

Attachment A Part 2 of 3

This page intentionally left blank.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
- D. Store liquid materials in unopened containers and protected from freezing.
- E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.10 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
 - 1. Provide tile complying with Standard grade requirements unless otherwise indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCA installation methods specified in tile installation schedules, and other requirements specified.
- C. FloorScore Compliance: Tile for floors shall comply with requirements of FloorScore Standard.
- D. Low-Emitting Materials: Tile flooring systems shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- E. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- F. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.
 - 1. Where tile is indicated for installation **in wet areas**, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

- G. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.2 TILE PRODUCTS

A. Tile Type

- 1. Basis-of-Design: See drawings for tile selection and locations.

2.3 CRACK ISOLATION MEMBRANE

- A. General: Manufacturer's standard product that complies with ANSI A118.12 for **high** performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

2.4 SETTING MATERIALS

A. Dry-Set Portland Cement Mortar (Thin Set): ANSI A118.1.

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Bostik, Inc.
 - b. Custom Building Products.
 - c. Laticrete International, Inc.
 - d. MAPEI Corporation.
- 2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.1.

B. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.

- 1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Bostik, Inc.
 - b. Custom Building Products.
 - c. Laticrete International, Inc.
 - d. MAPEI Corporation.
- 2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
- 3. Provide prepackaged, dry-mortar mix combined with **acrylic resin** liquid-latex additive at Project site.
- 4. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.

2.5 GROUT MATERIALS

A. Polymer-Modified Tile Grout: ANSI A118.7.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD., SALINAS

1. Basis-of-Design Product: Bostik, Inc; Hydroment or comparable product by one of the following:
 - a. Bostik, Inc.
 - b. Custom Building Products.
 - c. Laticrete International, Inc.
 - d. MAPEI Corporation.
2. Polymer Type: Ethylene vinyl acetate or acrylic additive, in dry, redispersible form, prepackaged with other dry ingredients.
3. Polymer Type: Acrylic resin in liquid-latex form for addition to prepackaged dry-grout mix.

2.6 ELASTOMERIC SEALANTS

- A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Division 07 Section "Joint Sealants."
 1. Sealants shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
 3. Use primers, backer rods, and sealant accessories recommended by sealant manufacturer.
- B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.
- C. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.
 1. Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. DAP Inc.; 100 percent Silicone Kitchen and Bath Sealant.
 - b. Dow Corning Corporation; Dow Corning 786.
 - c. GE Silicones; a division of GE Specialty Materials; Sanitary 1700.
 - d. Laticrete International, Inc.; Latasil Tile & Stone Sealant.
 - e. Pecora Corporation; Pecora 898 Sanitary Silicone Sealant.
 - f. Tremco Incorporated; Tremsil 600 White.
- D. Multipart, Pourable Urethane Sealant for Use T: ASTM C 920; Type M; Grade P; Class 25; Uses T, M, A, and, as applicable to joint substrates indicated, O.
 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Bostik, Inc.; Chem-Calk 550.
 - b. Degussa Building Systems; Sonneborn Sonolastic SL 2.
 - c. Pecora Corporation; Dynatrol II-SG
 - d. Sika Corporation; Sikaflex-2c SL.
 - e. Tremco Incorporated.; Vulkem 245.

2.7 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Metal Edge Strips: See details on the plans cove and edge trim product call outs. ASTM A 666, 300 Series exposed-edge material.
- C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- D. Grout Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Bonsal American; an Oldcastle company; Grout Sealer.
 - b. Bostik, Inc.; CeramaSeal Grout & Tile Sealer.
 - c. C-Cure; Penetrating Sealer 978.
 - d. Custom Building Products; Grout Sealer.
 - e. Jamo Inc.; Penetrating Sealer.
 - f. MAPEI Corporation; KER 004, Keraseal Penetrating Sealer for Unglazed Grout and Tile.
 - g. Southern Grouts & Mortars, Inc.; Silicone Grout Sealer.
 - h. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.

2.8 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
 - 1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
 - 2. Verify that concrete substrates for tile floors installed with comply with surface finish requirements in ANSI A108.01 for installations indicated.

- a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
 - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
 3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
 4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot (1:50) toward drains.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.
- D. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 TILE INSTALLATION

- A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
 1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:
 - a. Tile floors in wet areas.
 - b. Tile floors composed of tiles 8 by 8 inches (200 by 200 mm) or larger.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

- E. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
 - 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
 - 2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
 - 3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- F. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
 - 1. Ceramic Mosaic Tile: 1/16 inch (1.6 mm).
 - 2. Quarry Tile: 1/4 inch (6.35 mm)
 - 3. Glazed Wall Tile: 1/16 inch (1.6 mm).
 - 4. Decorative Thin Wall Tile: 1/16 inch (1.6 mm).
- G. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- H. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
 - 1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
 - 2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."
- I. Metal Edge Strips: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.
- J. Grout Sealer: Apply grout sealer to grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 TILE BACKING PANEL INSTALLATION

- A. Install cementitious backer units and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated.

3.5 CRACK ISOLATION MEMBRANE INSTALLATION

- A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness and bonded securely to substrate.
- B. Do not install tile or setting materials over crack isolation membrane until membrane has cured.

3.6 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove grout residue from tile as soon as possible.
 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
 3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.
- B. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- D. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.7 INTERIOR TILE INSTALLATION SCHEDULE

- A. Interior Wall Installations, Metal Studs or Furring:
1. Tile Installation W243-20: Thin-set mortar on coated glass-mat, water-resistant gypsum backer board.
- B. Interior Floor Installations, Concrete Floor
1. Tile Installation F113-20: Thin-set mortar on concrete slab on grade.
 2. Tile Installation F113A-20: Thin-set mortar on concrete slab above grade.

END OF SECTION 09 30 00

SECTION 09 51 23 - ACOUSTICAL TILE CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Acoustical tiles for ceilings.
 - 2. Concealed suspension systems.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, 6-inches- (150-mm-) in size.
- C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
 - 1. Acoustical Tile: Set of full-size Samples of each type, color, pattern, and texture.
 - 2. Concealed Suspension-System Members: 6-inch- (150-mm-) long Sample of each type.
 - 3. Exposed Moldings and Trim: Set of 6-inch- (150-mm-) long Samples of each type and color.
 - 4. **Meet minimum 60% recycled content.**

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For finishes to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Acoustical Ceiling Units: Full-size tiles equal to **2** percent of quantity installed.
 - 2. Suspension-System Components: Quantity of each concealed grid and exposed component equal to **2** percent of quantity installed.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to the National Voluntary Laboratory Accreditation Program (NVLAP) for testing indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical tiles, suspension-system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical tiles, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical tiles carefully to avoid chipping edges or damaging units in any way.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical tile ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
 - 1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical tile ceiling installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials.
 - 2. Smoke-Developed Index: 450 or less.

2.2 ACOUSTICAL TILES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Armstrong World Industries, Inc.
 - 2. CertainTeed Corp.
 - 3. USG Interiors, Inc.; Subsidiary of USG Corporation.
- B. Color: White

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD., SALINAS

- C. LR: Not less than 0.80
- D. NRC: Not less than 0.65
- E. CAC: Not less than 25.
- F. Edge/Joint Detail: Beveled, tegular
- G. Thickness: 3/4 inch (19 mm)
- H. Modular Size:
 - 1. 24 by 48 inches, Armstrong Cortega tegular.
 - 2. 24 by 48 inches; Armstrong Cortega Second Look II for Reception, Waiting Areas & Multi-Purpose Room.
- I. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical tiles treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

2.3 METAL SUSPENSION SYSTEMS, GENERAL

- A. Metal Suspension-System Standard: Provide manufacturer's standard metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635/C 635M.
- B. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
- C. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
 - 1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 - 2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 12 gage diameter wire.
- D. Seismic Struts: Manufacturer's standard compression struts designed to accommodate lateral forces.
- E. Seismic Clips: Manufacturer's standard seismic clips designed and spaced to secure acoustical tiles in-place.

2.4 METAL SUSPENSION SYSTEM

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Armstrong World Industries, Inc.; Suprafine XL 9/16" Exposed Tee System
 - 2. USG Interiors, Inc.; Donn Brand DX/DXL 9/16" ceiling suspension system

- B. Direct-Hung, Double-Web Suspension System: Main and cross runners roll formed from and capped with cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, G30 coating designation.

- 1. Structural Classification: Intermediate-duty system.

2.5 METAL EDGE MOLDINGS AND TRIM

- A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations complying with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
 - 1. Provide manufacturer's standard edge moldings that fit acoustical tile edge details and suspension systems indicated and that match width and configuration of exposed runners unless otherwise indicated.
 - 2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing and substrates to which acoustical tile ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine acoustical tiles before installation. Reject acoustical tiles that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Testing Substrates: Before installing adhesively applied tiles on wet-placed substrates such as cast-in-place concrete or plaster, test and verify that moisture level is below tile manufacturer's recommended limits.
- B. Measure each ceiling area and establish layout of acoustical tiles to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width tiles at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION OF SUSPENDED ACOUSTICAL TILE CEILINGS

- A. General: Install acoustical panel ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

- B. Suspend ceiling hangers from building's structural members and as follows:
1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
 6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 8. Do not attach hangers to steel deck tabs.
 9. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.
 10. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.
- D. Install edge moldings and trim of type indicated at perimeter of acoustical tile ceiling area and where necessary to conceal edges of acoustical tiles.
1. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3.2 mm in 3.6 m). Miter corners accurately and connect securely.
 2. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Arrange directionally patterned acoustical tiles as follows:
1. As indicated on reflected ceiling plans.

- G. Install acoustical tiles in coordination with suspension system and exposed moldings and trim. Place splines or suspension-system flanges into kerfed edges so tile-to-tile joints are closed by double lap of material.
 - 1. Fit adjoining tile to form flush, tight joints. Scribe and cut tile for accurate fit at borders and around penetrations through tile.
 - 2. Hold tile field in compression by inserting leaf-type, spring-steel spacers between tile and moldings, spaced 12 inches (305 mm) o.c.
 - 3. Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance-rated assembly.

3.4 CLEANING

- A. Clean exposed surfaces of acoustical tile ceilings, including trim and edge moldings. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace tiles and other ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 23

SECTION 09 65 13 – RESILIENT WALL BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:

- 1. Wall base.
- 2. Molding accessories.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of product indicated.
- C. Sustainable Materials Documentation:
 - 1. Compliance with materials shall be composed of 25% post-consumer recycled content or 50% post-industrial recycled content.
 - 2. Adhesives and Sealants to have **maximum VOC level of 30 g/L including copies of invoices.**

1.4 PRELIMINARY INSTALLATION CONFERENCE:

- 1. Conduct preliminary installation conference.
- 2. The following shall be present:
 - a. General Contractor.
 - b. Subcontractor/supplier.
 - c. The architect or engineer.
 - d. The owner.
 - e. HERS Rater.
- 3. Inspect and discuss condition of substrate and preparatory work performed by other trades.
- 4. Discuss requirements for protection of work, including restriction of traffic both during installation period and for remainder of construction period.
- 5. Review and establish construction schedule. Verify availability of materials, installer's personnel, and equipment required to execute the work without delays.

1.5 DELIVERY, STORAGE, AND HANDLING

- C. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.4 PROJECT CONDITIONS

- A. Maintain temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following time periods:
- B. After post-installation period, maintain temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Install resilient products after other finishing operations, including painting, have been completed.

1.5 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

PART 2 - PRODUCTS

2.1 COLORS AND PATTERNS

- A. Colors and Patterns: As selected by Architect from manufacturer's full range.

2.2 RESILIENT WALL BASE

- A. Wall Base: ASTM F 1861.
 - 1. Tarkett TA8 Welsh Castle, 6" high rubber wall base.
- B. Style: Cove (with top-set toe).
- C. Outside Corners: Job formed.
- D. Inside Corners: Job formed.
- E. Surface: Smooth.

2.3 RESILIENT MOLDING ACCESSORY

- A. Description: Nosing for carpet, nosing for resilient floor covering, and reducer strip for resilient floor covering.
 - 1. Burke Mercer Flooring Products; Transitional Mouldings where different flooring colors meet.
- B. Material: Rubber.

2.4 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic cement-based formulation provided or approved by resilient product manufacturers for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated. **Maximum VOC levels limited to 30 g/L.**

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written recommendations to ensure adhesion of resilient products.
- B. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
- C. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.
- D. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
 - 1. Do not install resilient products until they are the same temperature as the space where they are to be installed.
- E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 RESILIENT WALL BASE INSTALLATION

- A. Apply wall base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- B. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

- C. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- D. Do not stretch wall base during installation.
- E. Job-Formed Corners:
 - 1. Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends. Shave back of base at points where bends occur and remove strips perpendicular to length of base that are only deep enough to produce a snug fit without removing more than half the wall base thickness.
 - 2. Inside Corners: Use straight pieces of maximum lengths possible. Form by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce a snug fit to substrate.

3.4 RESILIENT ACCESSORY INSTALLATION

- A. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor coverings that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

- A. Perform the following operations immediately after completing resilient product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
 - a. Do not wash surfaces until after time period recommended by manufacturer.
- B. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.

3.6 WASTE MANAGEMENT

- A. Separate and recycle waste materials in accordance with the Waste Management Plan and to the maximum extent possible.
- B. Close and tightly seal all partly used adhesive containers and store protected in well-ventilated, fire-safe area at moderate temperature.

END OF SECTION 09 65 13

SECTION 09 65 16 - RESILIENT SHEET FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Vinyl sheet flooring with backing.
 - 2. Rubber sheet flooring.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For each type of resilient sheet flooring.
 - 1. Include sheet flooring layouts, locations of seams, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
- C. Samples: For each exposed product and for each color, texture, and pattern specified, in manufacturer's standard size, but not less than **6-by-9-inch** sections.
 - 1. For heat-welding bead, manufacturer's standard-size Samples, but not less than **9 inches** long, of each color required.
- D. CALgreen Tier 1 Requirements
 - 1. Certified under the Resilient Floor Covering Institute (RFCI) FloorScore program;
 - 2. Compliant with the VOC-emission limits and testing requirements specified in the California Department of Public Health's 2010 Standard Method for the Testing and Evaluation Chambers, Version 1.1, February 2010.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of resilient sheet flooring to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, **from the same product run,** that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Resilient Sheet Flooring: Furnish not less than **10 linear feet** for every **500 linear feet** or fraction thereof, in roll form and in full roll width for each type, color, and pattern of flooring installed.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for resilient sheet flooring installation and seaming method indicated.
 1. Engage an installer who employs workers for this Project who are trained or certified by resilient sheet flooring manufacturer for installation techniques required.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient sheet flooring and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store rolls upright.

1.8 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than **70 deg F** or more than **85 deg F**, in spaces to receive resilient sheet flooring during the following periods:
 1. 48 hours before installation.
 2. During installation.
 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than **55 deg F** or more than **95 deg F**.
- C. Close spaces to traffic during resilient sheet flooring installation.
- D. Close spaces to traffic for 48 hours after resilient sheet flooring installation.
- E. Install resilient sheet flooring after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 VINYL SHEET FLOORING WITH BACKING

- A. Product: See Finish Schedule on plans for specified products or equal.

- B. Seamless-Installation Method: **Heat welded.**

2.2 UNBACKED RUBBER SHEET FLOORING

- A. Product: See Finish Schedule on plans for specified products or equal.
- B. Seamless-Installation Method: Install per Manufacturer's Installation instructions.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient sheet flooring manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by flooring and adhesive manufacturers to suit resilient sheet flooring and substrate conditions indicated.
- C. Seamless-Installation Accessories:
 - 1. Heat-Welding Bead: Manufacturer's solid-strand product for heat welding seams.
 - a. Colors: Match flooring.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient sheet flooring.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to resilient sheet flooring manufacturer's written instructions to ensure adhesion of resilient sheet flooring.
- B. Concrete Substrates: Prepare according to ASTM F710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by resilient sheet flooring manufacturer. Do not use solvents.

3. Alkalinity and Adhesion Testing: Perform tests recommended by resilient sheet flooring manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing.
 4. Moisture Testing: Perform tests so that each test area does not exceed **1,000 sq. ft.** and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
 - D. Do not install resilient sheet flooring until materials are the same temperature as space where they are to be installed.
 1. At least 48 hours in advance of installation, move flooring and installation materials into spaces where they will be installed.
 - E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient sheet flooring.

3.3 RESILIENT SHEET FLOORING INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient sheet flooring.
- B. Unroll resilient sheet flooring and allow it to stabilize before cutting and fitting.
- C. Lay out resilient sheet flooring as follows:
 1. Maintain uniformity of flooring direction.
 2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches away from parallel joints in flooring substrates.
 3. Match edges of flooring for color shading at seams.
 4. Avoid cross seams.
- D. Scribe and cut resilient sheet flooring to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend resilient sheet flooring into toe spaces, door reveals, closets, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on resilient sheet flooring as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Adhere resilient sheet flooring to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- H. Seamless Installation:
 1. Heat-Welded Seams: Comply with ASTM F1516. Rout joints and heat weld with welding bead to fuse sections permanently into a seamless flooring installation. Prepare, weld, and finish seams to produce surfaces flush with adjoining flooring surfaces.

2. Chemically Bonded Seams: Bond seams with chemical-bonding compound to fuse sections permanently into a seamless flooring installation. Prepare seams and apply compound to produce tightly fitted seams without gaps, overlays, or excess bonding compound on flooring surfaces.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient sheet flooring.
- B. Perform the following operations immediately after completing resilient sheet flooring installation:
 1. Remove adhesive and other blemishes from surfaces.
 2. Sweep and vacuum surfaces thoroughly.
 3. Damp-mop surfaces to remove marks and soil.
- C. Protect resilient sheet flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Floor Polish if required: Remove soil, adhesive, and blemishes from flooring surfaces before applying liquid floor polish.
- E. Cover resilient sheet flooring until Substantial Completion.

END OF SECTION 096516

SECTION 09 84 33 - SOUND-ABSORBING WALL UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes shop-fabricated, acoustical panel units tested for acoustical performance, including the following:
 - 1. Sound-absorbing wall panels.

1.3 DEFINITIONS

- A. NRC: Noise Reduction Coefficient.
- B. SAA: Sound Absorption Average.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at **Project site**.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include **fabric facing**, panel edge, core material, and mounting indicated.
- B. Shop Drawings: For unit assembly and installation.
 - 1. Include plans, elevations, sections, and mounting devices and details.
 - 2. Include details at panel head, base, joints, and corners; and details at ceiling, floor base, and wall intersections. Indicate panel edge profile and core materials.
 - 3. Include details at cutouts and penetrations for other work.
 - 4. Include direction of fabric weave and pattern matching.
- C. Samples for Initial Selection: For each type of fabric facing.
 - 1. Include Samples of hardware and accessories involving color or finish selection.
- D. Samples for Verification: For the following products:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD., SALINAS

1. Fabric: Full-width by approximately 36-inch-long Sample, but not smaller than required to show complete pattern repeat, from dye lot to be used for the Work, and with specified treatments applied. Mark top and face of fabric.
2. Panel Edge: **12-inch** long Sample(s) showing each edge profile, corner, and finish.
3. Core Material: 12-inch- square Sample at corner.
4. Mounting Devices: Full-size Samples.
5. Assembled Panels: Approximately 36 by 36 inches, including joints and mounting methods.

1.6 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Elevations and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
- B. Product Certificates: For each type of unit.
- C. Sample Warranty: For manufacturer's special warranty.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of unit to include in maintenance manuals. Include fabric manufacturers' written cleaning and stain-removal instructions.

1.8 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials from same production run that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Fabric: For each fabric, color, and pattern installed, provide length equal to **10** percent of amount installed, but no fewer than **10 sq. yd.**, full width of bolt.

1.9 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials, fabrication, and installation.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Comply with fabric and unit manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.
- B. Deliver materials and units in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.

1.11 FIELD CONDITIONS

- A. Environmental Limitations: Do not install units until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work at and above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.12 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace units and components that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to the following:
 - a. Acoustical performance.
 - b. Fabric sagging, distorting, or releasing from panel edge.
 - c. Warping of core.
2. Warranty Period: **Two** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: Units shall comply with "Surface-Burning Characteristics" or "Fire Growth Contribution" Subparagraph below, or both, as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
1. Surface-Burning Characteristics: Comply with ASTM E84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: **450** or less.
 2. Fire Growth Contribution: Comply with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 265 Method B Protocol or NFPA 286.

2.2 SOUND-ABSORBING WALL UNITS

- A. Sound-Absorbing Wall Panels: See Finish Schedule Drawing Sheets A2.7 and A2.8.

2.3 FABRICATION

- A. Standard Construction: Use manufacturer's standard construction unless otherwise indicated; with facing material applied to face, edges, and back border of dimensionally stable core; and with rigid edges to reinforce panel perimeter against warpage and damage.
- B. Dimensional Tolerances of Finished Units: Plus or minus 1/16 inch for the following:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD., SALINAS

1. Thickness.
2. Edge straightness.
3. Overall length and width.
4. Squareness from corner to corner.
5. Chords, radii, and diameters.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fabric, fabricated units, substrates, areas, and conditions for compliance with requirements, installation tolerances, and other conditions affecting unit performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install units in locations indicated. Unless otherwise indicated, install units with vertical surfaces and edges plumb, top edges level and in alignment with other units, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.
- B. Comply with manufacturer's written instructions for installation of units using type of mounting devices indicated. Mount units securely to supporting substrate.
 1. Use Quick Grab adhesive on walls and ceilings.

3.3 INSTALLATION TOLERANCES

- A. Variation from Plumb and Level: Plus or minus **1/16 inch** in 48 inches, noncumulative.
- B. Variation of Joint Width: Not more than **1/16-inch** variation from **reveal line** in 48 inches, noncumulative.

3.4 CLEANING

- A. Clip loose threads; remove pills and extraneous materials.
- B. Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

END OF SECTION 09 84 33

SECTION 09 91 23 -INTERIOR & EXTERIOR PAINTS AND COATINGS

PART 1 GENERAL

1.0 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.1 SECTION INCLUDES

A Interior paint and coatings systems including: paint and opaque finishes

1.2 REFERENCES

- A SSPC-SP 1 - Solvent Cleaning
- B SSPC-SP 2 - Hand Tool Cleaning
- C SSPC-SP 3 - Power Tool Cleaning
- D SSPC-SP 13 / NACE No. 6 Surface Preparation for Concrete
- E EPA-Method 24
- F SCAQMD Rule 1113 - 7/01/2007

1.3 SUBMITTALS

- A Product Data: Manufacturer's data sheets on each paint and coating product should include:
 - 1 Product characteristics
 - 2 Surface preparation instructions and recommendations
 - 3 Primer requirements and finish specification
 - 4 Storage and handling requirements and recommendations
 - 5 Application methods
 - 6 Cautions
- B Selection Samples: Submit a complete set of color brushouts that represent the full range of manufacturer's color samples available.
- C Verification Samples: For each finish product specified, submit samples that represent actual product, color, and sheen.
- D Submit Zero VOC and / or SCAQMD compliant products only.
- E Submit documents to meet **with minimum 30% recycled content in Exterior Latex paint.**

1.4 MOCK-UP

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD., SALINAS

Include a mock-up if the project size and/or quality warrant taking such a precaution. The following is one example of how a mock-up on a large project might be specified. When deciding on the extent of the mock-up, consider all the major different types of painting on the project.

- A Finish surfaces for verification of products, colors, & sheens
- B Finish area designated by Architect
- C Provide samples that designate prime & finish coats
- D Do not proceed with remaining work until the Architect approves the mock-up samples

1.5 CLOSEOUT SUBMITTALS

Coating Maintenance Manual: Upon conclusion of the project, the Contractor or paint manufacturer/supplier shall furnish a coating maintenance manual, such as Sherwin-Williams "Custodian Project Color and Product Information" report or equal. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.6 DELIVERY, STORAGE, AND HANDLING

- A Delivery: Deliver manufacturer's unopened containers to the work site. Packaging shall bear the manufacture's name, label, and the following list of information:

- Product name, and type (description)
- Application & use instructions
- Surface preparation
- VOC content
- Environmental issues
- Batch date
- Color number

- B Storage: Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction. Store materials in an area that is within the acceptable temperature range, per manufacturers instructions. Protect from freezing.
- C Handling: Maintain a clean, dry storage area, to prevent contamination or damage to the coatings.

1.7 PROJECT CONDITIONS

- A Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not apply coatings under environmental conditions outside manufacturer's absolute limits.

Part 2 PRODUCTS

2.1 MANUFACTURERS

- A Specified Manufacturer: Products of the Sherwin-Williams Company are the basis of design products specified to establish the level of quality.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD., SALINAS

- B Substitutions: Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 Product Requirements. When submitting request for substitution, provide complete product data specified above under Submittals, for each substitute product.

2.2 MATERIALS - GENERAL REQUIREMENTS

- A Paints and Coatings - General:
 - 1 Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
 - 2 For opaque finishes, tint each coat including primers and finishes with Zero VOC colorants (Zero VOC, less exempt solvents).
 - 3 All ultradeep and vivid accent colors are to be tinted in Zero VOC finishes.
- B Primers:
 - 1 Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

2.3 ACCESSORIES

- A Coating Application Accessories:
 - 1 Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required, per manufacturer's specifications.

Part 3 EXECUTION

3.1 EXAMINATION

- A Do not begin application of coatings until substrates have been properly prepared. Notify Architect of unsatisfactory conditions before proceeding.
- B If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C Proceed with work only after conditions have been corrected and approved by all parties, otherwise application of coatings will be considered as an acceptance of surface conditions.

3.2 SURFACE PREPARATION

- A The surface must be dry and in sound condition. Remove oil, dust, dirt, loose rust, peeling paint or other contamination to ensure good adhesion.
- B Remove mildew before painting by washing with a solution of 1 part liquid household bleach and 3 parts of warm water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with clean water and allow the surface to dry 48 hours before painting. Wear protective glasses or goggles, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.
- C No exterior painting should be done immediately after a rain, during foggy weather, when rain is predicted, or when the temperature is below 50°F unless the specified product is designed for the marginal conditions.
- D Methods

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD., SALINAS

- 1 Aluminum
Remove all oil, grease, dirt, oxide and other foreign material by cleaning per SSPC-SP1, Solvent Cleaning.
- 2 Block (Cinder and Concrete)
Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement, and hardeners. Concrete and mortar must be cured at least 30 days at 75°F. The pH of the surface should be between 6 and 9, unless the products are designed to be used in high pH environments. On.
- 3 Concrete, SSPC-SP13 or NACE 6
This standard gives requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems. The requirements of this standard are applicable to all types of cementitious surfaces including cast-in-place concrete exposed foundations, masonry walls at interior of the trash enclosure, and others surfaces noted on the plans. An acceptable prepared concrete surface should be free of contaminants, laitance, loosely adhering concrete, and dust, and should provide a sound, uniform substrate suitable for the application of protective coating or lining systems.
- 4 Drywall—Interior
Must be clean and dry. All nail heads must be set and spackled. Joints must be taped and covered with a joint compound. Spackled nail heads and tape joints must be sanded smooth and all dust removed prior to painting.
- 5 Galvanized Metal
Clean per SSPC-SP1 to remove all grease and oils. Apply a test area, priming as required. Allow the coating to dry at least one week before testing. If adhesion is poor, Brush Blast per SSPC-SP7 is necessary to remove these treatments.
- 6 Plaster
Must be allowed to dry thoroughly for at least 30 days before painting, unless the products are designed to be used in high pH environments. Room must be ventilated while drying; in cold, damp weather, rooms must be heated. Damaged areas must be repaired with an appropriate patching material. Bare plaster must be cured and hard. Textured, soft, porous, or powdery plaster should be treated with a solution of 1 pint household vinegar to 1 gallon of water. Repeat until the surface is hard, rinse with clear water and allow to dry.
- 7 Steel: Structural, Plate, etc.
Should be cleaned by one or more of the surface preparations described below. These methods are used throughout the world for describing methods for cleaning structural steel. Visual standards are available through the Society of Protective Coatings. A brief description of these standards together with numbers by which they can be specified follow.
- 8 Solvent Cleaning, SSPC-SP1
Solvent cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants. Solvent cleaning does not remove rust or mill scale. Change rags and cleaning solution frequently so that deposits of oil and grease are not spread over additional areas in the cleaning process. Be sure to allow adequate ventilation.
- 9 Hand Tool Cleaning, SSPC-SP2
Hand Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before hand tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.

10 Power Tool Cleaning, SSPC-SP3

Power Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before power tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.

12 Wood

Must be clean and dry. Prime and paint as soon as possible. Knots and pitch streaks must be scraped, sanded, and spot primed before a full priming coat is applied. Patch all nail holes and imperfections with a wood filler or putty and sand smooth.

3.3 INSTALLATION

- A Apply all coatings and materials with manufacture specifications in mind. Mix all coatings according to manufacture recommendation. Do not thin paints and coatings unless directed according to manufacturer's instructions.
- B Do not apply to wet or damp surfaces.
 - 1 Wait at least 30 days before applying to new concrete or masonry. Or follow manufacturer's procedures to apply appropriate coatings prior to 30 days.
 - 2 Test new concrete for moisture content.
 - 3 Wait until wood is fully dry after rain, fog or dew.
- C Apply coatings using methods recommended by manufacturer.
- D Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.
- E Apply coatings at spreading rate required to achieve the manufacturers recommended dry film thickness.
- F Regardless of number of coats specified, apply as many coats as necessary for complete hide, and uniform appearance.
- G Inspection: The coated surface must be inspected and approved by the Architect or Engineer just prior to each coat.

3.4 PROTECTION

- A Protect finished coatings from damage until completion of project.
- B Touch-up damaged coatings after substantial completion, following manufacturer's recommendation for touch up or repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.

INTERIOR SCHEDULE

A. DRYWALL - (Walls, Ceilings, Gypsum Board, etc.)

1. Latex Systems

a. Egg Shell/Satin Finish

1st Coat: S-W ProMar 200 Zero Interior Latex Primer, B28W2600
(4 mils wet, 1.5 mils dry per coat)

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD., SALINAS

- 2nd & 3rd S-W Pro Industrial™ Zero Semi-Gloss Acrylic, B66-650 Series
Coat: (4 mils wet, 1.8 mils dry per coat)
 - b. Semi-Gloss Finish (Restrooms)
 - 1st Coat: S-W ProMar 200 Zero Interior Latex Primer, B28W2600
(4 mils wet, 1.5 mils dry per coat)
 - 2nd & 3rd S-W ProMar 200 Zero Semi-Gloss, B31-2600 Series
Coat: (4 mils wet, 1.7 mils dry per coat)
- B. PLYWOOD BACKING PANELS
 - 1. Firetect WT-102 White Intumescent Paint
 - a. Apply as required by manufacturer.
- C. WOOD DOORS
 - 1st Coat: B49WJ1100 Water Reducible Alkyd Primer Premium Wall & Wood Primer
B28WS8111
 - 2nd Coat: ProMar 200 Zero B31-2600
 - 3rd Coat: ProMar 200 Zero B31-2600
- D. CONCRETE – (Floors)
 - 1. Acrylic System (Water Base)
 - a. Semi Gloss Finish
 - 1st Coat: S-W Armorseal 8100
 - 2nd Coat: S-W Armorseal 8100
 - 3rd Coat: S-W Armorseal 8100 (Optional)
- E. METAL - (Aluminum, Galvanized) Walls, Doors/Frames, Steel Stairs and Railings, Exposed Duct Work, Electrical Panels)
 - 1. Latex Systems
 - a. Semi-Gloss Finish
 - 1st Coat: S-W Pro Industrial Pro-Cryl® Universal Primer, B66-310 Series
(5-10 mils wet, 2-4 mils dry)
 - 2nd & 3rd S-W ProMar 200 Zero Semi-Gloss, B31-2600 Series
Coat: (4 mils wet, 1.7 mils dry per coat)

EXTERIOR SCHEDULE

2.3 SCHEDULE

- A. CONCRETE - (Stucco, Cement Fiber Siding (backside of parapet walls onl) & Poured-in-place exposed Concrete foundations)
 - 1. Latex Systems
 - a. Flat
 - 1st Coat: S-W Loxon® Acrylic Masonry Primer, A24W8300
(8 mils wet, 3.2 mils dry)
 - 2nd Coat: S-W A-100
 - 3rd Coat: S-W A-100
(4 mils wet, 1.3 mils dry per coat)
- B. METAL - Ferrous (Structural Iron & Steel, Tanks, Water Towers, Sashes, Trim, Conductors, Doors, Ducts, Vents, (Non-Galvanized))
 - 1. Latex Systems
 - a. Egg-Shell
 - 1st Coat: S-W Pro Cryl Universal Metal Primer B66-310
 - 2nd & 3rd: S-W Pro Industrial Acrylic B66 Series
(8 mils wet, 3.5 mils dry per coat)

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD., SALINAS

PAINT ALL SIDES

END OF SECTION 09 91 23

SECTION 10 14 19 - DIMENSIONAL LETTER SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Cast dimensional characters.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For dimensional letter signs.
 - 1. Include fabrication and installation details and attachments to other work.
 - 2. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
 - 3. Show message list, typestyles, graphic elements, and layout for each sign at least half size.
- C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.
 - 1. Include representative Samples of available typestyles and graphic symbols.
- D. Sign Schedule: Use same designations specified or indicated on Drawings or in a sign schedule.

PART 2 - PRODUCTS

2.1 DIMENSIONAL CHARACTERS

- A. Cast Characters : Characters with uniform faces, sharp corners, and precisely formed lines and profiles, and as follows:
 - 1. Character Material: Cast aluminum.
 - 2. Character Height: See details on plans.
 - 3. Thickness: Manufacturer's standard for size of character.
 - 4. Finishes:

- a. Integral Aluminum Finish: Anodized color as selected by Architect from full range of industry colors and color densities.

5. Mounting: Concealed studs.

2.2 DIMENSIONAL CHARACTER MATERIALS

- A. Aluminum Castings: ASTM B 26/B 26M, alloy and temper recommended by sign manufacturer for casting process used and for type of use and finish indicated.
- B. Aluminum Sheet and Plate: ASTM B 209 (ASTM B 209M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
- C. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

2.3 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signage, noncorrosive and compatible with each material joined, and complying with the following:
 1. Sign Mounting Fasteners:
 - a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material, screwed into back of sign assembly, or screwed into tapped lugs cast integrally into back of cast sign material, unless otherwise indicated.

2.4 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
 1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
 2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
 3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
 4. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
 5. Internally brace signs for stability and for securing fasteners.
 6. Provide rebates, lugs, and brackets necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.
 7. Castings: Fabricate castings free of warp, cracks, blowholes, pits, scale, sand holes, and other defects that impair appearance or strength. Grind, wire brush, sandblast, and buff

castings to remove seams, gate marks, casting flash, and other casting marks before finishing.

2.5 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

2.6 ALUMINUM FINISHES

- A. Color Anodic Finish: AAMA 611, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of signage work.
- B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
 - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
 - 2. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
 - 3. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- B. Mounting Methods:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD., SALINAS

1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.
 - a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place sign in position and push until flush to surface, embedding studs in holes. Temporarily support sign in position until adhesive fully sets.
 - b. Thin or Hollow Surfaces: Place sign in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.

END OF SECTION 10 14 19

SECTION 10 14 23 - PANEL SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Room-identification signs.
 - 2. Field-applied, vinyl-character signs.

1.3 DEFINITIONS

- A. Accessible: In accordance with the accessibility standard.

1.4 COORDINATION

- A. Furnish templates for placement of sign-anchorage devices embedded in permanent construction by other installers.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For panel signs.
 - 1. Include fabrication and installation details and attachments to other work.
 - 2. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
 - 3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.
- C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.
 - 1. Include representative Samples of available typestyles and graphic symbols.
- D. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:
 - 1. Room-Identification Signs: Full-size Sample.

2. Field-Applied, Vinyl-Character Signs: Full-size Sample of characters on glass.

E. Sign Schedule: Use same designations specified or indicated on Drawings or in a sign schedule.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer of products.

1.7 FIELD CONDITIONS

A. Field Measurements: Verify locations of anchorage devices embedded in permanent construction by other installers by field measurements before fabrication, and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 SIGNS

- A. Room-Identification Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
1. Basis-of-Design Product: Mohawk Sign System: Window Plaques, Design M308b Sand carved phenolic ES/MP plastic laminate,
 2. Mounting: Manufacturer's standard method for substrates indicated.
 3. Text and Typeface: Finish raised characters to contrast with background color, and finish Braille to match background color.
 4. At exterior locations provide materials made for exterior use.

2.2 PANEL-SIGN MATERIALS

- A. Acrylic Sheet: ASTM D 4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).
- B. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated, complying with these standards:
1. Sheet and Plate: ASTM B 209
 2. Extruded Bars, Rods, Shapes and Tubes: ASTM B221
 3. Extruded Structural Pipe and Tubes: ASTM B 429
 4. Welding Rods and Bare Electrodes: AWS A5.10
- C. Vinyl Film: UV-resistant vinyl film of nominal thickness indicated, with pressure-sensitive, permanent adhesive on back; die cut to form characters or images as indicated and suitable for exterior applications.
- D. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

- E. Fasteners: Resistant to oxidation or other corrosive action. Secure work with fasteners of same color and finish as components they secure, where exposed to view. Perform fabrication with fasteners in strict accordance with manufacturer's specifications, directions and recommendations, and as indicated on Shop Drawings.
- F. Finishes
 - 1. Colors and Surfaces Textures: For exposed sign material that requires selection of materials with integral or applied colors, surface textures or other characteristics related to appearance, provide color and surface texture matches indicated, as selected by Architect from manufacturer's standards.
 - 2. Metal Finishes: Comply with NAAMM "Metal Finishes Manual" for finish designations and applications recommendations.
 - 3. Finish designations prefixed by AA conform to system established by Aluminum Association for designating aluminum finishes.
 - 4. Color Anodic Finish: AAMA 611, or thicker
 - a. Color: Clear Anodized Satin Finish.

2.3 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signage, noncorrosive and compatible with each material joined, and complying with the following:
 - 1. Sign Mounting Fasteners:
 - a. Through Fasteners: Exposed metal fasteners matching sign finish, with type of head indicated, installed in predrilled holes.
- B. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch (1.14 mm) thick, with adhesive on both sides.

2.4 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
 - 1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
 - 2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
 - 3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
 - 4. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
 - 5. Internally brace signs for stability and for securing fasteners.
 - 6. Provide rebates, lugs, and brackets necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.

- B. Subsurface-Applied Graphics: Apply graphics to back face of clear face-sheet material to produce precisely formed image. Image shall be free of rough edges.
- C. Subsurface-Engraved Graphics: Reverse engrave back face of clear face-sheet material. Fill resulting copy with manufacturer's standard enamel. Apply opaque manufacturer's standard background color coating over enamel-filled copy.
- D. Shop- and Subsurface-Applied Vinyl: Align vinyl film in final position and apply to surface. Firmly press film from the middle outward to obtain good bond without blisters or fishmouths.
- E. Signs with Changeable Message Capability: Fabricate signs to allow insertion of changeable messages as follows:
 - 1. For slide-in changeable inserts, fabricate slot without burrs or constrictions that inhibit function. Furnish initial changeable insert. Furnish two blank inserts for each sign for Owner's use.

2.5 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Directional Finishes: Run grain with long dimension of each piece and perpendicular to long dimension of finished trim or border surface unless otherwise indicated.
- D. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of signage work.
- B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.
- C. Verify that anchor inserts are correctly sized and located to accommodate signs.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
 - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
 - 2. Install signs so they do not protrude or obstruct according to the accessibility standard.
 - 3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
- B. Room-Identification Signs and Other Accessible Signage: Install in locations on walls as indicated and according to accessibility standard.
- C. Mounting Methods:
 - 1. Through Fasteners: Drill holes in substrate using predrilled holes in sign as template. Countersink holes in sign if required. Place sign in position and flush to surface. Install through fasteners and tighten.
 - 2. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.
- D. Field-Applied, Vinyl-Character Signs: Clean and dry substrate. Align sign characters in final position before removing release liner. Remove release liner in stages, and apply and firmly press characters into final position. Press from the middle outward to obtain good bond without blisters or fishmouths. Remove carrier film without disturbing applied vinyl film.
- E. Signs Mounted on Glass: Provide opaque sheet matching sign material and finish onto opposite side of glass to conceal back of sign.

3.3 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as signs are installed.
- C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 10 14 23

SECTION 10 20 00 – LOUVERS AND VENTS

PART 1 – GENERAL

1.0 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.1 SUMMARY

- A. Section Includes:
 - 1. Fixed wall louvers.
 - 2. Furnishing of door louvers; installation specified elsewhere.

1.2 SUBMITTALS

- A. Product Data.

1.3 PROJECT CONDITIONS

- A. Field Measurements: Where conditions permit, take field measurements and determine actual installed positions of louvers before beginning louver fabrication.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Galvanized Steel Sheet: ASTM A 526 and A 527, zinc-coated (G90), mill phosphatized.
- B. Fasteners:
 - 1. For steel or galvanized steel members: Stainless steel or galvanized steel.
 - 2. For stainless steel members: Stainless steel.
 - 3. Finish exposed-to-view fastener heads to match adjacent surface.
- B. Anchors and Inserts: Hot-dip galvanized steel or nonferrous metal.
- C. Bituminous Paint: SSPC-Paint 12; cold-applied asphalt mastic.

2.2 FIXED WALL LOUVERS

- A. Louver: Straight blade, standard mullion type.
 - 1. Depth: 2 inches.
 - 2. Fabricate blades and frame from galvanized steel sheet; minimum thickness: 18 gage (0.052 inch).
 - 3. Performance requirements:
 - a. Minimum free area: 50%.
 - 4. Finish: Factory prime.
 - 5. Accessories:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD., SALINAS

- a. Insect screens.
- 6. Manufacturer:
 - a. Plyco Standard and rectangle Vents
 - 1) Provide ST & WD Series.

2.3 WALL LOUVER ACCESSORIES

- A. Screens: Removable type; provide screens for indicated exterior louvers.
 - 1. Frame: Fabricate from same material used for louver. Miter and reinforce frame corners.
 - a. Fabricate frame from extruded or formed metal. Provide insert or driven spline for mesh attachment. Frame must be capable of being rewired.
 - 2. Insect screen mesh:
 - a. 18 by 16 mesh, 0.011 inch aluminum wire.
 - 3. Position screen on inner louver face; attach using machine screws located 3 inches from corner and 12 inches on center between corners.

2.4 DOOR LOUVERS

- A. Door Louver : Fixed N-shaped (standard) blades, 1-3/8 inches deep, spaced approximately 1-3/8 inches on center.
 - 1. Fabricate louvers and integral frame of extruded aluminum, minimum 0.050 inch thick.
 - 2. Frame style: Mitered trim frame, with welded corners; separate inner frame adjustable for door thickness and secured by countersunk screws.
 - 3. Insect screen: Provide 14 by 18 mesh aluminum wire screen. Provide rewirable spliced frame or channels in louver frame to receive screen.
 - 4. Finish: Factory prime.

2.5 FABRICATION

- A. Provide complete, shop-fabricated units, unless unit size dictates shipment in pieces; mark each component as required for proper field assembly.
- B. Fabricate frames to indicated profiles with features and clearances to suit installation conditions.
 - 1. Include integral sills of finish and construction to match louver.
 - 2. Provide clearance or recesses as required to accommodate sealant between louver and adjacent construction.
- C. Provide shop-welded joints between framing components, and between framing components and fixed louver blades, unless otherwise indicated or where field assembly is unavoidable.
- D. Provide uniform spacing between blades, including gap between blades and exposed face of head and sill members.
- E. Provide vertical mullions of type indicated.

2.6 FINISHES

- A. Factory Prime Finish: Chemically clean and etch metal and apply at least one coat of manufacturer's standard corrosion-inhibitive thermosetting (baked) primer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that substrates and openings to receive louvers are rigidly set, at proper lines and elevation, properly sized, and ready to receive louvers.
- B. Do not proceed with installation until conditions detrimental to proper installation have been corrected.

3.2 PREPARATION

- A. Coat contact surfaces of dissimilar metals with one or more coats of bituminous paint.
 - 1. The following metals are not considered dissimilar: Aluminum, stainless steel, and zinc.
- B. Apply one 15-mil dry film thickness coat of bituminous isolation coating to metal surfaces, other than galvanized steel, which will be in contact with cementitious materials.

3.3 INSTALLATION

- A. Installation of door louvers is specified elsewhere.
- B. Install louvers in accordance with manufacturer's instructions.
- C. Coordinate louver installation with adjacent elements of building envelope to ensure watertight construction.
- D. Set units and flashings in proper location, plumb and true, free of warp or twist.
- E. Fit joints tightly; where joint sealers are to be installed, make joints of sizes required.
- F. Provide positive flashing into siding system at perimeter.

3.4 CLEANING

- A. Wash exposed surfaces using mild detergent; thoroughly clean inside corners.
- B. Remove excess sealant by moderate use of mineral spirits or other solvent recommended by sealant manufacturer.
- C. Touch up marred or abraded areas of finished elements. If satisfactory touch-up cannot be accomplished, remove and replace element.

3.5 WASTE MANAGEMENT

- A. Separate and recycle waste materials in accordance with the Waste Management Plan and to the maximum extent possible.
- B. Close and tightly seal all partly used adhesive containers and store protected in well-ventilated, fire-safe area at moderate temperature.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD., SALINAS

END OF SECTION 10 20 00

SECTION 10 21 13 - TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Steel toilet compartments configured as toilet enclosures and urinal screens.
- B. Related Sections:
 - 1. DIVISION 5 – Structural Steel
 - 2. DIVISION 9 – Acoustical Tile Ceilings.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For toilet compartments. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Show locations of cutouts for compartment-mounted toilet accessories.
 - 2. Show locations of reinforcements for compartment-mounted grab bars.
 - 3. Show locations of centerlines of toilet fixtures.
 - 4. Show overhead support or bracing locations.
- C. Samples for Initial Selection: For each type of unit indicated. Include Samples of hardware and accessories involving material and color selection.
- D. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated:
 - 1. Each type of material, color, and finish required for units, prepared on 6-inch- (152-mm-) square Samples of same thickness and material indicated for Work.
 - 2. Each type of hardware and accessory.

1.4 QUALITY ASSURANCE

- A. Comply with requirements in GSA's CID-A-A-60003, "Partitions, Toilets, Complete."

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD., SALINAS

- B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84, or another standard acceptable to authorities having jurisdiction, by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- C. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities" for toilet compartments designated as accessible.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aluminum Castings: ASTM B 26/B 26M.
- B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M).
- C. Brass Castings: ASTM B 584.
- D. Brass Extrusions: ASTM B 455.
- E. Steel Sheet: Commercial steel sheet for exposed applications; mill phosphatized and selected for smoothness.
 - 1. Electrolytically Zinc Coated: ASTM A 879/A 879M, 01Z (03G).
 - 2. Hot-Dip Galvanized: ASTM A 653/A 653M, either hot-dip galvanized or galvanized.
- F. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.
- G. Stainless-Steel Castings: ASTM A 743/A 743M.
- H. Zamac: ASTM B 86, commercial zinc-alloy die castings.
- I. Plastic Laminate: NEMA LD 3, general-purpose HGS grade, 0.048-inch (1.2-mm) nominal thickness.

2.2 STEEL UNITS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Accurate Partitions Corporation.
 - 2. Bradley Corporation; Mills Partitions.
 - 3. Sanymetal; a Crane Plumbing company.

- B. Toilet-Enclosure Style: Ceiling hung.
- C. Urinal-Screen Style: Wall hung, flat panel.
- D. Door and Panel Construction: Seamless, metal facing sheets pressure laminated to core material; with continuous, interlocking molding strip or lapped-and-formed edge closures; corners secured by welding or clips and exposed welds ground smooth. **Provide with no-sightline system.** Exposed surfaces shall be free of pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections.
 - 1. Core Material: Manufacturer's standard sound-deadening honeycomb of resin-impregnated kraft paper in thickness required to provide finished thickness of 1 inch (25 mm) for doors and panels and 1-1/4 inches (32 mm) for pilasters.
 - 2. Grab-Bar Reinforcement: Provide concealed internal reinforcement for grab bars mounted on units.
 - 3. Tapping Reinforcement: Provide concealed reinforcement for tapping (threading) at locations where machine screws are used for attaching items to units.
- E. Urinal-Screen Construction:
 - 1. Flat-Panel Urinal Screen: Matching panel construction.
 - 2. Integral-Flange, Wall-Hung Urinal Screen: Similar to panel construction, with integral full-height flanges for wall attachment, and maximum 1-1/4 inches (32 mm) thick.
- F. Facing Sheets and Closures: Electrolytically coated steel sheet with nominal base-metal (uncoated) thicknesses as follows:
 - 1. Panels: Manufacturer's standard thickness, but not less than 0.030 inch.
 - 2. Doors: Manufacturer's standard thickness, but not less than 0.030 inch.
 - 3. Flat-Panel Urinal Screens: Thickness matching the panels.
- G. Brackets (Fittings):
 - 1. Full-Height (Continuous) Type: Manufacturer's standard design; stainless steel.
- H. Steel-Sheet Finish: Immediately after cleaning and pretreating, apply manufacturer's standard baked-on finish, including thermosetting, electrostatically applied, and powder coatings. Comply with coating manufacturer's written instructions for applying and baking. Apply one color in each room.
 - 1. Color: As selected by Architect from manufacturer's full range.

2.3 ACCESSORIES

- A. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories.
 - 1. Material: Stainless steel.
 - 2. Hinges: Manufacturer's standard paired, self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees.
 - 3. Latch and Keeper: Manufacturer's standard recessed latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.

4. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.
 5. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.
 6. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.
- B. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized steel, or other rust-resistant, protective-coated steel.

2.4 FABRICATION

- A. Fabrication, General: Fabricate toilet compartments to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories, and solid blocking within panel, where required, for attachment of toilet accessories.
- B. Ceiling-Hung units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for connection to structural support above finished ceiling. Provide assemblies that support pilasters from structure without transmitting load to finished ceiling. Provide sleeves (caps) at tops of pilasters to conceal anchorage.
- C. Door Size and Swings: Unless otherwise indicated, provide 24-inch-wide, in-swinging doors for standard toilet compartments and 36-inch-wide, out-swinging doors with a minimum 32-inch-wide, clear opening for compartments designated as accessible.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
1. Maximum Clearances:
 - a. Panels and Walls: 1/2 inch.
- B. Ceiling-Hung Units: Secure pilasters to supporting structure and level, plumb, and tighten. Hang doors and adjust so bottoms of doors are level with bottoms of pilasters when doors are in closed position.

3.2 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD., SALINAS

END OF SECTION 10 21 13

SECTION 10 22 38 - OPERABLE PANEL PARTITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Manually operated, acoustical panel partitions.
- B. Related Requirements:
 - 1. Division 5 Structural Steel

1.3 DEFINITIONS

- A. NIC: Noise Isolation Class.
- B. NRC: Noise Reduction Coefficient.
- C. STC: Sound Transmission Class.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For operable panel partitions.
 - 1. Include plans, elevations, sections, details, numbered panel installation sequence, and attachments to other work.
 - 2. Indicate stacking and operating clearances. Indicate location and installation requirements for hardware and track, blocking, and direction of travel.
 - 3. Include diagrams for power, signal, and control wiring.
- C. Samples for Initial Selection: For each type of exposed material, finish, covering, or facing.
 - 1. Include Samples of accessories involving color selection.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each operable panel partition, for tests performed by a qualified testing agency.

- B. Sample Warranty: For manufacturer's special warranty.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.
- B. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.
- C. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protectively package and sequence panels in order for installation. Clearly mark packages and panels with numbering system used on Shop Drawings. Do not use permanent markings on panels.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of operable panel partitions that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Faulty operation of operable panel partitions.
 - b. Deterioration of metals, metal finishes, and other materials beyond normal use.
 - 2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 OPERABLE ACOUSTICAL PANELS

- A. Operable Acoustical Panels: Partition system, including panels, seals, finish facing, suspension system, operators, and accessories.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hufcor, Inc.
 - b. Modernfold, Inc.; a DORMA Group company.
- B. Panel Operation: Manually operated, paired panels.
- C. Panel Construction: As required to support panel from suspension components and with reinforcement for hardware attachment. Fabricate panels with tight hairline joints and concealed fasteners. Fabricate panels so finished in-place partition is rigid; level; plumb;

aligned, with tight joints and uniform appearance; and free of bow, warp, twist, deformation, and surface and finish irregularities.

- D. Dimensions: Fabricate operable acoustical panel partitions to form an assembled system of dimensions indicated and verified by field measurements.
 - 1. Panel Width: Standard widths
- E. STC: Not less than 50.
- F. NRC: Not less than 0.65.
- G. Panel Weight: 8 lb/sq. ft. maximum.
- H. Panel Thickness: Not less than 3-1/2 inches.
- I. Panel Materials:
 - 1. Steel Frame: Steel sheet, manufacturer's standard 0.0747-inch nominal minimum thickness for uncoated steel.
- J. Panel Closure: Manufacturer's standard unless otherwise indicated.
- K. Hardware: Manufacturer's standard as required to operate operable panel partition and accessories; with decorative, protective finish.
 - 1. Hinges: Concealed (invisible)

2.2 SEALS

- A. General: Provide seals that produce operable panel partitions complying with performance requirements and the following:
 - 1. Manufacturer's standard seals unless otherwise indicated.
 - 2. Seals made from materials and in profiles that minimize sound leakage.
 - 3. Seals fitting tight at contact surfaces and sealing continuously between adjacent panels and between operable panel partition perimeter and adjacent surfaces, when operable panel partition is extended and closed.
- B. Vertical Seals: Deep-nesting, interlocking astragals mounted on each edge of panel, with continuous PVC acoustical seal.
- C. Horizontal Top Seals: Continuous-contact, extruded-PVC seal exerting uniform constant pressure on track.
- D. Horizontal Bottom Seals: PVC-faced, mechanical, retractable, constant-force-contact seal exerting uniform constant pressure on floor when extended, ensuring horizontal and vertical sealing and resisting panel movement.
 - 1. Mechanically Operated for Acoustical Panels: Extension and retraction of bottom seal by operating handle or built-in operating mechanism, with operating range not less than 1-1/2 inches between retracted seal and floor finish.

2.3 PANEL FINISH FACINGS

- A. General: Provide finish facings for panels that comply with indicated fire-test-response characteristics and that are factory applied to operable panel partitions with appropriate backing, using mildew-resistant nonstaining adhesive as recommended by facing manufacturer's written instructions.
 - 1. Apply facings free of air bubbles, wrinkles, blisters, and other defects, with no gaps or overlaps. Horizontal **seams** are not permitted. Tightly secure and conceal raw and selvage edges of facing for finished appearance.
 - 2. Match facing pattern 72 inches (1830 mm) above finished floor.
- B. Vinyl Wall Covering: Manufacturer's standard fabric, from same dye lot, treated to resist stains.
 - 1. Color/Pattern: As selected by Architect from manufacturer's full range
- C. Cap-Trimmed Edges: Protective perimeter-edge trim with tight hairline joints concealing edges of panel and finish facing, finished as follows:
 - 1. Aluminum: Finished with manufacturer's standard mill finish.

2.4 SUSPENSION SYSTEMS

- A. Tracks: Steel or aluminum designed for operation, size, and weight of operable panel partition indicated. Size track to support partition operation and storage without damage to suspension system, operable panel partitions, or adjacent construction. Limit track deflection to no more than 0.10 inch (2.54 mm) between bracket supports. Provide a continuous system of track sections and accessories to accommodate configuration and layout indicated for partition operation and storage.
 - 1. Panel Guide: Aluminum guide on both sides of the track to facilitate straightening of the panels; finished with factory-applied, decorative, protective finish.
 - 2. Head Closure Trim: As required for acoustical performance; with factory-applied, decorative, protective finish.
- B. Carriers: Trolley system as required for configuration type, size, and weight of partition and for easy operation; with ball-bearing wheels.
- C. Aluminum Finish: Mill finish or manufacturer's standard, factory-applied, decorative finish unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine flooring, structural support, and opening, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of operable panel partitions.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with ASTM E 557 except as otherwise required by operable panel partition manufacturer's written installation instructions.
- B. Install operable panel partitions and accessories after other finishing operations, including painting, have been completed in area of partition installation.
- C. Install panels from marked packages in numbered sequence indicated on Shop Drawings.
- D. Broken, cracked, chipped, deformed, or unmatched panels are not acceptable.
- E. Broken, cracked, deformed, or unmatched gasketing or gasketing with gaps at butted ends is not acceptable.
- F. Light-Leakage Test: Illuminate one side of partition installation and observe vertical joints and top and bottom seals for voids. Adjust partitions for alignment and full closure of vertical joints and full closure along top and bottom seals.

3.3 ADJUSTING

- A. Adjust operable panel partitions, hardware, and other moving parts to function smoothly, and lubricate as recommended by manufacturer.
- B. Adjust to operate smoothly and easily, without binding or warping.
- C. Verify that safety devices are properly functioning.

3.4 MAINTENANCE SERVICE

- A. Maintenance Service: Beginning at Substantial Completion, maintenance service shall include three months' full maintenance by manufacturer's authorized service representative. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper operable-partition operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain operable panel partitions.

END OF SECTION 10 22 38

SECTION 10 26 13 – CORNER GUARD

PART 1 – GENERAL

1.00 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.01 SUMMARY

- A. Corner guard system for wall protection

1.02 SECTION INCLUDES

- A. 160 BluNose High Impact Surface Mount Corner Guard System

1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM)
- B. National Building Code of Canada (NBC)
- C. National Fire Protection Association (NFPA)
- D. Society of Automotive Engineers (SAE)
- E. Underwriters Laboratory (UL)
- F. Underwriters Laboratory of Canada (ULC)
- G. Uniform Building Code (UBC)

1.04 SYSTEM DESCRIPTION

- A. Performance Requirements: Provide corner guard system that conform to the following requirements of regulatory agencies and the quality control of IPC Door and Wall Protection Systems, InPro Corporation.
 - 1. Fire Performance Characteristics: Provide UL Classified corner guards conforming with NFPA Class A fire rating. Surface burning characteristics, as determined by UL-723 (ASTM E-84), shall be flame spread of 10 and smoke development of 350 - 450. Provide ULC (Canada) listed corner guards conforming to the requirements of the National Building Code of Canada 2010, Subsection 3.1.13. Surface burning characteristics, as determined by CAN/ULC-S102.2, shall be flame spread of 15 and smoke developed of 35.
 - 2. Self Extinguishing: Provide corner guards with a CC1 classification, as tested in accordance with the procedures specified in ASTM D-635-74, Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position, as referenced in UBC 52-4-1988.
 - 3. Impact Strength: Provide rigid vinyl profile materials that have an Impact Strength of 30.2 ft-lbs/inch of thickness as tested in accordance with the procedures specified in ASTM D-256-90b, Impact Resistance of Plastics.
 - 4. System Impact Resistance: Provide a corner guard system that resists an impact of 153.9 ft-lbs while producing no visual blemishes upon the vinyl cover surface and no deformations in the vinyl retainers, as tested in accordance with the applicable provisions of ASTM F 476-84, paragraph 18, Impact Test.
 - 5. GREENGUARD Certified: Provide GREENGUARD Certified material. Profiles shall meet the requirements of GREENGUARD Certification Standards for Low-Emitting Products and GREENGUARD Product Emission Standard for Children & Schools.
 - 6. Chemical and Stain Resistance: Provide corner guards that show resistance to stain when tested in accordance with applicable provisions of ASTM D-543.
 - 7. Fungal and Bacterial Resistance: Provide rigid vinyl that does not support fungal or bacterial growth as tested in accordance with ASTM G-21 and ASTM G-22.
 - 8. Color Consistency: Provide components matched in accordance with SAE J-1545 - (Delta E) with a color difference no greater than 1.0 units using CIE Lab, CIE CMC, CIE LCh, Hunter Lab or similar color space scale systems.

1.05 SUBMITTALS

- A. Product Data: Manufacturer's printed product data for each type of corner guard specified.
- B. Detail Drawings: Mounting details with the appropriate fasteners for specific project substrates.
- C. Samples: Verification samples of corner guard, 8" (203mm) long, in full size profiles of each type and color indicated.
- D. Manufacturer's Installation Instruction: Printed installation instructions for each corner guard.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in unopened factory packaging to the jobsite
- B. Inspect materials at delivery to assure that specified products have been received.
- C. Store in original packaging in a climate controlled location away from direct sunlight.

1.07 PROJECT CONDITIONS

- A. Environmental Requirements: Products must be installed in an interior climate controlled environment.

1.08 WARRANTY

- A. Standard IPC Limited Lifetime Warranty against material and manufacturing defects.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Acceptable Manufacturer: IPC Door and Wall Protection Systems,
InPro Corporation, PO Box 406 Muskego, WI 53150 USA;
Telephone: 800-222-5556, Fax: 888-715-8407,
Internet address: <http://www.inprocorp.com>
- B. Substitutions: Not permitted
- C. Provide all corner guards and wall protection from a single source.

2.02 MANUFACTURED UNITS

- A. Corner Guard System
160BN BluNose High Impact Corner Guard Profile
2" x 2", 90 degree
4' standard height

2.03 MATERIALS

- A. Vinyl Covers: Snap on cover of .080" thickness shall be extruded from chemical and stain resistant polyvinyl chloride with the addition of impact modifiers. No plasticizers shall be added (plasticizers may aid in bacterial growth).
- B. Vinyl Retainers: Continuous vinyl retainers of .070" thickness with a Biopolymer Flex PVC apex shall be fabricated from polyvinyl chloride with the addition of impact modifiers.

2.04 COMPONENTS

- A. Top caps and bottom caps shall be made of injection molded thermoplastics.
- B. Fasteners: All mounting system accessories appropriate for substrates indicated on the drawings shall be provided.
- C. Optional flexible top caps shall be made of injection molded Biopolymer Flex PVC.

2.05 FINISHES

- A. Vinyl Covers: Colors of the corner guard to be selected by the architect from the IPC finish selection. Surface shall have a pebblette texture.
- B. Molded Components: Top caps and bottom caps shall be of a color matching the corner guards. Surface shall have a pebblette texture.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas and conditions in which the corner guard systems will be installed.
 - 1. Complete all finishing operations, including painting, before beginning installation of corner guard system materials.
- B. Wall surface shall be dry and free from dirt, grease and loose paint.

3.02 PREPARATION

- A. General: Prior to installation, clean substrate to remove dust, debris and loose particles.

3.03 INSTALLATION

- A. General: Locate corner guard as indicated on the approved detail drawings for the appropriate substrate and in compliance with the IPC installation instructions. Install corner guard level and plumb at the height indicated on drawings.

- B. Installation of 160BN BluNose High Impact Surface Mount

- Corner Guard:

- 1. Retainer Installation

- Position the vinyl retainer against the wall, allowing 5/16" from the bottom of the retainer to the top of the cove base or baseboard for the bottom cap.

- Drywall: Secure the retainer to the wall using #8 x 1-1/4" Phillips round head, self-tapping screws. Stagger the fasteners on each wing of the retainer. Use 4 screws per 3' length, 6 screws per 4' length, 10 screws per 8' length, or 12 screws per 9' length.

- Concrete: Drill 1/4" holes into the ends of the retainer for the top and bottom caps.

- Stagger the holes on each wing of the cap. Use the slotted tabs on the top and bottom cap to transfer hole location to the retainer. Drill 1/4" holes on the two wings of the retainer. Stagger the fasteners on each wing of the retainer. Drill 4 holes per 3' length, 6 holes per 4' length, 10 holes per 8' length, or 12 holes per 9' length. Transfer the location of all mounting holes to the wall. Drill 1/4" holes and position ALLIGATOR anchors into the holes on the wall. Mount the retainer with #10 x 1-3/4" Phillips pan head screws and tighten to secure the retainer to the wall.

- 2. Top and Bottom Cap Installation:

- Drywall: Overlap the retainer with the mounting tabs of the top and bottom caps and attach them to the retainer using two, #8 x 1-1/4" phillips flat head, self-tapping screws per cap. Stagger the fasteners on each wing of the cap.

- Concrete: Overlap the retainer with the mounting tabs of the top and bottom caps and attach them to the retainer and into the ALLIGATOR anchors using two, #8 x 1-1/2" phillips flat head screws per cap. When installing flexible top caps on custom angle corner guards, use cup washers and flat head screws to fasten the top caps to the retainer.

- 3. Position the vinyl cover on the retainer to check the fit. Adjust the top cap on the retainer to obtain a tight fit with the vinyl cover. Starting at the top, push the vinyl cover over the retainer pressing over the entire length until the cover snaps securely into place. INSTALLATION NOTE: Vinyl retainers can be field bent to angles 10° wider or 10° tighter than 90°. When doing so top and bottom caps cannot be used and the installation should be full height from floor to ceiling. When doing so use flexible top and bottom caps or the installation should be full height from floor to ceiling.

3.04 CLEANING

- A. At completion of the installation, clean surfaces in accordance with the IPC clean-up and maintenance instructions.

END OF SECTION 10 26 13

SECTION 10 26 23 – WALL PROTECTION

Part 1 - General

1.1 Summary

- A. This section includes the following types of wall protection systems:
 - 1. Wall Panels
- B. Related sections: The following section contain requirements related to this section:
 - 1. Division 10 – Corner Guards.

1.2 Submittals

General: Submit the following in accordance with conditions of contract and Division 1.

- A. Product data and detailed specifications for each system component and installation accessory required, including installation methods for each type of substrate.
- B. Shop drawings showing locations, extent and installation details of wall panel products.
- C. Samples for verification purposes: Submit the following samples, as proposed for this work, for verification of color, texture, pattern and thickness:
 - 1. Sample of each product specified.
- D. Maintenance data for wall protection system components for inclusion in the operating and maintenance manuals specified in Division 1.

1.3 Quality Assurance

- A. Installer qualifications: Engage an installer who has no less than 3 years experience in installation of wall panels similar in complexity to those required for this project.
- B. Fire performance characteristics: Provide engineered PVC FREE wall panels with a UL label indicating that they are identical to those tested in accordance with ASTM E84 for Class B/2 characteristics listed below:
 - 1. Flame spread 75 or less
 - 2. Smoke developed: 350 or less
- C. Impact Strength: Provide wall protection components that have been tested for impact using a ram-type impact test in accordance with the applicable provisions of ASTM F476 -84.
- D. Chemical and stain resistance: Provide wall panels with chemical and stain resistance in accordance with ASTM D543.
- E. Single source responsibility: Provide all components of the wall protection system manufactured by the same company to ensure compatibility of color, texture and physical properties.

1.4 Delivery, Storage and Handling

- A. Deliver materials to the project site in unopened packaging clearly labeled to show manufacturer.
- B. Store materials in original, undamaged packaging in a clean, dry place out of direct sunlight and exposure to the elements. A room temperature of 50-100°F (10-38°C) should be maintained.
- C. Materials must be stored flat.

1.5 Project Conditions

- A. Materials must be acclimated in an environment of 65-75°F (18-24°C) for at least 24 hours prior to beginning the installation.
- B. Installation areas must be enclosed and weatherproofed before installation commences.

1.6 Warranty

- A. Limited Lifetime Systems Warranty
 - Applies to CS Interior Wall Protection projects that include all recommended components and accessories related to CS Interior Wall Protection Products.

Part 2 - Products

2.1 Manufacturers

WALL PROTECTION

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD., SALINAS

- A. Interior surface protection products specified herein and included on the submittal drawings shall be manufactured by Construction Specialties, Inc. or equal.

2.2 Materials

- A. Engineered PVC FREE: Material should be high-impact Acrovyn 4000 with Suede texture, nominal .040" (1.02mm) thickness. Chemical and stain resistance should be per ASTM D543 standards as established by the manufacturer. Colors to be indicated in the finish schedule from one of manufacturer's available colors and patterns.
- B. Particle Board: 3/8" (9.53mm) thick particle board core.
- C. Aluminum: Optional aluminum reveals to be alloy 6063 T5 with clear anodized finish; minimum strength and durability properties as specified in ASTM B221.

2.3 Wall Panels

- A. Engineered PVC FREE Wall Panels to be CS Acrovyn: Wall panels to be manufactured of .040" (1.02mm) thick Acrovyn 4000 sheet in standard Suede texture, factory-bonded to the face side and edges of a 3/8" (9.53mm) thick particle board core. The backside of the panel and return edges to be laminated with a moisture resistant barrier.
 - 1. Acrovyn Wall Panel with Wrapped Square Edge has a standard maximum panel size of 46" x 118" (1.2m x 3.0m).
 - a. See drawings for color.
 - b. Provide edge trim.

2.4 Fabrication

- A. General: Fabricate wall panels to comply with requirements indicated for design, dimensions, detail, finish and sizes.

2.5 Finishes

- A. General: Comply with NAAMM "Metal Finishes Manual" for recommendations relative to applications and designation of finishes.

2.6 Accessories

- A. Acrovyn Wall Panels shall be furnished as a complete packaged system, including appropriate demountable hardware.

Part 3 - Execution

3.1 Examination

- A. Verification of conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
 - 1. Do not proceed until unsatisfactory conditions have been corrected.

3.2 Preparation

- A. Surface preparation: Prior to installation, clean substrate to remove dirt, debris and loose particles. Perform additional preparation procedures as required by manufacturer's instructions.
- B. Protection: Take all necessary steps to prevent damage to material during installation as required in manufacturer's installation instructions.

3.3 Installation

- A. Install the work of this section in strict accordance with the manufacturer's recommendations using approved demountable hardware.
- B. Temperature at the time of installation must be between 65-75°F (18-24°C) and be maintained for at least 48 hours after the installation to allow for proper adhesive set up.
- C. Relative humidity shall not exceed 80%.
- D. Do not expose wall panels to direct sunlight during or after installation. This will cause the surface

WALL PROTECTION

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD., SALINAS

temperature to rise, which in turn will cause bubbles and delamination.

3.4 Cleaning

- A. General: Immediately upon completion of installation, clean wall panels and accessories in accordance with manufacturer's recommended cleaning method.
- B. Remove surplus materials, rubbish and debris resulting from installation as work progresses and upon completion of work.

3.5 Protection

- A. Protect installed materials to prevent damage by other trades. Use materials that may be easily removed without leaving residue or permanent stains.

END OF SECTION 10 26 23

SECTION 10 28 00 – TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Washroom accessories.
 - 2. Custodial accessories.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include the following:
 - 1. Construction details and dimensions.
 - 2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
 - 3. Material and finish descriptions.
 - 4. Features that will be included for Project.
 - 5. Manufacturer's warranty.
- B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
 - 1. Identify locations using room designations indicated.
 - 2. Identify products using designations indicated.

1.4 QUALITY ASSURANCE

- A. Source Limitations: For products listed together in the same Part 2 articles, obtain products from single source from single manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.5 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD., SALINAS

- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.6 WARRANTY

- A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: **15** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch (0.8-mm) minimum nominal thickness unless otherwise indicated.
- B. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.
- C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch (0.9-mm) minimum nominal thickness.
- D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 (Z180) hot-dip zinc coating.
- E. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).
- H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.
- I. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.
- J. Batteries: Only use Lithium batteries.

2.2 WASHROOM ACCESSORIES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. American Specialties, Inc.
 - 2. Bobrick Washroom Equipment, Inc.
 - 3. Bradley Corporation.
- B. ACCESSORIES SCHEDULE: See drawings

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD., SALINAS

2.3 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Grab Bars: Install to withstand a downward load of at least 250 lbf (1112 N), when tested according to ASTM F 446.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

END OF SECTION 10 28 00

SECTION 10 44 16 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes portable, hand-carried fire extinguishers.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure of hydrostatic test according to NFPA 10.
 - b. Faulty operation of valves or release levers.
 - 2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. JL Industries, Inc.; a division of the Activar Construction Products Group.

COUNTY OF MONTEREY HEALTH DEPARTMENT
BEHAVIORAL HEALTH CENTER EAST SALINAS
331 N SANBORN RD., SALINAS

- b. Kidde Residential and Commercial Division; Subsidiary of Kidde plc.
 - c. Larsen's Manufacturing Company.
 - 2. Valves: Manufacturer's standard **Brass**.
 - 3. Handles and Levers: Manufacturer's standard.
 - 4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B
 - 5. Cabinet: 3" Rolled Semi-Recessed – Full glass door, White.
- B. Multipurpose Dry-Chemical Type in Brass Container: UL-rated 2-A:10-B:C, 5-lb nominal capacity, with monoammonium phosphate-based dry chemical in chrome-plated-brass container.
- C. Clean-Agent Type in Steel Container for IT Rooms: UL-rated 2-A:10-B:C, 14-lb nominal capacity, with HFC blend agent and inert material in enameled-steel container; with pressure-indicating gage.

2.2 MOUNTING BRACKETS (in Elevator Equipment room and IT room)

- A. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.
- B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
 - 1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.
 - a. Orientation: Vertical.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fire extinguishers for proper charging and tagging.
 - 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install fire extinguishers in locations indicated and in compliance with requirements of authorities having jurisdiction.
 - 1. Mounting Brackets: 54 inches (1372 mm) above finished floor to top of fire extinguisher.
- B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 10 44 16

SECTION 10 51 13 - METAL LOCKERS

PART 1 – GENERAL

1.00 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.01 SECTION INCLUDES

- A. Standard Duty Knocked Down Lockers

1.02 REFERENCES

- A. ADAAG - Americans with Disabilities Act, Accessibility Guidelines.

1.03 SUBMITTALS

- A. Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- B. Shop Drawings: Show the following:
 - 1. Dimensioned drawings including plans, elevations, and sections to show locker locations and interfaces with adjacent substrates.
 - 2. Details of assembly, erection, anchorage and clearance requirements.
- C. Selection Samples: Submit product information with manufacturer's full range of available colors and finishes.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Protect locker finish and adjacent surfaces from damage.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturer: Penco Products, Inc., which is located at: 1820 Stonehenge Drive, Greenville, NC 27858; Tel: 800-562-1000; Fax: 800-248-1555; Email: general@pencoproducts.com; Web: www.pencoproducts.com or Equal.
- B. Lockers shall be GREENGUARD Gold Certified by UL Environment through the GREENGUARD Certification Program.

2.02 MATERIALS

- A. Steel: Prime grade mild cold-rolled sheet steel free from surface imperfection, capable of taking a high-grade enamel finish and in compliance with ASTM A1008.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD., SALINAS

- B. Steel: Sheet steel components shall be fabricated using zinc-coated steel free from surface imperfection, capable of taking a high-grade enamel finish and in compliance with ASTM A879.
- C. Bolts and Nuts: Zinc plated truss fin head bolts and hex nuts.
- D. Provide only metal lockers fabricated in the United States by a single domestic manufacturer.

2.03 STANDARD DUTY LOCKERS

- A. Standard Duty Lockers:
 - 1. Acceptable Product: Penco Vanguard, knock-down lockers.
 - 2. Tops, Bottoms, Backs, Sides, and Shelves: 24 gauge sheet steel.
 - 3. Doors 12 inches or more wide or 20 inches high: 16 gauge sheet steel.
 - 4. Doors less than 12 inches wide: 18 gauge sheet steel.
- B. Locker Body: Steel specially formed for added strength and rigidity and to ensure tight joints at fastening points.
 - 1. Tops and bottoms with three sides formed 90 degrees, the front offset formed to be flush with horizontal frame member.
 - 2. Shelves with four sides formed to 90 degrees, front edge having a second bend.
 - 3. Hole spacing in locker body construction: Not exceeding 9 inches (225 mm).
 - 4. Form door frame members to a channel shape, not less than 16 gauge steel.
 - 5. Provide vertical door frame members with additional 3/8 inch (9.5 mm) flange as a continuous door strike.
 - 6. Mortise and tenon intermembering parts; electrically weld together in a rigid assembly capable of resisting strains.
 - 7. Securely weld cross frame members of channel shapes to vertical framing members to ensure rigidity, including intermediate cross frame on double and triple tier lockers.
 - 8. Optional factory assembly of locker bodies using rivets.
 - 9. Center partitions: 24 gauge steel vertical partitions, full depth between bottom and shelf.
- C. Locker Doors: One piece sheet steel.
 - 1. Multi-Point Latch Doors: Full channel formation of adequate depth to fully conceal lock bar on lock side, channel formation on hinge side, right angle formations across top and bottom, with holes for attaching number plates.
 - 2. Provide holes for attaching number plates.
 - 3. Doors over 15 inches (381 mm) wide by 60 inches (1.524 m) or 72 inches (1.828 m) high: 3 inch (75 mm) wide 20 gauge full height reinforcing pan welded to inside face of door at 6 inch (150 mm) centers.
 - 4. Box Lockers: Channel formations on lock and hinge sides, right angle flanges on top and bottom; pre-punch doors for padlock latch and friction catch and built-in combination and key locks.
 - 5. Ventilation: Provide louvered doors in manufacturer's standard louver pattern.
 - a. Doors 60 inches (1.524 m) or Higher: Louvers in groups of 6 at top and bottom.
 - b. 36 inch (0.914 m) High Doors: 3 and 6 louvers.
 - c. 30 inch (0.762 m) High Doors: Minimum one group of 6 louvers.
 - d. 24 inch (0.610 m) High Doors: Minimum one group of 3 louvers.
- D. Hinges:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD., SALINAS

1. Two inch high, 0.074 inch (1.88 mm) thick sheet steel, double spun, full loop, tight pin, projection welded to door frame and securely fastened to the door with two steel rivets.
 - a. Doors over 48 inches (1.066 m) high: Three 2 inch (51 mm) high five-knuckle hinges.
 - b. Doors over 24 inches (1.066 m) wide: Four 2 inch (51 mm) high five-knuckle hinges.
 - c. All other doors: Two 2 inch (51 mm) high five-knuckle hinges.

2.04 DOOR HANDLES AND LATCHING

- A. Two Person and Duplex Lockers, 1, 2 and 3 Tier: Multi-point latching:
 1. Chrome-plated zinc alloy die-cast case and handle, 40,000 psi (276 MPa) maximum tensile strength.
 2. Attachment to latch bar concealed inside door and tamperproof; pulling handle out shall move latch bar up and open door in one motion.
 3. Padlock Eye: For use with 9/32 inch (7.1 mm) diameter padlock, integral with handle and located so that extension of handle forms padlock strike.
 4. Case: Kick-proof type shielding movable part and providing padlock strike to prevent scratching and marring the door.
 5. Provide lock hole cover plate for use with padlocks.
 6. Latch Clip: Glass-filled nylon engaging the door frame and holding the door shut.
 - a. Doors over 48 inches (1.066 m) High: Three points.
 - b. All other Doors: Two points.
 7. Locking Device: Positive, automatic type, whereby locker may be locked when open, then closed without unlocking.
 8. Firmly secure rubber silencers in frame as required.
 9. Classic III Multi-point latching with recessed handles:
 - a. Recess finger-lift control handle in door.
 - b. Pocket: brushed stainless steel securely fastened to door with two tabs and a positive tamper-resistant decorative fastener; of depth sufficient to prevent a combination padlock, built-in combination lock, or key lock from protruding beyond door face.
 - c. Provide lock hole cover plate for use with padlocks.
 - d. Attach 14 gauge formed steel lifting piece to latching channel with one concealed retaining lug and one rivet, assuring a positive two-point connection.
 - e. Handle finger lift: Molded, sound-deadening, attached with rivet; padlock eye for use with 9/32 inch (7.1 mm) diameter padlock shackle.
 - f. Latch Clip: Glass-filled nylon engaging the door frame and holding the door shut.
 - 1) Doors 60 inches (1.524 m) and 72 inches (1.828 m) high: Three points.
 - 2) Doors 20 inches (0.508 m) to 48 inches (1.22 m) high: Two points.
 - g. Locking Device: Positive, automatic type, whereby locker may be locked when open, then closed without unlocking.
 - h. Firmly secure one rubber silencer in frame at each latch hook.

2.05 INTERIOR EQUIPMENT

- A. ADA-Compliant Lockers (Recessed Handles with Multi-Point Latch):
 1. Single Tier Lockers: Hat shelf 48 inches (1.219 m) maximum off the floor.
 2. Locker Compartment Bottom: Minimum of 15 inches (230 mm) off the floor, or an extra shelf placed 15 inches (381 mm) off the floor for unobstructed forward and side reach.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD., SALINAS

3. Handicapped symbol attached to door.
4. Hooks and rods as specified for other lockers.

2.06 ACCESSORIES

- A. Number Plates: Provide each locker with a polished aluminum number plate, 2-1/4 inches (57 mm) wide by 1 inch (25 mm) high, with black numerals not less than 3/8 inch (9.5 mm) high; attach to face of door with two aluminum rivets.
- B. Closed Bases: 18 gauge closed metal front and end bases, finished to match lockers.
- H. Continuous Sloped Hoods: 18 gauge steel, slope rise equal to 1/3 of the locker depth (18.5 degrees), plus a 1 inch (25 mm) vertical rise at front.
 1. Supplied in 72 inch (1829 mm) lengths only.
 2. Slip joints without visible fasteners at splice locations.
 3. Provide necessary end closures.
 4. Finish to match lockers.
- I. Continuous Sloped Hoods: 16 gauge steel, slope rise equal to 1/3 of the locker depth (18.5 degrees), plus a 1 inch (25 mm) vertical rise at front.
 1. Supplied in 72 inch (1829 mm) lengths only.
 2. Slip joints without visible fasteners at splice locations.
 3. Provide necessary end closures.
 4. Finish to match lockers.
- J. Finished End Panels: Minimum 16 gauge steel formed to match locker depth and height, 1 inch (25 mm) edge dimension; finish to match lockers; install with concealed fasteners.
- L. Front Fillers: 20 gauge steel formed in an angle shape, with 20 gauge slip joint angles formed in an angle shape with double bend on one leg forming a pocket to provide adjustable mating with angle filler.
 1. Attachment by means of concealed fasteners.
 2. Finish to match lockers.
- M. Zee Bases for Knock-Down Lockers: 14 gauge, steel flanged outward at top for support of lockers, flanged inward at bottom for anchoring to floor.
 1. Height: 4 inches (101 mm).
 2. Height: 6 inches (150 mm).
- N. Recess Trim: 18 gauge steel, 3 inch (75 mm) face dimension.
 1. Vertical and/or horizontal as required.
 2. Standard lengths as long as practical.
 3. Attach to lockers with concealed clips.
 4. Provide necessary finish caps and splices.
 5. Finish to match lockers.
- O.

2.07 FABRICATION

- A. Fabricate lockers square and rigid, without warp, with metal faces flat and free of distortion.
- B. Knock-Down Lockers: Fabricate lockers on the unit principle, each locker with individual door and frame, individual top, bottom, back, and shelves, with common intermediate divisions separating compartments. Verify dimensions and arrangement before fabrication.

- C. Finish: Enamel powder coat paint finish electrostatically applied and properly cured to manufacturer's specifications for optimum performance. Finishes containing volatile organic compounds and subject to out-gassing are not acceptable.
 - 1. Powder Coat - Dry Thickness: 1 to 1.2 mils (0.025 to 0.03 mm).
 - 2. Powder Coat Plus - Dry Thickness: 2 to 2.2 mils (0.05 to 0.055 mm).
 - 3. Color: As selected from manufacturer's standard colors.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates and bases have been properly prepared.
- B. If substrate and bases are the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 INSTALLATION

- A. Install metal lockers and accessories at locations shown in accordance with manufacturer's instructions.
- B. Install lockers plumb, level, and square.
- C. Anchor lockers to floor and wall at 48 inches (1.219 m) or less, as recommended by the manufacturer.
- D. Bolt adjoining locker units together to provide rigid installation.
- E. Install sloping tops and metal fillers using concealed fasteners. Provide flush hairline joints against adjacent surfaces.
- F. Install front bases between legs without overlap or exposed fasteners. Provide end bases on exposed ends.
- G. Install benches by fastening bench tops to pedestals and securely anchoring to the floor using appropriate anchors for the floor material.

3.03 ADJUSTING AND CLEANING

- A. Adjust doors and latches to operate without binding. Verify that latches are operating satisfactorily.
- B. Adjust built-in locks to prevent binding of dial or key and ensure smooth operation prior to substantial completion.
- C. Touch-up with factory-supplied paint and repair or replace damaged products before Substantial Completion.

3.04 PROTECTION

- A. Protect installed products until completion of project.

END OF SECTION 10 51 13

SECTION 10 82 13 ROOF SCREENS

PART 1 - GENERAL

1.0 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.1 SECTION INCLUDES

- A. Stand-alone roof equipment screens and supporting steel framework. Screens shall be designed to attach to the roof structure and not the equipment being screened.
- B. Roof screen accessories.

1.2 RELATED SECTIONS

- A. Division 5 - Metal Fabrications: Frames and supports.
- B. Division 8 – Roof Screen Louvers

1.3 REFERENCES

- A. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- B. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- C. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- D. ASTM A 1008 - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
- E. ASTM B 749 - Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products.
- F. ASTM D 4811 - Standard Specification for Nonvulcanized (Uncured) Rubber Sheet Used as Roof Flashing.
- G. ASTM D 6878 - Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing.
- H. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- I. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
- J. AWS D1.1 - Structural Welding Code - Steel.
- K. AWS D1.6 - Structural Welding Code - Stainless Steel.

1.4 COORDINATION

- A. Coordinate Work with other operations and installation of roofing materials to avoid damage to installed insulation and membrane materials.

1.5 ACTION SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- B. Shop Drawings: Layout and erection drawings showing typical cross sections and dimensioned locations of all frames and base supports. Include erection drawings, elevations, and details where applicable. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- D. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, shape, and patterns.

1.6 INFORMATIONAL SUBMITTALS

- A. Design Calculations: 3 copies of structural design calculations for structural components and components resisting wind loads with seal and signature of professional engineer licensed in the State of California.
- B. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- C. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within previous 12 months.
- D. Warranties: 3 signed copies.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer with a minimum five years documented experience in producing pre-manufactured metal-framed equipment screens.
- B. Design Qualifications: Provide structural design calculations stamped by a professional engineer licensed in the state in which this project is located.
- C. Welders: AWS certified within previous 12 months.
- D. Pre-Installation Meeting:
 - 1. Convene at job site, at least seven calendar days prior to scheduled beginning of construction activities of this section, to review requirements of this section.
 - 2. Require attendance by representatives of the installing subcontractor (who will represent the system manufacturer), the mechanical subcontractors and other entities affected by construction activities of this section.
 - 3. Notify Architect four calendar days in advance of scheduled meeting date.
- E. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and

application workmanship.

1. Locate in area designated by Architect.
2. Construct mock-up, one full screen section wide, including two roof supports.
3. Do not proceed with remaining work until workmanship, color, and location is approved by Architect.
4. Remove mock-up if required by Architect.
5. Accepted mock-up may remain in place.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the project site clearly marked for proper identification.
- B. Receive, handle and store materials in conformance with the manufacturers printed instructions.
- C. Store products under cover, in manufacturer's unopened packaging until ready for installation.
- D. Protect materials from exposure to moisture.
- E. Store materials in a dry, warm, ventilated weathertight location.
- F. Protect metal fabrications from damage by exposure to weather.
- G. Handling: Use a forklift or crane to move material. Do not lift the bundles by the metal bands.
 1. Fork Lift: Spread the forks as far as possible to balance the load. Drive slowly when moving long bundles over uneven surfaces to avoid tipping the load
 2. Crane: Position the canvas sling straps so that the space between the straps is at least 1/3 the length of the bundle. Use sling straps with looped ends running one end of the strap through the loop at the other end to cinch the bundle when lifted. When setting the load on the roof, put wood blocks under it to protect the roof and allow space to remove the sling straps.
 3. Roof Placement: Spread the bundles and crates out as much as possible to avoid overloading the roof structure. Place the material directly over major supports such as beams or trusses.
 4. Position bundles of tubing parallel to the slope of the roof and block prior to opening to prevent the tubing from rolling down the roof slope when unbundled.

1.9 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Field Measurements: Verify roof screen dimensions and conditions of the installation by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating equipment enclosure without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.10 WARRANTY

- A. Framing System: Provide manufacturer's standard written limited warranty stating that the complete framing system shall be warranted against structural failure due to cracking, buckling, bending, tearing or corrosion arising under normal use and environmental conditions for the coverage period applicable.
 - 1. Products installed on projects located 2 miles or greater from salt or brackish bodies of water shall be warranted for twenty (20) years
 - 2. Products installed on projects located greater than 1 mile but less than 2 miles from salt or brackish bodies of water will be warranted for five (5) years, except for aluminum, stainless steel or copper Products which will be warranted for twenty (20) years.
 - 3. Products installed on projects located 1 mile or less from salt or brackish bodies of water will be warranted for three (3) years, except for aluminum, stainless steel or copper Products which will be warranted for twenty (20) years
- B. Panel Finish:
 - 1. Provide written warranty stating that the paint finish applied on all equipment enclosure panels will be warranted against chipping, peeling, cracking, fading, or blistering for the coverage period of twenty (20) years.
 - 2. Provide warranty signed by the panel manufacturer and paint finish applicator (if separate from manufacturer).
- C. Louvers: Refer to Section 089100, Louvers
- D. The above warranties are in addition to, and not a limitation of, other rights the Owner may have under the Contract Documents.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Design Loads: Comply with Building Code for site location and building height.
 - 1. Design to resist ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
 - 2. Design all materials, assembly and attachments to resist snow, wind, suction and uplift loading at any point without damage or permanent set.
- B. Structural Design: Prepare structural design calculations for screen framing and attachment to structure including reactions at base supports for verification of roof structure by Architect.
- C. All welds to be performed by an AWS certified welder. Valid certification to be provided.

2.2 MANUFACTURERS

- A. Acceptable Manufacturer: RoofScreen Mfg., which is located at: 347 Coral St. ; Santa Cruz, CA 95060; Toll Free Tel: 866-766-3727; Tel: 831-421-9230; Fax: 866-253-0738; Email: request info (info@roofscreen.com); Web: www.roofscreen.com. Or equal.

2.3 MATERIALS

COUNTY OF MONTEREY HEALTH DEPARTMENT
BEHAVIORAL HEALTH CENTER EAST SALINAS
331 N SANBORN RD., SALINAS

- A. Square Base Supports: Weldments fabricated from cold rolled steel conforming to ASTM A 1008, fabricated with pre-punched holes in base plate for fastening to roof structure. After fabrication, apply minimum 2 to 4 mil baked on powder coat primer.
 - 1. Height 5 inches (127 mm).
 - 2. Height 9 inches (229 mm).
 - 3. Height 12 inches (305 mm).
- B. Square Base Support Extensions: Fabricated from same material and finish as base supports.
 - 1. Height 3 inches (76 mm).
 - 2. Height 4 inches (101 mm).
- C. Square Base Cap: Weldments fabricated from AISI Type 304 stainless steel with mill finish, and fabricated to overlap base support and flashing boot a minimum of 2 inches (51 mm). Provide moment resisting adjustable connection to attach framing to base cap.
- D. Round Post Supports: 12 inch (305 mm) tall weldments fabricated from galvanized steel tube conforming to ASTM A 500 and cold rolled steel plate conforming to ASTM A36, fabricated with pre-punched holes in base plate for fastening to roof structure. After fabrication, apply minimum 2 to 4 mil shop primer to base plate and weld. Provide height adjustment with galvanized tube sleeve conforming to ASTM A 500, sized to telescope over outside of round post tube and fastened at desired height with self-drilling, self-tapping screws.
- E. Round Post Cap: Weldments fabricated from AISI Type 304 stainless steel with mill finish fabricated to slip over 2-1/2" sleeve tube allowing adjustable height when used with Round Post Support.
- F. Square Galvanized Roof Flashing: Fabricated from galvanized sheet steel, 24 gauge, conforming to ASTM A 653/A 653M. Provide with galvanized sheet steel, 24 gauge (ASTM A 653/A 653M) base flange that extends a minimum of 4 inches (102 mm) onto the roof surface on all four sides. Riser shall be tapered to allow easy fit over Square Base Supports with minimal gap at top of flashing. Solder all seams for water tightness.
- G. Roof Flashing: Refer to Division 07 section that specifies the roof membrane.
- H. Base Cap Gasket: EPDM with self-adhesive closed cell foam.
- I. Framing: Carbon steel structural tubing in manufacturer's standard sizes, conforming to ASTM A 500 with manufacturer's standard galvanized coating conforming to ASTM B 117 salt spray testing. Provide with wall thickness as determined by structural calculations.
- J. Connector Fittings: Fabricated from AISI Type 304 stainless steel with mill finish.
- K. Steel Z section: Steel sheet conforming to ASTM A 653, Class SS, with a G90 hot-dip galvanized coating.
- L. Steel Hat Channel: Steel sheet conforming to ASTM A 653, Class SS, with a G90 hot-dip galvanized coating.
- M. Hardware: Bolts, nuts, washers and screws 18-8 stainless steel.
- N. Welding Materials: AWS D1.1; type required for materials being welded.
- O. Louvers: Refer to Section 08 91 00, Louvers.

2.4 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- E. Fabricate system components so that portions of screen can be dismantled for repairs to equipment being screened and for future roof replacement.
- F. Trim and Closures: Fabricated from 24 gauge metal and finished with the manufacturer's standard coating system.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine area where work will be installed to verify the installation can be performed in accordance with the Drawings and structural calculation requirements without interference from other equipment or trades.
- B. If preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Do not begin installation until conditions have been properly prepared.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects.
- C. Provide for erection loads, and for sufficient temporary bracing to maintain indicated alignment until completion of erection and installation of permanent attachments.
- D. Anchor fabrications to structure as indicated.
- E. Separate dissimilar metals and use gasketed fasteners, isolation shim, or isolation tape to eliminate possibility of corrosive or electrolytic action between metals.
- F. Exercise care when installing components so as not to damage finish surfaces. Touch up as required to repair damaged finishes.

- G. Install flashing boots at base supports as required to provide a watertight connection. Install as recommended by the roof membrane manufacturer.
- H. Remove all protective masking from material immediately after installation.

3.4 CLEANING AND PROTECTION

- A. Remove all protective masking from framing and trim material immediately after installation. Remove temporary protective coverings and strippable films, if any, as metal wall panels are installed, unless otherwise indicated in manufacturer's written installation instructions. Maintain in a clean condition during construction.
- B. Protect installed products until completion of project.
 - 1. Ensure that finishes and structure of installed systems are not damaged by subsequent construction activities.
 - 2. If minor damage to finishes occurs, repair damage in accordance with manufacturer's recommendations; provide replacement components if repaired finishes are unacceptable to Architect.
- C. Prior to Substantial Completion: Remove dust or other foreign matter from component surfaces; clean finishes in accordance with manufacturer's instructions.
- D. Replace metal wall panels and framing members that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 10 82 13

SECTION 11 68 13 - PLAY EQUIPMENT

PART 1 - GENERAL

1. RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to the work of this Section.

2. DESCRIPTION OF WORK

- A. Extent: Furnish all labor, material, equipment, tools, and incidentals necessary for the provision and installation of Site Furnishings as shown on the Drawings and as specified in this Section. The work includes all miscellaneous hardware, foundations, footings and miscellaneous appurtenances associated with the installation. Items to be installed include:

- 1. Play Equipment

- B. Related work includes but is not limited to:

- 1. Earthwork and Grading
 - 2. Site Concrete
 - 3. Resilient Surfacing

3. STANDARDS

- A. Applicable ASTM International Standards (latest revisions) as they apply to this work and related test methods, including:
- B. D2859 Test Method for Flammability of Finished Textile Floor Covering Materials.
- C. E303 Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester.
- D. F1292 Specification for Impact Attenuation of Surface Systems under and around Playground Equipment.
- E. F1487 Consumer Safety Performance Specification for Playground Equipment for Public Use
- F. F1951 Specification for Determination of Accessibility of Surface Systems under and around Playground Equipment.

4. QUALITY ASSURANCE

- A. Review: All play equipment and accessory locations shall be reviewed by the Engineer prior to installation.
- B. Qualifications: The Contractor must have a C-61, D-12 specialty contractor's license to install Poured-in-Place Resilient Surfacing.
- C. Poured-in-Place Resilient Surfacing System shall be WARRANTED by manufacturer for any defects in material and workmanship for a period of 5 YEARS from the date of purchase.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD., SALINAS

- D. Standards: All play equipment, resilient and wood fiber surfacing shall comply with the latest edition of the Handbook for Public Playground Safety as published by the U.S. Consumer Product and Safety Commission (CPSC), American Society for Testing and Materials (ASTM) and California Disabled Accessibility Guidebook (CALDAG).
- E. Calculations for play equipment footings shall be prepared by a Structural or Civil Engineer licensed in the State of California.

5. SUBMITTALS

- A. Submit Shop Drawings and/or Product Data, for review and approval by the Engineer, for all play equipment and accessories, other site accessories. Show all locations, markings, quantities, materials, sizes, and shapes and indicate all methods of connecting, anchoring, fastening, bracing, and attaching to the work of other trades.
- B. Submit plan view drawings of proposed equipment in play area for bid price indicated.
- C. Provide written certification that the equipment and materials provided and installed comply with the standards specified herein.

PART 2 - PRODUCTS

1. PLAY EQUIPMENT

- A. General: The following is a list of play structure and play equipment types, colors shall be as selected by the Engineer via the shop drawing submittals process.
- B. Stone Abacus
Manufacturer: Goric Marketing Group
Model: SEN07010490
Description: Feature to have oak posts.
Finish / color: - Feature to have oak posts.
Distributor / Contact: Recreation Republic 760-690-4030
- C. Double Seater
Manufacturer: Goric Marketing Group
Model: #SEN07010490
Description: Two person rocking spring seats for 2 years plus.
Distributor / Contact: Recreation Republic 760-690-4030
- D. Babel Drum Large
Manufacturer: Goric Marketing Group
Model: #PPBDL-L
Description: Steel drum for play with hands or finger tips for 2 years plus.
Distributor / Contact: Recreation Republic 760-690-4030

PART 3 - EXECUTION

1. GENERAL

- A. All site furnishings shall be located as shown on the approved shop drawing (plan). Adjustments shall be made as approved by the Engineer. Review all layout prior to proceeding with any installation.

SITE FURNISHINGS PLAY
EQUIPMENT

11 68 13 - 2

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD., SALINAS

2. INSTALLATION

- A. Play Equipment: Shall be installed per manufacturer's recommendations and as shown on the approved shop Drawings (Plan).

3. CLEAN-UP

- A. Restore adjacent existing areas that have been damaged from the construction.
- B. Repair damaged play equipment finishes to match original finish or replace damaged products prior to Substantial Completion.
- C. Clean playground equipment of construction materials, dirt, stains, filings, and blemishes due to shipment or installation. Clean in accordance with manufacturer's instructions, using cleaning agents as recommended by manufacturer.
- D. Clean play areas of excess construction materials, debris, and waste.
- E. Remove excess and waste material and legally dispose of off-site.
- F. Protect installed products from damage or use until Substantial Completion.

END OF SECTION 11 68 13

SECTION 12 24 13 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Manually operated roller shades with single rollers.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.
- B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.
- C. Samples: For each exposed product and for each color and texture specified, 10 inches long.
- D. Samples for Initial Selection: For each type and color of shade band material.
 - 1. Include Samples of accessories involving color selection.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.5 FIELD CONDITIONS

- A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from

Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Graber, by Spring Window Fashions
 - a. Series A300, "Crosshatch"
 - b. Color: White/Bone, 3% openness
- B. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.2 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS

- A. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.
 - 1. Bead Chains: Manufacturer's standard.
 - a. Loop Length: Full length of roller shade
 - b. Limit Stops: Provide upper and lower ball stops.
 - c. Chain-Retainer Type: Chain tensioner, sill mounted.
 - 2. Spring Lift-Assist Mechanisms: Manufacturer's standard for balancing roller-shade weight and lifting heavy roller shades.
 - a. Provide for shadebands that weigh more than 10 lb or for shades as recommended by manufacturer, whichever criteria are more stringent.
- B. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
 - 1. Shadeband-to-Roller Attachment: Manufacturer's standard method.
- C. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.
- D. Shadebands:
 - 1. Shadeband Material: Light-filtering fabric.
 - 2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
 - a. Type: Exposed with endcaps and integral light seal where bottom (sill) channels are indicated.
 - b. Color and Finish: As selected by Architect from manufacturer's full range.

E. Installation Accessories:

1. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller endcaps without exposed fasteners.
 - a. Shape: L-shaped.
 - b. Height: Manufacturer's standard height required to conceal roller and shadeband when shade is fully open, but not less than 3 inches
2. Exposed Headbox: Rectangular, extruded-aluminum enclosure including front fascia, top and back covers, endcaps, and removable bottom closure.
 - a. Height: Manufacturer's standard height required to enclose roller and shadeband when shade is fully open, but not less than 3 inches.
3. Endcap Covers: To cover exposed endcaps.
4. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.3 SHADEBAND MATERIALS

- A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.4 ROLLER-SHADE FABRICATION

- A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.
- B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F:
1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch per side or 1/2-inch total, plus or minus 1/8 inch. Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch, plus or minus 1/8 inch.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER-SHADE INSTALLATION

COUNTY OF MONTEREY HEALTH DEPARTMENT
BEHAVIORAL HEALTH CENTER EAST SALINAS
331 N SANBORN RD., SALINAS

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.
 - 1. Opaque Shadebands: Located so shadeband is not closer than 2 inches to interior face of glass. Allow clearances for window operation hardware.

3.3 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

- A. Clean roller-shade surfaces after installation, according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

END OF SECTION 12 24 13

SECTION 12 35 70 -HEALTHCARE CASEWORK

(SYNTHESIS™ CASEWORK COLLECTION BY MIDMARK – **PURCHASED BY OWNER AND
INSTALLED BY GENERAL CONTRACTOR**)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Work Included: Provide labor, materials and equipment necessary to install Owner purchased modular metal casework including floor base units, mobile units, overhead units, countertops, and accessory items.

1.3 SYSTEM DESCRIPTION **(FOR INFORMATION ONLY, CASEWORK PURCHASED BY OWNER)**

- A. Design Requirements: Casework shall be metal, modular, with each unit being an individual, interchangeable, integral part of assembly for making up desired casework unit. Each sectional unit shall be rigid and depend on no other component part of complete assembly for its rigidity. Internal components such as drawers, glides, shelves, and similar items shall be modular and interchangeable.
- B. Performance Requirements: Provide healthcare casework which has been manufactured, fabricated and installed to withstand the medical environment and maintain manufacturer's warranted performance without defects, damage, or failure.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's product data for each type of product.
- B. Shop Drawings: Submit shop drawings including the following:
 - 1. Complete list of products, sizes and manufacturer's descriptive and technical literature.
 - 2. Requirements for utility connections.
 - 3. Requirements for blocking and support.
 - 4. Keying schedule as applicable.
- C. Samples for Verification: Submit representative sample of each type of finish and color.
- D. **Installer Reports: Submit copy of installer's reports for the following:**
 - 1. **Certification that installer is acceptable to the manufacturer.**
 - 2. **Manufacturer's field service report.**
 - 3. **Pre-installation meeting report.**
- E. Operations and Maintenance Data: Submit manufacturer's recommendations for cleaning and maintenance, including a list of spare parts and information for ordering.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- F. Warranty: Submit executed copy of manufacturer's standard limited warranty.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Regularly engaged in manufacturing healthcare casework, ISO 13485 and ISO 9001 certified.
- B. Installer: Minimum 2 year documented history of installing similar casework and acceptable to the manufacturer. Installer shall accept responsibility for all field verifications.
- C. Pre-Installation Meeting: Convene a pre-installation meeting prior to installation to review existing conditions, schedule, sequence of installation, and proper placement of utilities.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store casework as recommended by manufacturer. Protect from the weather, humidity, temperature variation, dirt, dust, or other contaminants.

1.7 WARRANTY

- A. Modular Casework Limited Warranty: Provide manufacturer's standard limited warranty for the items listed below, with additional exclusions as included in manufacturer's standard warranty. Furnish copies of warranties for components not manufactured by Midmark Corporation but incorporated into the casework as applicable.
1. Door and drawer fronts, casters, 5 years.
 2. Task lights, 3 years.
 3. Laminate top surfaces and accessories, 1 year.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Basis-of-Design Manufacturer: Midmark Corporation, 60 Vista Drive, Versailles, Ohio 45380-0286, telephone 1-800-MIDMARK, fax 1-800-365-8631, www.midmark.com.

2.2 MODULAR METAL CASEWORK

- A. Modular Metal Casework: Synthesis™ Casework Collection by Midmark. No substitutions.
1. Sizes and Configuration: As indicated on the Drawings.
 2. Metal Finish: Premium powdercoat, baked-on epoxy.
 3. Metal Finish: 7 mil high-performance finish applied to powdercoated steel frame.
- B. Casework Assembly:
1. Design: Individual, interchangeable, integral, modular units.
 2. Cabinet: 18 gauge cold rolled steel; multi-piece shell and frame design; riveted and press joined (Tog-L-Loc).
 3. Filler and Trim: Manufacturer's standard coordinated components.
- C. Door Construction:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Panel Style: Serenity style.
 2. Front/Back: 12 mil seamless polymer-covered front; melamine back.
 3. Reveal: 1 mm reveal from the edge of the frame.
 4. Core: 45 lb. MDF board, 3/4 inch thick. Composite wood material to meet CARB P2 emission std of CARB regulation 91320.2.
 5. Hinges: Manufacturer's standard Blum, concealed, self-closing, 110 degree opening, nickel-plated metal, clip-on mount, three adjustment points.
 6. Pulls: Manufacturer's standard 128 mm pull offering for Serenity.
- D. Drawers:
1. Deep Drawer Construction: One piece molded polystyrene drawer bodies with rounded corners.
 2. File Drawer Construction: 18 gauge cold rolled steel frame; including suspended file system and file bars.
 3. Front/Back: 12 mil seamless polymer-covered front; melamine back.
 4. Reveal: 1 mm reveal from the edge of the frame.
 5. Core: 45 lb. MDF board, 3/4 inch thick. Composite wood material to meet CARB P2 emission std of CARB regulation 91320.2.
 6. Slides: Manufacturer's standard Accuride Aero (100 lb. capacity) ball bearing slides; Accuride Model 3832 (100 lb. capacity) for pullout writing surfaces and waste cans; and heavy duty Accuride Model 3640 (200 lb capacity) slide for file drawers and heavy duty pull out shelves.
 7. Pulls for Serenity, 128 mm pulls.
 8. Pulls for Cove Style Panels: Integrated front pull.
 9. Pulls for Renew Style Panels: Recessed clear snap-on handle with interchangeable color strips.
- E. Adjustable Shelving: 18 gauge cold rolled steel, painted to match cabinet color; manufacturer's standard die cast zinc support clips.
- F. Locks:
1. Doors: Manufacturer's standard Timberline, individually mounted, cam style lock removable lock plug; locks keyed alike with two keys per lock.
 2. Drawers: Manufacturer's standard Timberline lock body with removable lock plug with 14 gauge cold rolled steel pivoting lock bar for central lock system; locks keyed alike with two keys per lock.
- G. Casters: Manufacturer's standard Shepherd Caster Corp, 60 mm nylon or 4 inch twin wheel design with elastomeric treads, stem mounting; locking wheel.
- H. Countertops, Solid Surfacing:
1. Materials: Solid surfacing.
 2. Materials: Anti-Microbial solid surfacing.
 3. Countertops: MDF core. Composite wood material to meet CARB P2 emission std of CARB regulation 91320.2.
 4. Horizontal Surfacing: 0.5 inch thick, matte finish; EOS Cupron material 0.375 in thick.
 5. Manufacturer: Dupont Corian; Wilsonart; Formica, Meganite, EOS; as selected.
- I. Filler Panel/Leg Supports: MDF core. Composite wood material to meet CARB P2 emission std of CARB regulation 91320.2.

PART 3 - EXECUTION BY GENERAL CONTRACTOR

3.1 EXAMINATION

- A. Examine substrates and site conditions for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install products in strict accordance with manufacturer's instructions, approved submittals and in proper alignment with adjacent work. Provide installation method suitable for substrate and project conditions. Test operable components for proper operation and adjust until satisfactory results are obtained.

3.3 CLEANING AND PROTECTION

- A. Clean exposed surfaces using methods acceptable to the manufacturer which will not damage finish.
- B. Protect casework against damage until accepted. Restore damaged components and finishes as necessary so no evidence remains of corrective work.

END OF SECTION 12 35 70



Midmark Drawings

Project Name: MOCO Behavioral Health Clinic

Project #: MS210387

Phase: 01

Rev: 3

Date: 8/16/2021

Project Rep: Max Geittmann

Mgeittmann@midmark.com

Designer: Shannon Schwieterman Ext: 128406

sschwieterman@midmark.com

Phone: 1-800-MIDMARK



Midmark Quotation

Terms & Conditions

Project Information:

Project Name: MOCO Behavioral Health Clinic

Project #: MS210387 **Phase:** 01 **Rev:** 3

Agreement: Medical 2021 Mid-Year Vizient Pricing (Tier 1)

Midmark Rep Information:

Project Rep: Max Geittmann

Email: Mgeittmann@midmark.com

Designer Information:

Designer: Shannon Schwieterman Ext: 128406

Email: sschwieterman@midmark.com

Phone: 1-800-MIDMARK

Midmark Order Policy

- Order will not be sent to scheduling until a purchase order, signed drawing and field measurements (if applicable) are received.
- Installation is not included unless noted otherwise.
- Taxes and plumbing hook-ups are not included in the pricing.
- Order needs to be placed with an authorized Midmark distributor.

Order Changes

- All changes should happen before the receipt of the order.
- Order changes made after receipt of an order may incur a change fee and a shipping date change. This fee will cover materials, labor, and handling costs.
- All changes must be submitted in writing. Upon review and approval of changes, the order will be moved to the next available ship date.

Delayed/Rescheduled Ship Dates

- Request to reschedule orders that have not been built will be moved to the next available ship date.
- Request to reschedule or delay shipment of orders that have been built will incur storage and handling fees until shipped.

Order Cancellation

- Cancellation 48 hours from time of order placement is subject to penalty. An assessment will be made at time of cancellation to determine the amount of penalty including material, labor and handling costs.
- Cancellations must be received in writing. Non-standard color and custom configuration orders may not be cancelled without penalty.

Return of Merchandise

- Custom Cabinetry and Workstations are built-to-order and are non-returnable.

Shipping and Receiving Policy

- Cabinetry Packaging: . Cabinetry accessories and equipment will be boxed.
- Orders shipped via common LTL carrier or full truckload carrier.
- Please specify your preferred delivery date.
- Preferred delivery date is not guaranteed based on Midmark lead time and carrier's availability.
- Please specify if delivery site is NOT able to accept delivery on a full-size 53' truck and trailer.
- Report any damaged goods or short shipments to the freight carrier and contact Midmark Corporation immediately.
- Please specify if lift gate is required.
- Customer is responsible for freight unless discussed otherwise during quoting.
- Optional delivery services available for additional charges include: customer assisted inside delivery, guaranteed delivery and Premier Delivery Service. Please call for a quote for these additional services.

Lead Times

- Cabinetry lead time on standard items and color: 4-8 weeks**
- Equipment/Workstation lead time: 1-3 weeks**

****Lead times are subject to change based on volume and quantities**



Project Name: MOCO Behavioral Health Clinic
Project #: MS210387
Phase: 01 **Rev:** 3

Approved Revised to Reflect

Signature _____ Date _____

Countertops

Materials: Solid Surface

Handle Finishes: Copper

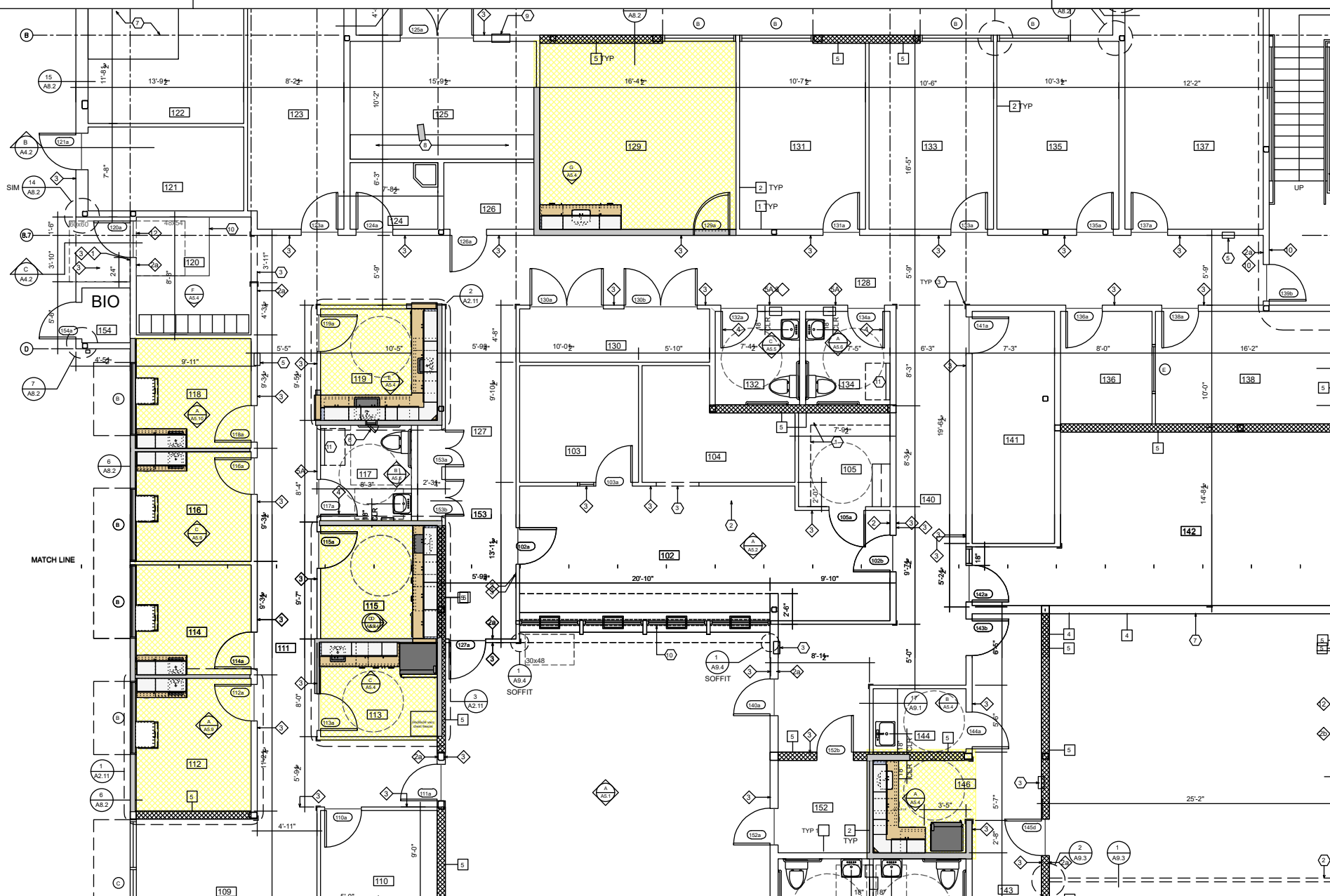


Pearl Essence
Panel/Cabinet

(Signature)

(Date)

1st Floor Plan View





www.midmark.com
design@midmark.com
Phone: 1-800-MIDMARK

Project Name **MOCO Behavioral Health Clinic**

Project # **MS210387**

Phase **01**

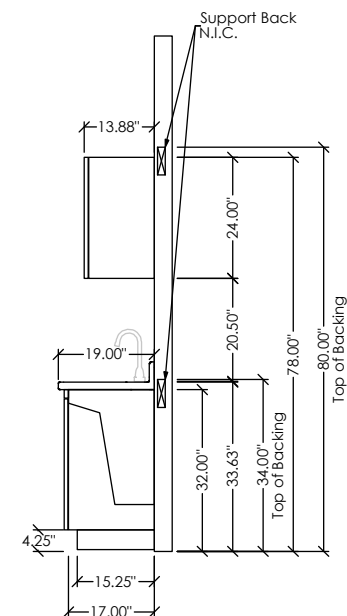
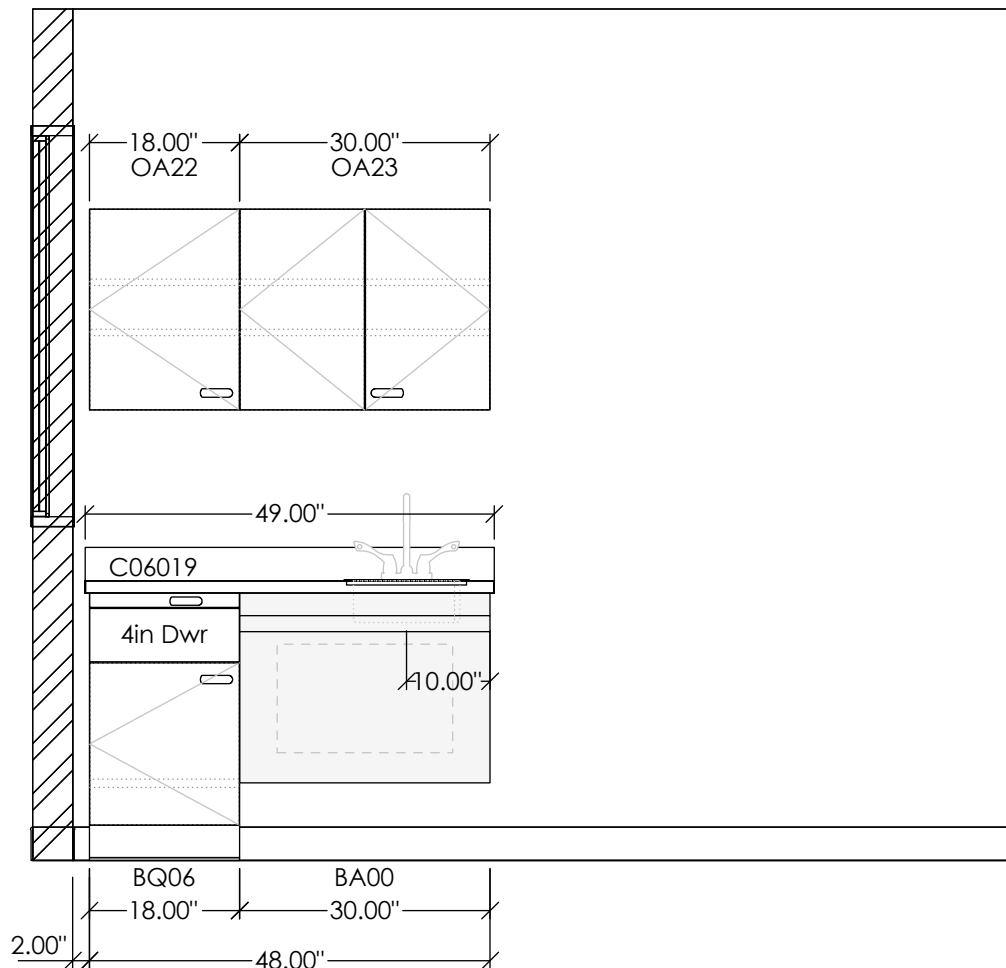
Rev: **3**

**Signed Drawings Required To
Process Order**

Base Finish:	805-Pearl Essence	Tasklight:	None	Top Material:	Solid Surface
Upper Finish:	805-Pearl Essence	Grommet:	None	Top Color:	Clam Shell
Panel Style:	Serenity Panel	Ultrasonic:	None	Note:	
Handle:	Copper Bent	Note:		Sink:	CSK-S131105-2
Lock:	Keyless Locking (See Elevation)	Note:		Faucet:	CFT-3GS4WB-2

(Signature)

(Date)



To meet ADA requirements, the highest point of the base cabinet set-up (including countertop and sink) is to be mounted at 34



www.midmark.com
design@midmark.com
Phone: 1-800-MIDMARK

Project Name **MOCO Behavioral Health Clinic**

Project # **MS210387**

Phase **01**

Rev: **3**

**Signed Drawings Required To
Process Order**

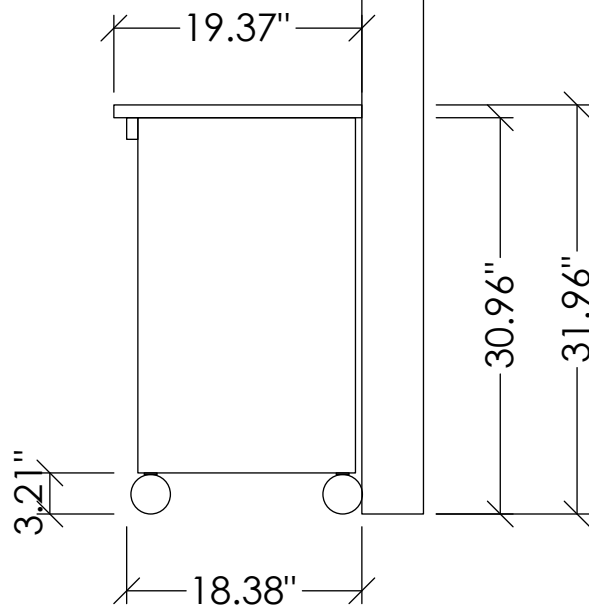
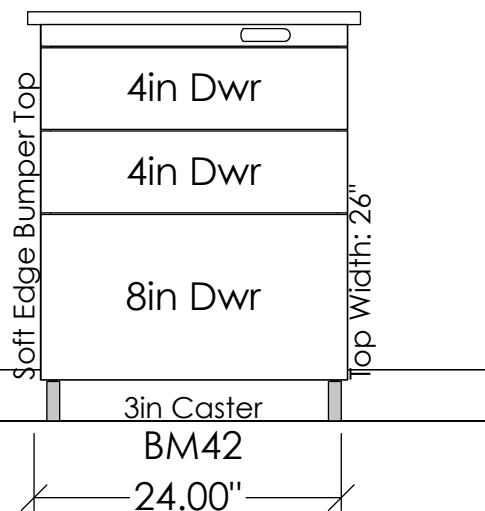
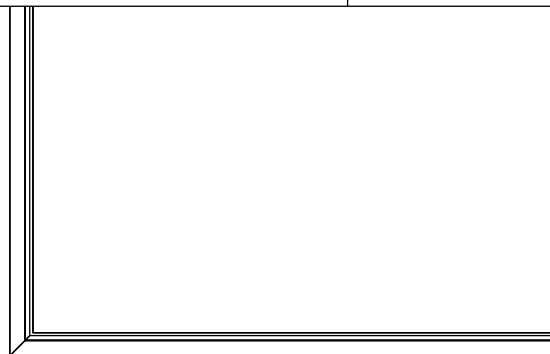
Base Finish: 805-Pearl Essence
Upper Finish:
Panel Style: Serenity Panel
Handle: Copper Bent
Lock: Keyless Locking (See Elevation)

Tasklight: None
Grommet: None
Ultrasonic: None
Note:
Note:

Top Material: Soft Edge Bumper Top
Top Color: None
Note:
Sink: None
Faucet: None

(Signature)

(Date)



112 Exam Rm



www.midmark.com
design@midmark.com
Phone: 1-800-MIDMARK

Project Name **MOCO Behavioral Health Clinic**

Project # **MS210387**

Phase **01**

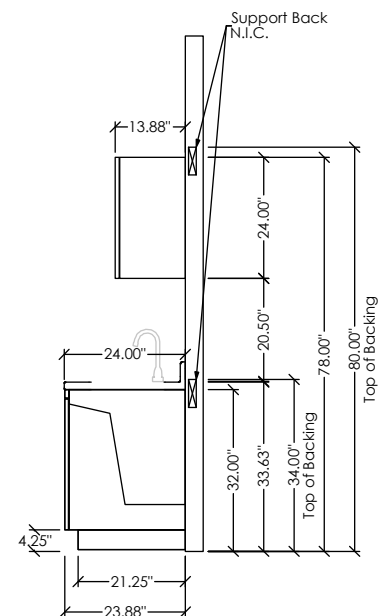
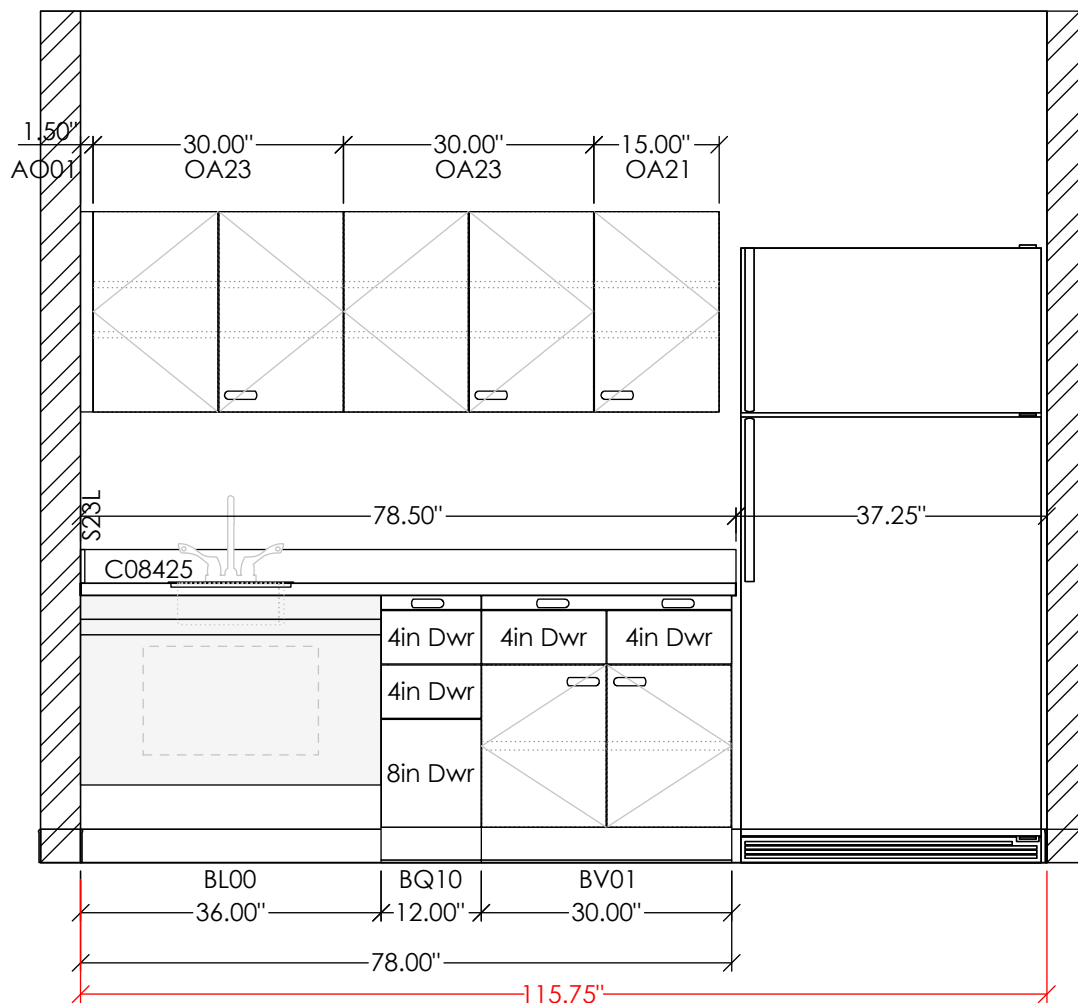
Rev: **3**

**Signed Drawings Required To
Process Order**

Base Finish:	805-Pearl Essence	Tasklight:	None	Top Material:	Solid Surface
Upper Finish:	805-Pearl Essence	Grommet:	None	Top Color:	Clam Shell
Panel Style:	Serenity Panel	Ultrasonic:	None	Note:	
Handle:	Copper Bent	Note:		Sink:	CSK-S131105-2
Lock:	Keyless Locking (See Elevation)	Note:	Field Measurement Required	Faucet:	CFT-3GS4WB-2

(Signature)

(Date)



To meet ADA requirements, the highest point of the base cabinet set-up (including countertop and sink) is to be mounted at 34



www.midmark.com
design@midmark.com
Phone: 1-800-MIDMARK

Project Name **MOCO Behavioral Health Clinic**

Project # **MS210387**

Phase **01**

Rev: **3**

**Signed Drawings Required To
Process Order**

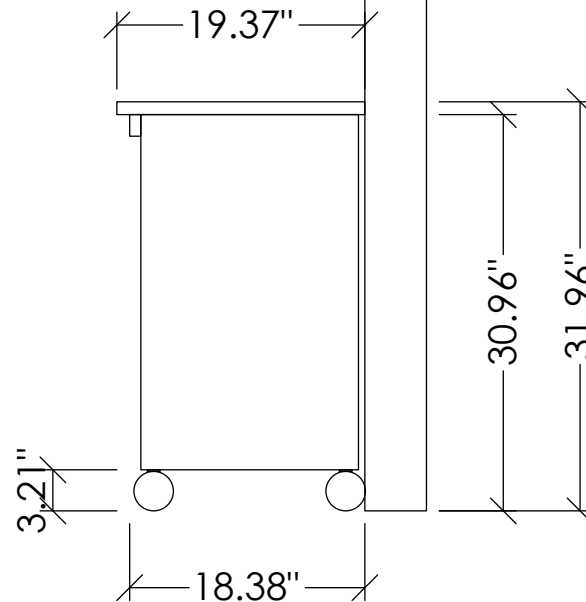
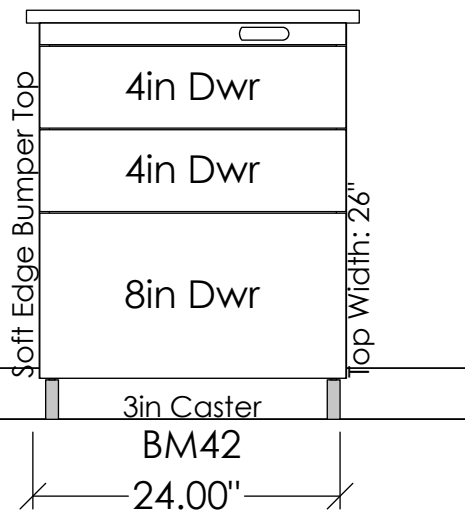
Base Finish: 805-Pearl Essence
Upper Finish:
Panel Style: Serenity Panel
Handle: Copper Bent
Lock: Keyless Locking (See Elevation)

Tasklight: None
Grommet: None
Ultrasonic: None
Note:
Note:

Top Material: Soft Edge Bumper Top
Top Color: None
Note:
Sink: None
Faucet: None

(Signature)

(Date)



114 Exam Rm



www.midmark.com
design@midmark.com
Phone: 1-800-MIDMARK

Project Name **MOCO Behavioral Health Clinic**

Project # **MS210387**

Phase **01**

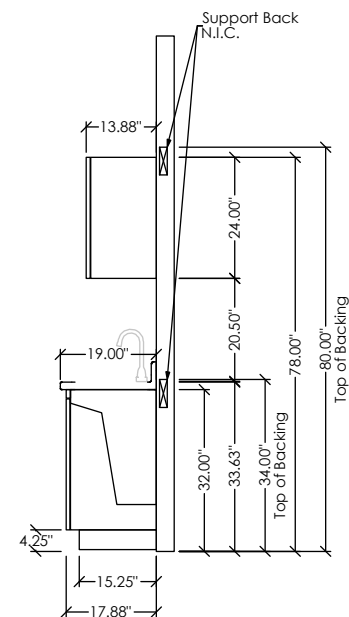
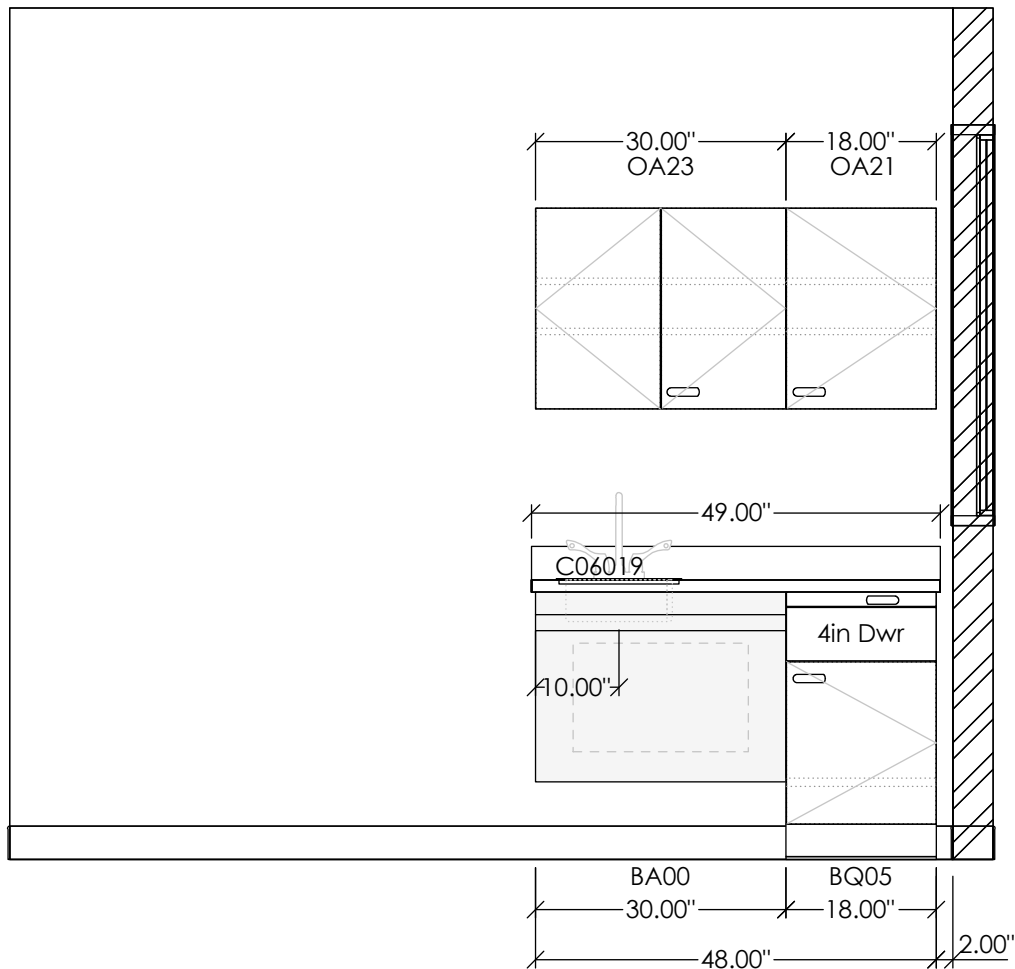
Rev: **3**

**Signed Drawings Required To
Process Order**

Base Finish:	805-Pearl Essence	Tasklight:	None	Top Material:	Solid Surface
Upper Finish:	805-Pearl Essence	Grommet:	None	Top Color:	Clam Shell
Panel Style:	Serenity Panel	Ultrasonic:	None	Note:	
Handle:	Copper Bent	Note:		Sink:	CSK-S131105-2
Lock:	Keyless Locking (See Elevation)	Note:		Faucet:	CFT-3GS4WB-2

(Signature)

(Date)



To meet ADA requirements, the highest point of the base cabinet set-up (including countertop and sink) is to be mounted at 34



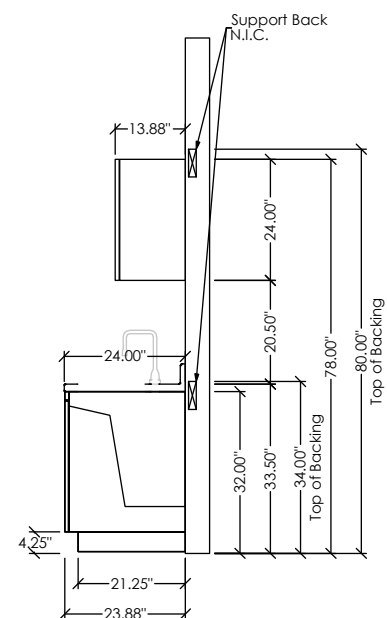
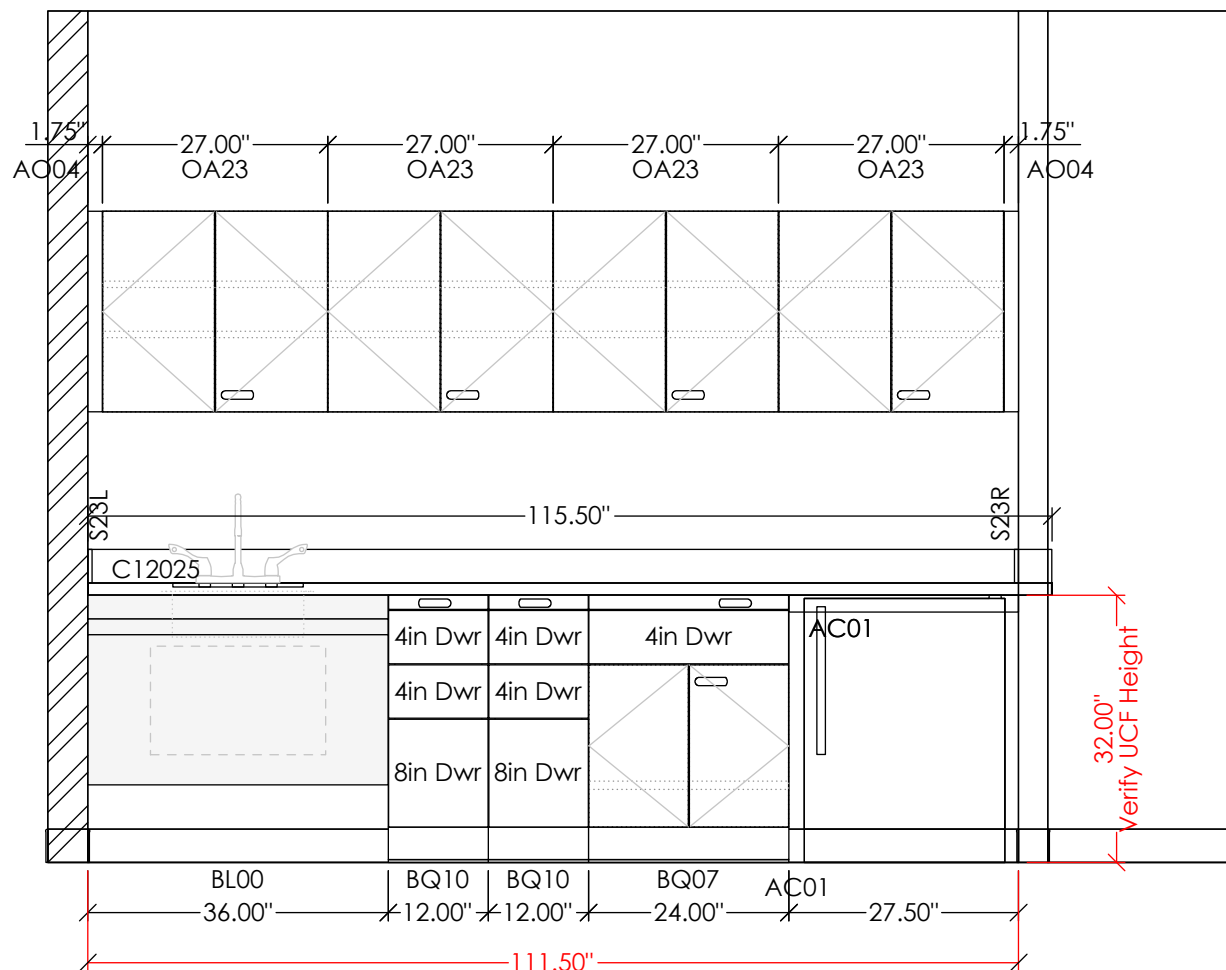
Rev: 3

**Signed Drawings Required To
Process Order**

Base Finish:	805-Pearl Essence	Tasklight:	None	Top Material:	Solid Surface
Upper Finish:	805-Pearl Essence	Grommet:	None	Top Color:	Clam Shell
Panel Style:	Serenity Panel	Ultrasonic:	None	Note:	
Handle:	Copper Bent	Note:		Sink:	Karran-E505D
Lock:	Keyless Locking (See Elevation)	Note:	Field Measurement Required	Faucet:	CFT-6GS4WB-3

(Signature)

(Date)



To meet ADA requirements, the highest point of the base cabinet set-up (including countertop and sink) is to be mounted at 34

115 Clean Rm

See Countertop Detail Sheet: Solid Surface B , Rolled Edge w/ Int BS 1" x 4"



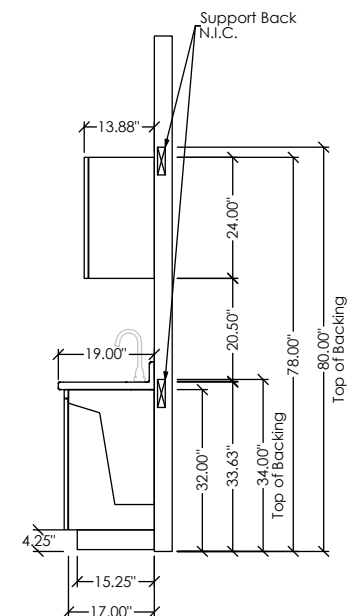
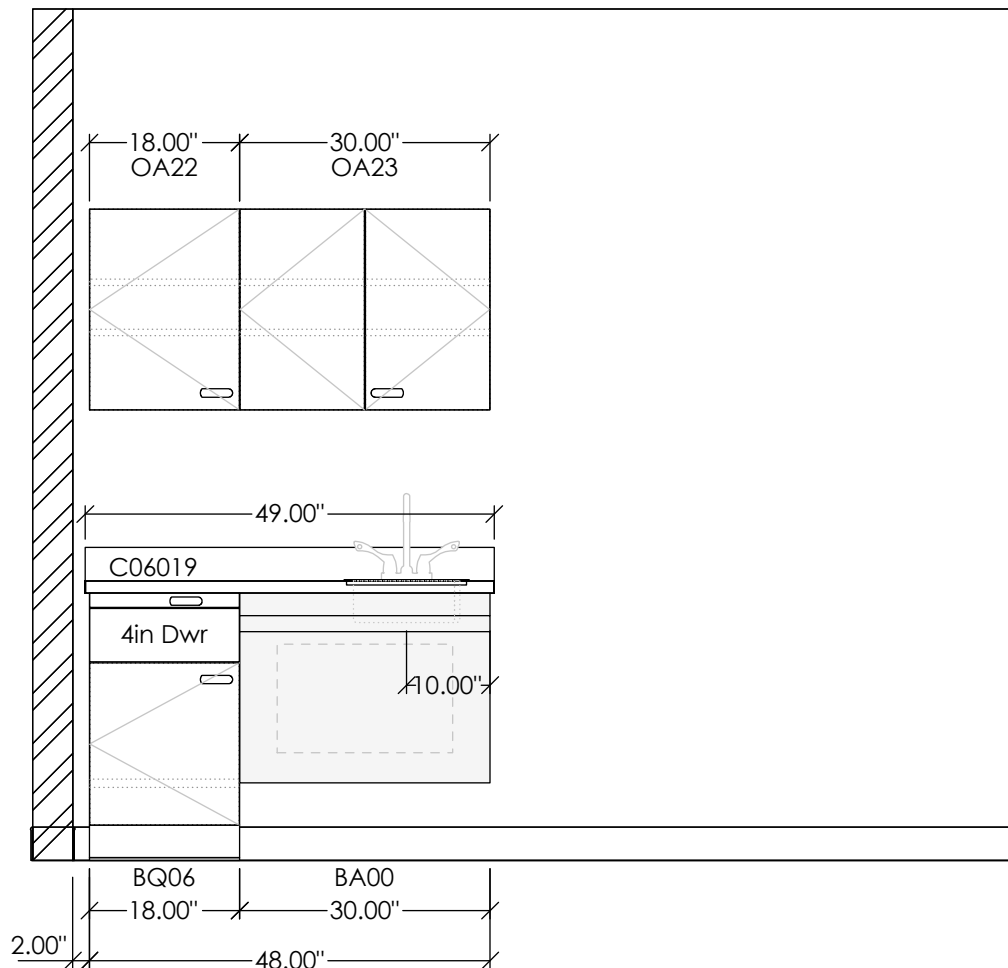
Rev: 3

**Signed Drawings Required To
Process Order**

Base Finish:	805-Pearl Essence	Tasklight:	None	Top Material:	Solid Surface
Upper Finish:	805-Pearl Essence	Grommet:	None	Top Color:	Clam Shell
Panel Style:	Serenity Panel	Ultrasonic:	None	Note:	
Handle:	Copper Bent	Note:		Sink:	CSK-S131105-2
Lock:	Keyless Locking (See Elevation)	Note:		Faucet:	CFT-3GS4WB-2

(Signature)

(Date)



To meet ADA requirements, the highest point of the base cabinet set-up (including countertop and sink) is to be mounted at 34

See Countertop Detail Sheet: Solid Surface B , Rolled Edge w/ Int BS 1" x 4"



www.midmark.com
design@midmark.com
Phone: 1-800-MIDMARK

Project Name **MOCO Behavioral Health Clinic**

Project # **MS210387**

Phase **01**

Rev: **3**

**Signed Drawings Required To
Process Order**

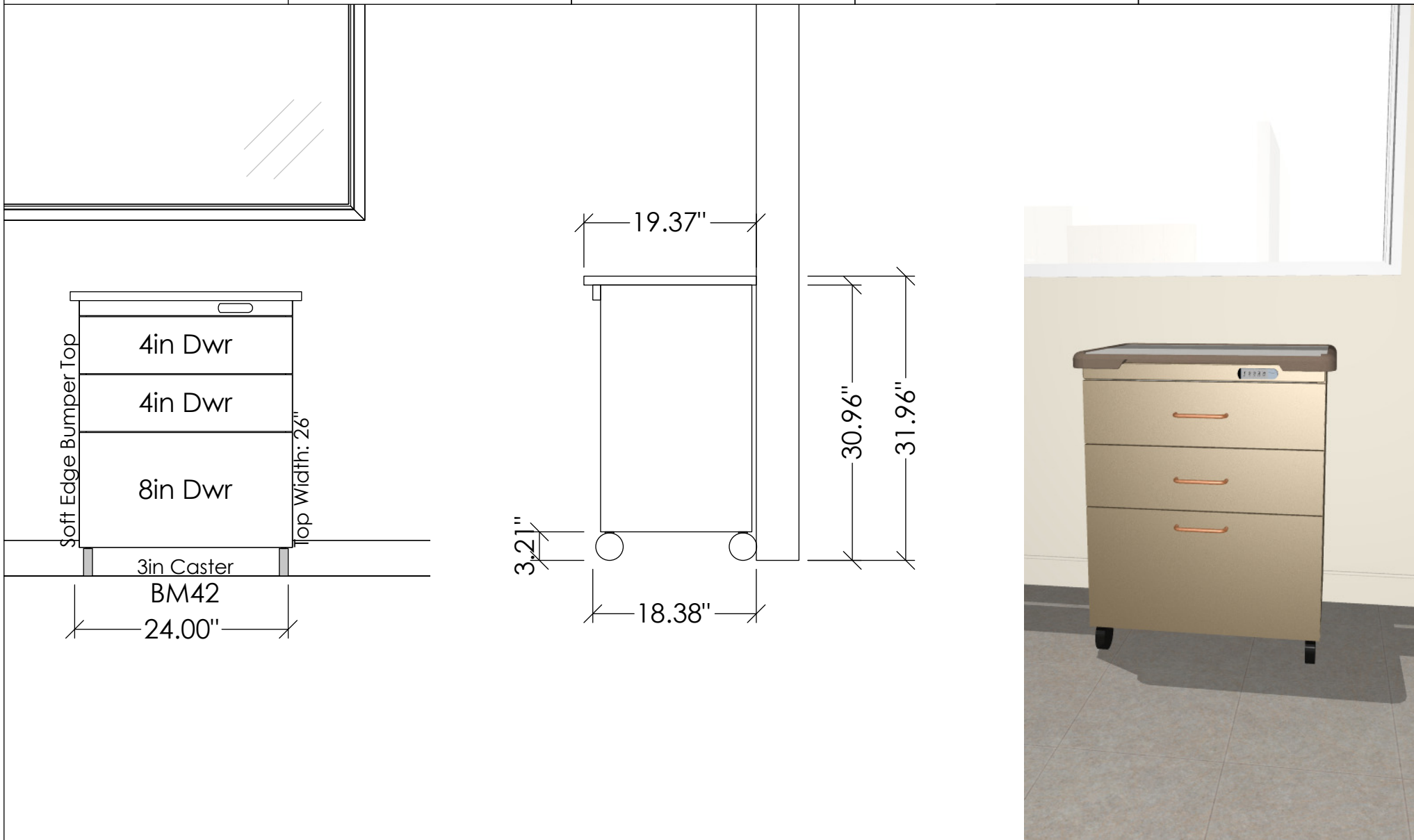
Base Finish: 805-Pearl Essence
Upper Finish:
Panel Style: Serenity Panel
Handle: Copper Bent
Lock: Keyless Locking (See Elevation)

Tasklight: None
Grommet: None
Ultrasonic: None
Note:
Note:

Top Material: Soft Edge Bumper Top
Top Color: None
Note:
Sink: None
Faucet: None

(Signature)

(Date)



116 Exam Rm



www.midmark.com
design@midmark.com
Phone: 1-800-MIDMARK

Project Name **MOCO Behavioral Health Clinic**

Project # **MS210387**

Phase **01**

Rev: **3**

**Signed Drawings Required To
Process Order**

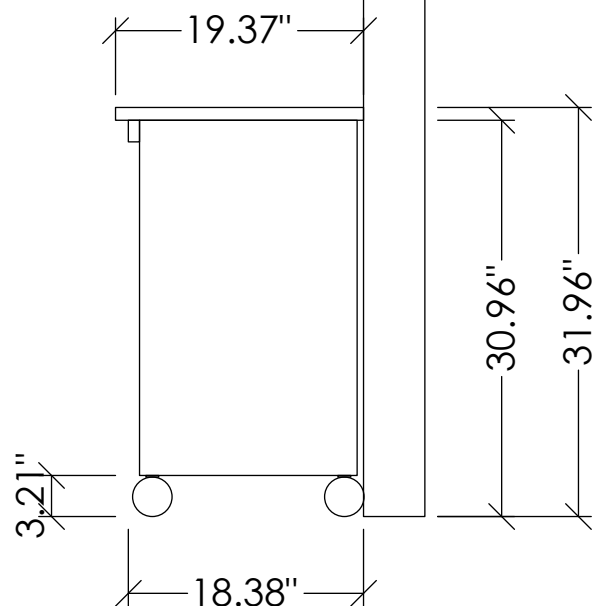
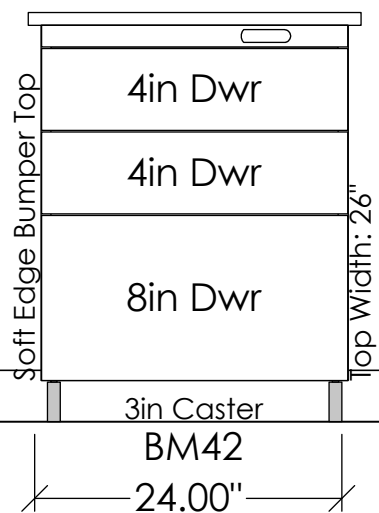
Base Finish: 805-Pearl Essence
Upper Finish:
Panel Style: Serenity Panel
Handle: Copper Bent
Lock: Keyless Locking (See Elevation)

Tasklight: None
Grommet: None
Ultrasonic: None
Note:
Note:

Top Material: Soft Edge Bumper Top
Top Color: None
Note:
Sink: None
Faucet: None

(Signature)

(Date)



118 Exam Rm



www.midmark.com
design@midmark.com
Phone: 1-800-MIDMARK

Project Name **MOCO Behavioral Health Clinic**

Project # **MS210387**

Phase **01**

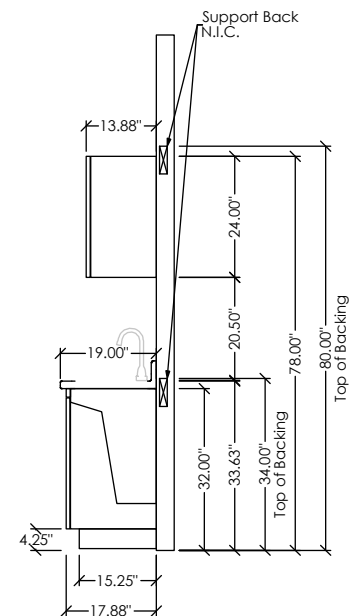
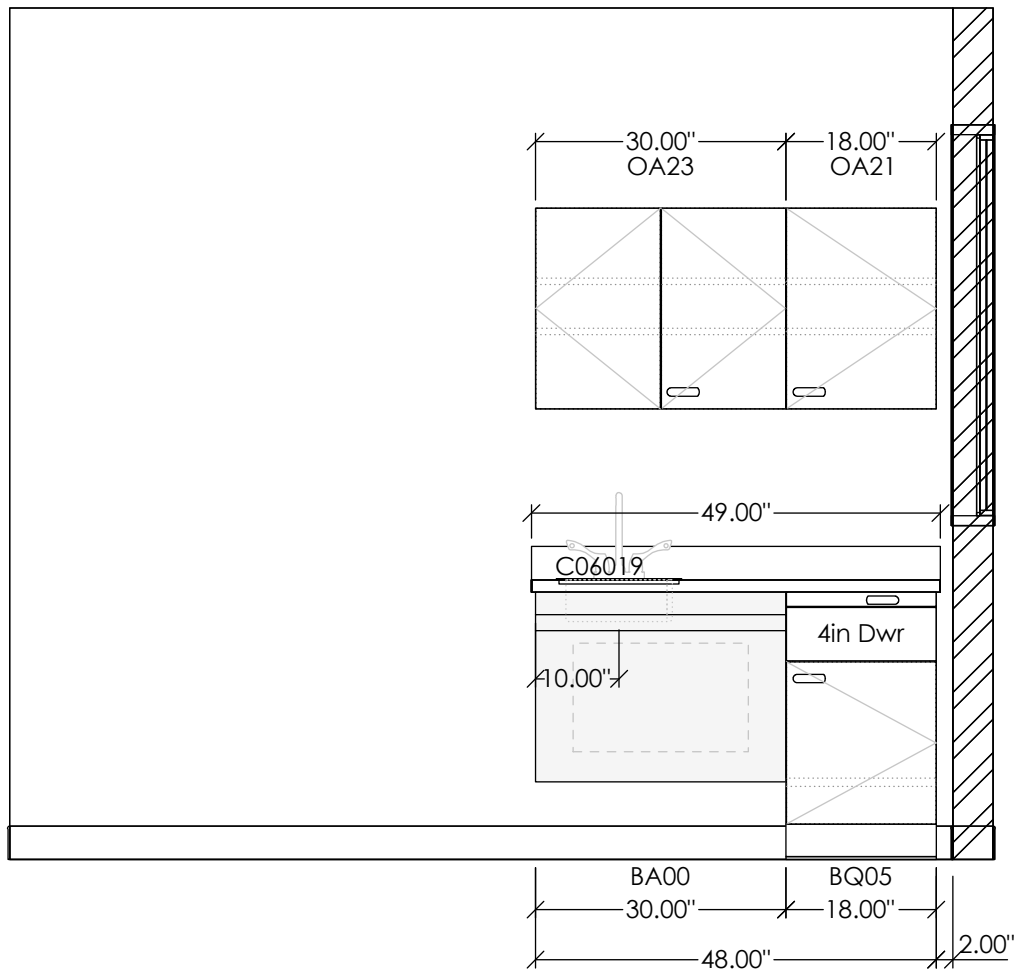
Rev: **3**

**Signed Drawings Required To
Process Order**

Base Finish:	805-Pearl Essence	Tasklight:	None	Top Material:	Solid Surface
Upper Finish:	805-Pearl Essence	Grommet:	None	Top Color:	Clam Shell
Panel Style:	Serenity Panel	Ultrasonic:	None	Note:	
Handle:	Copper Bent	Note:		Sink:	CSK-S131105-2
Lock:	Keyless Locking (See Elevation)	Note:		Faucet:	CFT-3GS4WB-2

(Signature)

(Date)



To meet ADA requirements, the highest point of the base cabinet set-up (including countertop and sink) is to be mounted at 34



www.midmark.com
design@midmark.com
Phone: 1-800-MIDMARK

Project Name **MOCO Behavioral Health Clinic**

Project # **MS210387**

Phase **01**

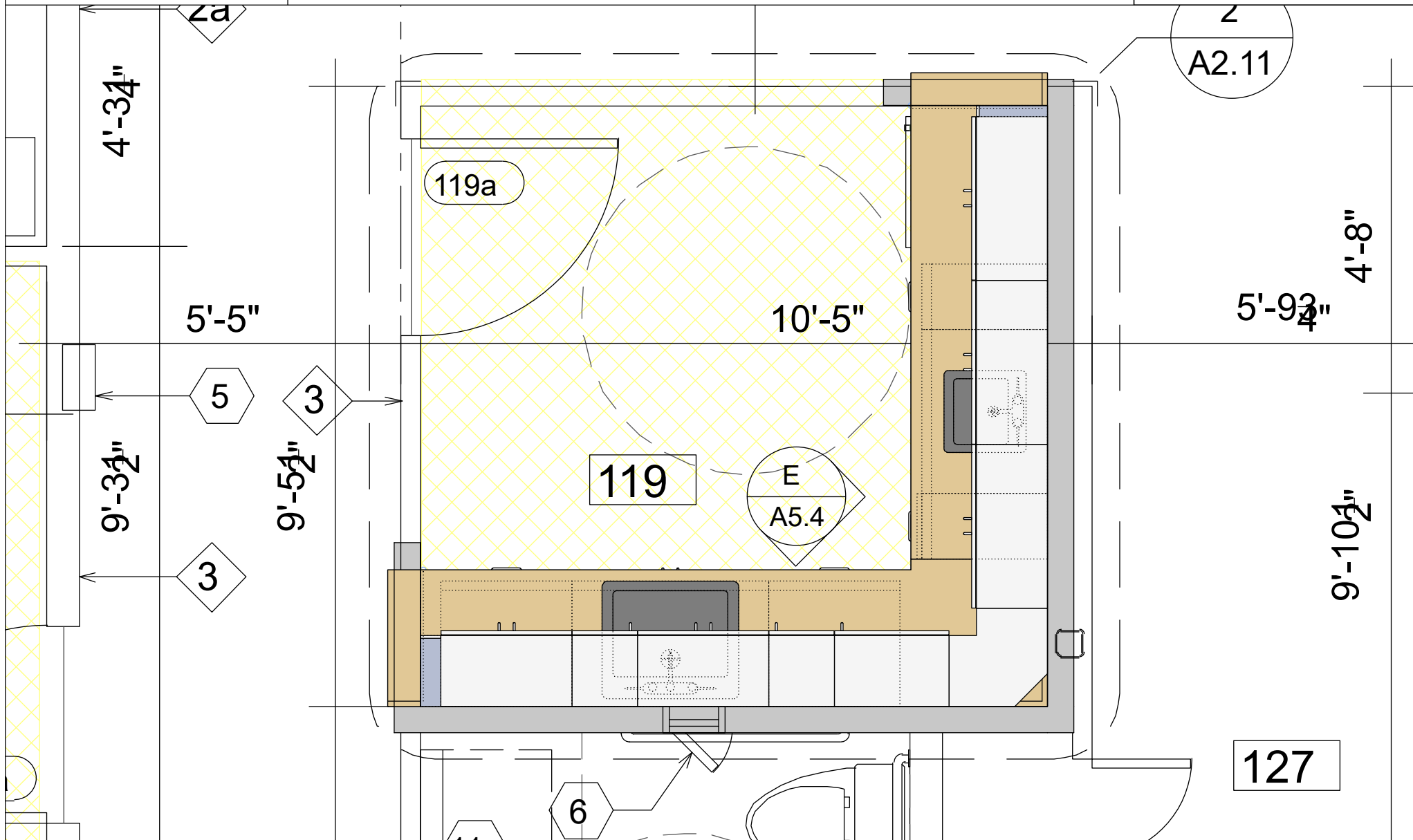
Rev: **3**

**Signed Drawings Required To
Process Order**

Room Plan View

(Signature)

(Date)



119 Dirty Rm



www.midmark.com
design@midmark.com
Phone: 1-800-MIDMARK

Project Name **MOCO Behavioral Health Clinic**

Project # **MS210387**

Phase **01**

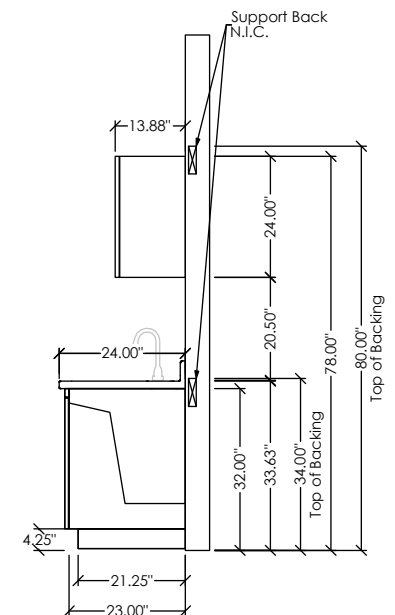
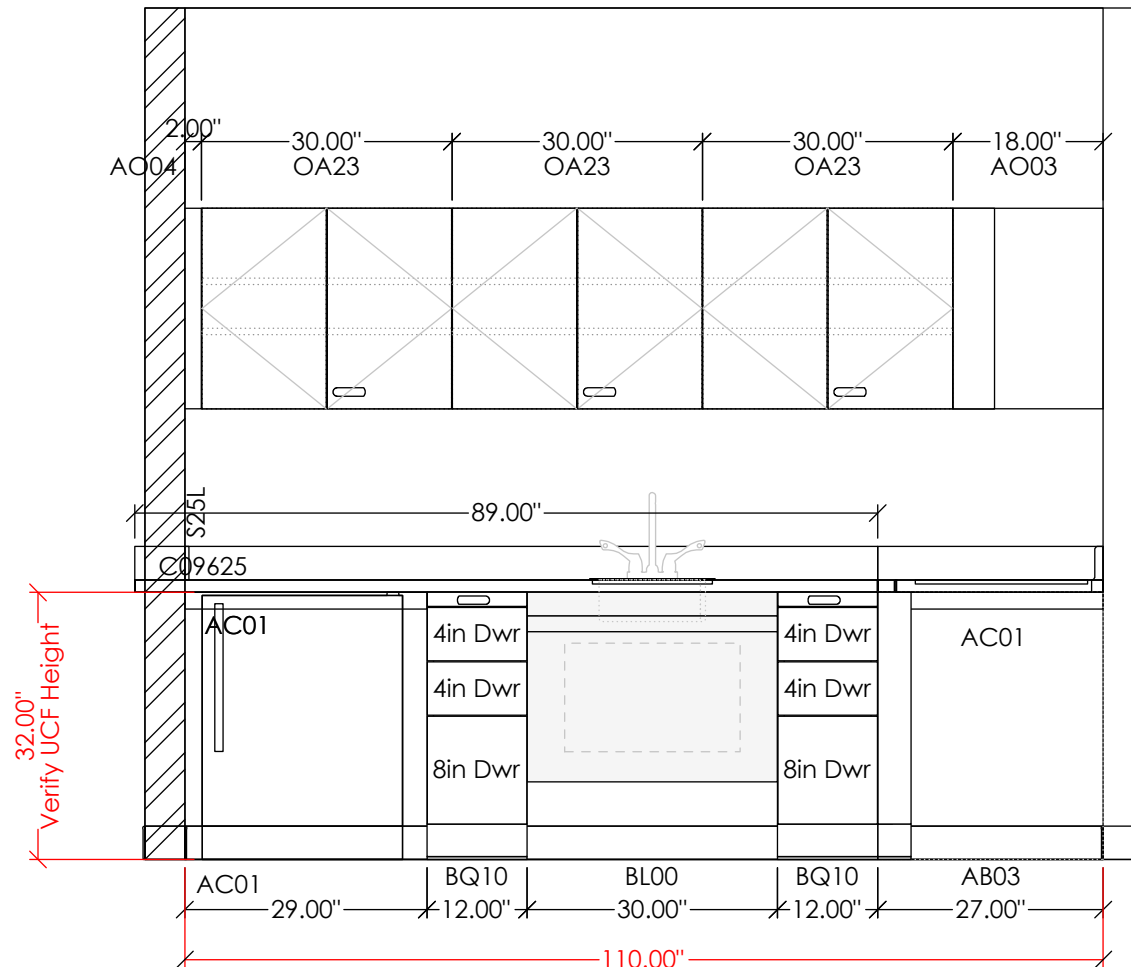
Rev: **3**

**Signed Drawings Required To
Process Order**

Base Finish:	805-Pearl Essence	Tasklight:	None	Top Material:	Solid Surface
Upper Finish:	805-Pearl Essence	Grommet:	None	Top Color:	Clam Shell
Panel Style:	Serenity Panel	Ultrasonic:	None	Note:	
Handle:	Copper Bent	Note:		Sink:	CSK-S131105-2
Lock:	Keyless Locking (See Elevation)	Note:	Field Measurement Required	Faucet:	CFT-3GS4WB-2

(Signature)

(Date)



To meet ADA requirements, the highest point of the base cabinet set-up (including countertop and sink) is to be mounted at 34"

119 Dirty Rm

See Countertop Detail Sheet: Solid Surface B , Rolled Edge w/ Int BS 1" x 4"



www.midmark.com
design@midmark.com
Phone: 1-800-MIDMARK

Project Name **MOCO Behavioral Health Clinic**

Project # **MS210387**

Phase **01**

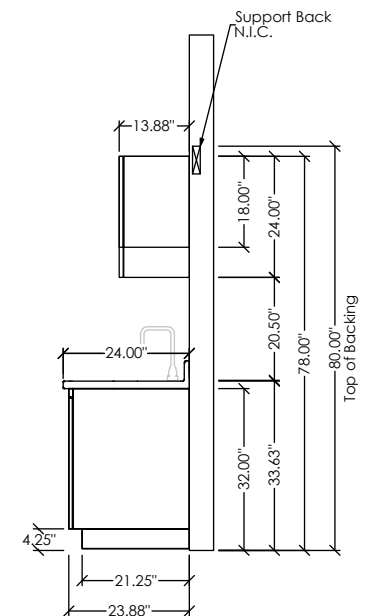
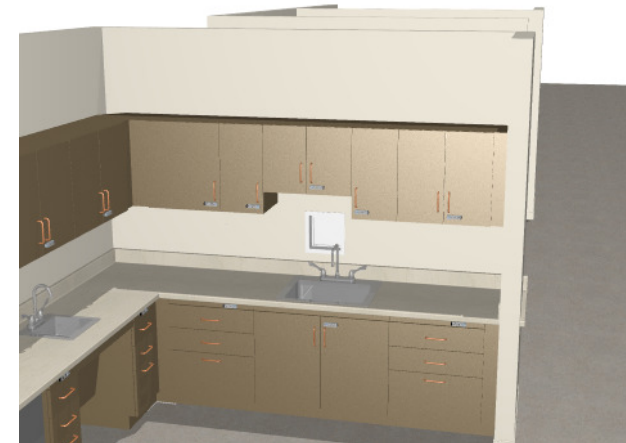
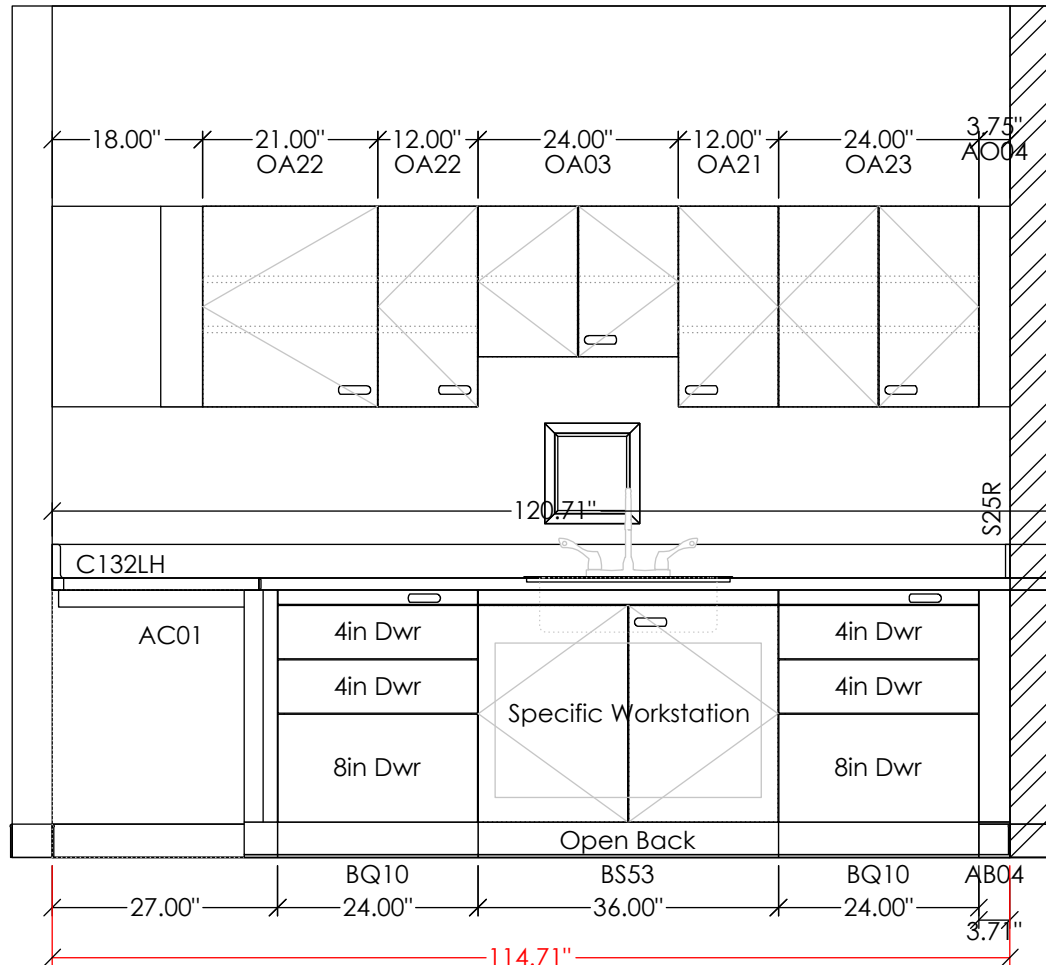
Rev: **3**

**Signed Drawings Required To
Process Order**

Base Finish:	805-Pearl Essence	Tasklight:	None	Top Material:	Solid Surface
Upper Finish:	805-Pearl Essence	Grommet:	None	Top Color:	Clam Shell
Panel Style:	Serenity Panel	Ultrasonic:	None	Note:	
Handle:	Copper Bent	Note:		Sink:	CSK-S211607-3
Lock:	Keyless Locking (See Elevation)	Note:	Field Measurement Required	Faucet:	CFT-6GS4WB-3

(Signature)

(Date)



To meet ADA requirements, the highest point of the base cabinet set-up (including countertop and sink) is to be mounted at 34"

119 Dirty Rm

See Countertop Detail Sheet: Solid Surface B, Rolled Edge w/ Int BS 1" x 4"



www.midmark.com
design@midmark.com
Phone: 1-800-MIDMARK

Project Name: **MOCO Behavioral Health Clinic**

Project #: **MS210387**

Phase **01**

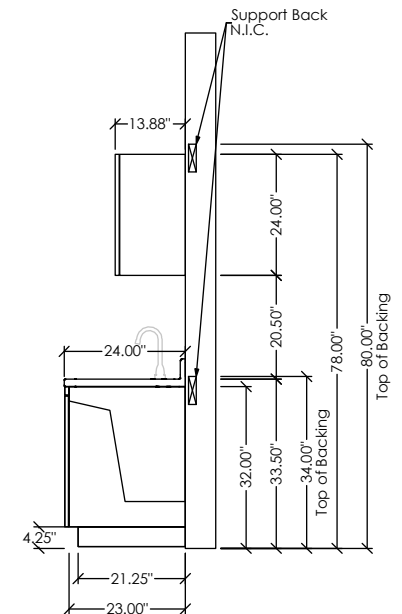
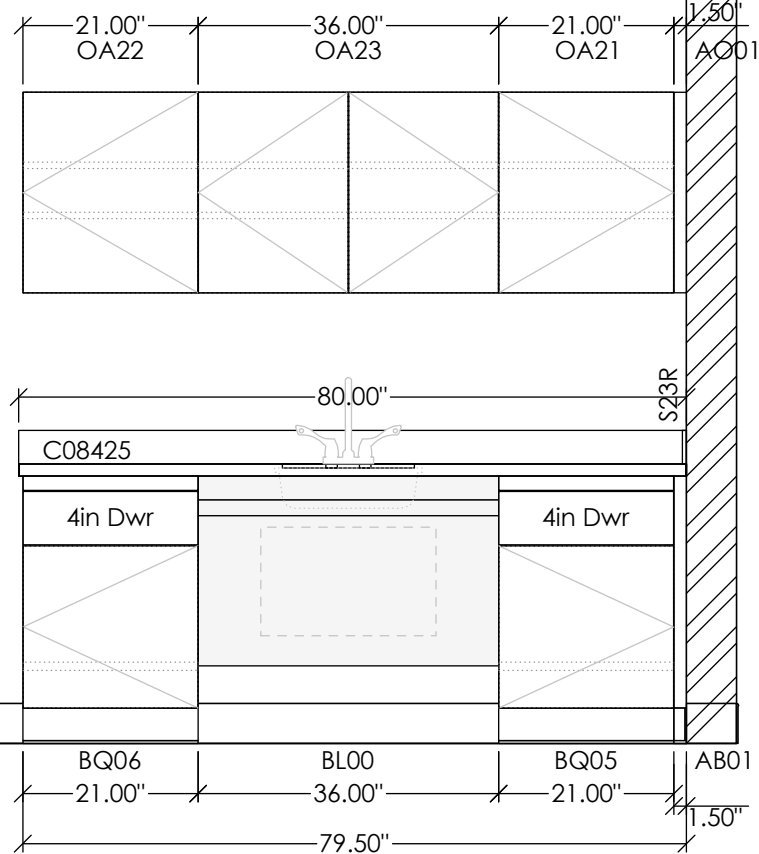
Rev: **3**

**Signed Drawings Required To
Process Order**

Base Finish:	805-Pearl Essence	Tasklight:	None	Top Material:	Solid Surface
Upper Finish:	805-Pearl Essence	Grommet:	None	Top Color:	Clam Shell
Panel Style:	Serenity Panel	Ultrasonic:	None	Note:	
Handle:	Copper Bent	Note:		Sink:	802 Sink
Lock:	No Lock	Note:		Faucet:	CFT-3GS4WB-2

(Signature)

(Date)



To meet ADA requirements, the highest point of the base cabinet set-up (including countertop and sink) is to be mounted at 34"



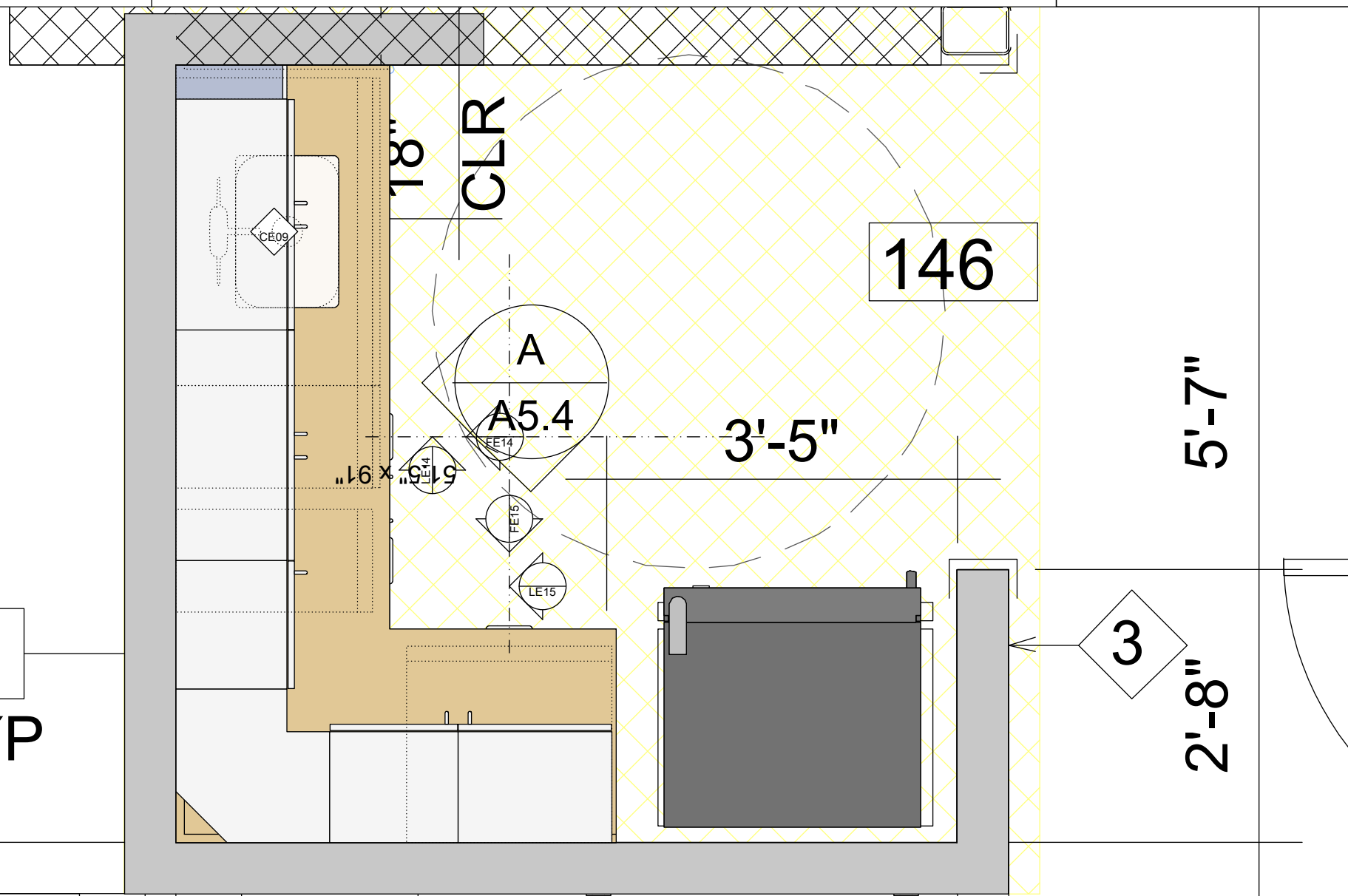
Rev: 3

**Signed Drawings Required To
Process Order**

(Signature)

(Date)

Room Plan View



146 Kitchenette



www.midmark.com
design@midmark.com
Phone: 1-800-MIDMARK

Project Name: **MOCO Behavioral Health Clinic**

Project #: **MS210387**

Phase **01**

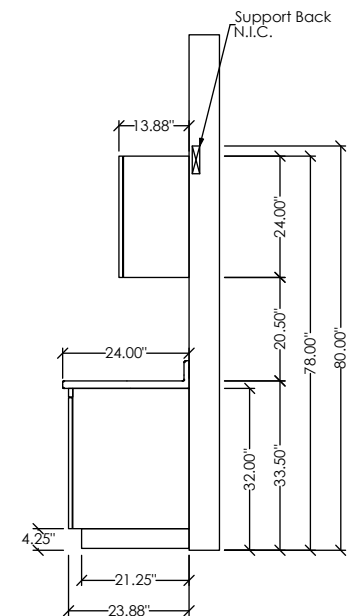
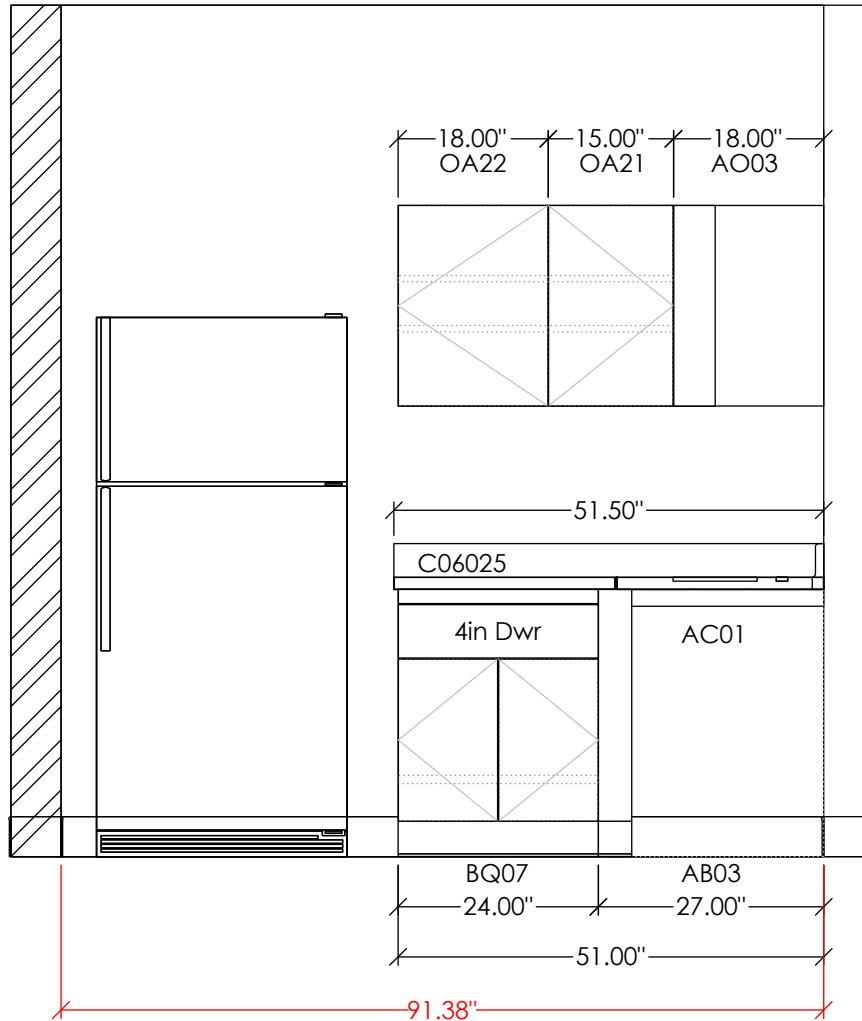
Rev: **3**

**Signed Drawings Required To
Process Order**

Base Finish:	805-Pearl Essence	Tasklight:	None	Top Material:	Solid Surface
Upper Finish:	805-Pearl Essence	Grommet:	None	Top Color:	Clam Shell
Panel Style:	Serenity Panel	Ultrasonic:	None	Note:	
Handle:	Copper Bent	Note:		Sink:	None
Lock:	No Lock	Note:	Field Measurement Required	Faucet:	None

(Signature)

(Date)





www.midmark.com
design@midmark.com
Phone: 1-800-MIDMARK

Project Name: **MOCO Behavioral Health Clinic**

Project #: **MS210387**

Phase **01**

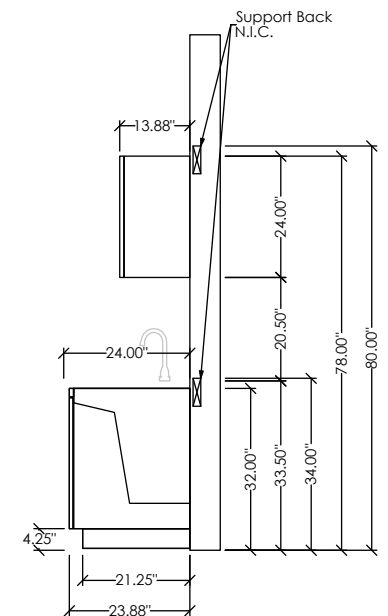
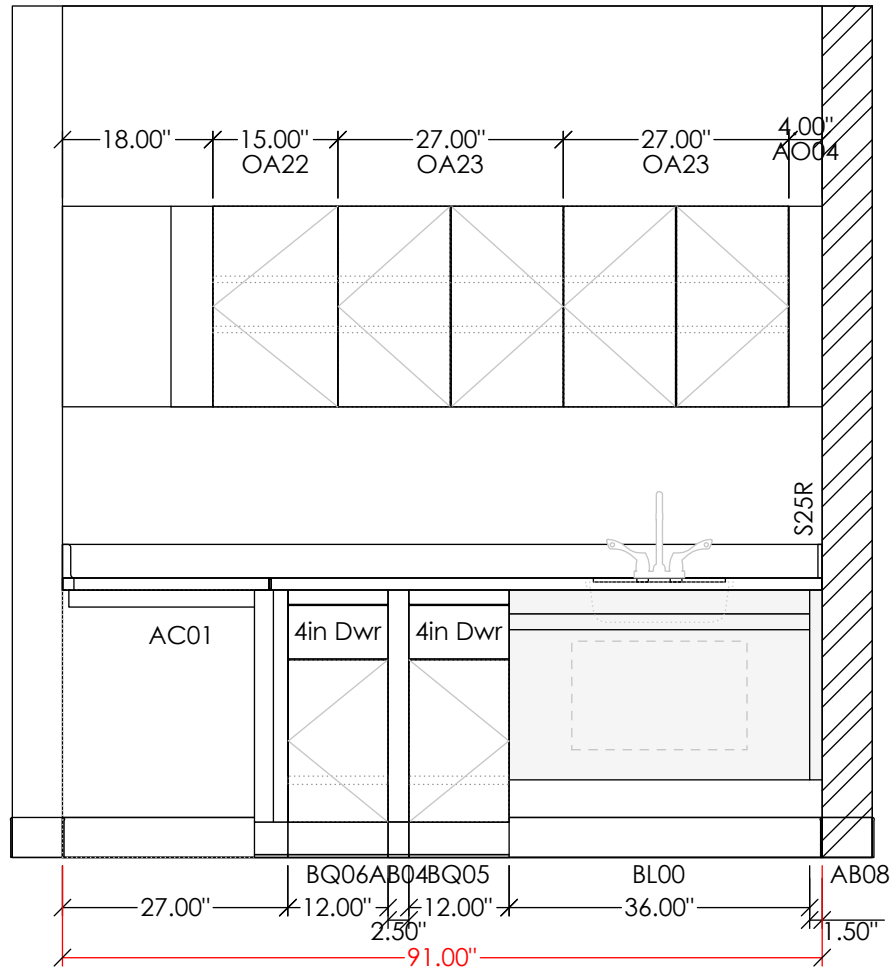
Rev: **3**

**Signed Drawings Required To
Process Order**

Base Finish:	805-Pearl Essence	Tasklight:	None	Top Material:	Solid Surface
Upper Finish:	805-Pearl Essence	Grommet:	None	Top Color:	Clam Shell
Panel Style:	Serenity Panel	Ultrasonic:	None	Note:	
Handle:	Copper Bent	Note:		Sink:	802 Sink
Lock:	No Lock	Note:	Field Measurement Required	Faucet:	CFT-3GS4WB-2

(Signature)

(Date)



146 Kitchenette

See Countertop Detail Sheet: Solid Surface B , Rolled Edge w/ Int BS 1" x 4"



www.midmark.com
design@midmark.com
Phone: 1-800-MIDMARK

Project Name: **MOCO Behavioral Health Clinic**

Project #: **MS210387**

Phase **01**

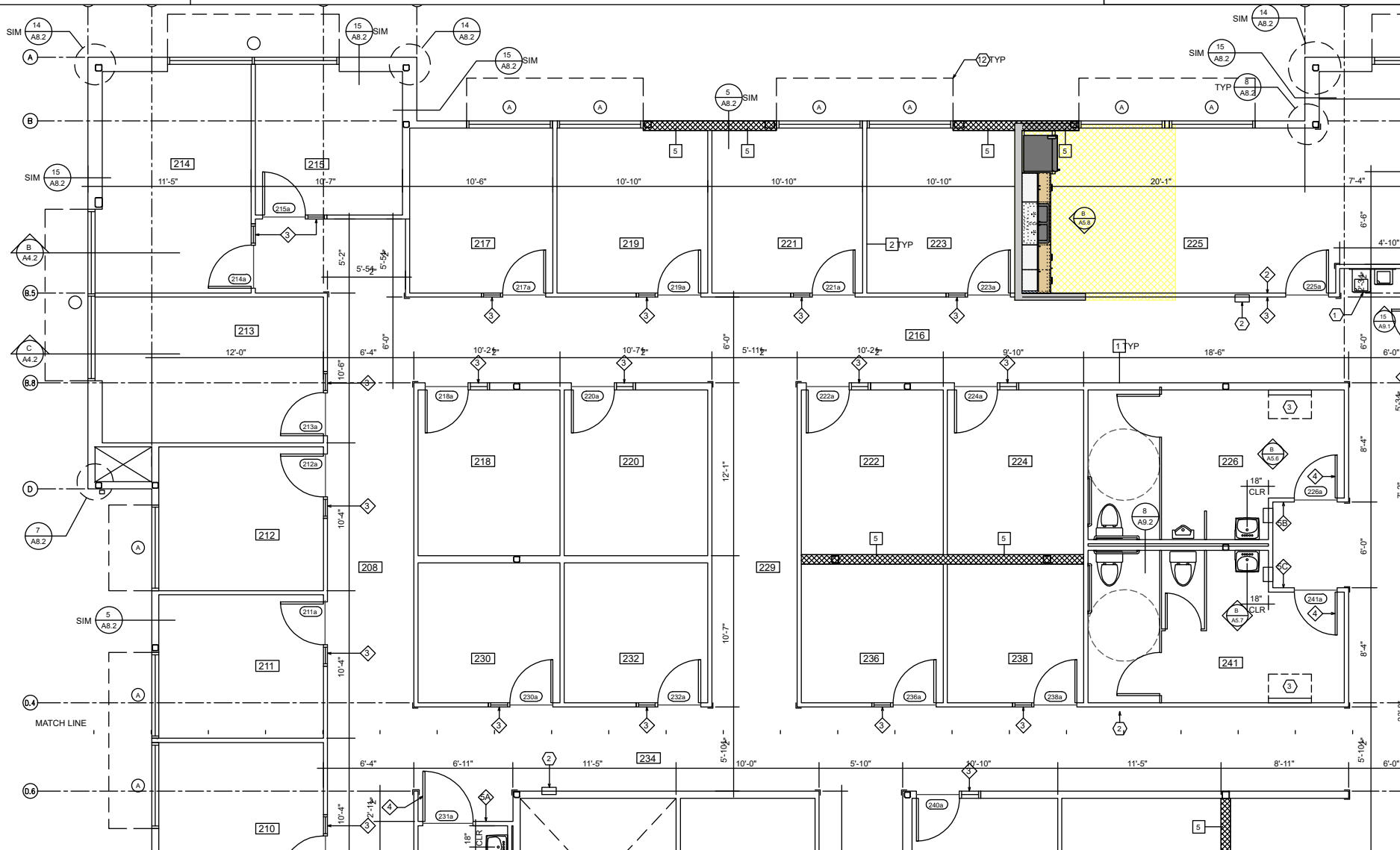
Rev: **3**

**Signed Drawings Required To
Process Order**

2nd Floor Plan View

(Signature)

(Date)



ENLARGED PARTIAL SECOND FLOOR PLAN



www.midmark.com
design@midmark.com
Phone: 1-800-MIDMARK

Project Name: **MOCO Behavioral Health Clinic**

Project #: **MS210387**

Phase **01**

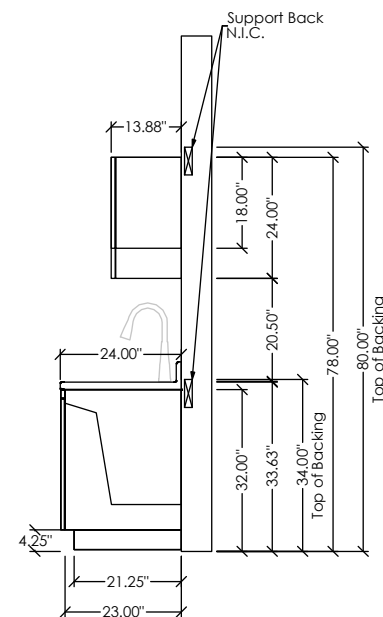
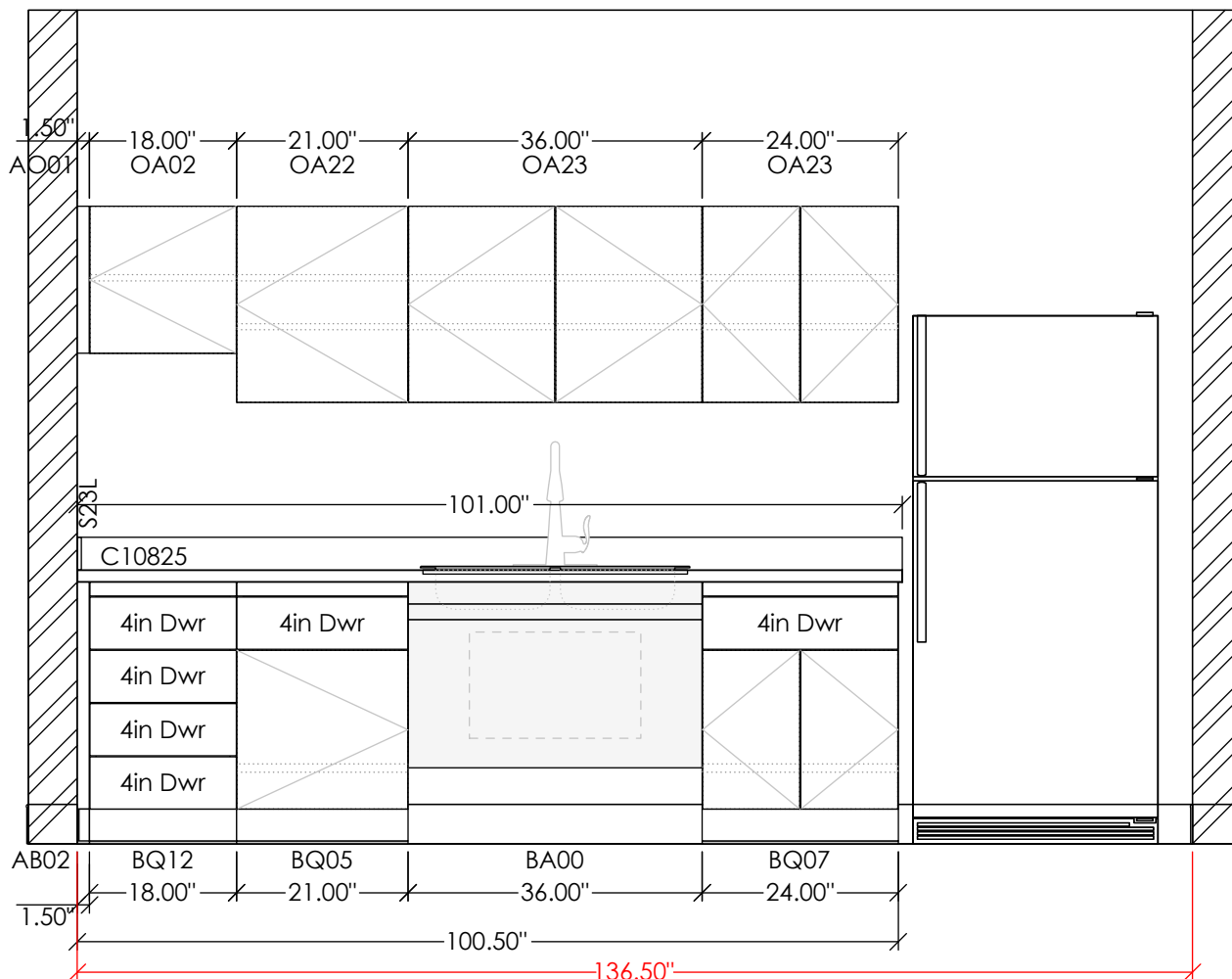
Rev: **3**

**Signed Drawings Required To
Process Order**

Base Finish:	805-Pearl Essence	Tasklight:	None	Top Material:	Solid Surface
Upper Finish:	805-Pearl Essence	Grommet:	None	Top Color:	Clam Shell
Panel Style:	Serenity Panel	Ultrasonic:	None	Note:	
Handle:	Copper Bent	Note:		Sink:	CSK-D141605-3
Lock:	No Lock	Note:	Field Measurement Required	Faucet:	CFT-8CHGSPULL-3

(Signature)

(Date)



To meet ADA requirements, the highest point of the base cabinet set-up (including countertop and sink) is to be mounted at 34"

225 Staff Rm

See Countertop Detail Sheet: Solid Surface B , Rolled Edge w/ Int BS 1" x 4"

Design Considerations:

- * Tops that exceed 144" or form an "L" or "U" shape will be sent as multiple pieces and require field seaming by a qualified solid surface fabricator.
- * Integrated and undermount sinks and chutes will be attached.
- * Sink and faucet cutouts provided only if sink and faucet are purchased from Midmark.
- * Tops will be manufactured based on the field measurements provided at the time of order. Tops may be sent long. See elevations for exact countertop width.
- * Side splashes next to tall towers and drop down ultrasonic areas will be nonwrapped (see detail drawing).
- * See color guide for standard color options. Confirm availability for nonstandard color options. Extended lead time will apply.

Material:

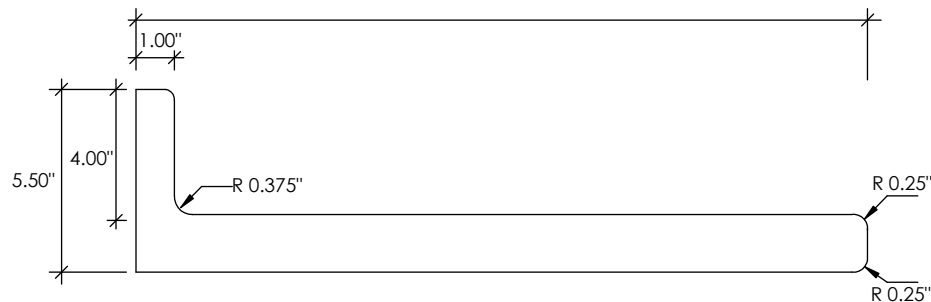
- * 1/2" thick solid surface material.

Features:

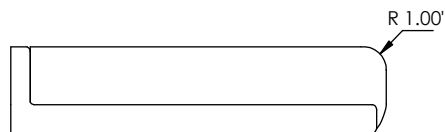
- * Outside corners of solid surface tops will have 3/8" radius.
- * Standard countertop overhang for base cabinets is 1/2".
- * Integrated solid surface sink will be Cameo White.
- * Loose set on side splash available.

Detail drawings:

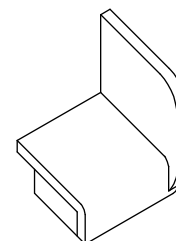
See Side Elevation



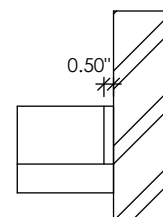
Countertop Detail



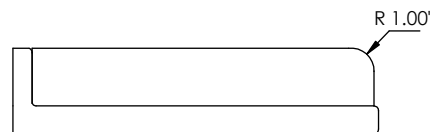
Wrapped Side Splash Detail



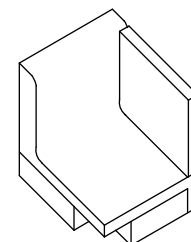
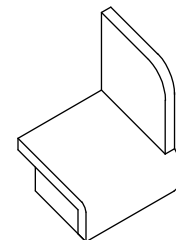
Wrapped Side Splash
Front Edge 3D



Side Splash Front Detail



Non Wrapped Side Splash Detail
Nonwrapped Side Splash
Front Edge 3D

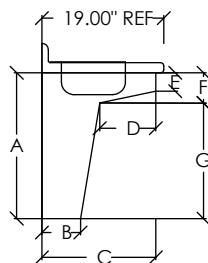


Side Splash &
Backsplash 3D

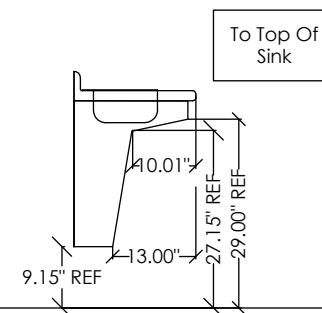
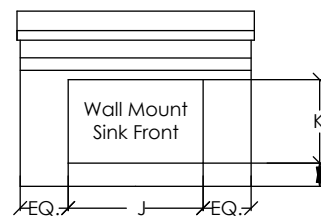
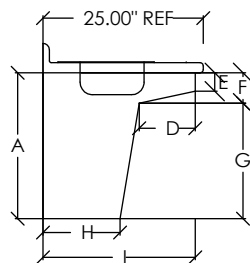
Wall Mount Sink BL00 Cabinet

Cabinet Clearance Guidelines:

Letter	Length
A	22.71"
B	6.00"
C	17.75"
D	8.76"
E	2.85"
F	4.71"
G	17.99"
H	12.00"
I	23.75"
J	21.00"
K	13.00"
L	3.62"

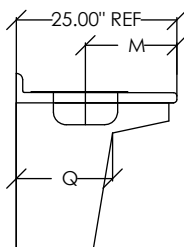
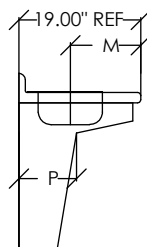


Floor



Sink Clearance Guidelines:

Letter	Note	Length
M	Min Drain	12.01
P	Frame Depth	8.99"
Q	Frame Depth	14.99"



Floor

Disclaimer

Sink cabinets are manufactured to be compliant with the Federal ADA Standards along with other local and state building codes. Please confirm local standards to ensure compliance.

Additional plumbing connections may be required for installation, not provided by Midmark.



Casework Detail Sheet

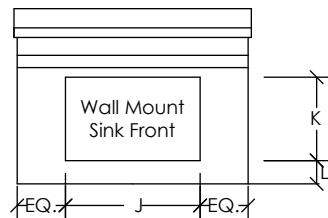
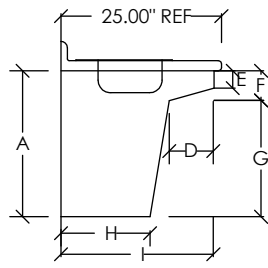
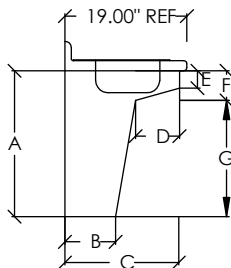
Wall Mount Sink

For Reference Only. Not all cabinet depths may be used in project quotation.

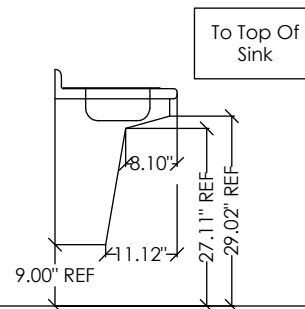
Wall Mount Sink BA00 Cabinet

Cabinet Clearance Guidelines:

Letter	Length
A	22.71"
B	7.88"
C	17.75"
D	6.85"
E	2.69"
F	4.60"
G	18.11"
H	13.88"
I	23.75"
J	21.00"
K	13.00"
L	3.62"



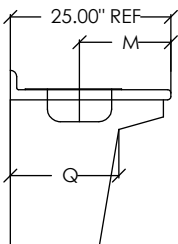
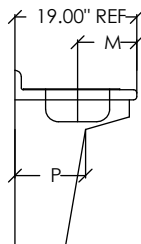
ADA Compliance Reference



Floor

Sink Clearance Guidelines:

Letter	Note	Length
M	Min Drain	10.13
P	Frame Depth	10.90"
Q	Frame Depth	16.90"



Floor

Sink Options:

Sink Name	Laminate		Corian	
	18 Deep	24 Deep	18 Deep	24 Deep
CSK-S131105-	X	X	X	X
CSK-S131105-	X	X	X	X
CSK-S11D05-0	X	X	X	X
CSK-S211605-		X		X
CSK-D141605-		X		X
Corian 802			X*	X

X* - Faucet must be side

Disclaimer

Sink cabinets are manufactured to be compliant with the Federal ADA Standards along with other local and state building codes. Please confirm local standards to ensure compliance.

Additional plumbing connections may be required for installation, not provided by Midmark.

SECTION 12 48 13 - ENTRANCE FLOOR MATS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Resilient entrance mats.
 - 2. Recessed frames.

1.3 COORDINATION

- A. Coordinate size and location of recesses in concrete to receive floor mats and frames.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for floor mats and frames.
- B. Samples: For the following products, in manufacturer's standard sizes:
 - 1. Floor Mat: Assembled sections of floor mat.
 - 2. Frame Members: Sample of each type and color.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For floor mats and frames to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 ENTRANCE FLOOR MATS AND FRAMES, GENERAL

- A. Structural Performance: Provide roll-up rail mats and frames capable of withstanding the following loads and stresses within limits and under conditions indicated:
 - 1. Uniform floor load of 300 lbf/sq. ft.

- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities.

2.2 RECESSED ENTRANCE MATS

- A. Carpet-Type Mats:
 - 1. Recessed Roll-up grid system.
 - a. Ronick Matting System: PediTred LP G3 Entry System.
 - b. Finish: Aluminum Mill
 - c. Heavy Duty Carpet insert: Select from manufacturer's options.
Frame: Recessed with tapered angle.

2.3 FRAMES

- A. Recessed Frames: Manufacturer's standard extrusion.
 - 1. Extruded Aluminum: ASTM B 221, Alloy 6061-T6 or Alloy 6063-T5, T6, or T52.
 - a. Color: As selected by Architect from full range of industry colors and color densities.

2.4 CONCRETE FILL AND GROUT MATERIALS

- A. Provide concrete fill and grout equivalent in strength to cast-in-place concrete slabs for recessed mats and frames. Use aggregate no larger than one-third fill thickness.

2.5 FABRICATION

- A. Floor Mats: Shop fabricate units to greatest extent possible in sizes indicated. Unless otherwise indicated, provide single unit for each mat installation; do not exceed manufacturer's recommended maximum sizes for units that are removed for maintenance and cleaning. Where joints in mats are necessary, space symmetrically and away from normal traffic lanes. Miter corner joints in framing elements with hairline joints or provide prefabricated corner units without joints.
- B. Surface-Mounted Frames: As indicated for permanent surface-mounted installation, complete with corner connectors, splice plates or connecting pins, and postinstalled expansion anchors.
- C. Recessed Frames: As indicated, for permanent recessed installation, complete with corner pins or reinforcement and anchorage devices.
 - 1. Fabricate edge-frame members in single lengths or, where frame dimensions exceed maximum available lengths, provide minimum number of pieces possible, with hairline joints equally spaced and pieces spliced together by straight connecting pins.
- D. Coat concealed surfaces of aluminum frames that contact cementitious material with manufacturer's standard protective coating.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and floor conditions for compliance with requirements for location, sizes, minimum recess depth, and other conditions affecting installation of floor mats and frames.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install recessed mat frames to comply with manufacturer's written instructions. Set mat tops at height recommended by manufacturer for most effective cleaning action; coordinate tops of mat surfaces with bottoms of doors that swing across mats to provide clearance between door and mat.
 - 1. Install necessary shims, spacers, and anchorages for proper location, and secure attachment of frames.
 - 2. Install grout and fill around frames and, if required to set mat tops at proper elevations, in recesses under mats. Finish grout and fill smooth and level.

3.3 PROTECTION

- A. After completing frame installation and concrete work, provide temporary filler of plywood or fiberboard in recesses and cover frames with plywood protective flooring. Maintain protection until construction traffic has ended and Project is near Substantial Completion.

END OF SECTION 12 48 13

SECTION 12 93 00 – SITE FURNISHINGS

PART 1 - GENERAL

1. RELATED DOCUMENTS
 - A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to the work of this Section.
2. DESCRIPTION OF WORK
 - A. Extent: Furnish all labor, material, equipment, tools, and incidentals necessary for the provision and installation of Site Furnishings as shown on the Drawings and as specified in this Section. The work includes all miscellaneous hardware, foundations, footings and miscellaneous appurtenances associated with the installation. Items to be installed include:
 1. Benches
 2. Bike Racks
 - B. Related work includes but is not limited to:
 1. Site Concrete
3. STANDARDS
 - A. Unless otherwise shown or specified, all materials and methods shall conform to the appropriate current sections of: he State of California Department of Transportation (CALTRANS) Standard Specifications, latest edition, except for measurement and payment requirements.
 - B. Applicable ASTM International Standards (latest revisions) as they apply to this work and related test methods.
 - C. Applicable ISO Testing Standards (latest revisions) as they apply to this work.
4. SUBMITTALS
 - A. Documentation: product data for all standard site furnishings and accessories.
 - B. Samples: manufacturer's sample chips of all finishes and colors specified.
 - C. Shop Drawings: for all custom site furnishings and accessories. Show all locations, markings, quantities, materials, sizes, and shapes and indicate all methods of connecting, anchoring, fastening, bracing, and attaching to the work of other trades.
 - D. Maintenance Data: At Substantial Completion submit maintenance information for site furnishings and accessories where applicable for inclusion in the Owner's maintenance manuals.

5. QUALITY ASSURANCE

- A. Manufacturer's Instructions: Materials, products, processes, equipment or the like shall be installed or applied in strict accordance with printed instructions furnished by the manufacturer of the material for use under conditions similar to those at the job site.
- B. Perform all work in accordance with all applicable State and local laws, codes and regulations.

6. DELIVERY, STORAGE & HANDLING

- A. Delivery & Handling: Transport, store and handle precast units and manufactured items in a manner to avoid hairline cracks, staining or other damage.
- B. Storage & Protection Store units free of the ground and protected from mud or rain splashes. Cover units, secure covers firmly, and protect the units from dust, dirt or other staining material.

PART 2 - PRODUCTS

1. FURNISHINGS

- A. Bench
Manufacturer: DuMor
Model #: 191
Description: Steel bench, backless, exterior use, embedded
Finish / color: Bronze color
Distributor/Contact: DuMor, (800) 598-4018
- B. Bike Rack
Manufacturer: Landscape Forms
Model #: Ring Bike Rack
Description: Steel hoop bike rack
Finish / color: Electro Polished Stainless Steel
Distributor/Contact: Landscape Forms, (800) 430-6209

PART 3 - EXECUTION

1. GENERAL

- A. Review and Adjustment: Locate all site furnishings as shown on the Drawings. Review all site furnishing locations prior to proceeding with any installation. Make adjustments as approved by the Owners Representative.
- B. Install all embedded site furnishings in concrete paving areas prior to the concrete pour. Schedule the receiving of equipment in conjunction with the concrete pour. Any block outs of concrete pour due to scheduling conflicts shall be approved by the Owners Representative and at no additional cost to the Owner. Finish of any block out areas shall match adjacent paving.
 - 1. Furnishings damaged due to the concrete pour shall be replaced at the discretion and to the satisfaction of the Owners Representative, and not repaired or cleaned.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD.

2. INSTALLATION

- A. Site Furnishings: install per manufacturer's recommendations and as shown on the Drawings and as specified herein.
- B. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.
- C. Set all work true and square, plumb and level. Provide spacers under furniture to level as acceptable to Owner's Representative.

3. CLEAN-UP

- A. After completion of all operations, remove all excess soil, trash, and other debris. Clean all walks, walls, and pavement, leaving the entire area in a neat, orderly condition.

4. CLOSEOUT SUBMITTALS

- A. Maintenance Data: cleaning and maintenance information for site furnishings and accessories.

END OF SECTION 12 93 00

SECTION 14 24 00 - HYDRAULIC ELEVATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Hydraulic passenger elevators.

- B. Related Requirements:

- 1. Division 3 - Cast-in-Place Concrete.
 - 2. Division 5 "Structural Steel Framing" for the following:
 - a. Attachment plates, angle brackets, and other structural-steel preparations for fastening guide-rail brackets.
 - b. Hoist beams.
 - c. Structural-steel shapes for subsills that are part of steel frame.
 - 3. Division 5 "Metal Fabrications" for the following:
 - a. Attachment plates and angle brackets for supporting guide-rail brackets.
 - b. Pit ladders.

1.3 DEFINITIONS

- A. Definitions in ASME A17.1/CSA B44 apply to work of this Section.

1.4 ACTION SUBMITTALS

- A. Product Data: Include capacities, sizes, performances, operations, safety features, finishes, and similar information. Include product data for car enclosures; hoistway entrances; and operation, control, and signal systems.
- B. Shop Drawings:
 - 1. Include plans, elevations, sections, and large-scale details indicating service at each landing; machine room layout; coordination with building structure; relationships with other construction; and locations of equipment.
 - 2. Include large-scale layout of car-control station and standby-power operation control panel.

3. Indicate maximum dynamic and static loads imposed on building structure at points of support as well as maximum and average power demands.

- C. Samples for Initial Selection: For finishes involving color selection.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For elevators to include in emergency, operation, and maintenance manuals.
 1. Submit manufacturer's/installer's standard operation and maintenance manual, in accordance with ASME A17.1/CSA B44 including diagnostic and repair information available to manufacturer's and Installer's maintenance personnel.
- B. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.
- C. Continuing Maintenance Proposal: Submit a continuing maintenance proposal from Installer to Owner, in the form of a standard two-year maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Elevator manufacturer or an authorized representative who is trained and approved by manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle materials, components and equipment in manufacturer's protective packaging. Store materials, components, and equipment off of ground, under cover, and in a dry location.

1.9 COORDINATION

- A. Coordinate installation of sleeves, block outs, elevator equipment with integral anchors, and other items that are embedded in concrete or masonry for elevator equipment. Furnish templates, sleeves, elevator equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.
- B. Coordinate locations and dimensions of other work specified in other Sections that relates to hydraulic elevators, including pit ladders; sumps and floor drains in pits; entrance subsills; electrical service; and electrical outlets, lights, and switches in hoistways, pits, and machine rooms.

1.10 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair, restore, or replace elevator work that fails in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, operation or control system failure, including excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.
 - 2. Warranty Period: 1 year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain elevators from single manufacturer.
 - 1. Major elevator components, including pump-and-tank units, plunger-cylinder assemblies, controllers, signal fixtures, door operators, car frames, cars, and entrances, are manufactured by single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with ASME A17.1/CSA B44.
- B. Accessibility Standard: Comply with applicable provisions in the United States Access Board's ADA-ABA Accessibility Guidelines and the @019 California Building Code. A117.1].
- C. Seismic Performance: Elevator system withstands the effects of earthquake motions determined according to ASCE/SEI 7 and complies with elevator seismic requirements in ASME A17.1/CSA B44.
 - 1. The term "withstand" means "the system will remain in place without separation of any parts when subjected to the seismic forces specified and the system will be fully operational after the seismic event."

2.3 ELEVATORS

- A. Elevator System, General: Manufacturer's standard elevator systems. Unless otherwise indicated, manufacturers' standard components are used, as included in standard elevator systems and as required for complete system.
- B. Elevator Description:
 - 1. Otis Hydrofit F Elevator System
 - 2. Type:
 - a. Holeless.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD., SALINAS

3. Rated Load: 4500 lb.
4. Rated Speed: 125 fpm.
5. Auxiliary Operations:
 - a. Battery Back-up Device.
 - b. Loaded-car bypass.
 - c. Automatic operation of lights and ventilation fans.
 - d. Car Fixtures: Brushed stainless steel,
 - e. Side and Rear Wall Panels: Plastic laminate: **Nevamar Galao WX0075AB Aged Bark.**
 - f. Reveals: Brushed Stainless Steel.
 - g. Door Faces (Interior): Satin stainless steel, ASTM A480/A480M, No. 4 finish
 - h. Aluminum Door Sills.
 - i. Door Sills: Aluminum.
 - j. Ceiling: Otis FC6 ceiling with Brushed Stainless Steel on rear wall.
 - k. Handrails: 1-1/2 inches satin stainless steel
 - l. Floor: Structural sub floor for tile floor.
 - m. Provide hanging hooks in cab for moving blankets.
6. Hoistway Entrances:
 - a. Width: 42 inches.
 - b. Height: 84 inches.
 - c. Type: Single-speed side sliding.
 - d. Frames and Doors at both floors Satin stainless steel, ASTM A480/A480M, No. 4 finish
 - e. Sills: Aluminum.
7. Hall Fixtures: Satin stainless steel, ASTM A480/A480M, No. 4 finish.
8. Additional Requirements:
 - a. Provide inspection certificate in each car, mounted under acrylic cover with frame made from satin stainless steel, ASTM A480/A480M, No. 4 finish
 - b. **Cab and door size and location for an 84" stretcher.**

2.4 SYSTEMS AND COMPONENTS

- A. Pump Units: As provided by Elevator Company used in specified elevator system.
- B. Hydraulic Silencers: System has hydraulic silencer containing pulsation-absorbing material in blowout-proof housing at pump unit.
- C. Piping: Size, type, and weight of piping as recommended by elevator manufacturer, with flexible connectors to minimize sound and vibration transmissions from power unit.
- D. Hydraulic Fluid: Elevator manufacturer's standard fluid with additives as needed to prevent oxidation of fluid, corrosion of cylinder and other components, and other adverse effects.
- E. Inserts: Provide location of required concrete and masonry inserts and similar anchorage devices for installing guide rails, machinery, and other components of elevator work. Installation will be by General Contractor.
- F. Car Frame and Platform: Manufacturer's standard for the use

- G. Guides: Manufacturer's standard for the use. Provide guides at top and bottom of car frame.

2.5 OPERATION SYSTEMS

- A. Provide manufacturer's standard microprocessor operation system as required to provide type of operation indicated.
- B. Auxiliary Operations:
 - 1. Single-Car Battery-Powered Lowering:
 - a. When power fails, car is lowered to the lowest floor, opens its doors, and shuts down. System includes rechargeable battery and automatic recharging system.
 - 2. Automatic Operation of Lights and Fan: When elevator is stopped and unoccupied with doors closed, lighting, ventilation fan, and cab displays are de-energized after 5 minutes and are re-energized before car doors open.
- C. Security Features: Security features do not affect emergency firefighters' service.
 - 1. Card-Reader Operation: System uses card readers at all push-button stations to authorize calls. Security system determines which landings and at what times calls require authorization by card reader. Provide required conductors in traveling cable and panel in machine room for interconnecting card readers, other security access system equipment, and elevator controllers. General Contractor shall provide.

2.6 DOOR-REOPENING DEVICES

- A. Infrared Array: Provide door-reopening device with uniform array of 36 or more microprocessor-controlled, infrared light beams projecting across car entrance. Interruption of one or more light beams causes doors to stop and reopen.
- B. Materials and Finishes: Manufacturer's standards, but not less than the following:
 - 1. Subfloor:
 - a. Exterior, C-C Plugged grade plywood, not less than 7/8-inch nominal thickness, provided by General Contractor.
 - 2. Floor Finish: Specified in on Drawings'
 - 3. Plastic-Laminate Wall Panels: Plastic laminate adhesively applied to manufacturer's plastic-laminate panel backing and manufacturer's standard protective edge trim. Panels have a flame-spread index of 25 or less, when tested according to ASTM E84. Plastic-laminate color, texture, and pattern as selected by Architect from plastic-laminate manufacturer's full range.
 - 4. Fabricate car with recesses and cutouts for signal equipment.
 - 5. Stainless Steel Doors: Flush, hollow-metal construction; fabricated from stainless steel sheet.

2.7 HOISTWAY ENTRANCES

- A. Hoistway Entrance Assemblies: Manufacturer's standard horizontal-sliding, door-and-frame hoistway entrances complete with track systems, hardware, sills, and accessories. Frame size and profile accommodate hoistway wall construction.
 - 1. Where gypsum board wall construction is indicated, frames provided by General Contractor and are self-supporting with reinforced head sections.
- B. Materials and Fabrication: Manufacturer's standards, but not less than the following:
 - 1. Stainless Steel Frames: Formed from stainless steel sheet.

2.8 SIGNAL EQUIPMENT

- A. Provide hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled. Provide vandal-resistant buttons and lighted elements illuminated with LEDs.
- B. At the first floor, hall-call signal equipment shall be connected to the building's card reader security system.**
- C. Car-Control Stations: Provide manufacturer's standard Video Voice and Text Communication Device.
- D. Emergency Communication System: Two-way voice communication system, with visible signal, which dials preprogrammed number of monitoring station and does not require handset use. System is contained in flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.
- E. Car Position Indicator: Provide [illuminated,]digital-type car position indicator, located above car door or above car-control station. Also, provide audible signal to indicate to passengers that car is either stopping at or passing each of the floors served. Include travel direction arrows if not provided in car-control station.
- F. Hall Push-Button Stations: Provide one hall push-button station at each.
 - 1. Provide manufacturer's standard wall-mounted units.
 - 2. Equip units with buttons for calling elevator and for indicating applicable direction of travel.
- G. Hall Lanterns: Units with illuminated arrows; however, provide single arrow at terminal landings.
- H. Hall Position Indicators: Provide illuminated, digital-display-type position indicators, located above each hoistway entrance at ground floor.
 - 1. Provide units with flat faceplate for mounting and with body of unit recessed in wall.

2.9 FINISH MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, commercial steel, Type B, exposed, matte finish.
- B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, commercial steel, Type B, pickled.

- C. Stainless Steel Sheet: ASTM A240/A240M, Type 304.
- D. Stainless Steel Bars: ASTM A276, Type 304.
- E. Stainless Steel Tubing: ASTM A554, Grade MT 304.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elevator areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work. Verify critical dimensions and examine supporting structure and other conditions under which elevator work is to be installed.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Set sills flush with finished floor surface at landing.
- B. Locate hall signal equipment for elevators as follows unless otherwise indicated:
 - 1. Mount hall lanterns at a minimum of 72 inches above finished floor.

3.3 FIELD QUALITY CONTROL

- A. Acceptance Testing: On completion of elevator installation and before permitting elevator use (either temporary or permanent), perform acceptance tests as required and recommended by ASME A17.1/CSA B44 and by governing regulations and agencies.
- B. Advise Owner, Architect, and authorities having jurisdiction in advance of dates and times that tests are to be performed on elevators.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to operate, adjust, and maintain elevator.

3.5 MAINTENANCE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service includes full maintenance by skilled employees of elevator Installer. Include monthly preventive

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD., SALINAS

maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper elevator operation. Parts and supplies are manufacturer's authorized replacement parts and supplies.

1. Perform maintenance during normal working hours.

END OF SECTION 14 24 00

SECTION 21 05 17 - SLEEVES AND SLEEVE SEALS FOR FIRE-SUPPRESSION PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Sleeves.
 - 2. Sleeve-seal systems.
 - 3. Grout.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 SLEEVES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Advance Products & Systems, Inc.
 - 2. CALPICO, Inc.
 - 3. GPT; an EnPro Industries company.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop collar.
- C. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, anticorrosion coated or galvanized, with plain ends and integral welded waterstop collar.

SLEEVES AND SLEEVE SEALS
FOR FIRE-SUPPRESSION PIPING

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- D. Galvanized-Steel Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

2.2 SLEEVE-SEAL SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Advance Products & Systems, Inc.
2. CALPICO, Inc.
3. GPT; an EnPro Industries company.
4. Metraflex Company (The).

- B. Description:

1. Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.
2. Designed to form a hydrostatic seal of 20 psig minimum.
3. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
4. Pressure Plates: Carbon steel.
5. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, ASTM B 633 of length required to secure pressure plates to sealing elements.

2.3 GROUT

- A. Description: Nonshrink, for interior and exterior sealing openings in non-fire-rated walls or floors.
- B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION

- A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
- B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.
1. Sleeves are not required for core-drilled holes.

SLEEVES AND SLEEVE SEALS FOR FIRE-SUPPRESSION PIPING

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.
 - 1. Permanent sleeves are not required for holes in slabs formed by molded-PE or -PP sleeves.
 - 2. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.
 - 3. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.
- D. Install sleeves for pipes passing through interior partitions.
 - 1. Cut sleeves to length for mounting flush with both surfaces.
 - 2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
 - 3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint.
- E. Fire-Resistance-Rated Penetrations, Horizontal Assembly Penetrations, and Smoke Barrier Penetrations: Maintain indicated fire or smoke rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with fire- and smoke-stop materials. Comply with requirements for firestopping and fill materials specified in Section 078413 "Penetration Firestopping."

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.
- B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.3 SLEEVE-SEAL-FITTING INSTALLATION

- A. Install sleeve-seal fittings in new walls and slabs as they are constructed.
- B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.
- C. Secure nailing flanges to concrete forms.
- D. Use grout to seal the space around outside of sleeve-seal fittings.

SLEEVES AND SLEEVE SEALS FOR FIRE-SUPPRESSION PIPING

3.4 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Leak Test: After allowing for a full cure, test sleeves and sleeve seals for leaks. Repair leaks and retest until no leaks exist.
- B. Sleeves and sleeve seals will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports.

3.5 SLEEVE AND SLEEVE-SEAL SCHEDULE

- A. Use sleeves and sleeve seals for the following piping-penetration applications:
 - 1. Exterior Concrete Walls above Grade:
 - a. Piping Smaller Than NPS 6: Cast-iron pipe sleeves.
 - b. Piping NPS 6 and Larger: Cast-iron pipe sleeves.
 - 2. Exterior Concrete Walls below Grade:
 - a. Piping Smaller Than NPS 6: Cast-iron pipe sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
 - b. Piping NPS 6 and Larger: Cast-iron pipe sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
 - 3. Concrete Slabs-on-Grade:
 - a. Piping Smaller Than NPS 6: Cast-iron pipe sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
 - b. Piping NPS 6 and Larger: Cast-iron pipe sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
 - 4. Concrete Slabs above Grade:
 - a. Piping Smaller Than NPS 6: Steel pipe sleeves.
 - b. Piping NPS 6 and Larger: Steel pipe sleeves.
 - 5. Interior Partitions:

SLEEVES AND SLEEVE SEALS
FOR FIRE-SUPPRESSION PIPING

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- a. Piping Smaller Than NPS 6: Steel pipe sleeves.
- b. Piping NPS 6 and Larger: Galvanized-steel sheet sleeves.

END OF SECTION 21 05 17

SLEEVES AND SLEEVE SEALS
FOR FIRE-SUPPRESSION PIPING

21 05 17 - 5

SECTION 21 05 18 - ESCUTCHEONS FOR FIRE-SUPPRESSION PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Escutcheons.
 - 2. Floor plates.

1.3 DEFINITIONS

- A. Existing Piping to Remain: Existing piping that is not to be removed and that is not otherwise indicated to be removed and salvaged, or removed and reinstalled.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. BrassCraft Manufacturing Co.; a Masco company.
 - 2. Dearborn Brass.
 - 3. ProFlo; a Ferguson Enterprises, Inc. brand.

2.2 ESCUTCHEONS

- A. One-Piece, Steel Type: With polished, chrome-plated finish and setscrew fastener.
- B. One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.
- C. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped steel with polished, chrome-plated finish and spring-clip fasteners.
- D. One-Piece, Stamped-Steel Type: With polished, chrome-plated finish and spring-clip fasteners.

- E. Split-Plate, Stamped-Steel Type: With polished, chrome-plated finish; concealed hinge; and spring-clip fasteners.

2.3 FLOOR PLATES

- A. Split Floor Plates: Cast brass with concealed hinge.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
- B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of insulated piping and with OD that completely covers opening.
 - 1. Escutcheons for New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep pattern.
 - b. Chrome-Plated Piping: One-piece steel with polished, chrome-plated finish.
 - c. Insulated Piping: One-piece steel with polished, chrome-plated finish.
 - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece steel with polished, chrome-plated finish.
 - e. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece steel with polished, chrome-plated finish.
 - f. Bare Piping in Unfinished Service Spaces: One-piece steel with polished, chrome-plated finish.
 - g. Bare Piping in Equipment Rooms: One-piece steel with polished, chrome-plated finish.
- C. Install floor plates for piping penetrations of equipment-room floors.
- D. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
 - 1. New Piping: One-piece, floor plate.

3.2 FIELD QUALITY CONTROL

- A. Using new materials, replace broken and damaged escutcheons and floor plates.

END OF SECTION 21 05 18

SECTION 21 05 23 - GENERAL-DUTY VALVES FOR FIRE PROTECTION PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Iron butterfly valves with indicators.
 - 2. Check valves.
 - 3. Iron OS&Y gate valves.
 - 4. Indicator posts.
 - 5. Trim and drain valves.

1.3 DEFINITIONS

- A. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- B. NRS: Nonrising stem.
- C. OS&Y: Outside screw and yoke.
- D. SBR: Styrene-butadiene rubber.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of valve.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, and weld ends.
 - 3. Set valves open to minimize exposure of functional surfaces.
- B. Use the following precautions during storage:
 - 1. Maintain valve end protection.
 - 2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use operating handles or stems as lifting or rigging points.
- D. Protect flanges and specialties from moisture and dirt.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

- A. UL Listed: Valves shall be listed in UL's "Online Certifications Directory" under the headings listed below and shall bear UL mark:
 - 1. Main Level: HAMV - Fire Main Equipment.
 - a. Level 1: HCBZ - Indicator Posts, Gate Valve.
 - b. Level 1: HLOT - Valves.
 - 1) Level 3: HLUG - Ball Valves, System Control.
 - 2) Level 3: HLXS - Butterfly Valves.
 - 3) Level 3: HMER - Check Valves.
 - 4) Level 3: HMRZ - Gate Valves.
 - 2. Main Level: VDGT - Sprinkler System & Water Spray System Devices.
 - a. Level 1: VQGU - Valves, Trim and Drain.
- B. FM Global Approved: Valves shall be listed in its "Approval Guide," under the headings listed below:
 - 1. Automated Sprinkler Systems:
 - a. Indicator posts.
 - b. Valves.
 - 1) Gate valves.
 - 2) Check valves.
 - a) Single check valves.
 - 3) Miscellaneous valves.
- C. Source Limitations for Valves: Obtain valves for each valve type from single manufacturer.
- D. ASME Compliance:
 - 1. ASME B16.1 for flanges on iron valves.
 - 2. ASME B1.20.1 for threads for threaded-end valves.
 - 3. ASME B31.9 for building services piping valves.
- E. AWWA Compliance: Comply with AWWA C606 for grooved-end connections.
- F. NFPA Compliance: Comply with NFPA 24 for valves.

GENERAL-DUTY VALVES FOR FIRE PROTECTION PIPING

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- G. Valve Pressure Ratings: Not less than the minimum pressure rating indicated or higher as required by system pressures.
- H. Valve Sizes: Same as upstream piping unless otherwise indicated.
- I. Valve Actuator Types:
 - 1. Worm-gear actuator with handwheel for quarter-turn valves, except for trim and drain valves.
 - 2. Handwheel: For other than quarter-turn trim and drain valves.
 - 3. Handlever: For quarter-turn trim and drain valves NPS 2 and smaller.

2.2 IRON BUTTERFLY VALVES WITH INDICATORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Anvil International.
 - 2. Globe Fire Sprinkler Corporation.
 - 3. Kennedy Valve Company; a division of McWane, Inc.
 - 4. Tyco by Johnson Controls Company.
 - 5. Victaulic Company.
 - 6. Zurn Industries, LLC.
- B. Description:
 - 1. Standard: UL 1091 and FM Global standard for indicating valves, (butterfly or ball type), Class Number 112.
 - 2. Minimum Pressure Rating: 175 psig.
 - 3. Body Material: Cast or ductile iron with nylon, EPDM, epoxy, or polyamide coating.
 - 4. Seat Material: EPDM.
 - 5. Stem: Stainless steel.
 - 6. Disc: Ductile iron, and EPDM or SBR coated.
 - 7. Actuator: Worm gear or traveling nut.
 - 8. Supervisory Switch: Internal or external.
 - 9. Body Design: Lug or wafer.

2.3 CHECK VALVES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Ames Fire & Waterworks; A WATTS Brand.
 - 2. Anvil International.
 - 3. FEBCO; A WATTS Brand.
 - 4. Fire Protection Products, Inc.
 - 5. Globe Fire Sprinkler Corporation.
 - 6. NIBCO INC.
 - 7. Reliable Automatic Sprinkler Co., Inc. (The).
 - 8. Shurjoint-Apollo Piping Products USA Inc.
 - 9. Tyco by Johnson Controls Company.
 - 10. United Brass Works, Inc.

GENERAL-DUTY VALVES FOR FIRE PROTECTION PIPING

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

11. [Venus Fire Protection Ltd.](#)
12. [Victaulic Company.](#)
13. [Viking Corporation.](#)
14. WATTS.
15. [Zurn Industries, LLC.](#)

B. Description:

1. Standard: UL 312 and FM Global standard for swing check valves, Class Number 1210.
2. Minimum Pressure Rating: 175 psig.
3. Type: Single swing check.
4. Body Material: Cast iron, ductile iron, or bronze.
5. Clapper: Bronze, ductile iron, or stainless steel with elastomeric seal.
6. Clapper Seat: Brass, bronze, or stainless steel.
7. Hinge Shaft: Bronze or stainless steel.
8. Hinge Spring: Stainless steel.
9. End Connections: Flanged, grooved, or threaded.

2.4 IRON OS&Y GATE VALVES

A. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:

1. [American Cast Iron Pipe Company.](#)
2. [Clow Valve Company; a subsidiary of McWane, Inc.](#)
3. [Kennedy Valve Company; a division of McWane, Inc.](#)
4. [Victaulic Company.](#)
5. WATTS.
6. [Zurn Industries, LLC.](#)

B. Description:

1. Standard: UL 262 and FM Global standard for fire-service water control valves (OS&Y- and NRS-type gate valves).
2. Minimum Pressure Rating: 175 psig.
3. Body and Bonnet Material: Cast or ductile iron.
4. Wedge: Cast or ductile iron, or bronze with elastomeric coating.
5. Wedge Seat: Cast or ductile iron, or bronze with elastomeric coating.
6. Stem: Brass or bronze.
7. Packing: Non-asbestos PTFE.
8. Supervisory Switch: External.
9. End Connections: Flanged.

2.5 INDICATOR POSTS

A. [Manufacturers:](#) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. [American Cast Iron Pipe Company.](#)
2. [Clow Valve Company; a subsidiary of McWane, Inc.](#)
3. [Kennedy Valve Company; a division of McWane, Inc.](#)
4. [Mueller Co.](#)

GENERAL-DUTY VALVES FOR
FIRE PROTECTION PIPING

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

5. [NIBCO INC.](#)

B. Description:

1. Standard: UL 789 and FM Global standard for indicator posts.
2. Type: Underground.
3. Base Barrel Material: Cast or ductile iron.
4. Cap: Cast or ductile iron.
5. Operation: Wrench.

2.6 TRIM AND DRAIN VALVES

A. Ball Valves:

1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - a. [Apollo Flow Controls; Conbraco Industries, Inc.](#)
 - b. [Fire Protection Products, Inc.](#)
 - c. [Fire-End & Croker Corporation.](#)
 - d. [NIBCO INC.](#)
 - e. [Potter Roemer LLC; a Division of Morris Group International.](#)
 - f. [Tyco by Johnson Controls Company.](#)
 - g. [Victaulic Company.](#)
 - h. [WATTS.](#)
 - i. [Zurn Industries, LLC.](#)
2. Description:
 - a. Pressure Rating: 175 psig.
 - b. Body Design: Two piece.
 - c. Body Material: Forged brass or bronze.
 - d. Port size: Full or standard.
 - e. Seats: PTFE.
 - f. Stem: Bronze or stainless steel.
 - g. Ball: Chrome-plated brass.
 - h. Actuator: Handlever.
 - i. End Connections for Valves NPS 1 through NPS 2-1/2: Threaded ends.
 - j. End Connections for Valves NPS 1-1/4 and NPS 2-1/2: Grooved ends.

B. Angle Valves:

1. [Manufacturers:](#) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. [Fire Protection Products, Inc.](#)
 - b. [NIBCO INC.](#)
 - c. [United Brass Works, Inc.](#)
2. Description:
 - a. Pressure Rating: 175 psig.

GENERAL-DUTY VALVES FOR
FIRE PROTECTION PIPING

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- b. Body Material: Brass or bronze.
- c. Ends: Threaded.
- d. Stem: Bronze.
- e. Disc: Bronze.
- f. Packing: Asbestos free.
- g. Handwheel: Malleable iron, bronze, or aluminum.

C. Globe Valves:

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. NIBCO INC.
 - b. United Brass Works, Inc.
- 2. Description:
 - a. Pressure Rating: 175 psig.
 - b. Body Material: Bronze with integral seat and screw-in bonnet.
 - c. Ends: Threaded.
 - d. Stem: Bronze.
 - e. Disc Holder and Nut: Bronze.
 - f. Disc Seat: Nitrile.
 - g. Packing: Asbestos free.
 - h. Handwheel: Malleable iron, bronze, or aluminum.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

3.2 GENERAL REQUIREMENTS FOR VALVE INSTALLATION

- A. Comply with requirements in the following Sections for specific valve installation requirements and applications:

GENERAL-DUTY VALVES FOR
FIRE PROTECTION PIPING

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Section 211313 "Wet-Pipe Sprinkler Systems" for application of valves in wet-pipe, fire-suppression sprinkler systems.
- B. Install listed fire-protection shutoff valves supervised-open, located to control sources of water supply except from fire-department connections. Install permanent identification signs indicating portion of system controlled by each valve.
- C. Install check valve in each water-supply connection. Install backflow preventers instead of check valves in potable-water-supply sources.
- D. Install valves having threaded connections with unions at each piece of equipment arranged to allow easy access, service, maintenance, and equipment removal without system shutdown. Provide separate support where necessary.
- E. Install valves in horizontal piping with stem at or above the pipe center.
- F. Install valves in position to allow full stem movement.
- G. Install valve tags. Comply with requirements in Section 210553 "Identification for Fire-Suppression Piping and Equipment" for valve tags and schedules and signs on surfaces concealing valves; and the NFPA standard applying to the piping system in which valves are installed. Install permanent identification signs indicating the portion of system controlled by each valve.
- H. Install listed fire-protection shutoff valves supervised-open, located to control sources of water supply except from fire-department connections.
- I. Install check valve in each water-supply connection. Install backflow preventers instead of check valves in potable-water-supply sources.

END OF SECTION 21 05 23

SECTION 21 05 29 - HANGERS AND SUPPORTS FOR FIRE SUPPRESSION PIPING AND
EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Metal pipe hangers and supports.
 - 2. Trapeze pipe hangers.
 - 3. Fastener systems.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show fabrication and installation details and include calculations for the following:
 - 1. Trapeze pipe hangers.
- C. Delegated-Design Submittal: For trapeze hangers indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 1. Detail fabrication and assembly of trapeze hangers.
 - 2. Include design calculations for designing trapeze hangers.

1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Structural-Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M.
- B. Pipe Welding Qualifications: Qualify procedures and operators according to 2015 ASME Boiler and Pressure Vessel Code, Section IX.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design trapeze pipe hangers and equipment supports.
- B. Structural Performance: Hangers and supports for fire-suppression piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
 - 1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
 - 2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
 - 3. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.
- C. NFPA Compliance: Comply with NFPA 13.
- D. UL Compliance: Comply with UL 203.

2.2 METAL PIPE HANGERS AND SUPPORTS

- A. Carbon-Steel Pipe Hangers and Supports:
 - 1. Description: Factory-fabricated components, NFPA approved, UL listed, or FM approved for fire-suppression piping support.
 - 2. Galvanized Metallic Coatings: Pregalvanized or hot-dip galvanized.
 - 3. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

2.3 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-58, Type 59, shop- or field-fabricated pipe-support assembly, made from structural-carbon-steel shapes, with NFPA-approved, UL-listed, or FM-approved carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.4 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: NFPA-approved, UL-listed, or FM-approved threaded-steel stud, for use in hardened portland cement concrete, with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hilti, Inc.
 - b. Simpson Strong-Tie Co., Inc.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- B. Mechanical-Expansion Anchors: NFPA-approved, UL-listed, or FM-approved, insert-wedge-type anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Hilti, Inc.
 - 2. Indoor Applications: Zinc-coated steel.
 - 3. Outdoor Applications: Stainless steel.

2.5 MATERIALS

- A. Carbon Steel: ASTM A1011/A1011M.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation, for penetrations through fire-rated walls, ceilings, and assemblies.
- B. Strength of Support Assemblies: Where not indicated, select sizes of components, so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

3.2 HANGER AND SUPPORT INSTALLATION

- A. Metal Pipe-Hanger Installation: Comply with installation requirements of approvals and listings. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-58. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.
 - 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size, or install intermediate supports for smaller-diameter pipes as specified for individual pipe hangers.
 - 2. Field fabricate from ASTM A36/A36M carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.
- C. Fastener System Installation:
 - 1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete, after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual. Install in accordance with approvals and listings.

HANGERS AND SUPPORTS FOR FIRE
SUPPRESSION PIPING AND EQUIPMENT

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

2. Install mechanical-expansion anchors in concrete, after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions. Install in accordance with approvals and listings.
- D. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- E. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- F. Install lateral bracing with pipe hangers and supports to prevent swaying.
- G. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms, and install reinforcing bars through openings at top of inserts.
- H. Load Distribution: Install hangers and supports, so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- I. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

3.3 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.4 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with NFPA requirements for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finishes.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use carbon-steel pipe hangers and supports and metal trapeze pipe hangers and attachments for general service applications.
- F. Horizontal-Piping Hangers and Supports: Comply with NFPA requirements. Unless otherwise indicated and except as specified in piping system Sections, install the following types:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
 2. Steel Pipe Clamps (MSS Type 4): For suspension of NPS 1/2 to NPS 24 if little or no insulation is required.
 3. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
 4. Split Pipe Ring with or without Turnbuckle Hangers (MSS Type 11): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 8.
 5. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 3.
 6. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
 7. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.
 8. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
 9. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.
- G. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.
- H. Hanger-Rod Attachments: Comply with NFPA requirements.
- I. Building Attachments: Comply with NFPA requirements. Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable-Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 2. C-Clamps (MSS Type 23): For structural shapes.
 3. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
- J. Saddles and Shields: Comply with NFPA requirements. Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
 3. Thermal Hanger-Shield Inserts: For supporting insulated pipe.
- K. Comply with NFPA requirements for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.
- L. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.
- M. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

HANGERS AND SUPPORTS FOR FIRE
SUPPRESSION PIPING AND EQUIPMENT

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

END OF SECTION 21 05 29

HANGERS AND SUPPORTS FOR FIRE
SUPPRESSION PIPING AND EQUIPMENT

21 05 29 - 6

09/21/21 ISSUED FOR BID

SECTION 21 05 53 - IDENTIFICATION FOR FIRE-SUPPRESSION PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Pipe labels.
 - 2. Valve tags.

PART 2 - PRODUCTS

2.1 PIPE LABELS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Actioncraft Products, Inc.; a division of Industrial Test Equipment Co., Inc.
 - 2. Brady Corporation.
 - 3. Champion America.
 - 4. Craftmark Pipe Markers.
 - 5. emedco.
 - 6. Seton Identification Products; a Brady Corporation company.
- B. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service and showing flow direction according to ASME A13.1.
- C. Self-adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- D. Pipe-Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.
 - 1. Flow-Direction Arrows: Integral with piping-system service lettering to accommodate both directions or as separate unit on each pipe label to indicate flow direction.
 - 2. Lettering Size: Size letters according to ASME A13.1 for piping.
- E. Pipe-Label Colors:
 - 1. Background Color: Safety Red.
 - 2. Letter Color: White.

2.2 VALVE TAGS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. Actioncraft Products, Inc.; a division of Industrial Test Equipment Co., Inc.
 2. Brady Corporation.
 3. Champion America.
 4. Craftmark Pipe Markers.
 5. emedco.
 6. Seton Identification Products; a Brady Corporation company.
- B. Description: Stamped or engraved with 1/4-inch letters for piping-system abbreviation and 1/2-inch numbers.
1. Tag Material: Brass, 0.032 inch thick, with predrilled holes for attachment hardware.
 2. Fasteners: Brass wire-link chain, beaded chain, or S-hook.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of incompatible primers, paints, and encapsulants, as well as dirt, oil, grease, release agents, and other substances that could impair bond of identification devices.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be installed.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

3.3 PIPE LABEL INSTALLATION

- A. Pipe-Label Locations: Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
1. Near each valve and control device.
 2. Near each branch connection excluding short takeoffs. Where flow pattern is not obvious, mark each pipe at branch.
 3. Near penetrations and on both sides of through walls, floors, ceilings, and inaccessible enclosures.
 4. At access doors, manholes, and similar access points that permit a view of concealed piping.
 5. Near major equipment items and other points of origination and termination.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
 7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
- B. Directional Flow Arrows: Arrows shall be used to indicate direction of flow in pipes including pipes where flow is allowed in both directions.

3.4 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in fire-suppression piping systems.

END OF SECTION 21 05 53

SECTION 21 13 13 - WET-PIPE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Pipes, fittings, and specialties.
- 2. Specialty valves.
- 3. Sprinklers.
- 4. Alarm devices.
- 5. Pressure gages.

- B. Related Requirements:

- 1. Section 230523 "General-Duty Valves for Fire-Suppression Piping" for ball, butterfly, check, gate, post-indicator, and trim and drain valves.

1.3 DEFINITIONS

- A. Standard-Pressure Sprinkler Piping: Wet-pipe sprinkler system piping designed to operate at working pressure of 175-psig maximum.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

- B. Shop Drawings: For wet-pipe sprinkler systems.

- 1. Include plans, elevations, sections, and attachment details.
- 2. Include diagrams for power, signal, and control wiring.

- C. Delegated-Design Submittal: For wet-pipe sprinkler systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Sprinkler systems, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Domestic water piping.
 - 2. Compressed air piping.
 - 3. HVAC hydronic piping.
 - 4. Items penetrating finished ceiling include the following:
 - a. Lighting fixtures.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Nurse call.
- B. Qualification Data: For qualified Installer.
- C. Design Data:
 - 1. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction, including hydraulic calculations if applicable.
- D. Field Test Reports:
 - 1. Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13. Include "Contractor's Material and Test Certificate for Aboveground Piping."
 - 2. Fire-hydrant flow test report.
- E. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For wet-pipe sprinkler systems and specialties to include in emergency, operation, and maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Sprinkler Cabinets: Finished, wall-mounted, steel cabinet with hinged cover, and with space for minimum of six spare sprinklers plus sprinkler wrench. Include number of sprinklers required by NFPA 13 and sprinkler wrench. Include separate cabinet with sprinklers and wrench for each type of sprinkler used on Project.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications:

WET-PIPE SPRINKLER SYSTEMS

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Installer's responsibilities include designing, fabricating, and installing sprinkler systems and providing professional engineering services needed to assume engineering responsibility, and obtaining a fire-hydrant flow test. Base calculations on results of fire-hydrant flow test.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Sprinkler system equipment, specialties, accessories, installation, and testing shall comply with the following:
 1. NFPA 13.
- B. Standard-Pressure Piping System Component: Listed for 175-psig minimum working pressure.
 1. Sprinkler system design shall be approved by authorities having jurisdiction.
 - a. Margin of Safety for Available Water Flow and Pressure: 10 percent, including losses through water-service piping, valves, and backflow preventers.
 - b. Sprinkler Occupancy Hazard Classifications:
 - 1) Building Service Areas: Ordinary Hazard, Group 1.
 - 2) Electrical Equipment Rooms: Ordinary Hazard, Group 1.
 - 3) General Storage Areas: Ordinary Hazard, Group 1.
 - 4) Mechanical Equipment Rooms: Ordinary Hazard, Group 1.
 - 5) Office and Public Areas: Light Hazard.
 2. Minimum Density for Automatic-Sprinkler Piping Design:
 - a. Light-Hazard Occupancy: 0.10 gpm over 1500-sq. ft. area.
 - b. Ordinary-Hazard, Group 1 Occupancy: 0.15 gpm over 1500-sq. ft. area.
 3. Maximum Protection Area per Sprinkler: According to UL listing.
- C. Seismic Performance: Sprinkler piping shall withstand the effects of earthquake motions determined according to NFPA 13 and ASCE/SEI 7.

2.2 STEEL PIPE AND FITTINGS

- A. Schedule 40, Galvanized- and Black-Steel Pipe: ASTM A53/A53M, Type E, Grade B. Pipe ends may be factory or field formed to match joining method.
- B. Schedule 10, Black-Steel Pipe: ASTM A135/A135M or ASTM A795/A795M, Schedule 10 in NPS 5 and smaller; and NFPA 13-specified wall thickness in NPS 6 to NPS 10, plain end.
- C. Grooved-Joint, Steel-Pipe Appurtenances:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Anvil International.

WET-PIPE SPRINKLER SYSTEMS

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- b. [Shurjoint-Apollo Piping Products USA Inc.](#)
 - c. [Tyco by Johnson Controls Company.](#)
 - d. [Victaulic Company.](#)
- 2. Pressure Rating: 175-psig minimum.
 - 3. Painted Grooved-End Fittings for Steel Piping: ASTM A47/A47M, malleable-iron casting or ASTM A536, ductile-iron casting, with dimensions matching steel pipe.
 - 4. Grooved-End-Pipe Couplings for Steel Piping: AWWA C606 and UL 213 rigid pattern, unless otherwise indicated, for steel-pipe dimensions. Include ferrous housing sections, EPDM-rubber gasket, and bolts and nuts.

2.3 SPECIALTY VALVES

- A. Listed in UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
- B. Pressure Rating:
 - 1. Standard-Pressure Piping Specialty Valves: 175-psig minimum.
- C. Body Material: Cast or ductile iron.
- D. Size: Same as connected piping.
- E. End Connections: Flanged or grooved.
- F. Automatic (Ball Drip) Drain Valves:
 - 1. [Manufacturers:](#) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. [Reliable Automatic Sprinkler Co., Inc. \(The\).](#)
 - b. [Tyco by Johnson Controls Company.](#)
 - 2. Standard: UL 1726.
 - 3. Pressure Rating: 175-psig minimum.
 - 4. Type: Automatic draining, ball check.
 - 5. Size: NPS 3/4.
 - 6. End Connections: Threaded.

2.4 SPRINKLER PIPING SPECIALTIES

- A. Branch Outlet Fittings:
 - 1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - a. [Anvil International.](#)
 - b. [National Fittings, Inc.](#)
 - c. [Shurjoint-Apollo Piping Products USA Inc.](#)
 - d. [Tyco by Johnson Controls Company.](#)
 - e. [Victaulic Company.](#)

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

2. Standard: UL 213.
3. Pressure Rating: 175-psig minimum.
4. Body Material: Ductile-iron housing with EPDM seals and bolts and nuts.
5. Type: Mechanical-tee and -cross fittings.
6. Configurations: Snap-on and strapless, ductile-iron housing with branch outlets.
7. Size: Of dimension to fit onto sprinkler main and with outlet connections as required to match connected branch piping.
8. Branch Outlets: Grooved, plain-end pipe, or threaded.

B. Flow Detection and Test Assemblies:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Reliable Automatic Sprinkler Co., Inc. (The).
 - b. Tyco by Johnson Controls Company.
 - c. Victaulic Company.
2. Standard: UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
3. Pressure Rating: 175-psig minimum.
4. Body Material: Cast- or ductile-iron housing with orifice, sight glass, and integral test valve.
5. Size: Same as connected piping.
6. Inlet and Outlet: Threaded or grooved.

C. Branch Line Testers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Elkhart Brass Mfg. Co., Inc.
 - b. Fire-End & Croker Corporation.
 - c. Potter Electric Signal Company, LLC.
 - d. Potter Roemer LLC; a Division of Morris Group International.
2. Standard: UL 199.
3. Pressure Rating: 175 psig.
4. Body Material: Brass.
5. Size: Same as connected piping.
6. Inlet: Threaded.
7. Drain Outlet: Threaded and capped.
8. Branch Outlet: Threaded, for sprinkler.

D. Sprinkler Inspector's Test Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Tyco by Johnson Controls Company.
 - b. Victaulic Company.
 - c. Viking Corporation.
2. Standard: UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
3. Pressure Rating: 175-psig minimum.
4. Body Material: Cast- or ductile-iron housing with sight glass.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

5. Size: Same as connected piping.
6. Inlet and Outlet: Threaded.

E. Adjustable Drop Nipples:

1. Standard: UL 1474.
2. Pressure Rating: 250-psig minimum.
3. Body Material: Steel pipe with EPDM-rubber O-ring seals.
4. Size: Same as connected piping.
5. Length: Adjustable.
6. Inlet and Outlet: Threaded.

F. Flexible Sprinkler Hose Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. FlexHead Industries, Inc.
 - b. Victaulic Company.
2. Standard: UL 1474.
3. Type: Flexible hose for connection to sprinkler, and with bracket for connection to ceiling grid.
4. Pressure Rating: 175-psig minimum.
5. Size: Same as connected piping, for sprinkler.

2.5 SPRINKLERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Globe Fire Sprinkler Corporation.
 2. Reliable Automatic Sprinkler Co., Inc. (The).
 3. Tyco by Johnson Controls Company.
 4. Venus Fire Protection Ltd.
 5. Victaulic Company.
 6. Viking Corporation.
- B. Listed in UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
- C. Pressure Rating for Automatic Sprinklers: 175-psig minimum.
- D. Automatic Sprinklers with Heat-Responsive Element:
1. Early-Suppression, Fast-Response Applications: UL 1767.
 2. Nonresidential Applications: UL 199.
 3. Characteristics: Nominal 1/2-inch orifice with Discharge Coefficient K of 5.6, and for "Ordinary" temperature classification rating unless otherwise indicated or required by application.
 4. Nominal Orifice: 1/2 inch, with discharge coefficient K between 5.3 and 5.8.
- E. Sprinkler Finishes: Chrome plated, bronze and painted.

WET-PIPE SPRINKLER SYSTEMS

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- F. Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.
 - 1. Ceiling Mounting: Chrome-plated steel, two piece, with 1-inch vertical adjustment.
 - 2. Sidewall Mounting: Chrome-plated steel, one piece, flat.
- G. Sprinkler Guards:
 - 1. Standard: UL 199.
 - 2. Type: Wire cage with fastening device for attaching to sprinkler.

2.6 ALARM DEVICES

- A. Alarm-device types shall match piping and equipment connections.
- B. Electrically Operated Alarm Bell:
 - 1. Standard: UL 464.
 - 2. Type: Vibrating, metal alarm bell.
 - 3. Size: 6-inch minimum- diameter.
 - 4. Finish: Red-enamel factory finish, suitable for outdoor use.
 - 5. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Water-Flow Indicators:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. ADT Security Services, Inc.
 - b. McDonnell & Miller.
 - c. Potter Electric Signal Company, LLC.
 - d. System Sensor.
 - e. Viking Corporation.
 - f. WATTS.
 - 2. Standard: UL 346.
 - 3. Water-Flow Detector: Electrically supervised.
 - 4. Components: Two single-pole, double-throw circuit switches for isolated alarm and auxiliary contacts, 7 A, 125-V ac and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal if removed.
 - 5. Type: Paddle operated.
 - 6. Pressure Rating: 250 psig.
 - 7. Design Installation: Horizontal or vertical.
- D. Valve Supervisory Switches:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- a. [Fire-Lite Alarms, Inc.; a Honeywell International company.](#)
 - b. [Kennedy Valve Company; a division of McWane, Inc.](#)
 - c. [Potter Electric Signal Company, LLC.](#)
 - d. [System Sensor.](#)
2. Standard: UL 346.
 3. Type: Electrically supervised.
 4. Components: Single-pole, double-throw switch with normally closed contacts.
 5. Design: Signals that controlled valve is in other than fully open position.
 6. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.7 PRESSURE GAGES

- A. [Manufacturers:](#) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 1. [AGF Manufacturing, Inc.](#)
 2. [AMETEK, Inc.](#)
 3. [Ashcroft Inc.](#)
 4. [Brecco Corporation.](#)
 5. [WIKA Instrument Corporation.](#)
- B. Standard: UL 393.
- C. Dial Size: 3-1/2- to 4-1/2-inch diameter.
- D. Pressure Gage Range: 0- to 250-psig minimum.
- E. Label: Include "WATER" label on dial face.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Perform fire-hydrant flow test according to NFPA 13 and NFPA 291. Use results for system design calculations required in "Quality Assurance" Article.
- B. Report test results promptly and in writing.

3.2 SERVICE-ENTRANCE PIPING

- A. Install shutoff valve, backflow preventer, pressure gage, drain, and other accessories indicated at connection to water-service piping.
- B. Install shutoff valve, check valve, pressure gage, and drain at connection to water service.

WET-PIPE SPRINKLER SYSTEMS

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS
3.3 PIPING INSTALLATION

- A. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated on approved working plans.
 - 1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.
 - 2. Coordinate layout and installation of sprinklers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.
- B. Piping Standard: Comply with NFPA 13 requirements for installation of sprinkler piping.
- C. Install seismic restraints on piping. Comply with NFPA 13 requirements for seismic-restraint device materials and installation.
- D. Use listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.
- E. Install unions adjacent to each valve in pipes NPS 2 and smaller.
- F. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.
- G. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, and sized and located according to NFPA 13.
- H. Install sprinkler piping with drains for complete system drainage.
- I. Install sprinkler control valves, test assemblies, and drain risers adjacent to standpipes when sprinkler piping is connected to standpipes.
- J. Install automatic (ball drip) drain valve at each check valve for fire-department connection, to drain piping between fire-department connection and check valve. Install drain piping to and spill over floor drain or to outside building.
- K. Install alarm devices in piping systems.
- L. Install hangers and supports for sprinkler system piping according to NFPA 13. Comply with requirements for hanger materials in NFPA 13. In seismic-rated areas, refer to Section 210548 "Vibration and Seismic Controls for Fire-Suppression Piping and Equipment."
- M. Install pressure gages on riser or feed main, at each sprinkler test connection, and at top of each standpipe. Include pressure gages with connection not less than NPS 1/4 and with soft-metal seated globe valve, arranged for draining pipe between gage and valve. Install gages to permit removal, and install where they are not subject to freezing.
- N. Fill sprinkler system piping with water.
- O. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 210517 "Sleeves and Sleeve Seals for Fire-Suppression Piping."
- P. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 210517 "Sleeves and Sleeve Seals for Fire-Suppression Piping."

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- Q. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 210518 "Escutcheons for Fire-Suppression Piping."

3.4 JOINT CONSTRUCTION

- A. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure ratings same as or higher than system's pressure rating for aboveground applications unless otherwise indicated.
- B. Install unions adjacent to each valve in pipes NPS 2 and smaller.
- C. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.
- D. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- E. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- F. Flanged Joints: Select appropriate gasket material in size, type, and thickness suitable for water service. Join flanges with gasket and bolts according to ASME B31.9.
- G. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- H. Steel-Piping, Roll-Grooved Joints: Roll rounded-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe grooved joints.
- I. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

3.5 VALVE AND SPECIALTIES INSTALLATION

- A. Install listed fire-protection valves, trim and drain valves, specialty valves and trim, controls, and specialties according to NFPA 13 and authorities having jurisdiction.
- B. Install listed fire-protection shutoff valves supervised open, located to control sources of water supply except from fire-department connections. Install permanent identification signs indicating portion of system controlled by each valve.
- C. Install check valve in each water-supply connection. Install backflow preventers instead of check valves in potable-water-supply sources.
- D. Specialty Valves:
 - 1. Install valves in vertical position for proper direction of flow, in main supply to system.

WET-PIPE SPRINKLER SYSTEMS

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

2. Install alarm valves with bypass check valve and retarding chamber drain-line connection.
3. Install deluge valves in vertical position, in proper direction of flow, and in main supply to deluge system. Install trim sets for drain, priming level, alarm connections, ball drip valves, pressure gages, priming chamber attachment, and fill-line attachment.

3.6 SPRINKLER INSTALLATION

- A. Install sprinklers in suspended ceilings in center of narrow dimension of acoustical ceiling panels.
- B. Install sprinklers into flexible, sprinkler hose fittings, and install hose into bracket on ceiling grid.

3.7 IDENTIFICATION

- A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13.
- B. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.8 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 1. Leak Test: After installation, charge systems and test for leaks. Repair leaks and retest until no leaks exist.
 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 3. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.
 4. Energize circuits to electrical equipment and devices.
 5. Coordinate with fire-alarm tests. Operate as required.
 6. Verify that equipment hose threads are same as local fire department equipment.
- B. Sprinkler piping system will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.9 CLEANING

- A. Clean dirt and debris from sprinklers.
- B. Only sprinklers with their original factory finish are acceptable. Remove and replace any sprinklers that are painted or have any other finish than their original factory finish.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS
3.10 PIPING SCHEDULE

- A. Piping between Fire Department Connections and Check Valves: Galvanized, standard-weight steel pipe with grooved ends, grooved-end fittings, grooved-end-pipe couplings, and grooved joints.
- B. Sprinkler specialty fittings may be used, downstream of control valves, instead of specified fittings.
- C. Standard-pressure, wet-pipe sprinkler system, NPS 1-1/2 and smaller, shall be the following:
 - 1. Schedule 40, galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.
- D. Standard-pressure, wet-pipe sprinkler system, NPS 2 to NPS 5, shall be the following:
 - 1. Schedule 10 black-steel pipe with roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
- E. Standard-pressure, wet-pipe sprinkler system, NPS 6 and larger, shall be the following:
 - 1. Schedule 10 black-steel pipe with roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

3.11 SPRINKLER SCHEDULE

- A. Use sprinkler types in subparagraphs below for the following applications:
 - 1. Rooms without Ceilings: Upright sprinklers.
 - 2. Rooms with Suspended Ceilings: Concealed sprinklers.
 - 3. Wall Mounting: Sidewall sprinklers.
- B. Provide sprinkler types in subparagraphs below with finishes indicated.
 - 1. Concealed Sprinklers: Rough brass, with factory-painted white cover plate.
 - 2. Upright and Sidewall Sprinklers: Chrome plated in finished spaces exposed to view; rough bronze in unfinished spaces not exposed to view.

END OF SECTION 21 13 13

SECTION 22 05 13 -COMMON MOTOR REQUIREMENTS FOR PLUMBING EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes general requirements for single-phase and polyphase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on alternating-current power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

1.3 COORDINATION

- A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:
 - 1. Motor controllers.
 - 2. Torque, speed, and horsepower requirements of the load.
 - 3. Ratings and characteristics of supply circuit and required control sequence.
 - 4. Ambient and environmental conditions of installation location.

PART 2 - PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

- A. Comply with NEMA MG 1 unless otherwise indicated.

2.2 MOTOR CHARACTERISTICS

- A. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet above sea level.
- B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

2.3 POLYPHASE MOTORS

- A. Description: NEMA MG 1, Design B, medium induction motor.

COMMON MOTOR REQUIREMENTS FOR PLUMBING EQUIPMENT

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- B. Efficiency: Premium efficient, as defined in NEMA MG 1.
- C. Service Factor: 1.15.
- D. Rotor: Random-wound, squirrel cage.
- E. Bearings: Regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading.
- F. Temperature Rise: Match insulation rating.
- G. Insulation: Class F.
- H. Code Letter Designation:
 - 1. Motors 15 HP and Larger: NEMA starting Code F or Code G.
 - 2. Motors Smaller Than 15 HP: Manufacturer's standard starting characteristic.
- I. Enclosure Material: Cast iron for motor frame sizes 324T and larger; rolled steel for motor frame sizes smaller than 324T.

2.4 ADDITIONAL REQUIREMENTS FOR POLYPHASE MOTORS

- A. Motors Used with Variable-Frequency Controllers:
 - 1. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width-modulated inverters.
 - 2. Inverter-Duty Motors: Class F temperature rise; Class H insulation.
 - 3. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.

2.5 SINGLE-PHASE MOTORS

- A. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:
 - 1. Permanent-split capacitor.
 - 2. Electronically commutated.
 - 3. Split phase.
 - 4. Capacitor start, inductor run.
 - 5. Capacitor start, capacitor run.
- B. Multispeed Motors: Variable-torque, permanent-split-capacitor type.
- C. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.
- D. Motors 1/20 HP and Smaller: Shaded-pole type.
- E. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation.

COMMON MOTOR REQUIREMENTS
FOR PLUMBING EQUIPMENT

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

Thermal-protection device shall automatically reset when motor temperature returns to normal range.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 22 05 13

SECTION 22 05 16 - EXPANSION FITTINGS AND LOOPS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Flexible-hose packless expansion joints.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For expansion joints to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Compatibility: Products shall be suitable for piping service fluids, materials, working pressures, and temperatures.
- B. Capability: Products to absorb 200 percent of maximum axial movement between anchors.

2.2 PACKLESS EXPANSION JOINTS

- A. Flexible-Hose Packless Expansion Joints:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Flex Pression Ltd.
 - b. Flex-Hose Co., Inc.
 - c. Flexicraft Industries.
 - d. Mason Industries, Inc.
 - e. Metraflex Company (The).

2. Description: Manufactured assembly with inlet and outlet elbow fittings and two flexible-metal-hose legs joined by long-radius, 180-degree return bend or center section of flexible hose.
3. Flexible Hose: Corrugated-metal inner hoses and braided outer sheaths.
4. Expansion Joints for Copper Tubing NPS 2 and Smaller: Copper-alloy fittings with solder-joint end connections.
 - a. Bronze hoses and single-braid bronze sheaths with 450 psig at 70 deg F and 340 psig at 450 deg F ratings.
5. Expansion Joints for Copper Tubing NPS 2-1/2 to NPS 4: Copper-alloy fittings with threaded end connections.
 - a. Stainless-steel hoses and single-braid, stainless-steel sheaths with 300 psig at 70 deg F and 225 psig at 450 deg F ratings.

PART 3 - EXECUTION

3.1 EXPANSION JOINT INSTALLATION

- A. Install expansion joints of sizes matching sizes of piping in which they are installed.
- B. Install metal-bellows expansion joints according to EJMA's "Standards of the Expansion Joint Manufacturers Association, Inc."
- C. Install rubber packless expansion joints according to FSA-PSJ-703.

END OF SECTION 22 05 16

SECTION 22 05 17 SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Sleeves.
 - 2. Sleeve-seal systems.
 - 3. Grout.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 SLEEVES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Advance Products & Systems, Inc.
 - 2. CALPICO, Inc.
 - 3. GPT; an EnPro Industries company.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop collar.
- C. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, anticorrosion coated or galvanized, with plain ends and integral welded waterstop collar.
- D. Galvanized-Steel Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

2.2 SLEEVE-SEAL SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Advance Products & Systems, Inc.
 2. CALPICO, Inc.
 3. GPT; an EnPro Industries company.
 4. Metraflex Company (The).
- B. Description:
1. Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.
 2. Designed to form a hydrostatic seal of 20 psig minimum.
 3. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 4. Pressure Plates: Carbon steel.
 5. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, ASTM B 633 of length required to secure pressure plates to sealing elements.

2.3 GROUT

- A. Description: Nonshrink, for interior and exterior sealing openings in non-fire-rated walls or floors.
- B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION

- A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
- B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.
1. Sleeves are not required for core-drilled holes.
- C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.
1. Permanent sleeves are not required for holes in slabs formed by molded-PE or -PP sleeves.
 2. Cut sleeves to length for mounting flush with both surfaces.

- a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.
- 3. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.
- D. Install sleeves for pipes passing through interior partitions.
 - 1. Cut sleeves to length for mounting flush with both surfaces.
 - 2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
 - 3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint.
- E. Fire-Resistance-Rated Penetrations, Horizontal Assembly Penetrations, and Smoke Barrier Penetrations: Maintain indicated fire or smoke rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with fire- and smoke-stop materials. Comply with requirements for firestopping and fill materials specified in Section 078413 "Penetration Firestopping."

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.
- B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.3 SLEEVE-SEAL-FITTING INSTALLATION

- A. Install sleeve-seal fittings in new walls and slabs as they are constructed.
- B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.
- C. Secure nailing flanges to concrete forms.
- D. Use grout to seal the space around outside of sleeve-seal fittings.

3.4 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Leak Test: After allowing for a full cure, test sleeves and sleeve seals for leaks. Repair leaks and retest until no leaks exist.
- B. Sleeves and sleeve seals will be considered defective if they do not pass tests and inspections.

- C. Prepare test and inspection reports.

3.5 SLEEVE AND SLEEVE-SEAL SCHEDULE

- A. Use sleeves and sleeve seals for the following piping-penetration applications:

1. Exterior Concrete Walls above Grade:
 - a. Piping Smaller Than NPS 6: Cast-iron pipe sleeves.
 - b. Piping NPS 6 and Larger: Cast-iron pipe sleeves.
2. Exterior Concrete Walls below Grade:
 - a. Piping Smaller Than NPS 6: Cast-iron pipe sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
 - b. Piping NPS 6 and Larger: Cast-iron pipe sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
3. Concrete Slabs-on-Grade:
 - a. Piping Smaller Than NPS 6: Cast-iron pipe sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
 - b. Piping NPS 6 and Larger: Cast-iron pipe sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
4. Concrete Slabs above Grade:
 - a. Piping Smaller Than NPS 6: Steel pipe sleeves.
 - b. Piping NPS 6 and Larger: Steel pipe sleeves.
5. Interior Partitions:
 - a. Piping Smaller Than NPS 6: Steel pipe sleeves.
 - b. Piping NPS 6 and Larger: Galvanized-steel sheet sleeves.

END OF SECTION 22 05 17

SECTION 22 05 18 - ESCUTCHEONS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Escutcheons.
 - 2. Floor plates.

1.3 DEFINITIONS

- A. Existing Piping to Remain: Existing piping that is not to be removed and that is not otherwise indicated to be removed and salvaged, or removed and reinstalled.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. BrassCraft Manufacturing Co.; a Masco company.
 - 2. Dearborn Brass.
 - 3. ProFlo; a Ferguson Enterprises, Inc. brand.

2.2 ESCUTCHEONS

- A. One-Piece, Steel Type: With polished, chrome-plated finish and setscrew fastener.
- B. One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.
- C. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped steel with polished, chrome-plated finish and spring-clip fasteners.
- D. One-Piece, Stamped-Steel Type: With polished, chrome-plated finish and spring-clip fasteners.

- E. Split-Plate, Stamped-Steel Type: With polished, chrome-plated finish; concealed hinge; and spring-clip fasteners.

2.3 FLOOR PLATES

- A. Split Floor Plates: Cast brass with concealed hinge.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
- B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of insulated piping and with OD that completely covers opening.
 - 1. Escutcheons for New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep pattern.
 - b. Chrome-Plated Piping: One-piece steel with polished, chrome-plated finish.
 - c. Insulated Piping: One-piece steel with polished, chrome-plated finish.
 - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece steel with polished, chrome-plated finish.
 - e. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece steel with polished, chrome-plated finish.
 - f. Bare Piping in Unfinished Service Spaces: One-piece steel with polished, chrome-plated finish.
 - g. Bare Piping in Equipment Rooms: One-piece steel with polished, chrome-plated finish.
- C. Install floor plates for piping penetrations of equipment-room floors.
- D. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
 - 1. New Piping: One-piece, floor plate.

3.2 FIELD QUALITY CONTROL

- A. Using new materials, replace broken and damaged escutcheons and floor plates.

END OF SECTION 22 05 18

SECTION 22 05 19 -METERS AND GAGES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Liquid-in-glass thermometers.
 - 2. Thermowells.
 - 3. Dial-type pressure gages.
 - 4. Gage attachments.
 - 5. Test plugs.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For meters and gages to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 LIQUID-IN-GLASS THERMOMETERS

- A. Metal-Case, Industrial-Style, Liquid-in-Glass Thermometers:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Flo Fab Inc.
 - b. Miljoco Corporation.
 - c. Tel-Tru Manufacturing Company.
 - d. Trerice, H. O. Co.
 - e. Weiss Instruments, Inc.
 - f. Winters Instruments - U.S.
 - 2. Standard: ASME B40.200.
 - 3. Case: Cast aluminum; 7-inch nominal size unless otherwise indicated.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

4. Case Form: Adjustable angle unless otherwise indicated.
5. Tube: Glass with magnifying lens and blue or red organic liquid.
6. Tube Background: Nonreflective aluminum with permanently etched scale markings graduated in deg F.
7. Window: Glass or plastic.
8. Stem: Aluminum and of length to suit installation.
 - a. Design for Thermowell Installation: Bare stem.
9. Connector: 1-1/4 inches, with ASME B1.1 screw threads.
10. Accuracy: Plus or minus 1 percent of scale range or one scale division, to a maximum of 1.5 percent of scale range.

2.2 THERMOWELLS

A. Thermowells:

1. Standard: ASME B40.200.
2. Description: Pressure-tight, socket-type fitting made for insertion into piping tee fitting.
3. Material for Use with Copper Tubing: CNR.
4. Material for Use with Steel Piping: CRES.
5. Type: Stepped shank unless straight or tapered shank is indicated.
6. External Threads: NPS 1/2, NPS 3/4, or NPS 1, ASME B1.20.1 pipe threads.
7. Internal Threads: 1/2, 3/4, and 1 inch, with ASME B1.1 screw threads.
8. Bore: Diameter required to match thermometer bulb or stem.
9. Insertion Length: Length required to match thermometer bulb or stem.
10. Lagging Extension: Include on thermowells for insulated piping and tubing.
11. Bushings: For converting size of thermowell's internal screw thread to size of thermometer connection.

B. Heat-Transfer Medium: Mixture of graphite and glycerin.

2.3 PRESSURE GAGES

A. Direct-Mounted, Metal-Case, Dial-Type Pressure Gages:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Flo Fab Inc.
 - b. Miljoco Corporation.
 - c. Tel-Tru Manufacturing Company.
 - d. Trerice, H. O. Co.
 - e. Weiss Instruments, Inc.
 - f. Winters Instruments - U.S.
2. Standard: ASME B40.100.
3. Case: Liquid-filled type(s); cast aluminum or drawn steel; 4-1/2-inch nominal diameter.
4. Pressure-Element Assembly: Bourdon tube unless otherwise indicated.
5. Pressure Connection: Brass, with NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe threads and bottom-outlet type unless back-outlet type is indicated.
6. Movement: Mechanical, with link to pressure element and connection to pointer.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

7. Dial: Nonreflective aluminum with permanently etched scale markings graduated in psi.
8. Pointer: Dark-colored metal.
9. Window: Glass or plastic.
10. Ring: Metal.
11. Accuracy: Grade B, plus or minus 2 percent of middle half of scale range.

2.4 GAGE ATTACHMENTS

- A. Snubbers: ASME B40.100, brass; with NPS 1/4 or NPS 1/2 , ASME B1.20.1 pipe threads and piston-type surge-dampening device. Include extension for use on insulated piping.
- B. Valves: Brass or stainless-steel needle, with NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe threads.

2.5 TEST PLUGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Flow Design, Inc.
 2. Miljoco Corporation.
 3. Peterson Equipment Co., Inc.
 4. Trerice, H. O. Co.
 5. Weiss Instruments, Inc.
- B. Description: Test-station fitting made for insertion into piping tee fitting.
- C. Body: Brass or stainless steel with core inserts and gasketed and threaded cap. Include extended stem on units to be installed in insulated piping.
- D. Thread Size: NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe thread.
- E. Minimum Pressure and Temperature Rating: 500 psig at 200 deg F.
- F. Core Inserts: Chlorosulfonated polyethylene synthetic self-sealing rubber.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install thermowells with socket extending to center of pipe and in vertical position in piping tees.
- B. Install thermowells of sizes required to match thermometer connectors. Include bushings if required to match sizes.
- C. Install thermowells with extension on insulated piping.
- D. Fill thermowells with heat-transfer medium.
- E. Install direct-mounted thermometers in thermowells and adjust vertical and tilted positions.

METERS AND GAGES FOR PLUMBING PIPING

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- F. Install remote-mounted thermometer bulbs in thermowells and install cases on panels; connect cases with tubing and support tubing to prevent kinks. Use minimum tubing length.
- G. Install direct-mounted pressure gages in piping tees with pressure gage located on pipe at the most readable position.
- H. Install remote-mounted pressure gages on panel.
- I. Install valve and snubber in piping for each pressure gage for fluids.
- J. Install test plugs in piping tees.
- K. Install thermometers in the following locations:
 - 1. Inlet and outlet of each water heater.
 - 2. Inlets and outlets of each domestic water heat exchanger.
 - 3. Inlet and outlet of each domestic hot-water storage tank.
- L. Install pressure gages in the following locations:
 - 1. Building water service entrance into building.
 - 2. Inlet and outlet of each pressure-reducing valve.
 - 3. Suction and discharge of each domestic water pump.

3.2 CONNECTIONS

- A. Install meters and gages adjacent to machines and equipment to allow service and maintenance of meters, gages, machines, and equipment.

3.3 ADJUSTING

- A. Adjust faces of meters and gages to proper angle for best visibility.

3.4 THERMOMETER SCHEDULE

- A. Thermometers at inlet and outlet of each domestic water heater shall be the following:
 - 1. Direct-mounted, metal-case, vapor-actuated type.
- B. Thermometer stems shall be of length to match thermowell insertion length.

3.5 THERMOMETER SCALE-RANGE SCHEDULE

- A. Scale Range for Domestic Hot-Water Piping: 0 to 250 deg F.

3.6 PRESSURE-GAGE SCHEDULE

- A. Pressure gages at discharge of each water service into building shall be the following:

METERS AND GAGES FOR PLUMBING PIPING

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Liquid-filled, direct-mounted, metal case.
2. Test plug with chlorosulfonated polyethylene synthetic self-sealing rubber inserts.

3.7 PRESSURE-GAGE SCALE-RANGE SCHEDULE

- A. Scale Range for Water Service Piping: 0 to 100 psi.
- B. Scale Range for Domestic Water Piping: 0 to 100 psi.

END OF SECTION 22 05 19

SECTION 22 05 23.12 -BALL VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Bronze ball valves.

1.3 DEFINITIONS

- A. CWP: Cold working pressure.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of valve.
 - 1. Certification that products comply with NSF 61and NSF 372.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, and soldered ends.
 - 3. Set ball valves open to minimize exposure of functional surfaces.
- B. Use the following precautions during storage:
 - 1. Maintain valve end protection.
 - 2. Store valves indoors and maintain at higher-than-ambient-dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use operating handles or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
 - 1. ASME B1.20.1 for threads for threaded end valves.
 - 2. ASME B16.1 for flanges on iron valves.
 - 3. ASME B16.5 for flanges on steel valves.
 - 4. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
 - 5. ASME B16.18 for solder-joint connections.
 - 6. ASME B31.9 for building services piping valves.
- C. NSF Compliance: NSF 61 and NSF 372 for valve materials for potable-water service.
- D. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.
- E. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- F. Valve Sizes: Same as upstream piping unless otherwise indicated.
- G. Valve Actuator Types:
 - 1. Gear Actuator: For quarter-turn valves NPS 4 and larger.
 - 2. Handlever: For quarter-turn valves smaller than NPS 4.
- H. Valves in Insulated Piping:
 - 1. Include 2-inch stem extensions.
 - 2. Extended operating handles of nonthermal-conductive material and protective sleeves that allow operation of valves without breaking vapor seals or disturbing insulation.
 - 3. Memory stops that are fully adjustable after insulation is applied.

2.2 BRONZE BALL VALVES

- A. Bronze Ball Valves, Two-Piece with Full Port and Stainless-Steel Trim:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Apollo Flow Controls; Conbraco Industries, Inc.
 - b. FNW; Ferguson Enterprises, Inc.
 - c. Milwaukee Valve Company.
 - d. NIBCO INC.
 - e. WATTS.
 - 2. Description:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- a. Standard: MSS SP-110 or MSS-145.
- b. CWP Rating: 600 psig.
- c. Body Design: Two piece.
- d. Body Material: Bronze.
- e. Ends: Threaded or soldered.
- f. Seats: PTFE.
- g. Stem: Stainless steel.
- h. Ball: Stainless steel, vented.
- i. Port: Full.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.

3.3 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valves with specified CWP ratings are unavailable, the same types of valves with higher CWP ratings may be substituted.
- B. Select valves with the following end connections:
 - 1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option or press-end option is indicated in valve schedules below.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.
3. For Copper Tubing, NPS 5 and Larger: Flanged ends.

3.4 DOMESTIC HOT- AND COLD-WATER VALVE SCHEDULE

A. Pipe NPS 2 and Smaller:

1. Bronze ball valves, two-piece with full port and stainless steel trim. Provide with solder-joint ends.

END OF SECTION 22 05 23.12

SECTION 22 05 23.14 -CHECK VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Bronze lift check valves.
 - 2. Bronze swing check valves.
 - 3. Bronze swing check valves, press ends.

1.3 DEFINITIONS

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene-diene terpolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of valve.
 - 1. Certification that products comply with NSF 61 and NSF 372.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, grooves, and weld ends.
 - 3. Set check valves in either closed or open position.
- B. Use the following precautions during storage:
 - 1. Maintain valve end protection.
 - 2. Store valves indoors and maintain at higher-than-ambient-dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
 - 1. ASME B1.20.1 for threads for threaded end valves.
 - 2. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
 - 3. ASME B16.18 for solder joint.
 - 4. ASME B31.9 for building services piping valves.
- C. Drinking Water System Components - Health Effects and Drinking Water System Components - Lead Content Compliance: NSF 61 and NSF 372.
- D. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.
- E. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- F. Valve Sizes: Same as upstream piping unless otherwise indicated.
- G. Valve Bypass and Drain Connections: MSS SP-45.

2.2 BRONZE LIFT CHECK VALVES

- A. Bronze Lift Check Valves with Bronze Disc, Class 125:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Crane; Crane Energy Flow Solutions.
 - b. Jenkins Valves; Crane Energy Flow Solutions.
 - c. Stockham; Crane Energy Flow Solutions.
 - 2. Description:
 - a. Standard: MSS SP-80, Type 1.
 - b. CWP Rating: 200 psig.
 - c. Body Design: Vertical flow.
 - d. Body Material: ASTM B 61 or ASTM B 62, bronze.
 - e. Ends: Threaded or soldered. See valve schedule articles.
 - f. Disc: Bronze.

2.3 BRONZE SWING CHECK VALVES

- A. Bronze Swing Check Valves with Bronze Disc, Class 125:

CHECK VALVES FOR PLUMBING PIPING

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Apollo Flow Controls; Conbraco Industries, Inc.
 - b. Crane; Crane Energy Flow Solutions.
 - c. Hammond Valve.
 - d. Jenkins Valves; Crane Energy Flow Solutions.
 - e. Milwaukee Valve Company.
 - f. NIBCO INC.
 - g. WATTS.
2. Description:
 - a. Standard: MSS SP-80, Type 3.
 - b. CWP Rating: 200 psig.
 - c. Body Design: Horizontal flow.
 - d. Body Material: ASTM B 62, bronze.
 - e. Ends: Threaded or soldered. See valve schedule articles.
 - f. Disc: Bronze.

B. Bronze Swing Check Valves, Press Ends:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Apollo Flow Controls; Conbraco Industries, Inc.
 - b. Elkhart Products Corporation.
 - c. Milwaukee Valve Company.
 - d. NIBCO INC.
2. Description:
 - a. Standard: MSS SP-80 and MSS SP-139.
 - b. CWP Rating: Minimum 200 psig.
 - c. Body Design: Horizontal flow.
 - d. Body Material: ASTM B 584, bronze.
 - e. Ends: Press.
 - f. Press Ends Connection Rating: Minimum 200 psig
 - g. Disc: Brass or bronze.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.

CHECK VALVES FOR PLUMBING PIPING

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.
- E. Check Valves: Install check valves for proper direction of flow.
 - 1. Swing Check Valves: In horizontal position with hinge pin level.
 - 2. Lift Check Valves: With stem upright and plumb.
- F. Install valve tags. Comply with requirements in Section 220553 "Identification for Plumbing Piping and Equipment" for valve tags and schedules.

3.3 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.4 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valve applications are not indicated, use the following:
 - 1. Pump-Discharge Check Valves:
 - a. NPS 2 and Smaller: Bronze swing check valves with bronze disc.
- B. If valves with specified CWP ratings are unavailable, the same types of valves with higher CWP ratings may be substituted.
- C. End Connections:
 - 1. For Copper Tubing, NPS 2 and Smaller: Threaded or soldered or press-ends.

3.5 DOMESTIC HOT- AND COLD-WATER VALVE SCHEDULE

- A. Pipe NPS 2 and Smaller:

CHECK VALVES FOR PLUMBING PIPING

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Bronze swing check valves with bronze disc, Class 125, with soldered or threaded end connections.

END OF SECTION 22 05 23.14

SECTION 22 05 29 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Metal pipe hangers and supports.
 - 2. Trapeze pipe hangers.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
 - 1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
 - 2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
 - 3. Design seismic-restraint hangers and supports for piping and equipment.

2.2 METAL PIPE HANGERS AND SUPPORTS

- A. Carbon-Steel Pipe Hangers and Supports:
 - 1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
 - 2. Galvanized Metallic Coatings: Pregalvanized, hot-dip galvanized, or electro-galvanized.
 - 3. Nonmetallic Coatings: Plastic coated or epoxy powder coated.
 - 4. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

2.3 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-58, Type 59, shop- or field-fabricated pipe-support assembly, made from structural-carbon-steel shapes, with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.4 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hilti, Inc.
 - b. Simpson Strong-Tie Co., Inc.
- B. Mechanical-Expansion Anchors: Insert-wedge-type anchors, for use in hardened portland cement concrete, with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Hilti, Inc.
 - 2. Indoor Applications: Zinc-coated steel.
 - 3. Outdoor Applications: Stainless steel.

2.5 MATERIALS

- A. Aluminum: ASTM B221.
- B. Carbon Steel: ASTM A1011/A1011M.
- C. Structural Steel: ASTM A36/A36M carbon-steel plates, shapes, and bars; black and galvanized.
- D. Stainless Steel: ASTM A240/A240M.
- E. Grout: ASTM C1107/C1107M, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
 - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation, for penetrations through fire-rated walls, ceilings, and assemblies.
- B. Strength of Support Assemblies: Where not indicated, select sizes of components, so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

3.2 HANGER AND SUPPORT INSTALLATION

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-58. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-58. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.
 - 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size, or install intermediate supports for smaller-diameter pipes as specified for individual pipe hangers.
 - 2. Field fabricate from ASTM A36/A36M carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.
- C. Thermal Hanger-Shield Installation: Install in pipe hanger or shield for insulated piping.
- D. Fastener System Installation:
 - 1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete, after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
 - 2. Install mechanical-expansion anchors in concrete, after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- E. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- F. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- G. Install lateral bracing with pipe hangers and supports to prevent swaying.
- H. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms, and install reinforcing bars through openings at top of inserts.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- I. Load Distribution: Install hangers and supports, so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- J. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- K. Insulated Piping:
 - 1. Attach clamps and spacers to piping.
 - a. Piping Operating Above Ambient Air Temperature: Clamp may project through insulation.
 - b. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
 - 2. Install MSS SP-58, Type 39 protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
 - a. Option: Thermal hanger-shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
 - 3. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.

3.3 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

3.4 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.5 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-58 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finishes.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use carbon-steel pipe hangers and supports or metal trapeze pipe hangers and attachments for general service applications.
- F. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
- G. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
 - 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.
- H. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Steel Turnbuckles (MSS Type 13): For adjustment of up to 6 inches for heavy loads.
 - 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
 - 3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11 split pipe rings.
- I. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Steel or Malleable-Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 - 2. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 - 3. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
- J. Comply with MSS SP-58 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.
- K. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

END OF SECTION 22 05 29

SECTION 22 05 53 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Equipment labels.
 - 2. Pipe labels.
 - 3. Valve tags.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve numbering scheme.
- E. Valve Schedules: For each piping system to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

- A. Plastic Labels for Equipment:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. Brimar Industries, Inc.
 - c. Craftmark Pipe Markers.
 - d. emedco.
 - e. Seton Identification Products.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

2. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
3. Letter Color: White.
4. Background Color: Red.
5. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
6. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
7. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
8. Fasteners: Stainless-steel rivets or self-tapping screws.
9. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

2.2 PIPE LABELS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Brady Corporation.
 2. Champion America.
 3. Craftmark Pipe Markers.
 4. emedco.
 5. Seton Identification Products.
- B. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings; also include pipe size and an arrow indicating flow direction.
 1. Flow-Direction Arrows: Integral with piping-system service lettering to accommodate both directions or as separate unit on each pipe label to indicate flow direction.

2.3 VALVE TAGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Brady Corporation.
 2. Brimar Industries, Inc.
 3. Champion America.
 4. Craftmark Pipe Markers.
 5. emedco.
 6. Seton Identification Products.
- B. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Tag Material: aluminum, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 2. Fasteners: Brass beaded chain or S-hook.
- C. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
1. Valve-tag schedule shall be included in operation and maintenance data.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

3.3 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

3.4 PIPE LABEL INSTALLATION

- A. Pipe Label Locations: Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
1. Near each valve and control device.
 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 5. Near major equipment items and other points of origination and termination.
 6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet Insert dimension in areas of congested piping and equipment.

IDENTIFICATION FOR PLUMBING
PIPING AND EQUIPMENT

7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
- B. Directional Flow Arrows: Arrows shall be used to indicate direction of flow in pipes, including pipes where flow is allowed in both directions.
- C. Pipe Label Color Schedule:
 1. Domestic Water Piping
 - a. Background: Safety green.
 - b. Letter Colors: White.
 2. Sanitary Waste and Storm Drainage Piping:
 - a. Background Color: Safety green.
 - b. Letter Color: White.

3.5 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves, valves within factory-fabricated equipment units, shutoff valves, faucets, convenience and lawn-watering hose connections, and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:
 1. Valve-Tag Size and Shape:
 - a. Cold Water: 1-1/2 inches, round.
 - b. Hot Water: 1-1/2 inches, round.
 2. Valve-Tag Colors:
 - a. Cold Water: Natural.
 - b. Hot Water: Natural.

END OF SECTION 22 05 53

SECTION 22 07 19 - PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes insulating the following plumbing piping services:
 - 1. Domestic hot-water piping.
 - 2. Domestic recirculating hot-water piping.
 - 3. Supplies and drains for handicap-accessible lavatories and sinks.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory and field applied if any).

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.5 COORDINATION

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.6 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS
PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come into contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested in accordance with ASTM C871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable in accordance with ASTM C795.
- E. Mineral-Fiber, Preformed Pipe: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C547.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Johns Manville; a Berkshire Hathaway company.
 - b. Knauf Insulation.
 - c. Owens Corning.
 - 2. Preformed Pipe Insulation: Type I, Grade A with factory-applied ASJ-SSL.
 - 3. 850 deg F.
 - 4. Factory fabricate shapes in accordance with ASTM C450 and ASTM C585.
 - 5. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

2.2 FACTORY-APPLIED JACKETS

- A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
 - 1. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C1136, Type I.

2.3 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C1136, Type I, unless otherwise indicated.
- B. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Johns Manville; a Berkshire Hathaway company.
 - b. Proto Corporation.

- c. [Speedline Corporation](#).
- 2. Adhesive: As recommended by jacket material manufacturer.
- 3. Color: White.
- 4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
 - a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.

2.4 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Covers,:

- 1. [Manufacturers](#): Subject to compliance with requirements, provide products by one of the following:
 - a. [Buckaroos, Inc.](#)
 - b. [Truebro](#).
 - c. [Zurn Industries, LLC](#).
- 2. Description: Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
 - 1. Verify that systems to be insulated have been tested and are free of defects.
 - 2. Verify that surfaces to be insulated are clean and dry.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Coordinate insulation installation with the tradesman installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- C. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless steel surfaces, use demineralized water.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS
3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and of thicknesses required for each item of pipe system, as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during storage, application, and finishing. Replace insulation materials that get wet.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends attached to structure with vapor-barrier mastic.
 - 3. Install insert materials and insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth.
 - 2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward-clinching staples along both edges of strip, spaced 4 inches o.c.
 - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward-clinching staples along edge at 4 inches o.c.
 - a. For below-ambient services, apply vapor-barrier mastic over staples.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

4. Cover joints and seams with tape, in accordance with insulation material manufacturer's written instructions, to maintain vapor seal.
 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation more than 25 percent of its nominal thickness.
- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches in similar fashion to butt joints.
- P. For above-ambient services, do not install insulation to the following:
1. Vibration-control devices.
 2. Testing agency labels and stamps.
 3. Nameplates and data plates.
 4. Cleanouts.

3.4 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
 4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.
- C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
 4. Seal jacket to wall flashing with flashing sealant.
- D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.
 - 1. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping and fire-resistive joint sealers.
- F. Insulation Installation at Floor Penetrations:
 - 1. Pipe: Install insulation continuously through floor penetrations.
 - 2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.5 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials, except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, Mechanical Couplings, and Unions:
 - 1. Install insulation over fittings, valves, strainers, flanges, mechanical couplings, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
 - 2. Insulate pipe elbows using preformed fitting insulation made from same material and density as that of adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
 - 3. Insulate tee fittings with preformed fitting insulation of same material and thickness as that used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
 - 4. Insulate valves using preformed fitting insulation of same material, density, and thickness as that used for adjacent pipe. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
 - 5. Insulate strainers using preformed fitting insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers, so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
 - 6. Insulate flanges, mechanical couplings, and unions, using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Stencil or label the outside insulation jacket of each union with the word "union" matching size and color of pipe labels.
 - 7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
 - 8. For services not specified to receive a field-applied jacket, except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and

unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing, using PVC tape.

- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

3.6 INSTALLATION OF MINERAL-FIBER INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands, and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward-clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive, as recommended by insulation material manufacturer, and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as that of straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as that of straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.7 FIELD-APPLIED JACKET INSTALLATION

- A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.
 - 1. Draw jacket smooth and tight to surface with 2-inch overlap at seams and joints.
 - 2. Embed glass cloth between two 0.062-inch-thick coats of lagging adhesive.
 - 3. Completely encapsulate insulation with coating, leaving no exposed insulation.
- B. Where FSK jackets are indicated, install as follows:
 - 1. Draw jacket material smooth and tight.
 - 2. Install lap or joint strips with same material as jacket.
 - 3. Secure jacket to insulation with manufacturer's recommended adhesive.
 - 4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch-wide joint strips at end joints.
 - 5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.
- C. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints. Seal with manufacturer's recommended adhesive.
 - 1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

3.8 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
 - 1. Drainage piping located in crawl spaces.
 - 2. Domestic cold water piping.
 - 3. Sanitary waste and vent piping.
 - 4. Storm drainage piping.
 - 5. Underground piping.
 - 6. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.9 INDOOR PIPING INSULATION SCHEDULE

- A. Domestic Hot and Recirculated Hot Water:
 - 1. NPS 1 and Smaller: Insulation shall be the following:
 - a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
 - 2. NPS 1-1/4 and Larger: Insulation shall be the following:
 - a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1-1/2 inch thick.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

B. Exposed Sanitary Drains, Domestic Water, Domestic Hot Water, and Stops for Plumbing Fixtures for People with Disabilities:

1. All Pipe Sizes: Insulation shall be the following:

- a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1/2 inch thick.

C. Hot Service Drains:

1. All Pipe Sizes: Insulation shall be the following:

- a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

D. Hot Service Vents:

1. All Pipe Sizes: Insulation shall be the following:

- a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

3.10 INDOOR, FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. If more than one material is listed, selection from materials listed is Contractor's option.

C. Piping, Exposed:

1. PVC: 30 mils thick.

END OF SECTION 22 07 19

SECTION 22 08 00 - COMMISSIONING OF PLUMBING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. The General Conditions, any Supplementary Conditions, Section 22 40 00, Plumbing, and Division 01 are hereby a part of this Section as fully as if repeated herein.

1.2 SCOPE

- A. Work includes performing commissioning process requirements for domestic hot water systems including controls, assemblies, and equipment.
- B. Refer to Section 01 91 00 General Commissioning Requirements for general commissioning process requirements.

1.3 DEFINITIONS

- A. See 01 91 00 General Commissioning Requirements for definitions

1.4 CONTRACTOR'S RESPONSIBILITIES

- A. See 01 91 00 General Commissioning Requirements for contractors' and subcontractors' responsibilities.
- B. Provide training on each piece of commissioned equipment. See 01 91 00 for training details.

1.5 CA RESPONSIBILITIES

- A. See 01 91 00 General Commissioning Requirements for CA responsibilities

1.6 COMMISSIONING DOCUMENTATION

- A. Provide the following information to the CA for inclusion in the commissioning plan:
 - 1. Identification of installed systems, assemblies, equipment, and components including design changes that occurred during the construction phase.
 - 2. Schedule for completing construction checklists and manufacturer's prestart and startup checklists for Plumbing systems, assemblies, equipment, and components to be commissioned.
- B. Provide the following as discussed in Section 01 91 00, General Commissioning Requirements to General Contractor:
 - 1. Completed system readiness checklist for each piece of commissioned equipment. Completion of system readiness checklist, O&M manual start-up checklist, and any manufacturer provided field start-up checklists.
 - 2. Verification to GC readiness certifying that Plumbing systems, subsystems, equipment, and associated controls are ready for functional testing.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD., SALINAS

3. Corrective action documents resulting from issues in the Commissioning Issues Log or deficiencies found from completing the start-up plan.

1.7 SUBMITTALS

- A. Updated submittals: keep the CA informed of all changes to the control system documentation made during programming and setup.
- B. Certificates of readiness (completion of the system readiness checklist) to General Contractor for review by CA.
- C. Written training plan for review by A/E and CA prior to training. See Section 01 91 00 General Commissioning Requirements for specific items to be included in the training plan.
- D. Provide O&M manuals to GC for submission to CA. These are required prior to development of the system readiness checklists.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

- A. Provide all standard testing equipment required to perform startup and initial checkout and required functional performance testing.
- B. Equipment-specific tools: where special testing equipment, tools and instruments are specific to a piece of equipment, are only available from the vendor, and are required in order to accomplish startup or functional testing, provide such equipment, tools, and instruments as part of the work at no extra cost to owner; such equipment, tools, and instruments are to become the property of owner.

PART 3 - EXECUTION

3.1 TESTING PREPARATION

- A. Cooperate with the CA in development of the functional test procedures.
- B. Certify that plumbing systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.
- C. Certify that plumbing instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.
- D. Provide temperature and pressure taps according to contract documents.
- E. Provide input to GC on construction schedule to include division pipe and system testing, flushing, and cleaning. Provide input on equipment start-up and testing and balance schedule to GC. Notify the CA when these items are scheduled.
- F. Certify that all related A/E punch list items are complete prior to commencing functional tests.
- G. Correct deficiencies found from completing the start-up plan prior to conducting functional tests.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N SANBORN RD., SALINAS
3.2 GENERAL TESTING REQUIREMENTS

- A. System readiness checklists and functional test forms will be provided by CA, and executed by installing subcontractors. System readiness checklists are part of the start-up plan that will be provided by the CA to the GC. The GC will distribute the forms and ensure their completion prior to submitting back to the CA for review.
- B. CA will oversee execution of the functional tests. Functional tests are provided early to obtain any comments or suggestions.
- C. Provide installing technicians, instrumentation, and tools to perform commissioning test at the direction of the CA.
- D. Provide skilled technicians who are familiar with this building to execute the functional tests as directed by the CA.
- E. Scope of plumbing testing shall include domestic hot water system.
- F. The CA may direct that set points be altered when simulating conditions is not practical.
- G. If tests cannot be completed because of a deficiency outside the scope of the plumbing system, document the deficiency and report it to the CM and GC. After deficiencies are resolved, coordinate with CA to reschedule tests.
- H. Installing subcontractor shall be present during all functional tests, whether sub-contractor's equipment is directly involved with the test or not. This is to speed the process of problem resolution as they are discovered during the testing process.

3.3 TESTING PROCEDURES

- A. See 01 91 00 General Commissioning Requirements for contractor's testing procedures.

3.4 TRAINING

- A. Provide training on each piece of commissioned equipment. See 01 91 00 and Division 22 for training details.
 - 1. Instructor and technicians conducting training must be familiar with this building and equipment. Have the technicians that performed work on this building available for answering questions.

END OF SECTION 22 08 00

SECTION 22 11 16 - DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Copper tube and fittings.
 - 2. Piping joining materials.
 - 3. Encasement for piping.
 - 4. Transition fittings.
 - 5. Dielectric fittings.

1.3 ACTION SUBMITTALS

- A. Product Data: For transition fittings and dielectric fittings.

1.4 INFORMATIONAL SUBMITTALS

- A. System purging and disinfecting activities report.
- B. Field quality-control reports.

1.5 FIELD CONDITIONS

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.
- B. Potable-water piping and components shall comply with NSF 14, NSF 61, and NSF 372. Include marking "NSF-pw" on piping.

2.2 COPPER TUBE AND FITTINGS

- A. Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper.

DOMESTIC WATER PIPING

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- B. Soft Copper Tube: ASTM B 88, Type K water tube, annealed temper.
- C. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
- D. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
- E. Copper Unions:
 - 1. MSS SP-123.
 - 2. Cast-copper-alloy, hexagonal-stock body.
 - 3. Ball-and-socket, metal-to-metal seating surfaces.
 - 4. Solder-joint or threaded ends.

2.3 PIPING JOINING MATERIALS

- A. Pipe-Flange Gasket Materials:
 - 1. AWWA C110/A21.10, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free unless otherwise indicated.
 - 2. Full-face or ring type unless otherwise indicated.
- B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
- C. Solder Filler Metals: ASTM B 32, lead-free alloys.
- D. Flux: ASTM B 813, water flushable.
- E. Solvent Cements for Joining CPVC Piping and Tubing: ASTM F 493.
- F. Plastic, Pipe-Flange Gaskets, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.

2.4 DIELECTRIC FITTINGS

- A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
- B. Dielectric Unions:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. A.Y. McDonald Mfg. Co.
 - b. Capitol Manufacturing Company.
 - c. Central Plastics Company.
 - d. Jomar Valve.
 - e. WATTS.
 - f. Wilkins.
 - g. Zurn Industries, LLC.
 - 2. Standard: ASSE 1079.
 - 3. Pressure Rating: 125 psig minimum at 180 deg F.

4. End Connections: Solder-joint copper alloy and threaded ferrous.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Comply with requirements in Section 312000 "Earth Moving" for excavating, trenching, and backfilling.

3.2 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."
- C. Install ductile-iron piping under building slab with restrained joints according to AWWA C600 and AWWA M41.
- D. Install underground copper tube in PE encasement according to ASTM A 674 or AWWA C105/A21.5.
- E. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve inside the building at each domestic water-service entrance. Comply with requirements for pressure gages in Section 220519 "Meters and Gages for Plumbing Piping" and with requirements for drain valves and strainers in Section 221119 "Domestic Water Piping Specialties."
- F. Install shutoff valve immediately upstream of each dielectric fitting.
- G. Install domestic water piping level without pitch and plumb.
- H. Rough-in domestic water piping for water-meter installation according to utility company's requirements.
- I. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- J. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- K. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
- L. Install piping to permit valve servicing.
- M. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.

DOMESTIC WATER PIPING

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- N. Install piping free of sags and bends.
- O. Install fittings for changes in direction and branch connections.
- P. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.
- Q. Install pressure gages on suction and discharge piping for each plumbing pump and packaged booster pump. Comply with requirements for pressure gages in Section 220519 "Meters and Gages for Plumbing Piping."
- R. Install thermostats in hot-water circulation piping. Comply with requirements for thermostats in Section 221123 "Domestic Water Pumps."
- S. Install thermometers on outlet piping from each water heater. Comply with requirements for thermometers in Section 220519 "Meters and Gages for Plumbing Piping."
- T. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
- U. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
- V. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."

3.3 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- D. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."
- E. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.
- F. Joint Construction for Solvent-Cemented Plastic Piping: Clean and dry joining surfaces. Join pipe and fittings according to the following:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements. Apply primer.
 2. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
- G. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.

3.4 DIELECTRIC FITTING INSTALLATION

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- B. Dielectric Fittings for NPS 2 and Smaller: Use dielectric unions.
- C. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flange kits.

3.5 INSTALLATION OF HANGERS AND SUPPORTS

- A. Comply with requirements for hangers, supports, and anchor devices in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
 1. Vertical Piping: MSS Type 8 or 42, clamps.
 2. Individual, Straight, Horizontal Piping Runs:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.
 3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- B. Install hangers for copper tubing, with maximum horizontal spacing and minimum rod diameters, to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- C. Install vinyl-coated hangers for CPVC piping, with maximum horizontal spacing and minimum rod diameters, to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- D. Install vinyl-coated hangers for PEX tubing, with maximum horizontal spacing and minimum rod diameters, to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- E. Support horizontal piping within 12 inches of each fitting.
- F. Support vertical runs of copper tubing to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- G. Support vertical runs of CPVC piping to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

- H. Support vertical runs of PEX tubing to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.6 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.
- C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.
- D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:
 - 1. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
 - 2. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.
 - 3. Equipment: Cold- and hot-water-supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.7 IDENTIFICATION

- A. Identify system components. Comply with requirements for identification materials and installation in Section 220553 "Identification for Plumbing Piping and Equipment."
- B. Label pressure piping with system operating pressure.

3.8 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Piping Inspections:
 - a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
 - b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
 - 1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.
 - 2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.
 - c. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.

- d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
 - 2. Piping Tests:
 - a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
 - b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
 - c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 - d. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
 - e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
 - f. Prepare reports for tests and for corrective action required.
 - B. Domestic water piping will be considered defective if it does not pass tests and inspections.
 - C. Prepare test and inspection reports.
- 3.9 ADJUSTING
- A. Perform the following adjustments before operation:
 - 1. Close drain valves, hydrants, and hose bibbs.
 - 2. Open shutoff valves to fully open position.
 - 3. Open throttling valves to proper setting.
 - 4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.
 - a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide hot-water flow in each branch.
 - b. Adjust calibrated balancing valves to flows indicated.
 - 5. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
 - 6. Remove and clean strainer screens. Close drain valves and replace drain plugs.
 - 7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
 - 8. Check plumbing specialties and verify proper settings, adjustments, and operation.
- 3.10 CLEANING
- A. Clean and disinfect potable domestic water piping as follows:
 - 1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.

2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system according to either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
 - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
 - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Repeat procedures if biological examination shows contamination.
 - e. Submit water samples in sterile bottles to authorities having jurisdiction.

B. Clean non-potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
2. Use purging procedures prescribed by authorities having jurisdiction or; if methods are not prescribed, follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.

C. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.

D. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.11 PIPING SCHEDULE

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
- B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.
- C. Aboveground domestic water piping, NPS 4 and smaller, shall be one of the following:
 1. Hard copper tube, ASTM B 88, Type L; wrought-copper, solder-joint fittings; and soldered joints.

3.12 VALVE SCHEDULE

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Shutoff Duty: Use ball valves for piping NPS 2 and smaller. Use butterfly or ball valves with flanged ends for piping NPS 2-1/2 and larger.
 2. Throttling Duty: Use ball or globe valves for piping NPS 2 and smaller. Use butterfly or ball valves with flanged ends for piping NPS 2-1/2 and larger.
 3. Hot-Water Circulation Piping, Balancing Duty: Calibrated balancing valves.
 4. Drain Duty: Hose-end drain valves.
- B. Use check valves to maintain correct direction of domestic water flow to and from equipment.

END OF SECTION 22 11 16

SECTION 22 11 19 - DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Backflow preventers.
 - 2. Balancing valves.
 - 3. Temperature-actuated, water mixing valves.
 - 4. Strainers.
 - 5. Outlet boxes.
 - 6. Hose bibbs.
 - 7. Drain valves.
 - 8. Water-hammer arresters.
 - 9. Trap-seal primer valves.
 - 10. Flexible connectors.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PIPING SPECIALTIES

- A. Potable-water piping and components shall comply with NSF 61 and NSF 14.
- B. Comply with NSF 372 for low lead.

2.2 PERFORMANCE REQUIREMENTS

- A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig unless otherwise indicated.

2.3 BACKFLOW PREVENTERS

- A. Reduced-Pressure-Principle Backflow Preventers:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Apollo Flow Controls; Conbraco Industries, Inc.
 - b. FEBCO; A WATTS Brand.
 - c. WATTS.
 - d. Zurn Industries, LLC.
 - 2. Standard: ASSE 1013.
 - 3. Operation: Continuous-pressure applications.
 - 4. Pressure Loss: 12 psig maximum, through middle third of flow range.
 - 5. Body: Bronze for NPS 2 and smaller; steel with interior lining that complies with AWWA C550 or that is FDA approved for NPS 2-1/2 and larger.
 - 6. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
 - 7. Configuration: Designed for horizontal, straight-through flow.
 - 8. Accessories:
 - a. Valves NPS 2 and Smaller: Ball type with threaded ends on inlet and outlet.
 - b. Valves NPS 2-1/2 and Larger: Outside-screw and yoke-gate type with flanged ends on inlet and outlet.
 - c. Air-Gap Fitting: ASME A112.1.2, matching backflow-preventer connection.

2.4 BALANCING VALVES

- A. Copper-Alloy Calibrated Balancing Valves:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. NIBCO INC.
 - b. WATTS.
 - 2. Type: Ball or Y-pattern globe valve with two readout ports and memory-setting indicator.
 - 3. Body: Brass or bronze.
 - 4. Size: Same as connected piping, but not larger than NPS 2.
 - 5. Accessories: Meter hoses, fittings, valves, differential pressure meter, and carrying case.

2.5 TEMPERATURE-ACTUATED, WATER MIXING VALVES

- A. Primary, Thermostatic, Water Mixing Valves:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Apollo Flow Controls; Conbraco Industries, Inc.
 - b. Leonard Valve Company.
 - c. POWERS; A WATTS Brand.
 - d. Symmons Industries, Inc.
 - e. Zurn Industries, LLC.
2. Standard: ASSE 1017.
3. Pressure Rating: 125 psig minimum unless otherwise indicated.
4. Type: Exposed-mounted, thermostatically controlled, water mixing valve.
5. Material: Bronze body with corrosion-resistant interior components.
6. Connections: Threaded union inlets and outlet.
7. Accessories: Manual temperature control, check stops on hot- and cold-water supplies, and adjustable, temperature-control handle.

B. Individual-Fixture, Water Tempering Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Lawler Manufacturing Company, Inc.
 - b. Leonard Valve Company.
 - c. POWERS; A WATTS Brand.
 - d. Zurn Industries, LLC.
2. Standard: ASSE 1016, thermostatically controlled, water tempering valve.
3. Pressure Rating: 125 psig minimum unless otherwise indicated.
4. Body: Bronze body with corrosion-resistant interior components.
5. Temperature Control: Adjustable.
6. Inlets and Outlet: Threaded.
7. Finish: Rough or chrome-plated bronze.

2.6 STRAINERS FOR DOMESTIC WATER PIPING

A. Y-Pattern Strainers:

1. Pressure Rating: 125 psig minimum unless otherwise indicated.
2. Body: Bronze for NPS 2 and smaller; cast iron with interior lining that complies with AWWA C550 or that is FDA approved, epoxy coated and for NPS 2-1/2 and larger.
3. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
4. Screen: Stainless steel with round perforations unless otherwise indicated.
5. Perforation Size:
 - a. Strainers NPS 2 and Smaller: 0.033 inch.
 - b. Strainers NPS 2-1/2 to NPS 4: 0.062 inch.
6. Drain: Pipe plug for strainers NPS 2 and smaller; factory-installed, hose-end drain valve for strainers NPS 2-1/2 and larger.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

2.7 OUTLET BOXES

A. Icemaker Outlet Boxes:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. LSP Products Group.
 - b. Oatey.
 - c. Sioux Chief Manufacturing Company, Inc.
2. Mounting: Recessed.
3. Material and Finish: Enameled-steel or epoxy-painted-steel box and faceplate.
4. Faucet: Valved fitting complying with ASME A112.18.1. Include NPS 1/2 or smaller copper tube outlet.
5. Supply Shutoff Fitting: NPS 1/2 gate, globe, or ball valve and NPS 1/2 copper, water tubing.

2.8 HOSE BIBBS

A. Hose Bibbs:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Jay R. Smith Mfg Co; a division of Morris Group International.
 - b. MIFAB, Inc.
 - c. Woodford Manufacturing Company.
 - d. Zurn Industries, LLC.
2. Standard: ASME A112.18.1 for sediment faucets.
3. Body Material: Bronze.
4. Seat: Bronze, replaceable.
5. Supply Connections: NPS 1/2 or NPS 3/4 threaded or solder-joint inlet.
6. Outlet Connection: Garden-hose thread complying with ASME B1.20.7.
7. Pressure Rating: 125 psig.
8. Vacuum Breaker: Integral nonremovable, drainable, hose-connection vacuum breaker complying with ASSE 1011.
9. Finish for Equipment Rooms: Rough bronze, or chrome or nickel plated.
10. Finish for Service Areas: Rough bronze.
11. Finish for Finished Rooms: Chrome or nickel plated.
12. Operation for Equipment Rooms: Wheel handle or operating key.
13. Operation for Service Areas: Wheel handle.
14. Operation for Finished Rooms: Removable wheel handle.
15. Include wall flange with each chrome- or nickel-plated hose bibb.

2.9 DRAIN VALVES

A. Ball-Valve-Type, Hose-End Drain Valves:

1. Standard: MSS SP-110 for standard-port, two-piece ball valves.
2. Pressure Rating: 400-psig minimum CWP.

DOMESTIC WATER PIPING SPECIALTIES

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

3. Size: NPS 3/4.
4. Body: Copper alloy.
5. Ball: Chrome-plated brass.
6. Seats and Seals: Replaceable.
7. Handle: Vinyl-covered steel.
8. Inlet: Threaded or solder joint.
9. Outlet: Threaded, short nipple with garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

2.10 WATER-HAMMER ARRESTERS

A. Water-Hammer Arresters:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AMTROL, Inc.
 - b. Jay R. Smith Mfg Co; a division of Morris Group International.
 - c. Josam Company.
 - d. MIFAB, Inc.
 - e. Precision Plumbing Products.
 - f. Sioux Chief Manufacturing Company, Inc.
 - g. WATTS.
 - h. Zurn Industries, LLC.
2. Standard: ASSE 1010 or PDI-WH 201.
3. Type: Metal bellows or copper tube with piston.
4. Size: ASSE 1010, Sizes AA and A through F, or PDI-WH 201, Sizes A through F.

2.11 TRAP-SEAL PRIMER DEVICE

A. Supply-Type, Trap-Seal Primer Device:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Jay R. Smith Mfg Co; a division of Morris Group International.
 - b. MIFAB, Inc.
 - c. Precision Plumbing Products.
 - d. Sioux Chief Manufacturing Company, Inc.
 - e. WATTS.
 - f. Zurn Industries, LLC.
2. Standard: ASSE 1018.
3. Pressure Rating: 125 psig minimum.
4. Body: Bronze.
5. Inlet and Outlet Connections: NPS 1/2 threaded, union, or solder joint.
6. Gravity Drain Outlet Connection: NPS 1/2 threaded or solder joint.
7. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

B. Drainage-Type, Trap-Seal Primer Device:

DOMESTIC WATER PIPING SPECIALTIES

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Jay R. Smith Mfg Co; a division of Morris Group International.
2. Standard: ASSE 1044, lavatory P-trap with NPS 3/8 minimum, trap makeup connection.
3. Size: NPS 1-1/4 minimum.
4. Material: Chrome-plated, cast brass.

2.12 FLEXIBLE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 1. Flex-Hose Co., Inc.
 2. Metraflex Company (The).
- B. Bronze-Hose Flexible Connectors: Corrugated-bronze tubing with bronze wire-braid covering and ends brazed to inner tubing.
 1. Working-Pressure Rating: Minimum 200 psig.
 2. End Connections NPS 2 and Smaller: Threaded copper pipe or plain-end copper tube.
 3. End Connections NPS 2-1/2 and Larger: Flanged copper alloy.
- C. Stainless-Steel-Hose Flexible Connectors: Corrugated-stainless-steel tubing with stainless-steel wire-braid covering and ends welded to inner tubing.
 1. Working-Pressure Rating: Minimum 200 psig.
 2. End Connections NPS 2 and Smaller: Threaded steel-pipe nipple.
 3. End Connections NPS 2-1/2 and Larger: Flanged steel nipple.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Backflow Preventers: Install backflow preventers in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.
 1. Locate backflow preventers in same room as connected equipment or system.
 2. Install drain for backflow preventers with atmospheric-vent drain connection with air-gap fitting, fixed air-gap fitting, or equivalent positive pipe separation of at least two pipe diameters in drain piping and pipe-to-floor drain. Locate air-gap device attached to or under backflow preventer. Simple air breaks are unacceptable for this application.
 3. Do not install bypass piping around backflow preventers.
- B. Balancing Valves: Install in locations where they can easily be adjusted.
- C. Temperature-Actuated, Water Mixing Valves: Install with check stops or shutoff valves on inlets and with shutoff valve on outlet.

DOMESTIC WATER PIPING SPECIALTIES

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Install cabinet-type units recessed in or surface mounted on wall as specified.
- D. Y-Pattern Strainers: For water, install on supply side of each solenoid valve and pump.
- E. Outlet Boxes: Install boxes recessed in wall or surface mounted on wall. Install 2-by-4-inch fire-retardant-treated-wood blocking, wall reinforcement between studs. Comply with requirements for fire-retardant-treated-wood blocking in Section 061000 "Rough Carpentry."
- F. Water-Hammer Arresters: Install in water piping according to PDI-WH 201.
- G. Supply-Type, Trap-Seal Primer Device: Install with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.
- H. Drainage-Type, Trap-Seal Primer Device: Install as lavatory trap with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting.

3.2 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. When installing piping specialties adjacent to equipment and machines, allow space for service and maintenance.

3.3 IDENTIFICATION

- A. Plastic Labels for Equipment: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:
 1. Reduced-pressure-principle backflow preventers.
 2. Calibrated balancing valves.
 3. Primary, thermostatic, water mixing valves.
 4. Outlet boxes.
 5. Supply-type, trap-seal primer valves.
 6. Trap-seal primer systems.
- B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.4 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 1. Test each reduced-pressure-principle backflow preventer according to authorities having jurisdiction and the device's reference standard.
- B. Domestic water piping specialties will be considered defective if they do not pass tests and inspections.

DOMESTIC WATER PIPING SPECIALTIES

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- C. Prepare test and inspection reports.

3.5 ADJUSTING

- A. Set field-adjustable flow set points of balancing valves.
- B. Set field-adjustable temperature set points of temperature-actuated, water mixing valves.

END OF SECTION 22 11 19

SECTION 22 11 23.21 - INLINE, DOMESTIC-WATER PUMPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. In-line, sealless centrifugal pumps.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include construction materials, rated capacities, certified performance curves with operating points plotted on curves, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For inline, domestic-water pumps to include in operation and maintenance manuals.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Retain shipping flange protective covers and protective coatings during storage.
- B. Protect bearings and couplings against damage.
- C. Comply with pump manufacturer's written instructions for handling.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. UL Compliance: UL 778 for motor-operated water pumps.
- C. Drinking Water System Components - Health Effects and Drinking Water System Components - Lead Content Compliance: NSF 61 and NSF 372.

2.2 IN-LINE, SEALLESS CENTRIFUGAL PUMPS

- A. Description: Factory-assembled and -tested, in-line, close-coupled, canned-motor, sealless, overhung-impeller centrifugal pumps.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Bell and Gossett.
 - 2. Grundfos Pumps Corp.
 - 3. WILO USA LLC - WILO Canada Inc.
- C. Pump Construction:
 - 1. Pump and Motor Assembly: Hermetically sealed, replaceable-cartridge type with motor and impeller on common shaft and designed for installation with pump and motor shaft horizontal.
 - 2. Minimum Working Pressure: 125 psig.
 - 3. Maximum Continuous Operating Temperature: 220 deg F.
 - 4. Casing: Bronze or stainless steel, with threaded or companion-flange connections.
 - 5. Impeller: Composite or stainless steel.
 - 6. Motor: Single speed.

2.3 MOTORS

- A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 220513 "Common Motor Requirements for Plumbing Equipment."
 - 1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

2.4 CONTROLS

- A. Thermostats: Electric; adjustable for control of hot-water circulation pump.
 - 1. Type: Water-immersion temperature sensor, for installation in piping.
 - 2. Range: 50 to 125 deg F.
 - 3. Enclosure: NEMA 250, Type 3R.
 - 4. Operation of Pump: On or off.
 - 5. Transformer: Provide if required.
 - 6. Power Requirement: 120 V ac.
 - 7. Settings: Start pump at 105 deg F and stop pump at 120 deg F.
- B. Timers: Electric, for control of hot-water circulation pump.
 - 1. Type: Programmable, seven-day clock with manual override on-off switch.
 - 2. Enclosure: NEMA 250, Type 3R, suitable for wall mounting.
 - 3. Operation of Pump: On or off.
 - 4. Transformer: Provide if required.
 - 5. Power Requirement: 120 V ac.
 - 6. Programmable Sequence of Operation: Up to two on-off cycles each day for seven days.

INLINE, DOMESTIC-WATER PUMPS

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in for domestic-water-piping system to verify actual locations of piping connections before pump installation.

3.2 PUMP INSTALLATION

- A. Comply with HI 1.4.
- B. Mount pumps in orientation complying with manufacturer's written instructions.
- C. Install thermostats in hot-water return piping.
- D. Install timers on wall in mechanical equipment room.
- E. Install time-delay relays in piping between water heaters and hot-water storage tanks.

3.3 PIPING CONNECTIONS

- A. Comply with requirements for piping specified in Section 221116 "Domestic Water Piping." Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Where installing piping adjacent to inline, domestic-water pumps, allow space for service and maintenance.
- C. Connect domestic-water piping to pumps. Install suction and discharge piping equal to or greater than size of pump nozzles.
- D. Install shutoff valve and strainer on suction side of each pump, and check, shutoff, and throttling valves on discharge side of each pump. Install valves same size as connected piping. Comply with requirements for strainers specified in Section 221119 "Domestic Water Piping Specialties." Comply with requirements for valves specified in the following:
 - 1. Section 220523.12 "Ball Valves for Plumbing Piping."
 - 2. Section 220523.14 "Check Valves for Plumbing Piping."

3.4 CONTROL CONNECTIONS

- A. Install control and electrical power wiring to field-mounted control devices.
- B. Connect control wiring between temperature controllers and devices.

3.5 IDENTIFICATION

- A. Identify system components. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment" for identification of pumps.

3.6 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 - 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Inline, domestic-water pump will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

3.7 STARTUP SERVICE

- A. Perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.
 - 2. Check piping connections for tightness.
 - 3. Clean strainers on suction piping.
 - 4. Set thermostats and timers for automatic starting and stopping operation of pumps.
 - 5. Perform the following startup checks for each pump before starting:
 - a. Verify bearing lubrication.
 - b. Verify that pump is free to rotate by hand and that pump for handling hot liquid is free to rotate with pump hot and cold. If pump is bound or drags, do not operate until cause of trouble is determined and corrected.
 - c. Verify that pump is rotating in the correct direction.
 - 6. Prime pump by opening suction valves and closing drains, and prepare pump for operation.
 - 7. Start motor.
 - 8. Open discharge valve slowly.
 - 9. Adjust temperature settings on thermostats.
 - 10. Adjust timer settings.

3.8 ADJUSTING

- A. Adjust inline, domestic-water pumps to function smoothly, and lubricate as recommended by manufacturer.
- B. Adjust initial temperature set points.
- C. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

END OF SECTION 22 11 23.21

SECTION 22 13 16 - SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Hubless, cast-iron soil pipe and fittings.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 FIELD CONDITIONS

- A. Interruption of Existing Sanitary Waste Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
 - 1. Notify Owner no fewer than two days in advance of proposed interruption of sanitary waste service.
 - 2. Do not proceed with interruption of sanitary waste service without Owner's written permission.

1.5 WARRANTY

- A. Listed manufacturers to provide labeling and warranty of their respective products.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:
 - 1. Soil, Waste, and Vent Piping: 10-foot head of water.
 - 2. Waste, Force-Main Piping: 50 psig.
- B. Seismic Performance: Soil, waste, and vent piping and support and installation shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

2.2 PIPING MATERIALS

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.3 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. AB & I Foundry; a part of the McWane family of companies.
 - 2. Charlotte Pipe and Foundry Company.
 - 3. Tyler Pipe; a part of McWane family of companies.
- B. Pipe and Fittings: ASTM A 888 or CISPI 301.
- C. CISPI, Hubless-Piping Couplings:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ANACO-Husky.
 - b. Charlotte Pipe and Foundry Company.
 - c. Dallas Specialty & Mfg. Co.
 - d. Fernco Inc.
 - e. MIFAB, Inc.
 - f. Tyler Pipe; a subsidiary of McWane Inc.
 - 2. Standards: ASTM C 1277 and CISPI 310.
 - 3. Description: Stainless-steel corrugated shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.
- D. Heavy-Duty, Hubless-Piping Couplings:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ANACO-Husky.
 - b. Charlotte Pipe and Foundry Company.
 - c. Clamp-All Corp.
 - d. Dallas Specialty & Mfg. Co.
 - e. MIFAB, Inc.
 - f. Tyler Pipe; a subsidiary of McWane Inc.
 - 2. Standards: ASTM C 1277 and ASTM C 1540.
 - 3. Description: Stainless-steel shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

PART 3 - EXECUTION

3.1 EARTH MOVING

- A. Comply with requirements for excavating, trenching, and backfilling specified in Section 312000 "Earth Moving."

3.2 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems.
 - 1. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations.
 - 2. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping to permit valve servicing.
- F. Install piping at indicated slopes.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Install piping to allow application of insulation.
- J. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends.
 - 1. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical.
 - 2. Use long-turn, double Y-branch and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe.
 - a. Straight tees, elbows, and crosses may be used on vent lines.
 - 3. Do not change direction of flow more than 90 degrees.
 - 4. Use proper size of standard increasers and reducers if pipes of different sizes are connected.
 - a. Reducing size of waste piping in direction of flow is prohibited.
- K. Lay buried building waste piping beginning at low point of each system.

SANITARY WASTE AND VENT PIPING

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream.
 2. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
 3. Maintain swab in piping and pull past each joint as completed.
- L. Install soil and waste and vent piping at the following minimum slopes unless otherwise indicated:
1. Building Sanitary Waste: 2 percent downward in direction of flow for piping NPS 3 and smaller; 2 percent downward in direction of flow for piping NPS 4 and larger.
 2. Horizontal Sanitary Waste Piping: 2 percent downward in direction of flow.
 3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.
- M. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
- N. Plumbing Specialties:
1. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary waste gravity-flow piping.
 - a. Comply with requirements for cleanouts specified in Section 221319 "Sanitary Waste Piping Specialties."
 2. Install drains in sanitary waste gravity-flow piping.
 - a. Comply with requirements for drains specified in Section 221319 "Sanitary Waste Piping Specialties."
- O. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
- P. Install sleeves for piping penetrations of walls, ceilings, and floors.
1. Comply with requirements for sleeves specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
- Q. Install sleeve seals for piping penetrations of concrete walls and slabs.
1. Comply with requirements for sleeve seals specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
- R. Install escutcheons for piping penetrations of walls, ceilings, and floors.
1. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."
- 3.3 JOINT CONSTRUCTION
- A. Join hubless, cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.
- B. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1.

SANITARY WASTE AND VENT PIPING

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Cut threads full and clean using sharp dies.
2. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - a. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - b. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
 - c. Do not use pipe sections that have cracked or open welds.
- C. Join copper tube and fittings with soldered joints according to ASTM B 828. Use ASTM B 813, water-flushable, lead-free flux and ASTM B 32, lead-free-alloy solder.
- D. Grooved Joints: Cut groove ends of pipe according to AWWA C606. Lubricate and install gasket over ends of pipes or pipe and fitting. Install coupling housing sections, over gasket, with keys seated in piping grooves. Install and tighten housing bolts.
- E. Flanged Joints: Align bolt holes. Select appropriate gasket material, size, type, and thickness. Install gasket concentrically positioned. Use suitable lubricants on bolt threads. Torque bolts in cross pattern.
- F. Plastic, Nonpressure-Piping, Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 appendixes.
 3. PVC Piping: Join according to ASTM D 2855 and ASTM D 2665 appendixes.

3.4 SPECIALTY PIPE FITTING INSTALLATION

- A. Dielectric Fittings:
 1. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
 2. Dielectric Fittings for NPS 2 and Smaller: Use dielectric unions.
 3. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flanges.
 4. Dielectric Fittings for NPS 5 and Larger: Use dielectric flange kits.

3.5 INSTALLATION OF HANGERS AND SUPPORTS

- A. Comply with requirements for pipe hanger and support devices and installation specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
 1. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.
 2. Install carbon-steel pipe support clamps for vertical piping in noncorrosive environments.
 3. Install stainless-steel pipe support clamps for vertical piping in corrosive environments.
 4. Vertical Piping: MSS Type 8 or Type 42, clamps.
 5. Install individual, straight, horizontal piping runs:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.

SANITARY WASTE AND VENT PIPING

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

6. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 7. Base of Vertical Piping: MSS Type 52, spring hangers.
- B. Install hangers for cast-iron soil piping, with maximum horizontal spacing and minimum rod diameters, to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
 - C. Support horizontal piping and tubing within 12 inches of each fitting, valve, and coupling.
 - D. Support vertical runs of cast iron soil piping to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.6 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.
- C. Connect waste and vent piping to the following:
 1. Plumbing Fixtures: Connect waste piping in sizes indicated, but not smaller than required by plumbing code.
 2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
 3. Plumbing Specialties: Connect waste and vent piping in sizes indicated, but not smaller than required by plumbing code.
 4. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.
 5. Comply with requirements for cleanouts and drains specified in Section 221319 "Sanitary Waste Piping Specialties."
 6. Equipment: Connect waste piping as indicated.
 - a. Provide shutoff valve if indicated and union for each connection.
 - b. Use flanges instead of unions for connections NPS 2-1/2 and larger.
- D. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.
- E. Make connections according to the following unless otherwise indicated:
 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.

3.7 IDENTIFICATION

- A. Identify exposed sanitary waste and vent piping.
- B. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

SANITARY WASTE AND VENT PIPING

3.8 FIELD QUALITY CONTROL

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
 - 1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 - 2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
- C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- D. Test sanitary waste and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
 - 1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired.
 - a. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
 - 2. Leave uncovered and unconcealed new, altered, extended, or replaced waste and vent piping until it has been tested and approved.
 - a. Expose work that was covered or concealed before it was tested.
 - 3. Roughing-in Plumbing Test Procedure: Test waste and vent piping except outside leaders on completion of roughing-in.
 - a. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water.
 - b. From 15 minutes before inspection starts to completion of inspection, water level must not drop.
 - c. Inspect joints for leaks.
 - 4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight.
 - a. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg.
 - b. Use U-tube or manometer inserted in trap of water closet to measure this pressure.
 - c. Air pressure must remain constant without introducing additional air throughout period of inspection.
 - d. Inspect plumbing fixture connections for gas and water leaks.
 - 5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
 - 6. Prepare reports for tests and required corrective action.

3.9 CLEANING AND PROTECTION

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect sanitary waste and vent piping during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.
- D. Exposed ABS and PVC Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.
- E. Repair damage to adjacent materials caused by waste and vent piping installation.

3.10 PIPING SCHEDULE

- A. Aboveground, soil and waste piping NPS 4 and smaller shall be the following:
 - 1. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.
- B. Aboveground, soil and waste piping NPS 5 and larger shall be the following:
 - 1. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.
- C. Aboveground, vent piping NPS 4 and smaller shall be the following:
 - 1. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.
- D. Underground, soil, waste, and vent piping NPS 4 and smaller shall be the following:
 - 1. Hubless, cast-iron soil pipe and fittings; heavy-duty hubless-piping couplings; and coupled joints.
- E. Underground, soil and waste piping NPS 5 and larger shall be the following:
 - 1. Hubless, cast-iron soil pipe and fittings; heavy-duty hubless-piping couplings; coupled joints.

END OF SECTION 22 13 16

SECTION 22 13 19 - SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Cleanouts.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For sanitary waste piping specialties to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTIONS

- A. Sanitary waste piping specialties shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF 14 for plastic sanitary waste piping specialty components.

2.2 CLEANOUTS

- A. Cast-Iron Exposed Cleanouts:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Jay R. Smith Mfg Co; a division of Morris Group International.
 - b. Josam Company.
 - c. MIFAB, Inc.
 - d. Tyler Pipe; a subsidiary of McWane Inc.
 - e. WATTS.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- f. [Zurn Industries, LLC.](#)
 2. Standard: ASME A112.36.2M.
 3. Size: Same as connected drainage piping
 4. Body Material: Hubless, cast-iron soil pipe test tee as required to match connected piping.
 5. Closure: Countersunk or raised-head, brass plug.
 6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
- B. Cast-Iron Exposed Floor Cleanouts:
1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - a. [Jay R. Smith Mfg Co; a division of Morris Group International.](#)
 - b. [Josam Company.](#)
 - c. [MIFAB, Inc.](#)
 - d. [Sioux Chief Manufacturing Company, Inc.](#)
 - e. [WATTS.](#)
 - f. [Zurn Industries, LLC.](#)
 2. Standard: ASME A112.36.2M for adjustable housing cleanout.
 3. Size: Same as connected branch.
 4. Type: Adjustable housing.
 5. Body or Ferrule: Cast iron.
 6. Clamping Device: Required.
 7. Outlet Connection: Inside calk.
 8. Closure: Brass plug with straight threads and gasket.
 9. Adjustable Housing Material: Cast iron with setscrews or other device.
 10. Frame and Cover Material and Finish: Nickel-bronze, copper alloy.
 11. Frame and Cover Shape: Round.
 12. Top-Loading Classification: Medium Duty.
 13. Riser: ASTM A74, Service Class, cast-iron drainage pipe fitting and riser to cleanout.
- C. Cast-Iron Wall Cleanouts:
1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - a. [Jay R. Smith Mfg Co; a division of Morris Group International.](#)
 - b. [Josam Company.](#)
 - c. [MIFAB, Inc.](#)
 - d. [WATTS.](#)
 - e. [Zurn Industries, LLC.](#)
 2. Standard: ASME A112.36.2M. Include wall access.
 3. Size: Same as connected drainage piping.
 4. Body: Hubless, cast-iron soil pipe test tee as required to match connected piping.
 5. Closure Plug:
 - a. Brass.
 - b. Countersunk or raised head.
 - c. Drilled and threaded for cover attachment screw.
 - d. Size: Same as or not more than one size smaller than cleanout size.

6. Wall Access, Frame and Cover: Square, nickel-bronze, copper-alloy, or stainless steel wall-installation frame and cover.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:
 1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
 2. Locate at each change in direction of piping greater than 45 degrees.
 3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
 4. Locate at base of each vertical soil and waste stack.
- B. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.
- C. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.
- D. Install floor-drain, trap-seal primer fittings on inlet to floor drains that require trap-seal primer connection.
 1. Exception: Fitting may be omitted if trap has trap-seal primer connection.
 2. Size: Same as floor drain inlet.
- E. Install sleeve and sleeve seals with each riser and stack passing through floors with waterproof membrane.

3.2 PIPING CONNECTIONS

- A. Comply with requirements in Section 221316 "Sanitary Waste and Vent Piping" for piping installation requirements. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment, to allow service and maintenance.

3.3 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION 22 13 19

SECTION 22 34 00 - FUEL-FIRED, DOMESTIC-WATER HEATERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Commercial, gas-fired, high-efficiency, storage, domestic-water heaters.
 - 2. Domestic-water heater accessories.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings:
 - 1. Include diagrams for power, signal, and control wiring.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fuel-fired, domestic-water heaters to include in emergency, operation, and maintenance manuals.

1.5 COORDINATION

- A. Coordinate sizes and locations of concrete bases with actual equipment provided.

1.6 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of fuel-fired, domestic-water heaters that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including storage tank and supports.
 - b. Faulty operation of controls.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal use.
 - 2. Warranty Periods: From date of Substantial Completion.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- a. Commercial, Gas-Fired, Storage, Domestic-Water Heaters:
 - 1) Storage Tank: Three years.
 - 2) Controls and Other Components: Two year(s).
- b. Expansion Tanks: Five years.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and use.
- B. ASME Compliance:
 - 1. Where ASME-code construction is indicated, fabricate and label commercial, domestic-water heater storage tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
 - 2. Where ASME-code construction is indicated, fabricate and label commercial, finned-tube, domestic-water heaters to comply with ASME Boiler and Pressure Vessel Code: Section IV.
- C. NSF Compliance: Fabricate and label equipment components that will be in contact with potable water to comply with NSF 61 and NSF 372.

2.2 COMMERCIAL, GAS-FIRED, STORAGE, DOMESTIC-WATER HEATERS

- A. Commercial, Gas-Fired, High-Efficiency, Storage, Domestic-Water Heaters:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. A. O. Smith Corporation.
 - b. Bradford White Corporation.
 - c. Rheem Manufacturing Company.
 - d. State Industries.
 - 2. Source Limitations: Obtain domestic-water heaters from single source from single manufacturer.
 - 3. Standard: ANSI Z21.10.3/CSA 4.3.
 - 4. Factory-Installed, Storage-Tank Appurtenances:
 - a. Anode Rod: Replaceable magnesium.
 - b. Dip Tube: Required unless cold-water inlet is near bottom of tank.
 - c. Drain Valve: Corrosion-resistant metal with hose-end connection.
 - d. Insulation: Comply with ASHRAE/IES 90.1. Surround entire storage tank except connections and controls.
 - e. Jacket: Steel with enameled finish.

FUEL-FIRED, DOMESTIC-WATER HEATERS

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- f. Burner or Heat Exchanger: Comply with UL 795 or approved testing agency requirements for gas-fired, high-efficiency, domestic-water heaters and natural-gas fuel.
- g. Temperature Control: Adjustable thermostat.
- h. Safety Controls: Automatic, high-temperature-limit and low-water cutoff devices or systems.
- i. Combination Temperature-and-Pressure Relief Valves: ANSI Z21.22/CSA 4.4. Include one or more relief valves with total relieving capacity at least as great as heat input, and include pressure setting less than working-pressure rating of domestic-water heater. Select one relief valve with sensing element that extends into storage tank.

2.3 DOMESTIC-WATER HEATER ACCESSORIES

A. Domestic-Water Expansion Tanks:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. A. O. Smith Corporation.
 - b. AMTROL, Inc.
 - c. State Industries.
- 2. Source Limitations: Obtain domestic-water heaters from single source from single manufacturer.
- 3. Description: Steel, pressure-rated tank constructed with welded joints and factory-installed, butyl-rubber diaphragm. Include air precharge to minimum system-operating pressure at tank.
- 4. Construction:
 - a. Tappings: Factory-fabricated steel, welded to tank before testing and labeling. Include ASME B1.20.1 pipe thread.
 - b. Interior Finish: Comply with NSF 61 and NSF 372 barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.
 - c. Air-Charging Valve: Factory installed.

B. Drain Pans: Corrosion-resistant metal with raised edge. Include dimensions not less than base of domestic-water heater, and include drain outlet not less than NPS 3/4 with ASME B1.20.1 pipe threads.

C. Comply with requirements for ball-type shutoff valves specified in Section 220523.12 "Ball Valves for Plumbing Piping."

- 1. Comply with requirements for balancing valves specified in Section 221119 "Domestic Water Piping Specialties."

D. Gas Shutoff Valves: ANSI Z21.15/CSA 9.1, manually operated. Furnish for installation in piping.

E. Gas Pressure Regulators: ANSI Z21.18/CSA 6.3, appliance type. Include 1/2-psig pressure rating as required to match gas supply.

FUEL-FIRED, DOMESTIC-WATER HEATERS

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- F. Combination Temperature-and-Pressure Relief Valves: Include relieving capacity at least as great as heat input, and include pressure setting less than working-pressure rating of domestic-water heater. Select relief valves with sensing element that extends into storage tank.

- 1. Gas-Fired, Domestic-Water Heaters: ANSI Z21.22/CSA 4.4.

2.4 SOURCE QUALITY CONTROL

- A. Factory Tests: Test and inspect assembled domestic-water heaters specified to be ASME-code construction, in accordance with ASME Boiler and Pressure Vessel Code.
- B. Hydrostatically test domestic-water heaters to minimum of one and one-half times pressure rating before shipment.
- C. Domestic-water heaters will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 DOMESTIC-WATER HEATER INSTALLATION

- A. Commercial, Domestic-Water Heater Mounting: Install commercial domestic-water heaters on concrete base. Comply with requirements for concrete base specified in Section 033000 "Cast-in-Place Concrete."
 - 1. Maintain manufacturer's recommended clearances.
 - 2. Arrange units so controls and devices that require servicing are accessible.
 - 3. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
 - 4. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
 - 5. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 6. Install anchor bolts to elevations required for proper attachment to supported equipment.
 - 7. Anchor domestic-water heaters to substrate.
- B. Install domestic-water heaters level and plumb, in accordance with layout drawings, original design, and referenced standards. Maintain manufacturer's recommended clearances. Arrange units so controls and devices needing service are accessible.
 - 1. Install shutoff valves on domestic-water-supply piping to domestic-water heaters and on domestic-hot-water outlet piping. Comply with requirements for shutoff valves specified in Section 220523.12 "Ball Valves for Plumbing Piping."
- C. Install gas-fired, domestic-water heaters in accordance with NFPA 54.
 - 1. Install gas shutoff valves on gas supply piping to gas-fired, domestic-water heaters without shutoff valves.

FUEL-FIRED, DOMESTIC-WATER HEATERS

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

2. Install gas pressure regulators on gas supplies to gas-fired, domestic-water heaters without gas pressure regulators if gas pressure regulators are required to reduce gas pressure at burner.
 3. Install automatic gas valves on gas supplies to gas-fired, domestic-water heaters if required for operation of safety control.
 4. Comply with requirements for gas shutoff valves, gas pressure regulators, and automatic gas valves specified in Section 231123 "Facility Natural-Gas Piping."
- D. Install combination temperature-and-pressure relief valves in top portion of storage tanks. Use relief valves with sensing elements that extend into tanks. Extend domestic-water-heater relief-valve outlet, with drain piping same as domestic-water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.
- E. Install water-heater drain piping as indirect waste to spill by positive air gap into open drains or over floor drains. Install hose-end drain valves at low points in water piping for domestic-water heaters that do not have tank drains. Comply with requirements for hose-end drain valves specified in Section 221119 "Domestic Water Piping Specialties."
- F. Install thermometer on outlet piping of domestic-water heaters. Comply with requirements for thermometers specified in Section 220519 "Meters and Gages for Plumbing Piping."
- G. Assemble and install inlet and outlet piping manifold kits for multiple domestic-water heaters. Fabricate, modify, or arrange manifolds for balanced water flow through each domestic-water heater. Include shutoff valve and thermometer in each domestic-water heater inlet and outlet, and throttling valve in each domestic-water heater outlet. Comply with requirements for valves specified in Section 220523.12 "Ball Valves for Plumbing Piping" and comply with requirements for thermometers specified in Section 220519 "Meters and Gages for Plumbing Piping."
- H. Install piping-type heat traps on inlet and outlet piping of domestic-water heater storage tanks without integral or fitting-type heat traps.
- I. Fill domestic-water heaters with water.
- J. Charge domestic-water expansion tanks with air to required system pressure.
- K. Install dielectric fittings in all locations where piping of dissimilar metals is to be joined. The wetted surface of the dielectric fitting contacted by potable water shall contain less than 0.25 percent of lead by weight.
- 3.2 PIPING CONNECTIONS
- A. Comply with requirements for domestic-water piping specified in Section 221116 "Domestic Water Piping."
- B. Comply with requirements for gas piping specified in Section 231123 "Facility Natural-Gas Piping."
- C. Drawings indicate general arrangement of piping, fittings, and specialties.
- D. Where installing piping adjacent to fuel-fired, domestic-water heaters, allow space for service and maintenance of water heaters. Arrange piping for easy removal of domestic-water heaters.

3.3 IDENTIFICATION

- A. Identify system components. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation.
 - 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Domestic-water heaters will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

3.5 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain commercial, gas-fired, storage, domestic-water heaters. Training shall be a minimum of one hour.

END OF SECTION 22 34 00

SECTION 22 42 13.13 - COMMERCIAL WATER CLOSETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Water closets.
 - 2. Flushometer valves and tanks.
 - 3. Toilet seats.

1.3 DEFINITIONS

- A. Remote Water Closet: Located more than 30 feet from other drain line connections or fixture and where less than 1.5 drainage fixture units are upstream of the drain line connection.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for water closets.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For flushometer valves and electronic sensors to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 FLOOR-MOUNTED, BOTTOM-OUTLET WATER CLOSETS

- A. Water Closets: Floor mounted, bottom outlet, top spud.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- a. [American Standard.](#)
- b. [FNW; Ferguson Enterprises, Inc.](#)
- c. [Kohler Co.](#)
- d. [Zurn Industries, LLC.](#)

2. Bowl:

- a. Standards: ASME A112.19.2/CSA B45.1 and ASME A112.19.5.
- b. Material: Vitreous china.
- c. Type: Siphon jet.
- d. Style: Flushometer valve.
- e. Height: Handicapped/elderly, complying with ICC/ANSI A117.1.
- f. Rim Contour: Elongated.
- g. Water Consumption: 1.28 gal. per flush.
- h. Spud Size and Location: NPS 1-1/2; top.
- i. Color: White.

3. Bowl-to-Drain Connecting Fitting: ASTM A1045 or ASME A112.4.3.

2.2 FLUSHOMETER VALVES

A. Battery-Powered, Solenoid-Actuator, Piston Flushometer Valves:

1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - a. [American Standard.](#)
 - b. [Delany Products.](#)
 - c. [Kohler Co.](#)
 - d. [Moen Incorporated.](#)
 - e. [Sloan Valve Company.](#)
 - f. [Zurn Industries, LLC.](#)
2. Standard: ASSE 1037.
3. Minimum Pressure Rating: 125 psig.
4. Features: Include integral check stop and backflow-prevention device.
5. Material: Brass body with corrosion-resistant components.
6. Exposed Flushometer-Valve Finish: Chrome plated.
7. Style: Exposed.
8. Actuator: Solenoid complying with UL 1951, and listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
9. Trip Mechanism: Battery-powered electronic sensor complying with UL 1951, and listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
10. Consumption: 1.28 gal. per flush.
11. Minimum Inlet: NPS 1.
12. Minimum Outlet: NPS 1-1/4.

2.3 TOILET SEATS

A. Toilet Seats:

COMMERCIAL WATER CLOSETS

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Standard.
 - b. Bemis Manufacturing Company.
 - c. Centoco Manufacturing Corporation.
 - d. Kohler Co.
 - e. Olsonite Seat Co.
 - f. TOTO USA, INC.
 - g. Zurn Industries, LLC.
2. Standard: IAPMO/ANSI Z124.5.
3. Material: Plastic.
4. Type: Commercial (Standard).
5. Shape: Elongated rim, open front.
6. Hinge: Self-sustaining, check.
7. Hinge Material: Noncorroding metal.
8. Color: White.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before water-closet installation.
- B. Examine walls and floors for suitable conditions where water closets will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Water-Closet Installation:
 1. Install level and plumb according to roughing-in drawings.
 2. Install floor-mounted water closets on bowl-to-drain connecting fitting attachments to piping or building substrate.
- B. Support Installation:
 1. Install supports, affixed to building substrate, for floor-mounted, back-outlet water closets.
 2. Use carrier supports with waste-fitting assembly and seal.
 3. Install floor-mounted, back-outlet water closets attached to building floor substrate, onto waste-fitting seals; and attach to support.
 4. Install wall-mounted, back-outlet water-closet supports with waste-fitting assembly and waste-fitting seals; and affix to building substrate.
- C. Flushometer-Valve Installation:
 1. Install flushometer-valve, water-supply fitting on each supply to each water closet.
 2. Attach supply piping to supports or substrate within pipe spaces behind fixtures.

COMMERCIAL WATER CLOSETS

- 3. Install actuators in locations that are easy for people with disabilities to reach.
- D. Install toilet seats on water closets.
- E. Wall Flange and Escutcheon Installation:
 - 1. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations and within cabinets and millwork.
 - 2. Install deep-pattern escutcheons if required to conceal protruding fittings.
 - 3. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."

3.3 CONNECTIONS

- A. Connect water closets with water supplies and soil, waste, and vent piping. Use size fittings required to match water closets.
- B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."
- C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."
- D. Where installing piping adjacent to water closets, allow space for service and maintenance.

3.4 ADJUSTING

- A. Operate and adjust water closets and controls. Replace damaged and malfunctioning water closets, fittings, and controls.
- B. Adjust water pressure at flushometer valves to produce proper flow.

3.5 CLEANING AND PROTECTION

- A. Clean water closets and fittings with manufacturers' recommended cleaning methods and materials.
- B. Install protective covering for installed water closets and fittings.
- C. Do not allow use of water closets for temporary facilities unless approved in writing by Owner.

END OF SECTION 22 42 13.13

SECTION 22 42 13.16 - COMMERCIAL URINALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Urinals.
 - 2. Flushometer valves.
 - 3. Supports.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for urinals.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For flushometer valves and electronic sensors to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 WALL-HUNG URINALS

- A. Urinals: Wall hung, back outlet, washout, accessible.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Standard.
 - b. Crane Plumbing, L.L.C.
 - c. FNW; Ferguson Enterprises, Inc.
 - d. Kohler Co.
 - e. Zurn Industries, LLC.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

2. Fixture:
 - a. Standards: ASME A112.19.2/CSA B45.1 and ASME A112.19.5.
 - b. Material: Vitreous china.
 - c. Type: Washout with extended shields.
 - d. Strainer or Trapway: Manufacturer's standard strainer with integral trap.
 - e. Water Consumption: Water saving.
 - f. Spud Size and Location: NPS 3/4, top.
 - g. Outlet Size and Location: NPS 2, back.
 - h. Color: White.
3. Waste Fitting:
 - a. Standard: ASME A112.18.2/CSA B125.2 for coupling.
 - b. Size: NPS 2.
4. Support: Type I Urinal Carrier with fixture support plates and coupling with seal and fixture bolts and hardware matching fixture. Include rectangular, steel uprights.
5. Urinal Mounting Height: Handicapped/elderly according to ICC A117.1.

2.2 URINAL FLUSHOMETER VALVES

A. Battery-Powered, Solenoid-Actuator, Piston Flushometer Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Standard.
 - b. Kohler Co.
 - c. Moen Incorporated.
 - d. Sloan Valve Company.
 - e. Zurn Industries, LLC.
2. Standard: ASSE 1037.
3. Minimum Pressure Rating: 125 psig.
4. Features: Include integral check stop and backflow-prevention device.
5. Material: Brass body with corrosion-resistant components.
6. Exposed Flushometer-Valve Finish: Chrome plated.
7. Style: Exposed.
8. Actuator: Solenoid complying with UL 1951; listed and labeled as defined in NFPA 70, by a qualified testing agency; and marked for intended location and application.
9. Trip Mechanism: Battery-powered electronic sensor complying with UL 1951; listed and labeled as defined in NFPA 70, by a qualified testing agency; and marked for intended location and application.
10. Consumption: 0.125 gal. per flush.
11. Minimum Inlet: NPS 3/4.
12. Minimum Outlet: NPS 3/4.

2.3 SUPPORTS

A. Type I Urinal Carrier:

COMMERCIAL URINALS

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Jay R. Smith Mfg Co; a division of Morris Group International.
 - b. Josam Company.
 - c. MIFAB, Inc.
 - d. WATTS.
 - e. Zurn Industries, LLC.
2. Standard: ASME A112.6.1M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before urinal installation.
- B. Examine walls and floors for suitable conditions where urinals will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Urinal Installation:
 1. Install urinals level and plumb according to roughing-in drawings.
 2. Install wall-hung, back-outlet urinals onto waste fitting seals and attached to supports.
 3. Install wall-hung, bottom-outlet urinals with tubular waste piping attached to supports.
 4. Install accessible, wall-mounted urinals at mounting height for the handicapped/elderly, according to ICC/ANSI A117.1.
 5. Install trap-seal liquid in waterless urinals.
- B. Support Installation:
 1. Install supports, affixed to building substrate, for wall-hung urinals.
 2. Use off-floor carriers with waste fitting and seal for back-outlet urinals.
 3. Use carriers without waste fitting for urinals with tubular waste piping.
 4. Use chair-type carrier supports with rectangular steel uprights for accessible urinals.
- C. Flushometer-Valve Installation:
 1. Install flushometer-valve water-supply fitting on each supply to each urinal.
 2. Attach supply piping to supports or substrate within pipe spaces behind fixtures.
 3. Install lever-handle flushometer valves for accessible urinals with handle mounted on open side of compartment.
 4. Install fresh batteries in battery-powered, electronic-sensor mechanisms.
- D. Wall Flange and Escutcheon Installation:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations.
2. Install deep-pattern escutcheons if required to conceal protruding fittings.
3. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."

3.3 CONNECTIONS

- A. Connect urinals with water supplies and soil, waste, and vent piping. Use size fittings required to match urinals.
- B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."
- C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."
- D. Where installing piping adjacent to urinals, allow space for service and maintenance.

3.4 ADJUSTING

- A. Operate and adjust urinals and controls. Replace damaged and malfunctioning urinals, fittings, and controls.
- B. Adjust water pressure at flushometer valves to produce proper flow.
- C. Install fresh batteries in battery-powered, electronic-sensor mechanisms.

3.5 CLEANING AND PROTECTION

- A. Clean urinals and fittings with manufacturers' recommended cleaning methods and materials.
- B. Install protective covering for installed urinals and fittings.
- C. Do not allow use of urinals for temporary facilities unless approved in writing by Owner.

END OF SECTION 22 42 13.16

SECTION 22 42 16.13 - COMMERCIAL LAVATORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Lavatories.
 - 2. Faucets.
 - 3. Supply fittings.
 - 4. Waste fittings.
 - 5. Supports.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Counter cutout templates for mounting of counter-mounted lavatories.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For lavatories and faucets to include in operation and maintenance manuals.
 - 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 - a. Servicing and adjustments of automatic faucets.

PART 2 - PRODUCTS

2.1 VITREOUS-CHINA, WALL-MOUNTED LAVATORIES

- A. Lavatory: Vitreous china, wall mounted, with back.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Standard.
 - b. Kohler Co.
 - c. Zurn Industries, LLC.
 - 2. Fixture:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- a. Standard: ASME A112.19.2/CSA B45.1.
 - b. Type: For wall hanging.
 - c. Nominal Size: Oval, 19 by 16 inches.
 - d. Faucet-Hole Punching: One hole.
 - e. Faucet-Hole Location: Top.
 - f. Color: White.
3. Support: Type II, concealed-arm lavatory carrier.
4. Lavatory Mounting Height: Handicapped/elderly according to ICC A117.1.

2.2 SOLID-BRASS, AUTOMATICALLY OPERATED LAVATORY FAUCETS

- A. NSF Standard: Comply with NSF 372 for faucet materials that will be in contact with potable water.
- B. Lavatory Faucets: Automatic-type, battery-powered, electronic-sensor-operated, nonmixing, solid-brass valve.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Chicago Faucets; Geberit Company.
 - b. Gerber Plumbing Fixtures LLC.
 - c. Moen Incorporated.
 - d. Speakman Company.
 - e. T&S Brass and Bronze Works, Inc.
 - f. Zurn Industries, LLC.
 2. Standards: ASME A112.18.1/CSA B125.1 and UL 1951.
 3. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 4. General: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture hole punchings; coordinate outlet with spout and fixture receptor.
 5. Body Type: Single hole.
 6. Body Material: Commercial, solid brass.
 7. Finish: Polished chrome plate.
 8. Maximum Flow Rate: 0.5 gpm.
 9. Mounting Type: Deck, concealed.
 10. Spout: Rigid type.
 11. Spout Outlet: Laminar flow.
 12. Drain: Not part of faucet.

2.3 LAMINAR-FLOW, FAUCET-SPOUT OUTLETS

- A. NSF Standard: Comply with NSF 372 for faucet-spout-outlet materials that will be in contact with potable water.
- B. Description: Chrome-plated-brass, faucet-spout outlet that produces non-aerating, laminar stream. Include external or internal thread that mates with faucet outlet for attachment to faucets where indicated and flow-rate range that includes flow of faucet.

COMMERCIAL LAVATORIES

2.4 SUPPLY FITTINGS

- A. NSF Standard: Comply with NSF 372 for supply-fitting materials that will be in contact with potable water.
- B. Standard: ASME A112.18.1/CSA B125.1.
- C. Supply Piping: Chrome-plated-brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated-brass or stainless-steel wall flange.
- D. Supply Stops: Chrome-plated-brass, one-quarter-turn, ball-type or compression valve with inlet connection matching supply piping.
- E. Operation: Wheel handle.
- F. Risers:
 - 1. NPS 3/8
 - 2. ASME A112.18.6, braided- or corrugated-stainless-steel, flexible hose riser.

2.5 WASTE FITTINGS

- A. Standard: ASME A112.18.2/CSA B125.2.
- B. Drain: Grid type with NPS 1-1/4 offset and straight tailpiece.
- C. Trap:
 - 1. Size: NPS 1-1/2 by NPS 1-1/4.
 - 2. Material: Chrome-plated, two-piece, cast-brass trap and ground-joint swivel elbow with 0.032-inch-thick brass tube to wall; and chrome-plated, brass or steel wall flange.

2.6 SUPPORTS

- A. Type II Lavatory Carrier:
 - 1. Standard: ASME A112.6.1M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before lavatory installation.
- B. Examine counters and walls for suitable conditions where lavatories will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

COMMERCIAL LAVATORIES

3.2 INSTALLATION

- A. Install lavatories level and plumb according to roughing-in drawings.
- B. Install supports, affixed to building substrate, for wall-mounted lavatories.
- C. Install accessible wall-mounted lavatories at handicapped/elderly mounting height for people with disabilities or the elderly, according to ICC/ANSI A117.1.
- D. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."
- E. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible lavatories. Comply with requirements in Section 220719 "Plumbing Piping Insulation."

3.3 CONNECTIONS

- A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."
- C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

3.4 ADJUSTING

- A. Operate and adjust lavatories and controls. Replace damaged and malfunctioning lavatories, fittings, and controls.
- B. Adjust water pressure at faucets to produce proper flow.
- C. Install fresh batteries in battery-powered, electronic-sensor mechanisms.

3.5 CLEANING AND PROTECTION

- A. After completing installation of lavatories, inspect and repair damaged finishes.
- B. Clean lavatories, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.
- C. Provide protective covering for installed lavatories and fittings.
- D. Do not allow use of lavatories for temporary facilities unless approved in writing by Owner.

END OF SECTION 22 42 16.13

SECTION 22 42 16.16 - COMMERCIAL SINKS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Service basins.
 - 2. Utility sinks.
 - 3. Sink faucets.
 - 4. Laminar-flow, faucet-spout outlets.
 - 5. Supports.
 - 6. Supply fittings.
 - 7. Waste fittings.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for sinks.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For sinks to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 SERVICE BASINS

- A. Service Basins: Terrazzo, floor mounted.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Acorn Engineering Company; a Division of Morris Group International.
 - b. Crane Plumbing, L.L.C.
 - c. Florestone Products Co., Inc.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

2. Fixture:
 - a. Standard: IAPMO PS 99.
 - b. Shape: Square.
 - c. Nominal Size: 24 by 24 inches.
 - d. Height: 12 inches.
 - e. Tiling Flange: On two sides.
 - f. Rim Guard: On front top surfaces.
 - g. Drain: Grid with NPS 2 outlet.
3. Mounting: On floor and flush to wall.

2.2 UTILITY SINKS

A. Utility Sinks: Stainless steel, counter mounted.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Advance Tabco.
 - b. Eagle Group.
 - c. Elkay Manufacturing Co.
 - d. Just Manufacturing.
2. Fixture:
 - a. Standard: ASME A112.19.3/CSA B45.4.
3. Supply Fittings:
 - a. Standard: ASME A112.18.1/CSA B125.1.
 - b. Supplies: Chrome-plated brass compression stop with inlet connection matching water-supply piping type and size.
 - 1) Operation: Wheel handle.
 - 2) Risers: NPS 1/2, ASME A112.18.6, braided or corrugated stainless-steel flexible hose.
4. Waste Fittings:
 - a. Standard: ASME A112.18.2/CSA B125.2.
 - b. Trap(s):
 - 1) Size: NPS 1-1/2.
 - 2) Material: Chrome-plated, two-piece, cast-brass trap and ground-joint swivel elbow with 0.032-inch-thick brass tube to wall; and chrome-plated brass or steel wall flange.
5. Mounting: On counter with sealant.

COMMERCIAL SINKS

2.3 SINK FAUCETS

- A. NSF Standard: Comply with NSF 372 for faucet-spout materials that will be in contact with potable water.
- B. Sink Faucets: Manual type, one or two lever handle mixing valve as indicated on the drawings.
 - 1. Commercial, Solid-Brass Faucets:
 - a. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - 1) [Chicago Faucets; Geberit Company.](#)
 - 2) [Delta Faucet Company.](#)
 - 3) [GROHE America, Inc.](#)
 - 4) [Moen Incorporated.](#)
 - 5) [T&S Brass and Bronze Works, Inc.](#)
 - 6) [Zurn Industries, LLC.](#)
 - 2. Standard: ASME A112.18.1/CSA B125.1.
 - 3. General: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture hole punchings; coordinate outlet with spout and sink receptor.
 - 4. Maximum Flow Rate: 2.2 gpm.
- C. Sink Faucets: Automatic, sensor-operated type, battery-powered, mixing valve.
 - 1. Commercial, Solid-Brass Faucets:
 - a. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - 1) [Chicago Faucets; Geberit Company.](#)
 - 2) [GROHE America, Inc.](#)
 - 3) [Moen Incorporated.](#)
 - 4) [Sloan Valve Company.](#)
 - 5) [T&S Brass and Bronze Works, Inc.](#)
 - 6) [Zurn Industries, LLC.](#)
 - 2. Standard: ASME A112.18.1/CSA B125.1.
 - 3. General: Coordinate faucet inlets with supplies and fixture hole punchings; coordinate outlet with spout and sink receptor.
 - 4. Body Type: Single hole.
 - 5. Body Material: Commercial, solid brass.
 - 6. Finish: Chrome plated.
 - 7. Maximum Flow Rate: 0.5 gpm.
 - 8. Mounting Type: Deck.
 - 9. Spout Type: Rigid gooseneck.
 - 10. Spout Outlet: Laminar flow.
 - 11. Thermostatic Mixing Valve: Below deck, single temperature, with check valves.

2.4 LAMINAR-FLOW, FAUCET-SPOUT OUTLETS

- A. NSF Standard: Comply with NSF 372 for faucet-spout-outlet materials that will be in contact with potable water.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. AM Conservation Group, Inc.
 - 2. NEOPERL, Inc.
 - 3. T&S Brass and Bronze Works, Inc.
- C. Description: Chrome-plated brass, faucet-spout outlet that produces non-aerating, laminar stream. Include external or internal thread that mates with faucet outlet for attachment to faucets where indicated and flow-rate range that includes flow of faucet.

2.5 SUPPLY FITTINGS

- A. NSF Standard: Comply with NSF 372 for supply-fitting materials that will be in contact with potable water.
- B. Standard: ASME A112.18.1/CSA B125.1.
- C. Supply Piping: Chrome-plated brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated brass or stainless-steel wall flange.
- D. Supply Stops: Chrome-plated brass, one-quarter-turn, ball-type or compression valve with inlet connection matching supply piping.
- E. Operation: Wheel handle.
- F. Risers:
 - 1. NPS 1/2.
 - 2. ASME A112.18.6, braided or corrugated stainless-steel flexible hose.

2.6 WASTE FITTINGS

- A. Standard: ASME A112.18.2/CSA B125.2.
- B. Drain: Grid type with NPS 1-1/2 offset and straight tailpiece.
- C. Trap:
 - 1. Size: NPS 1-1/2.
 - 2. Material: Chrome-plated, two-piece, cast-brass trap and ground-joint swivel elbow with 0.032-inch-thick brass tube to wall; and chrome-plated brass or steel wall flange.

2.7 GROUT

- A. Standard: ASTM C1107/C1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- B. Characteristics: Nonshrink; recommended for interior and exterior applications.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before sink installation.
- B. Examine walls, floors, and counters for suitable conditions where sinks will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install sinks level and plumb according to roughing-in drawings.
- B. Install supports, affixed to building substrate, for wall-hung sinks.
- C. Install accessible wall-mounted sinks at handicapped/elderly mounting height according to ICC/ANSI A117.1.
- D. Set floor-mounted sinks in leveling bed of cement grout.
- E. Install water-supply piping with stop on each supply to each sink faucet.
 - 1. Exception: Use ball valves if supply stops are not specified with sink. Comply with valve requirements specified in Section 220523.12 "Ball Valves for Plumbing Piping."
 - 2. Install stops in locations where they can be easily reached for operation.
- F. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."
- G. Seal joints between sinks and counters, floors, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."
- H. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible sinks. Comply with requirements in Section 220719 "Plumbing Piping Insulation."

3.3 CONNECTIONS

- A. Connect sinks with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."
- C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

3.4 ADJUSTING

- A. Operate and adjust sinks and controls. Replace damaged and malfunctioning sinks, fittings, and controls.
- B. Adjust water pressure at faucets to produce proper flow.

3.5 CLEANING AND PROTECTION

- A. After completing installation of sinks, inspect and repair damaged finishes.
- B. Clean sinks, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.
- C. Provide protective covering for installed sinks and fittings.
- D. Do not allow use of sinks for temporary facilities unless approved in writing by Owner.

END OF SECTION 22 42 16.16

SECTION 22 47 13 - DRINKING FOUNTAINS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes drinking fountains and related components.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of drinking fountain.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 - 2. Include operating characteristics, and furnished specialties and accessories.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For drinking fountains to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 DRINKING FOUNTAINS

- A. Drinking Fountains: Stainless steel, recessed, wheelchair accessible.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Elkay Manufacturing Co.
 - b. Halsey Taylor.
 - c. Haws Corporation.
 - d. Oasis International.
 - 2. Standards:
 - a. Comply with NSF 61 and NSF 372.
 - b. Comply with ICC A117.1.
 - 3. Receptor Shape: Concave with flush wall flange.
 - 4. Bubbler: One, with adjustable stream regulator, located on deck.
 - 5. Maximum Water Flow: 0.15 gpm.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

6. Control: Push button.
7. Drain: Grid with NPS 1-1/4 minimum horizontal waste and trap, complying with ASME A112.18.2/CSA B125.2.
8. Supply: NPS 3/8 with shutoff valve.
9. Support: Mounting frame or brackets for attaching to substrate.

B. Bottle-Filling Station: Recessed, wheelchair accessible, vandal-resistant.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Elkay Manufacturing Co.
 - b. Halsey Taylor.
 - c. Haws Corporation.
 - d. Oasis International.
2. Standards:
 - a. Comply with ASME A112.19.3/CSA B45.4.
 - b. Comply with NSF 61 and NSF 372.
 - c. Comply with ICC A117.1.
3. Cabinet: Stainless steel/ABS combination.
4. Bottle Filler: Sensor activation. Fill rate 0.5 to 1.5 gpm.
5. Drain: Grid type with NPS 1-1/4 tailpiece.
6. Supply: NPS 3/8 with shutoff valve.
7. Waste Fitting: ASME A112.18.2/CSA B125.2, NPS 1-1/4 brass P-trap.
8. Bottle-Filling Station Mounting Height: Handicapped/elderly according to ICC A117.1.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in for water-supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before fixture installation.
- B. Examine walls and floors for suitable conditions where fixtures will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install fixtures level and plumb according to roughing-in drawings. For fixtures indicated for children, install at height required by authorities having jurisdiction.
- B. Install recessed drinking fountains secured to wood blocking in wall construction.
- C. Install off-the-floor carrier supports, affixed to building substrate, for wall-mounted fixtures.
- D. Install water-supply piping with shutoff valve on supply to each fixture to be connected to domestic-water distribution piping. Use ball valve. Install valves in locations where they can be

DRINKING FOUNTAINS

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

easily reached for operation. Valves are specified in Section 220523.12 "Ball Valves for Plumbing Piping."

- E. Install trap and waste piping on drain outlet of each fixture to be connected to sanitary drainage system.
- F. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons where required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."
- G. Seal joints between fixtures and walls using sanitary-type, one-part, mildew-resistant, silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

3.3 CONNECTIONS

- A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."
- C. Install ball shutoff valve on water supply to each fixture. Comply with valve requirements specified in Section 220523.12 "Ball Valves for Plumbing Piping."
- D. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

3.4 ADJUSTING

- A. Adjust fixture flow regulators for proper flow and stream height.

3.5 CLEANING

- A. After installing fixtures, inspect unit. Remove paint splatters and other spots, dirt, and debris. Repair damaged finish to match original finish.
- B. Clean fixtures, on completion of installation, according to manufacturer's written instructions.
- C. Provide protective covering for installed fixtures.
- D. Do not allow use of fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION 22 47 13

SECTION 23 05 13 - COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes general requirements for single-phase and polyphase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on alternating-current power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

1.3 COORDINATION

- A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:
 - 1. Motor controllers.
 - 2. Torque, speed, and horsepower requirements of the load.
 - 3. Ratings and characteristics of supply circuit and required control sequence.
 - 4. Ambient and environmental conditions of installation location.

PART 2 - PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

- A. Comply with NEMA MG 1 unless otherwise indicated.

2.2 MOTOR CHARACTERISTICS

- A. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet above sea level.
- B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

2.3 POLYPHASE MOTORS

- A. Description: NEMA MG 1, Design B, medium induction motor.

COMMON MOTOR REQUIREMENTS
FOR HVAC EQUIPMENT

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- B. Efficiency: Premium efficient, as defined in NEMA MG 1.
- C. Service Factor: 1.15.
- D. Multispeed Motors: Separate winding for each speed.
- E. Rotor: Random-wound, squirrel cage.
- F. Bearings: Regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading.
- G. Temperature Rise: Match insulation rating.
- H. Insulation: Class F.
- I. Code Letter Designation:
 - 1. Motors 15 HP and Larger: NEMA starting Code F or Code G.
 - 2. Motors Smaller Than 15 HP: Manufacturer's standard starting characteristic.
- J. Enclosure Material: Cast iron for motor frame sizes 324T and larger; rolled steel for motor frame sizes smaller than 324T.

2.4 ADDITIONAL REQUIREMENTS FOR POLYPHASE MOTORS

- A. Motors Used with Reduced-Voltage and Multispeed Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.
- B. Motors Used with Variable-Frequency Controllers:
 - 1. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width-modulated inverters.
 - 2. Premium-Efficient Motors: Class B temperature rise; Class F insulation.
 - 3. Inverter-Duty Motors: Class F temperature rise; Class H insulation.
 - 4. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.

2.5 SINGLE-PHASE MOTORS

- A. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:
 - 1. Electronically commutated.
 - 2. Permanent-split capacitor.
 - 3. Split phase.
 - 4. Capacitor start, inductor run.
 - 5. Capacitor start, capacitor run.
- B. Multispeed Motors: Variable-torque, permanent-split-capacitor type.

COMMON MOTOR REQUIREMENTS
FOR HVAC EQUIPMENT

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- C. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.
- D. Motors 1/20 HP and Smaller: Shaded-pole type.
- E. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 23 05 13

SECTION 23 05 16 - EXPANSION FITTINGS AND LOOPS FOR HVAC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Flexible-hose packless expansion joints.
 - 2. Alignment guides and anchors.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For expansion joints to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Compatibility: Products shall be suitable for piping service fluids, materials, working pressures, and temperatures.
- B. Capability: Products to absorb 200 percent of maximum axial movement between anchors.

2.2 PACKLESS EXPANSION JOINTS

- A. Flexible-Hose Packless Expansion Joints:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Flex-Hose Co., Inc.
 - b. Flexicraft Industries.
 - c. Mason Industries, Inc.
 - d. Metraflex Company (The).
 - e. Unisource Manufacturing, Inc.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

2. Description: Manufactured assembly with inlet and outlet elbow fittings and two flexible-metal-hose legs joined by long-radius, 180-degree return bend or center section of flexible hose.
3. Flexible Hose: Corrugated-metal inner hoses and braided outer sheaths.
4. Expansion Joints for Copper Tubing NPS 2 and Smaller: Copper-alloy fittings with solder-joint end connections.
 - a. Bronze hoses and single-braid bronze sheaths with 450 psig at 70 deg F and 340 psig at 450 deg F ratings.
5. Expansion Joints for Copper Tubing NPS 2-1/2 to NPS 4: Copper-alloy fittings with threaded end connections.
 - a. Stainless-steel hoses and single-braid, stainless-steel sheaths with 300 psig at 70 deg F and 225 psig at 450 deg F ratings.

2.3 ALIGNMENT GUIDES AND ANCHORS

A. Alignment Guides:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Adscos Manufacturing LLC.
 - b. Advanced Thermal Systems, Inc.
 - c. Flex-Hose Co., Inc.
 - d. Flexicraft Industries.
 - e. Flex-Weld, Inc.
 - f. Mason Industries, Inc.
 - g. Metraflex Company (The).
 - h. Unisource Manufacturing, Inc.
2. Description: Steel, factory-fabricated alignment guide, with bolted two-section outer cylinder and base for attaching to structure; with two-section guiding slider for bolting to pipe.

B. Anchor Materials:

1. Steel Shapes and Plates: ASTM A36/A36M.
2. Bolts and Nuts: ASME B18.10 or ASTM A183, steel hex head.
3. Washers: ASTM F844, steel, plain, flat washers.
4. Mechanical Fasteners: Insert-wedge-type stud with expansion plug anchor for use in hardened portland cement concrete, with tension and shear capacities appropriate for application.
 - a. Stud: Threaded, zinc-coated carbon steel.
 - b. Expansion Plug: Zinc-coated steel.
 - c. Washer and Nut: Zinc-coated steel.

EXPANSION FITTINGS AND LOOPS FOR HVAC PIPING

PART 3 - EXECUTION

3.1 EXPANSION JOINT INSTALLATION

- A. Install expansion joints of sizes matching sizes of piping in which they are installed.

3.2 ALIGNMENT-GUIDE AND ANCHOR INSTALLATION

- A. Install alignment guides to guide expansion and to avoid end-loading and torsional stress.
- B. Install two guide(s) on each side of pipe expansion fittings and loops. Install guides nearest to expansion joint not more than four pipe diameters from expansion joint.
- C. Attach guides to pipe, and secure guides to building structure.
- D. Install anchors at locations to prevent stresses from exceeding those permitted by ASME B31.9 and to prevent transfer of loading and stresses to connected equipment.
- E. Anchor Attachments:
 - 1. Anchor Attachment to Copper Tubing: Attach with pipe hangers. Use MSS SP-69, Type 24; U bolts bolted to anchor.
- F. Fabricate and install steel anchors by welding steel shapes, plates, and bars. Comply with ASME B31.9 and AWS D1.1/D1.1M.
 - 1. Anchor Attachment to Steel Structural Members: Attach by welding.
 - 2. Anchor Attachment to Concrete Structural Members: Attach by fasteners. Follow fastener manufacturer's written instructions.
- G. Use grout to form flat bearing surfaces for guides and anchors attached to concrete.

END OF SECTION 23 05 16

SECTION 23 05 17 - SLEEVES AND SLEEVE SEALS FOR HVAC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Sleeves.
 - 2. Sleeve-seal systems.
 - 3. Grout.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 SLEEVES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Advance Products & Systems, Inc.
 - 2. CALPICO, Inc.
 - 3. GPT; an EnPro Industries company.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop collar.
- C. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, anticorrosion coated or galvanized, with plain ends and integral welded waterstop collar.
- D. Galvanized-Steel Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

2.2 SLEEVE-SEAL SYSTEMS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Advance Products & Systems, Inc.
 2. CALPICO, Inc.
 3. GPT; an EnPro Industries company.
 4. Metraflex Company (The).
- B. Description:
1. Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.
 2. Designed to form a hydrostatic seal of 20 psig minimum.
 3. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 4. Pressure Plates: Carbon steel.
 5. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, ASTM B 633 of length required to secure pressure plates to sealing elements.

2.3 GROUT

- A. Description: Nonshrink, for interior and exterior sealing openings in non-fire-rated walls or floors.
- B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION

- A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
- B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.
1. Sleeves are not required for core-drilled holes.
- C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.
1. Permanent sleeves are not required for holes in slabs formed by molded-PE or -PP sleeves.
 2. Cut sleeves to length for mounting flush with both surfaces.

- a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.
- 3. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.
- D. Install sleeves for pipes passing through interior partitions.
 - 1. Cut sleeves to length for mounting flush with both surfaces.
 - 2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
 - 3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint.
- E. Fire-Resistance-Rated Penetrations, Horizontal Assembly Penetrations, and Smoke Barrier Penetrations: Maintain indicated fire or smoke rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with fire- and smoke-stop materials. Comply with requirements for firestopping and fill materials specified in Section 078413 "Penetration Firestopping."

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.
- B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.3 SLEEVE-SEAL-FITTING INSTALLATION

- A. Install sleeve-seal fittings in new walls and slabs as they are constructed.
- B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.
- C. Secure nailing flanges to concrete forms.
- D. Use grout to seal the space around outside of sleeve-seal fittings.

3.4 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Leak Test: After allowing for a full cure, test sleeves and sleeve seals for leaks. Repair leaks and retest until no leaks exist.
- B. Sleeves and sleeve seals will be considered defective if they do not pass tests and inspections.

- C. Prepare test and inspection reports.

3.5 SLEEVE AND SLEEVE-SEAL SCHEDULE

- A. Use sleeves and sleeve seals for the following piping-penetration applications:

1. Exterior Concrete Walls above Grade:
 - a. Piping Smaller Than NPS 6: Cast-iron pipe sleeves.
 - b. Piping NPS 6 and Larger: Cast-iron pipe sleeves.
2. Exterior Concrete Walls below Grade:
 - a. Piping Smaller Than NPS 6: Cast-iron pipe sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
 - b. Piping NPS 6 and Larger: Cast-iron pipe sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
3. Concrete Slabs-on-Grade:
 - a. Piping Smaller Than NPS 6: Cast-iron pipe sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
 - b. Piping NPS 6 and Larger: Cast-iron pipe sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
4. Concrete Slabs above Grade:
 - a. Piping Smaller Than NPS 6: Steel pipe sleeves.
 - b. Piping NPS 6 and Larger: Steel pipe sleeves.
5. Interior Partitions:
 - a. Piping Smaller Than NPS 6: Steel pipe sleeves.
 - b. Piping NPS 6 and Larger: Galvanized-steel sheet sleeves.

END OF SECTION 23 05 17

SECTION 23 05 18 - ESCUTCHEONS FOR HVAC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Escutcheons.
 - 2. Floor plates.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. BrassCraft Manufacturing Co.; a Masco company.
 - 2. Dearborn Brass.
 - 3. ProFlo; a Ferguson Enterprises, Inc. brand.

2.2 ESCUTCHEONS

- A. One-Piece, Steel Type: With polished, chrome-plated finish and setscrew fastener.
- B. One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.
- C. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped steel with polished, chrome-plated finish and spring-clip fasteners.
- D. One-Piece, Stamped-Steel Type: With polished, chrome-plated finish and spring-clip fasteners.
- E. Split-Plate, Stamped-Steel Type: With polished, chrome-plated finish; concealed hinge; and spring-clip fasteners.

2.3 FLOOR PLATES

- A. Split Floor Plates: Cast brass with concealed hinge.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
- B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of insulated piping and with OD that completely covers opening.
 - 1. Escutcheons for New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep pattern.
 - b. Chrome-Plated Piping: One-piece steel with polished, chrome-plated finish.
 - c. Insulated Piping: One-piece steel with polished, chrome-plated finish.
 - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece steel with polished, chrome-plated finish.
 - e. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece steel with polished, chrome-plated finish.
 - f. Bare Piping in Unfinished Service Spaces: One-piece steel with polished, chrome-plated finish.
 - g. Bare Piping in Equipment Rooms: One-piece steel with polished, chrome-plated finish.
- C. Install floor plates for piping penetrations of equipment-room floors.
- D. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
 - 1. New Piping: One-piece, floor plate.

3.2 FIELD QUALITY CONTROL

- A. Using new materials, replace broken and damaged escutcheons and floor plates.

END OF SECTION 23 05 18

SECTION 23 05 23.12 - BALL VALVES FOR HVAC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Brass ball valves.
 - 2. Bronze ball valves.

1.3 DEFINITIONS

- A. CWP: Cold working pressure.
- B. SWP: Steam working pressure.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of valve.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, and weld ends.
 - 3. Set ball valves open to minimize exposure of functional surfaces.
- B. Use the following precautions during storage:
 - 1. Maintain valve end protection.
 - 2. Store valves indoors and maintain at higher-than-ambient-dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use operating handles or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
 - 1. ASME B1.20.1 for threads for threaded-end valves.
 - 2. ASME B16.5 for flanges on steel valves.
 - 3. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
 - 4. ASME B16.18 for solder-joint connections.
 - 5. ASME B31.1 for power piping valves.
 - 6. ASME B31.9 for building services piping valves.
- C. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.
- D. Refer to HVAC valve schedule articles for applications of valves.
- E. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- F. Valve Sizes: Same as upstream piping unless otherwise indicated.
- G. Valve Actuator Types:
 - 1. Gear Actuator: For quarter-turn valves NPS 4 and larger.
 - 2. Handlever: For quarter-turn valves smaller than NPS 4.
- H. Valves in Insulated Piping:
 - 1. Include 2-inch stem extensions.
 - 2. Extended operating handle of nonthermal-conductive material, and protective sleeves that allow operation of valves without breaking the vapor seals or disturbing insulation.
 - 3. Memory stops that are fully adjustable after insulation is applied.
- I. Valve Bypass and Drain Connections: MSS SP-45.

2.2 BRONZE BALL VALVES

- A. Bronze Ball Valves, Two-Piece with Full Port and Stainless-Steel Trim:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. [Apollo Flow Controls; Conbraco Industries, Inc.](#)
 - b. [Crane; Crane Energy Flow Solutions.](#)
 - c. [Hammond Valve.](#)
 - d. [Milwaukee Valve Company.](#)
 - e. [NIBCO INC.](#)

f. WATTS.

2. Description:

- a. Standard: MSS SP-110.
- b. SWP Rating: 150 psig.
- c. CWP Rating: 600 psig.
- d. Body Design: Two piece.
- e. Body Material: Bronze.
- f. Ends: Threaded.
- g. Seats: PTFE.
- h. Stem: Stainless steel.
- i. Ball: Stainless steel, vented.
- j. Port: Full.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.
- E. Install valve tags. Comply with requirements in Section 230553 "Identification for HVAC Piping and Equipment" for valve tags and schedules.

3.3 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valves with specified SWP classes or CWP ratings are unavailable, the same types of valves with higher SWP classes or CWP ratings may be substituted.
- B. Select valves with the following end connections:
 - 1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option or press-end option is indicated in valve schedules below.
 - 2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.
 - 3. For Copper Tubing, NPS 5 and Larger: Flanged ends.

3.4 HEATING-WATER VALVE SCHEDULE

- A. Pipe NPS 2 and Smaller: Bronze ball valves, two-piece with stainless-steel trim, full port, threaded, solder or press connection-joint ends.
- B. Pipe NPS 2-1/2 and Larger:
 - 1. Bronze ball valves, Class 150.

END OF SECTION 23 05 23.12

SECTION 23 05 23.13 - BUTTERFLY VALVES FOR HVAC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Iron, grooved-end butterfly valves.
 - 2. Chainwheels.

1.3 DEFINITIONS

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of valve.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, grooves, and weld ends.
 - 3. Set butterfly valves closed or slightly open.
- B. Use the following precautions during storage:
 - 1. Maintain valve end protection.
 - 2. Store valves indoors and maintain at higher-than-ambient-dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
 - 1. ASME B16.1 for flanges on iron valves.
 - 2. ASME B16.5 for pipe flanges and flanged fittings, NPS 1/2 through NPS 24.
 - 3. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
 - 4. ASME B31.1 for power piping valves.
 - 5. ASME B31.9 for building services piping valves.
- C. AWWA Compliance: Comply with AWWA C606 for grooved-end connections.
- D. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- E. Valve Sizes: Same as upstream piping unless otherwise indicated.
- F. Valve Actuator Types:
 - 1. Gear Actuator: For valves NPS 8 and larger.
 - 2. Handlever: For valves NPS 6 and smaller.
 - 3. Chainwheel: Device for attachment to gear, stem, or other actuator of size and with chain for mounting height, according to "Valve Installation" Article.
- G. Valves in Insulated Piping: With 2-inch stem extensions with extended necks.

2.2 DUCTILE-IRON, GROOVED-END BUTTERFLY VALVES

- A. Iron, Grooved-End Butterfly Valves, 175 CWP:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Grinnell G-Fire by Johnson Controls Company.
 - b. Kennedy Valve Company; a division of McWane, Inc.
 - c. Tyco by Johnson Controls Company.
 - d. Victaulic Company.
 - 2. Description:
 - a. Standard: MSS SP-67, Type I.
 - b. CWP Rating: 175 psig.
 - c. Body Material: Coated, ductile iron.
 - d. Stem: Two-piece stainless steel.
 - e. Disc: Coated, ductile iron.
 - f. Seal: EPDM.

2.3 CHAINWHEELS

- A. Description: Valve actuation assembly with sprocket rim, chain guides, chain, and attachment brackets for mounting chainwheels directly to hand wheels.
 - 1. Sprocket Rim with Chain Guides: Ductile iron, of type and size required for valve.
 - 2. Chain: Hot-dip, galvanized steel, of size required to fit sprocket rim.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine mating flange faces for damage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- D. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.
- E. Install chainwheels on operators for butterfly valves NPS 4 and larger and more than 96 inches above floor. Extend chains to 60 inches above finished floor.
- F. Install valve tags. Comply with requirements in Section 230553 "Identification for HVAC Piping and Equipment" for valve tags and schedules.

3.3 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

3.4 HEATING-WATER VALVE SCHEDULE

A. Pipe NPS 2-1/2 and Larger:

1. Iron, Grooved-End Butterfly Valves, NPS 2-1/2 to NPS 12: 175 CWP.

END OF SECTION 23 05 23.13

SECTION 23 05 23.14 - CHECK VALVES FOR HVAC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Bronze lift check valves.
 - 2. Bronze swing check valves.

1.3 DEFINITIONS

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of valve.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, grooves, and weld ends.
 - 3. Block check valves in either closed or open position.
- B. Use the following precautions during storage:
 - 1. Maintain valve end protection.
 - 2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
 - 1. ASME B1.20.1 for threads for threaded-end valves.
 - 2. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
 - 3. ASME B16.18 for solder joint.
 - 4. ASME B31.1 for power piping valves.
 - 5. ASME B31.9 for building services piping valves.
- C. AWWA Compliance: Comply with AWWA C606 for grooved-end connections.
- D. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.
- E. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- F. Valve Sizes: Same as upstream piping unless otherwise indicated.
- G. Valve Bypass and Drain Connections: MSS SP-45.

2.2 BRONZE SWING CHECK VALVES

- A. Bronze Swing Check Valves with Nonmetallic Disc, Class 150:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Crane; Crane Energy Flow Solutions.
 - b. Milwaukee Valve Company.
 - c. NIBCO INC.
 - d. WATTS.
 - 2. Description:
 - a. Standard: MSS SP-80, Type 4.
 - b. CWP Rating: 300 psig.
 - c. Body Design: Horizontal flow.
 - d. Body Material: ASTM B 62, bronze.
 - e. Ends: Threaded.
 - f. Disc: PTFE.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.
- E. Install check valves for proper direction of flow and as follows:
 - 1. Swing Check Valves: In horizontal position with hinge pin level.
 - 2. Center-Guided Check Valves: In horizontal or vertical position, between flanges.
 - 3. Lift Check Valves: With stem upright and plumb.
- F. Install valve tags. Comply with requirements for valve tags and schedules in Section 230553 "Identification for HVAC Piping and Equipment."

3.3 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.4 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valve applications are not indicated, use the following:
 - 1. Pump-Discharge Check Valves:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- a. NPS 2 and Smaller: Bronze swing check valves with nonmetallic disc.
 - b. NPS 2-1/2 and Larger: Iron swing check valves with lever and weight or with spring or iron, center-guided, resilient-seat check valves.
- B. If valves with specified SWP classes or CWP ratings are unavailable, the same types of valves with higher SWP classes or CWP ratings may be substituted.
- C. Select valves, except wafer types, with the following end connections:
 - 1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules.
 - 2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules.
 - 3. For Copper Tubing, NPS 5 and Larger: Flanged ends.
 - 4. For Steel Piping, NPS 2 and Smaller: Threaded ends.
 - 5. For Steel Piping, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules.
 - 6. For Steel Piping, NPS 5 and Larger: Flanged ends.
 - 7. For Grooved-End Steel Piping except Steam and Steam Condensate Piping: Valve ends may be grooved.

3.5 HEATING-WATER VALVE SCHEDULE

- A. Pipe NPS 3 and Smaller:
 - 1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
 - 2. Bronze swing check valves with nonmetallic disc, Class 150.

END OF SECTION 23 05 23.14

SECTION 23 05 29 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Metal pipe hangers and supports.
 - 2. Trapeze pipe hangers.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
 - 1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
 - 2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
 - 3. Design seismic-restraint hangers and supports for piping and equipment.

2.2 METAL PIPE HANGERS AND SUPPORTS

- A. Carbon-Steel Pipe Hangers and Supports:
 - 1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
 - 2. Galvanized Metallic Coatings: Pregalvanized, hot-dip galvanized, or electro-galvanized.
 - 3. Nonmetallic Coatings: Plastic coated or epoxy powder coated.
 - 4. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

2.3 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-58, Type 59, shop- or field-fabricated pipe-support assembly, made from structural-carbon-steel shapes, with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.4 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hilti, Inc.
 - b. Simpson Strong-Tie Co., Inc.
- B. Mechanical-Expansion Anchors: Insert-wedge-type anchors, for use in hardened portland cement concrete, with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Hilti, Inc.
 - 2. Indoor Applications: Zinc-coated steel.
 - 3. Outdoor Applications: Stainless steel.

2.5 MATERIALS

- A. Aluminum: ASTM B221.
- B. Carbon Steel: ASTM A1011/A1011M.
- C. Structural Steel: ASTM A36/A36M carbon-steel plates, shapes, and bars; black and galvanized.
- D. Stainless Steel: ASTM A240/A240M.
- E. Grout: ASTM C1107/C1107M, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
 - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation, for penetrations through fire-rated walls, ceilings, and assemblies.
- B. Strength of Support Assemblies: Where not indicated, select sizes of components, so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

3.2 HANGER AND SUPPORT INSTALLATION

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-58. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-58. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.
 - 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size, or install intermediate supports for smaller-diameter pipes as specified for individual pipe hangers.
 - 2. Field fabricate from ASTM A36/A36M carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.
- C. Thermal Hanger-Shield Installation: Install in pipe hanger or shield for insulated piping.
- D. Fastener System Installation:
 - 1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete, after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
 - 2. Install mechanical-expansion anchors in concrete, after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- E. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- F. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- G. Install lateral bracing with pipe hangers and supports to prevent swaying.
- H. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms, and install reinforcing bars through openings at top of inserts.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- I. Load Distribution: Install hangers and supports, so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- J. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- K. Insulated Piping:
 - 1. Attach clamps and spacers to piping.
 - a. Piping Operating Above Ambient Air Temperature: Clamp may project through insulation.
 - b. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
 - 2. Install MSS SP-58, Type 39 protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
 - a. Option: Thermal hanger-shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
 - 3. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.

3.3 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

3.4 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.5 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-58 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finishes.

HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use carbon-steel pipe hangers and supports or metal trapeze pipe hangers and attachments for general service applications.
- F. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
- G. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
 - 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.
- H. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Steel Turnbuckles (MSS Type 13): For adjustment of up to 6 inches for heavy loads.
 - 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
 - 3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11 split pipe rings.
- I. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Steel or Malleable-Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 - 2. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 - 3. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
- J. Comply with MSS SP-58 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.
- K. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

END OF SECTION 23 05 29

SECTION 23 05 48 - VIBRATION AND SEISMIC CONTROLS FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Elastomeric isolation pads.
 - 2. Restrained-spring isolators.
 - 3. Restraint cables.
 - 4. Seismic-restraint accessories.
 - 5. Mechanical anchor bolts.
 - 6. Adhesive anchor bolts.
 - 7. Restrained isolation roof-curb rails.

1.3 DEFINITIONS

- A. IBC: International Building Code.
- B. ICC-ES: ICC-Evaluation Service.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
 - 2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of vibration isolation device and seismic-restraint component required.
 - a. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear as evaluated by an evaluation service member of ICC-ES.
 - b. Annotate to indicate application of each product submitted and compliance with requirements.
 - 3. Interlocking Snubbers: Include ratings for horizontal, vertical, and combined loads.
- B. Shop Drawings:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Detail fabrication and assembly of equipment bases. Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.
2. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.

C. Delegated-Design Submittal: For each vibration isolation and seismic-restraint device.

1. Include design calculations and details for selecting vibration isolators, seismic restraints, and vibration isolation bases complying with performance requirements, design criteria, and analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
2. Design Calculations: Calculate static and dynamic loading due to equipment weight, operation, and seismic forces required to select vibration isolators and seismic restraints and for designing vibration isolation bases.
 - a. Coordinate design calculations with wind load calculations required for equipment mounted outdoors. Comply with requirements in other Sections for equipment mounted outdoors.
3. Riser Supports: Include riser diagrams and calculations showing anticipated expansion and contraction at each support point, initial and final loads on building structure, spring deflection changes, and seismic loads. Include certification that riser system was examined for excessive stress and that none exists.
4. Seismic- and Wind-Restraint Details:
 - a. Design Analysis: To support selection and arrangement of seismic restraints. Include calculations of combined tensile and shear loads.
 - b. Details: Indicate fabrication and arrangement. Detail attachments of restraints to the restrained items and to the structure. Show attachment locations, methods, and spacings. Identify components, list their strengths, and indicate directions and values of forces transmitted to the structure during seismic events. Indicate association with vibration isolation devices.
 - c. Coordinate seismic-restraint and vibration isolation details with wind-restraint details required for equipment mounted outdoors. Comply with requirements in other Sections for equipment mounted outdoors.
 - d. Preapproval and Evaluation Documentation: By an evaluation service member of ICC-ES, showing maximum ratings of restraint items and the basis for approval (tests or calculations).

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Show coordination of vibration isolation device installation and seismic bracing for HVAC piping and equipment with other systems and equipment in the vicinity, including other supports and restraints, if any.
- B. Welding certificates.
- C. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7 and that is acceptable to authorities having jurisdiction.
- B. Comply with seismic-restraint requirements in the IBC unless requirements in this Section are more stringent.
- C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- D. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval OPA number from OSHPD, preapproval by ICC-ES, or preapproval by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are unavailable, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic-Restraint Loading:
 - 1. Site Class as Defined in the IBC: D.
 - 2. Assigned Seismic Use Group or Building Category as Defined in the IBC: III.
 - a. Component Importance Factor: 1.0.
 - b. Component Response Modification Factor: As per Table 13.6.1 of ASCE 7-05.
 - c. Component Amplification Factor: as per Table 13.6.1 of ASCE 7-05.
 - 3. Design Spectral Response Acceleration at Short Periods (0.2 Second): 0.92.
 - 4. Design Spectral Response Acceleration at 1.0-Second Period: 0.63.
 - 5. Rated strengths, features, and applications shall be as defined in reports by an evaluation service member of ICC-ES.

2.2 RESTRAINED-SPRING ISOLATORS

- A. Freestanding, Laterally Stable, Open-Spring Isolators with Vertical-Limit Stop Restraint:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CADDY; a brand of nVent.
 - b. California Dynamics Corporation.
 - c. Kinetics Noise Control, Inc.
 - d. Mason Industries, Inc.

2. Housing: Steel housing with vertical-limit stops to prevent spring extension due to weight being removed.
 - a. Base with holes for bolting to structure with an elastomeric isolator pad attached to the underside. Bases shall limit floor load to 500 psig.
 - b. Top plate with elastomeric pad.
 - c. Internal leveling bolt that acts as blocking during installation.
3. Restraint: Limit stop as required for equipment and authorities having jurisdiction.
4. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
5. Minimum Additional Travel: 50 percent of the required deflection at rated load.
6. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
7. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

2.3 SPRING HANGERS

- A. Combination Coil-Spring and Elastomeric-Insert Hanger with Spring and Insert in Compression:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CADDY; a brand of nVent.
 - b. California Dynamics Corporation.
 - c. Kinetics Noise Control, Inc.
 - d. Mason Industries, Inc.
 2. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 degrees of angular hanger-rod misalignment without binding or reducing isolation efficiency.
 3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
 4. Minimum Additional Travel: 50 percent of the required deflection at rated load.
 5. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
 6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
 7. Elastomeric Element: Molded, oil-resistant rubber or neoprene. Steel-washer-reinforced cup to support spring and bushing projecting through bottom of frame.
 8. Adjustable Vertical Stop: Steel washer with neoprene washer "up-stop" on lower threaded rod.
 9. Self-centering hanger-rod cap to ensure concentricity between hanger rod and support spring coil.

2.4 RESTRAINT CABLES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 1. CADDY; a brand of nVent.
 2. Vibration Mountings & Controls, Inc.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- B. Restraint Cables: ASTM A603 galvanized-steel cables. End connections made of steel assemblies with thimbles, brackets, swivel, and bolts designed for restraining cable service; with a minimum of two clamping bolts for cable engagement.

2.5 SEISMIC-RESTRAINT ACCESSORIES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. B-line, an Eaton business.
 - 2. CADDY; a brand of nVent.
 - 3. Mason Industries, Inc.
- B. Hanger-Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections to hanger rod.
- C. Hinged and Swivel Brace Attachments: Multifunctional steel connectors for attaching hangers to rigid channel bracings and restraint cables.
- D. Bushings for Floor-Mounted Equipment Anchor Bolts: Neoprene bushings designed for rigid equipment mountings, and matched to type and size of anchor bolts and studs.
- E. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for rigid equipment mountings, and matched to type and size of attachment devices used.
- F. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.

2.6 MECHANICAL ANCHOR BOLTS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Hilti, Inc.
- B. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E488.

2.7 ADHESIVE ANCHOR BOLTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Hilti, Inc.
 - 2. Simpson Strong-Tie Co., Inc.
- B. Adhesive Anchor Bolts: Drilled-in and capsule anchor system containing PVC or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless

steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E488.

2.8 RESTRAINED ISOLATION ROOF-CURB RAILS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. CADDY; a brand of nVent.
 2. California Dynamics Corporation.
 3. Kinetics Noise Control, Inc.
 4. Mason Industries, Inc.
- B. Description: Factory-assembled, fully enclosed, insulated, air- and watertight curb rail designed to resiliently support equipment and to withstand seismic forces.
- C. Upper Frame: The upper frame shall provide continuous support for equipment and shall be captive to resiliently resist seismic forces.
- D. Lower Support Assembly: The lower support assembly shall be formed sheet metal section containing adjustable and removable steel springs that support the upper frame. The lower support assembly shall have a means for attaching to building structure and a wood nailer for attaching roof materials, and shall be insulated with a minimum of 2 inches of rigid, glass-fiber insulation on inside of assembly. Adjustable, restrained-spring isolators shall be mounted on elastomeric vibration isolation pads and shall have access ports, for level adjustment, with removable waterproof covers at all isolator locations. Isolators shall be located so they are accessible for adjustment at any time during the life of the installation without interfering with the integrity of the roof.
- E. Snubber Bushings: All-directional, elastomeric snubber bushings at least 1/4 inch thick.
- F. Water Seal: Galvanized sheet metal with EPDM seals at corners, attached to upper support frame, extending down past wood nailer of lower support assembly, and counterflashed over roof materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and equipment to receive vibration isolation and seismic-control devices for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATIONS

- A. Multiple Pipe Supports: Secure pipes to trapeze member with clamps approved for application by an evaluation service member of ICC-ES.
- B. Hanger-Rod Stiffeners: Install hanger-rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.
- C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength is adequate to carry present and future static and seismic loads within specified loading limits.

3.3 VIBRATION CONTROL AND SEISMIC-RESTRAINT DEVICE INSTALLATION

- A. Coordinate the location of embedded connection hardware with supported equipment attachment and mounting points and with requirements for concrete reinforcement and formwork specified in Section 033000 "Cast-in-Place Concrete."
- B. Installation of vibration isolators must not cause any change of position of equipment, piping, or ductwork resulting in stresses or misalignment.
- C. Comply with requirements in Section 077200 "Roof Accessories" for installation of roof curbs, equipment supports, and roof penetrations.
- D. Equipment Restraints:
 - 1. Install seismic snubbers on HVAC equipment mounted on vibration isolators. Locate snubbers as close as possible to vibration isolators and bolt to equipment base and supporting structure.
 - 2. Install resilient bolt isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch.
 - 3. Install seismic-restraint devices using methods approved by an evaluation service member of ICC-ES that provides required submittals for component.
- E. Piping Restraints:
 - 1. Comply with requirements in MSS SP-127.
 - 2. Space lateral supports a maximum of 40 feet o.c., and longitudinal supports a maximum of 80 feet o.c.
 - 3. Brace a change of direction longer than 12 feet.
- F. Install cables so they do not bend across edges of adjacent equipment or building structure.
- G. Install seismic-restraint devices using methods approved by an evaluation service member of ICC-ES that provides required submittals for component.
- H. Install bushing assemblies for anchor bolts for floor-mounted equipment, arranged to provide resilient media between anchor bolt and mounting hole in concrete base.
- I. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- J. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.
- K. Drilled-in Anchors:
 - 1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
 - 2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
 - 3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
 - 4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
 - 5. Set anchors to manufacturer's recommended torque, using a torque wrench.
 - 6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.
 - 2. Schedule test with Owner, through Architect, before connecting anchorage device to restrained component (unless postconnection testing has been approved), and with at least seven days' advance notice.
 - 3. Obtain Architect's approval before transmitting test loads to structure. Provide temporary load-spreading members.
 - 4. Test at least four of each type and size of installed anchors and fasteners selected by Architect.
 - 5. Test to 90 percent of rated proof load of device.
 - 6. Measure isolator restraint clearance.
 - 7. Measure isolator deflection.
 - 8. Verify snubber minimum clearances.
- C. Remove and replace malfunctioning units and retest as specified above.
- D. Prepare test and inspection reports.

3.5 ADJUSTING

- A. Adjust isolators after piping system is at operating weight.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- B. Adjust limit stops on restrained-spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

END OF SECTION 23 05 48

SECTION 23 05 53 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Equipment labels.
2. Pipe labels.
3. Duct labels.
4. Valve tags.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

- A. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
2. Letter Color: White.
3. Background Color: Red.
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
7. Fasteners: Stainless-steel rivets or self-tapping screws.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

2.2 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction according to ASME A13.1.

IDENTIFICATION FOR HVAC PIPING
AND EQUIPMENT

- B. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- C. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings; also include pipe size and an arrow indicating flow direction.
 - 1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions or as separate unit on each pipe label to indicate flow direction.
 - 2. Lettering Size: Size letters according to ASME A13.1 for piping.

2.3 DUCT LABELS

- A. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- B. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
- C. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- D. Duct Label Contents: Include identification of duct service using same designations or abbreviations as used on Drawings; also include duct size and an arrow indicating flow direction.
 - 1. Flow-Direction Arrows: Integral with duct system service lettering to accommodate both directions or as separate unit on each duct label to indicate flow direction.

2.4 VALVE TAGS

- A. Description: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.
 - 1. Tag Material: Aluminum, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 - 2. Fasteners: Brass wire-link chain, beaded chain or S-hook.
- B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
 - 1. Valve-tag schedule shall be included in operation and maintenance data.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

3.3 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

3.4 PIPE LABEL INSTALLATION

- A. Pipe Label Locations: Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
 - 1. Near each valve and control device.
 - 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 - 3. Near penetrations and on both sides of through walls, floors, ceilings, and inaccessible enclosures.
 - 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 - 5. Near major equipment items and other points of origination and termination.
 - 6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
 - 7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
- B. Directional Flow Arrows: Arrows shall be used to indicate direction of flow in pipes, including pipes where flow is allowed in both directions.

3.5 DUCT LABEL INSTALLATION

- A. Install self-adhesive duct labels with permanent adhesive on air ducts in the following color codes:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Blue: For cold-air supply ducts.
 2. Yellow: For hot-air supply ducts.
 3. Green: For exhaust-, outside-, relief-, return-, and mixed-air ducts.
- B. Locate labels near points where ducts enter into and exit from concealed spaces and at maximum intervals of 50 feet in each space where ducts are exposed or concealed by removable ceiling system.

3.6 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves, valves within factory-fabricated equipment units, shutoff valves, faucets, convenience and lawn-watering hose connections, and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:
1. Valve-Tag Size and Shape:
 - a. Refrigerant: 1-1/2 inches, round.
 - b. Hot Water: 1-1/2 inches, round.
 - c. Gas: 1-1/2 inches, round.

END OF SECTION 23 05 53

SECTION 23 05 66 - ANTIMICROBIAL ULTRAVIOLET LAMP SYSTEMS FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Antimicrobial UV-C lamp systems for packaged air-handling units.
 - 2. Controls.

1.3 DEFINITIONS

- A. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.
- B. UV-C: Ultraviolet-C short-wave spectrum.
- C. UV-C Lamp System: Unit including UV lamp, power supply, housing, and supports.
- D. UVGI: Ultraviolet germicidal irradiation.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Product description with complete technical data, performance data, and product specification sheets.
 - 2. Operating characteristics; electrical characteristics; and furnished accessories indicating process operating power, distribution range, control signal over range, default control signal with loss of power, electrical power requirements, and limitations of ambient operating environment, including temperature and humidity.
 - 3. Installation instructions, including factors affecting performance.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For lamp systems to include in operation and maintenance manuals.
 - 1. Provide a list of all lamp and fixture types used on Project.

1.6 WARRANTY

- A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period, System: Five years from date of Substantial Completion.
 - 2. Warranty Period, Lamp: One year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. ASHRAE 62.1 Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."
- C. ASHRAE Compliance:
 - 1. Test UV-C lamp systems according to ASHRAE 185.1, "Method of Testing UV-C Lights for Use in Air-Handling Units or Air Ducts to Inactivate Airborne Microorganisms."
 - 2. Test UV-C lamp systems according to ASHRAE 185.2, "Method of Testing Ultraviolet Lamps for Use in HVAC&R Units or Air Ducts on Irradiated Surfaces."

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Carrier Corporation.
 - 2. Fresh-Aire UV; a Triatomic Environmental Inc. company.
 - 3. Steril-Aire, Inc.
 - 4. Trane Corporation.
- B. Source Limitations: Obtain from single source from single manufacturer.

2.3 ANTIMICROBIAL UV-C LAMP SYSTEMS FOR LARGE AIR-HANDLING UNITS

- A. Description: UV-C lamp system consisting of power supply, power supply housing, wiring, UV lamp(s), lamp plug, lamp plug protector, encapsulated lamp, and lamp holder.
- B. Power Supply: UL listed, single phase, 120 or 277 V ac, 60 Hz, with a programmed rapid start.
 - 1. Power Factor: High power factor, Class P, Sound Rated A, Type 1 Outdoor, and with inherent thermal protection and without polychlorinated biphenyl.
 - 2. Operating Temperature: From 34 to 194 deg F (1 to 90 deg C).
 - 3. Wiring Harness: Plug and play.
 - 4. Power Consumption: Maximum of 15 W/sq. ft. (161.5 W/per sq. m).
 - 5. Electrical Connection: Single electrical connection.

- C. UV-C Lamps: Encapsulated lamps, with lamp wattage and model number visibly printed on all lamps, less than 8 Mg of mercury in each lamp. UV-C lamps do not produce ozone.
 - 1. Quantity and Type: One 145-W UV-C lamp.
 - 2. Output: UV-C energy, primarily at the 253.7-nm wavelength with a 360-degree energy distribution.
 - 3. Operating Temperature: From 34 to 158 deg F (1 to 70 deg C), 100 percent relative humidity, at any velocity.
 - 4. Lamp Protection: Hermetically sealed with a thin layer of UV-C-transmissible fluorinated ethylene propylene to provide protection against lamp breakage and to ensure lamp contents from a broken lamp are contained.
 - 5. Lamp Life: Minimum of 9000 hours with greater than 85 percent of initial output at end of lamp life.
- D. Power Supply Housing: Galvanized-steel, 20-gauge (0.813-mm), powder-coated finish, for installation inside or outside of air-handling units or plenums.
 - 1. Provide a suitable separate NEMA enclosure, for field installation of power supply, on the exterior of an outside air-handling unit.
- E. Wiring Loom: UV-C-resistant jacket materials with internal aluminum/Mylar shield.
 - 1. Conduit: Loom covered with UL flexible metal conduit, galvanized.
- F. Lamp Plug, Holder, and Lamp Clamp: Four-pin type accommodates a single-ended high output lamp.
 - 1. Lamp Plug and Holder Construction: UV-resistant materials designed to connect lamp to the plug.
 - 2. UL Listing: Listed and labeled to UL.
 - 3. Lamp Clamp Construction: UV-resistant materials to ensure a watertight connection. A seal between the single-ended UV lamp and the lamp plug prevents electrical shock, connection shorts, and lamp or power supply failure, from lamp pin oxidation or arcing.
 - 4. Position: Adjustable positioning of lamp holder and lamp clamp.
- G. Lamp Holsters: Dual lamp holsters permanently affixed within the irradiated cavity to interior surface of an air-handling unit or to vertical supports.
 - 1. Lamp Holster Construction: UV-C-resistant materials for fastening strength.
 - 2. Positioning: Flexible lamp positioning allows ease of lamp removal.

2.4 CONTROLS

- A. Interface with DDC System for HVAC: Factory-installed hardware and software (where applicable) to enable the DDC system for HVAC to monitor, control, and display status and alarms.
- B. Lamp and Power Supply Monitoring: Factory-assembled and tested, consisting of a housing, PC board, and wire block. Construction is designed to withstand installation inside air-handling unit airstream.
 - 1. Housing: Industrial-grade plastic equipped with a direct-reading high-output green LED, two mounting holes, and an external wiring block for wiring to a remote sensing or input

- device. PC board converts inductive field to a regulated electromotive force of 1 to 5 V dc, maximum.
 - 2. Wiring Block: One positive and one negative terminal for No. 18 AWG and smaller wire.
 - 3. Remote Monitor(s): Installed outside the plenum in a suitable NEMA enclosure to directly or remotely monitor the lamp and power supply combination, with option for a single signal to the DDC system.
- C. Operating Control: Monitor lamp and power supply combination and provide a single on/off signal to the DDC system. UV-C lamp system operates continuously. Interlock UV-C lamp system operation with air-handling unit and component access doors. When an access door is opened, UV-C lamp system is de-energized.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for UV-C lamp system to verify actual locations of UV lamps and electrical connections before UV-C lamp system installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Install UV-C lamp systems according to manufacturer's installation manual and drawings unless otherwise indicated.
- B. Install UV lamps in each UV-C lamp system.
- C. Install UV-C lamp systems in locations that are accessible and that will permit servicing and maintenance.
- D. Provide sufficient length of wiring loom to facilitate lamp connection to a remotely located power supply and/or power supply housing, such that lamp and loom can be mounted anywhere in the system.
- E. Seal air-handling unit penetrations to maintain integrity of air-handling unit casings.
- F. Irradiation: Quantity of UV lamps are to be installed to provide an equal distribution of available UV-C energy. When installed, UV-C energy produced shall be of the lowest possible reflected and shadowed losses, distributed in a 360-degree pattern within the cavity or plenum space.
- G. Intensity: UV-C lamp system modeling shall be included in the submittal and must contain necessary calculations to demonstrate a minimum of 6 W/sq. ft. (64.6 W/sq. m) of coil surface area to achieve a minimum of 100 microwatts/sq. cm equally distributed on the target surface as recommended by ASHRAE.
- H. Housing Installation: Power supply housing can be installed inside or outside air-handling units or plenums.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- I. UV Lamp Installation: Mount UV lamp to irradiate surfaces, as well as the available line of sight airstream, through proper lamp placement, and incident angle reflection.
 - J. Safety: Comply with requirements in UL 1995, "Standard of Safety for Heating and Cooling Equipment." Provide mechanical interlock switch on access panels and doors to UV lamp systems, or within view of UV lamp systems, to ensure that UV-C lamp systems will be de-energized when these accesses are opened. Warning signs and labels are specified in Section 230553 "Identification for HVAC Piping and Equipment."
 - K. Signage: Comply with requirements in UL 1995 "Heating and Cooling Equipment." Mark access panels and doors to UV-C lamp systems with warning signs stating, "WARNING: UV LIGHT SOURCE" and "DISCONNECT POWER BEFORE SERVICING." Warning signs and labels are specified in Section 230553 "Identification for HVAC Piping and Equipment."
- 3.3 INSTALLATION OF ANTIMICROBIAL UV-C LAMP SYSTEMS FOR LARGE AIR-HANDLING UNITS
- A. Size and rate supports for UV-C lamp system weight.
 - B. Maintain UV lamp position after cleaning and relamping.
 - C. Provide support for UV-C lamp system without causing deflection of air-handling unit casing.
 - D. Provide vertical supports on interior air-handling unit surfaces for UV-C lamp system.
 - E. UV-C lamp system mounting devices shall be capable of supporting a horizontal force of 100 percent of system weight, and a vertical force of 400 percent of system weight.
 - F. Equipment supports are specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."
- 3.4 ELECTRIC CONNECTIONS
- A. Provide electrical power and service disconnects to products requiring electrical connections.
 - B. Install electrical devices furnished by manufacturer, but not factory mounted, according to NFPA 70 and NECA 1.
 - C. Comply with requirements for service disconnects in Section 262816 "Enclosed Switches and Circuit Breakers."
 - D. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
 - E. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- 3.5 CONTROL CONNECTIONS
- A. Install control and electrical power wiring to field-mounted control devices.

- B. Connect control wiring according to Section 260523 "Control-Voltage Electrical Power Cables."

3.6 IDENTIFICATION

- A. Identify UV-C lamp systems with equipment labels. Comply with requirements for equipment labels specified in Section 230553 "Identification for HVAC Piping and Equipment."

3.7 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 - 1. Operational Test: After installing UV-C lamp systems, and after electrical circuitry has been energized, test units to confirm proper operation.
 - 2. Safety Interlock: Confirm proper operation of safety interlock power switches on access panels and doors.
- B. UV-C lamp systems and components will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports.

3.8 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.

3.9 ADJUSTING

- A. After installation, adjust UV-C lamp systems and supports to maximize exposure to surfaces, before energizing system.

3.10 CLEANING

- A. Wipe lamps clean using manufacturers' recommended cleaning methods and materials.

3.11 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain UV-C lamp systems.

END OF SECTION 23 05 66

SECTION 23 05 93 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. Balancing Air Systems:
 - a. Constant-volume air systems.
 - b. Variable-air-volume systems.
- 2. Balancing Hydronic Piping Systems:
 - a. Constant-flow hydronic systems.
 - b. Variable-flow hydronic systems.
 - c. Primary-secondary hydronic systems.
- 3. Testing, Adjusting, and Balancing Equipment:
 - a. Motors.
 - b. Condensing units.
 - c. Boilers.
 - d. Heat-transfer coils.
- 4. Testing, adjusting, and balancing existing systems and equipment.
- 5. Control system verification.

1.3 DEFINITIONS

- A. BAS: Building automation systems.
- B. NEBB: National Environmental Balancing Bureau.
- C. TAB: Testing, adjusting, and balancing.
- D. TABB: Testing, Adjusting, and Balancing Bureau.
- E. TAB Specialist: An independent entity meeting qualifications to perform TAB work.
- F. TDH: Total dynamic head.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine installed systems for balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are applicable for intended purpose and are accessible.
- B. Examine the approved submittals for HVAC systems and equipment.
- C. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- D. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.
- E. Examine equipment performance data including fan and pump curves.
 - 1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
 - 2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.
- F. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- G. Examine test reports specified in individual system and equipment Sections.
- H. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, filters are clean, and equipment with functioning controls is ready for operation.
- I. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.
- J. Examine strainers. Verify that startup screens have been replaced by permanent screens with indicated perforations.
- K. Examine control valves for proper installation for their intended function of throttling, diverting, or mixing fluid flows.
- L. Examine heat-transfer coils for correct piping connections and for clean and straight fins.
- M. Examine system pumps to ensure absence of entrained air in the suction piping.

- N. Examine operating safety interlocks and controls on HVAC equipment.
- O. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

- A. Prepare a TAB plan that includes the following:
 - 1. Equipment and systems to be tested.
 - 2. Strategies and step-by-step procedures for balancing the systems.
 - 3. Instrumentation to be used.
 - 4. Sample forms with specific identification for all equipment.
- B. Perform system-readiness checks of HVAC systems and equipment to verify system readiness for TAB work. Include, at a minimum, the following:
 - 1. Airside:
 - a. Verify that leakage and pressure tests on air distribution systems have been satisfactorily completed.
 - b. Duct systems are complete with terminals installed.
 - c. Volume, smoke, and fire dampers are open and functional.
 - d. Clean filters are installed.
 - e. Fans are operating, free of vibration, and rotating in correct direction.
 - f. Variable-frequency controllers' startup is complete and safeties are verified.
 - g. Automatic temperature-control systems are operational.
 - h. Ceilings are installed.
 - i. Windows and doors are installed.
 - j. Suitable access to balancing devices and equipment is provided.
 - 2. Hydronics:
 - a. Verify leakage and pressure tests on water distribution systems have been satisfactorily completed.
 - b. Piping is complete with terminals installed.
 - c. Water treatment is complete.
 - d. Systems are flushed, filled, and air purged.
 - e. Strainers are pulled and cleaned.
 - f. Control valves are functioning per the sequence of operation.
 - g. Shutoff and balance valves have been verified to be 100 percent open.
 - h. Pumps are started and proper rotation is verified.
 - i. Pump gage connections are installed directly at pump inlet and outlet flanges or in discharge and suction pipe prior to valves or strainers.
 - j. Variable-frequency controllers' startup is complete and safeties are verified.
 - k. Suitable access to balancing devices and equipment is provided.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing" and in this Section.
- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.
 - 1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
 - 2. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Section 230713 "Duct Insulation" and Section 230719 "HVAC Piping Insulation."
- C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Cross-check the summation of required outlet volumes with required fan volumes.
- B. Prepare schematic diagrams of systems' "as-built" duct layouts.
- C. For variable-air-volume systems, develop a plan to simulate diversity.
- D. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.
- E. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.
- F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- G. Verify that motor starters are equipped with properly sized thermal protection.
- H. Check dampers for proper position to achieve desired airflow path.
- I. Check for airflow blockages.
- J. Check condensate drains for proper connections and functioning.
- K. Check for proper sealing of air-handling-unit components.
- L. Verify that air duct system is sealed as specified in Section 233113 "Metal Ducts."

3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
 - 1. Measure total airflow.
 - a. Set outside-air, return-air, and relief-air dampers for proper position that simulates minimum outdoor-air conditions.
 - b. Where duct conditions allow, measure airflow by main Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses, close to the fan and prior to any outlets, to obtain total airflow.
 - c. Where duct conditions are not suitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.
 - 2. Measure fan static pressures as follows:
 - a. Measure static pressure directly at the fan outlet or through the flexible connection.
 - b. Measure static pressure directly at the fan inlet or through the flexible connection.
 - c. Measure static pressure across each component that makes up the air-handling system.
 - d. Report artificial loading of filters at the time static pressures are measured.
 - 3. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
 - 4. Obtain approval from Architect for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
 - 5. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload occurs. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.
- B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows.
 - 1. Measure airflow of submain and branch ducts.
 - 2. Adjust submain and branch duct volume dampers for specified airflow.
 - 3. Re-measure each submain and branch duct after all have been adjusted.
- C. Adjust air inlets and outlets for each space to indicated airflows.
 - 1. Set airflow patterns of adjustable outlets for proper distribution without drafts.
 - 2. Measure inlets and outlets airflow.
 - 3. Adjust each inlet and outlet for specified airflow.
 - 4. Re-measure each inlet and outlet after they have been adjusted.
- D. Verify final system conditions.
 - 1. Re-measure and confirm that minimum outdoor, return, and relief airflows are within design. Readjust to design if necessary.
 - 2. Re-measure and confirm that total airflow is within design.

3. Re-measure all final fan operating data, rpms, volts, amps, and static profile.
4. Mark all final settings.
5. Test system in economizer mode. Verify proper operation and adjust if necessary.
6. Measure and record all operating data.
7. Record final fan-performance data.

3.6 PROCEDURES FOR VARIABLE-AIR-VOLUME SYSTEMS

A. Adjust the variable-air-volume systems as follows:

1. Verify that the system static pressure sensor is located two-thirds of the distance down the duct from the fan discharge.
2. Verify that the system is under static pressure control.
3. Select the terminal unit that is most critical to the supply-fan airflow. Measure inlet static pressure, and adjust system static pressure control set point so the entering static pressure for the critical terminal unit is not less than the sum of the terminal-unit manufacturer's recommended minimum inlet static pressure plus the static pressure needed to overcome terminal-unit discharge system losses.
4. Calibrate and balance each terminal unit for maximum and minimum design airflow as follows:
 - a. Adjust controls so that terminal is calling for maximum airflow. Some controllers require starting with minimum airflow. Verify calibration procedure for specific project.
 - b. Measure airflow and adjust calibration factor as required for design maximum airflow. Record calibration factor.
 - c. When maximum airflow is correct, balance the air outlets downstream from terminal units.
 - d. Adjust controls so that terminal is calling for minimum airflow.
 - e. Measure airflow and adjust calibration factor as required for design minimum airflow. Record calibration factor. If no minimum calibration is available, note any deviation from design airflow.
 - f. When in full cooling or full heating, ensure that there is no mixing of hot-deck and cold-deck airstreams unless so designed.
 - g. On constant volume terminals, in critical areas where room pressure is to be maintained, verify that the airflow remains constant over the full range of full cooling to full heating. Note any deviation from design airflow or room pressure.
5. After terminals have been calibrated and balanced, test and adjust system for total airflow. Adjust fans to deliver total design airflows within the maximum allowable fan speed listed by fan manufacturer.
 - a. Set outside-air, return-air, and relief-air dampers for proper position that simulates minimum outdoor-air conditions.
 - b. Set terminals for maximum airflow. If system design includes diversity, adjust terminals for maximum and minimum airflow so that connected total matches fan selection and simulates actual load in the building.
 - c. Where duct conditions allow, measure airflow by Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses to obtain total airflow.
 - d. Where duct conditions are not suitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.
 - e. If a reliable Pitot-tube traverse or coil traverse is not possible, measure airflow at terminals and calculate the total airflow.

6. Measure fan static pressures as follows:
 - a. Measure static pressure directly at the fan outlet or through the flexible connection.
 - b. Measure static pressure directly at the fan inlet or through the flexible connection.
 - c. Measure static pressure across each component that makes up the air-handling system.
 - d. Report any artificial loading of filters at the time static pressures are measured.
7. Set final return and outside airflow to the fan while operating at maximum return airflow and minimum outdoor airflow.
 - a. Balance the return-air ducts and inlets the same as described for constant-volume air systems.
 - b. Verify that terminal units are meeting design airflow under system maximum flow.
8. Re-measure the inlet static pressure at the most critical terminal unit and adjust the system static pressure set point to the most energy-efficient set point to maintain the optimum system static pressure. Record set point and give to controls contractor.
9. Verify final system conditions as follows:
 - a. Re-measure and confirm that minimum outdoor, return, and relief airflows are within design. Readjust to match design if necessary.
 - b. Re-measure and confirm that total airflow is within design.
 - c. Re-measure final fan operating data, rpms, volts, amps, and static profile.
 - d. Mark final settings.
 - e. Test system in economizer mode. Verify proper operation and adjust if necessary. Measure and record all operating data.
 - f. Verify tracking between supply and return fans.

3.7 GENERAL PROCEDURES FOR HYDRONIC SYSTEMS

- A. Prepare test reports for pumps, coils, and heat exchangers. Obtain approved submittals and manufacturer-recommended testing procedures. Crosscheck the summation of required coil and heat exchanger flow rates with pump design flow rate.
- B. Prepare schematic diagrams of systems' "as-built" piping layouts.
- C. In addition to requirements in "Preparation" Article, prepare hydronic systems for testing and balancing as follows:
 1. Check liquid level in expansion tank.
 2. Check highest vent for adequate pressure.
 3. Check flow-control valves for proper position.
 4. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
 5. Verify that motor starters are equipped with properly sized thermal protection.
 6. Check that air has been purged from the system.

3.8 PROCEDURES FOR CONSTANT-FLOW HYDRONIC SYSTEMS

- A. Adjust pumps to deliver total design gpm.
 1. Measure total water flow.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- a. Position valves for full flow through coils.
 - b. Measure flow by main flow meter, if installed.
 - c. If main flow meter is not installed, determine flow by pump TDH or exchanger pressure drop.
 2. Measure pump TDH as follows:
 - a. Measure discharge pressure directly at the pump outlet flange or in discharge pipe prior to any valves.
 - b. Measure inlet pressure directly at the pump inlet flange or in suction pipe prior to any valves or strainers.
 - c. Convert pressure to head and correct for differences in gage heights.
 - d. Verify pump impeller size by measuring the TDH with the discharge valve closed. Note the point on manufacturer's pump curve at zero flow, and verify that the pump has the intended impeller size.
 - e. With valves open, read pump TDH. Adjust pump discharge valve until design water flow is achieved.
 3. Monitor motor performance during procedures and do not operate motor in an overloaded condition.
- B. Adjust flow-measuring devices installed in mains and branches to design water flows.
1. Measure flow in main and branch pipes.
 2. Adjust main and branch balance valves for design flow.
 3. Re-measure each main and branch after all have been adjusted.
- C. Adjust flow-measuring devices installed at terminals for each space to design water flows.
1. Measure flow at terminals.
 2. Adjust each terminal to design flow.
 3. Re-measure each terminal after it is adjusted.
 4. Position control valves to bypass the coil, and adjust the bypass valve to maintain design flow.
 5. Perform temperature tests after flows have been balanced.
- D. For systems with pressure-independent valves at terminals:
1. Measure differential pressure and verify that it is within manufacturer's specified range.
 2. Perform temperature tests after flows have been verified.
- E. For systems without pressure-independent valves or flow-measuring devices at terminals:
1. Measure and balance coils by either coil pressure drop or temperature method.
 2. If balanced by coil pressure drop, perform temperature tests after flows have been verified.
- F. Verify final system conditions as follows:
1. Re-measure and confirm that total water flow is within design.
 2. Re-measure final pumps' operating data, TDH, volts, amps, and static profile.
 3. Mark final settings.
- G. Verify that memory stops have been set.

3.9 PROCEDURES FOR VARIABLE-FLOW HYDRONIC SYSTEMS

- A. Balance systems with automatic two- and three-way control valves by setting systems at maximum flow through heat-exchange terminals, and proceed as specified above for hydronic systems.
- B. Adjust the variable-flow hydronic system as follows:
 - 1. Verify that the differential-pressure sensor is located as indicated.
 - 2. Determine whether there is diversity in the system.
- C. For systems with no diversity:
 - 1. Adjust pumps to deliver total design gpm.
 - a. Measure total water flow.
 - 1) Position valves for full flow through coils.
 - 2) Measure flow by main flow meter, if installed.
 - 3) If main flow meter is not installed, determine flow by pump TDH or exchanger pressure drop.
 - b. Measure pump TDH as follows:
 - 1) Measure discharge pressure directly at the pump outlet flange or in discharge pipe prior to any valves.
 - 2) Measure inlet pressure directly at the pump inlet flange or in suction pipe prior to any valves or strainers.
 - 3) Convert pressure to head and correct for differences in gage heights.
 - 4) Verify pump impeller size by measuring the TDH with the discharge valve closed. Note the point on manufacturer's pump curve at zero flow and verify that the pump has the intended impeller size.
 - 5) With valves open, read pump TDH. Adjust pump discharge valve until design water flow is achieved.
 - c. Monitor motor performance during procedures and do not operate motor in an overloaded condition.
 - 2. Adjust flow-measuring devices installed in mains and branches to design water flows.
 - a. Measure flow in main and branch pipes.
 - b. Adjust main and branch balance valves for design flow.
 - c. Re-measure each main and branch after all have been adjusted.
 - 3. Adjust flow-measuring devices installed at terminals for each space to design water flows.
 - a. Measure flow at terminals.
 - b. Adjust each terminal to design flow.
 - c. Re-measure each terminal after it is adjusted.
 - d. Position control valves to bypass the coil and adjust the bypass valve to maintain design flow.
 - e. Perform temperature tests after flows have been balanced.

4. For systems with pressure-independent valves at terminals:
 - a. Measure differential pressure and verify that it is within manufacturer's specified range.
 - b. Perform temperature tests after flows have been verified.
 5. For systems without pressure-independent valves or flow-measuring devices at terminals:
 - a. Measure and balance coils by either coil pressure drop or temperature method.
 - b. If balanced by coil pressure drop, perform temperature tests after flows have been verified.
 6. Prior to verifying final system conditions, determine the system differential-pressure set point.
 7. If the pump discharge valve was used to set total system flow with variable-frequency controller at 60 Hz, at completion open discharge valve 100 percent and allow variable-frequency controller to control system differential-pressure set point. Record pump data under both conditions.
 8. Mark final settings and verify that all memory stops have been set.
 9. Verify final system conditions as follows:
 - a. Re-measure and confirm that total water flow is within design.
 - b. Re-measure final pumps' operating data, TDH, volts, amps, and static profile.
 - c. Mark final settings.
 10. Verify that memory stops have been set.
- D. For systems with diversity:
1. Determine diversity factor.
 2. Simulate system diversity by closing required number of control valves, as approved by the design engineer.
 3. Adjust pumps to deliver total design gpm.
 - a. Measure total water flow.
 - 1) Position valves for full flow through coils.
 - 2) Measure flow by main flow meter, if installed.
 - 3) If main flow meter is not installed, determine flow by pump TDH or exchanger pressure drop.
 - b. Measure pump TDH as follows:
 - 1) Measure discharge pressure directly at the pump outlet flange or in discharge pipe prior to any valves.
 - 2) Measure inlet pressure directly at the pump inlet flange or in suction pipe prior to any valves or strainers.
 - 3) Convert pressure to head and correct for differences in gage heights.
 - 4) Verify pump impeller size by measuring the TDH with the discharge valve closed. Note the point on manufacturer's pump curve at zero flow and verify that the pump has the intended impeller size.
 - 5) With valves open, read pump TDH. Adjust pump discharge valve until design water flow is achieved.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- c. Monitor motor performance during procedures and do not operate motor in an overloaded condition.
- 4. Adjust flow-measuring devices installed in mains and branches to design water flows.
 - a. Measure flow in main and branch pipes.
 - b. Adjust main and branch balance valves for design flow.
 - c. Re-measure each main and branch after all have been adjusted.
- 5. Adjust flow-measuring devices installed at terminals for each space to design water flows.
 - a. Measure flow at terminals.
 - b. Adjust each terminal to design flow.
 - c. Re-measure each terminal after it is adjusted.
 - d. Position control valves to bypass the coil, and adjust the bypass valve to maintain design flow.
 - e. Perform temperature tests after flows have been balanced.
- 6. For systems with pressure-independent valves at terminals:
 - a. Measure differential pressure, and verify that it is within manufacturer's specified range.
 - b. Perform temperature tests after flows have been verified.
- 7. For systems without pressure-independent valves or flow-measuring devices at terminals:
 - a. Measure and balance coils by either coil pressure drop or temperature method.
 - b. If balanced by coil pressure drop, perform temperature tests after flows have been verified.
- 8. Open control valves that were shut. Close a sufficient number of control valves that were previously open to maintain diversity, and balance terminals that were just opened.
- 9. Prior to verifying final system conditions, determine system differential-pressure set point.
- 10. If the pump discharge valve was used to set total system flow with variable-frequency controller at 60 Hz, at completion open discharge valve 100 percent and allow variable-frequency controller to control system differential-pressure set point. Record pump data under both conditions.
- 11. Mark final settings and verify that memory stops have been set.
- 12. Verify final system conditions as follows:
 - a. Re-measure and confirm that total water flow is within design.
 - b. Re-measure final pumps' operating data, TDH, volts, amps, and static profile.
 - c. Mark final settings.
- 13. Verify that memory stops have been set.

3.10 PROCEDURES FOR PRIMARY-SECONDARY HYDRONIC SYSTEMS

- A. Balance the primary circuit flow first.
- B. Balance the secondary circuits after the primary circuits are complete.

TESTING, ADJUSTING, AND
BALANCING FOR HVAC

- C. Adjust pumps to deliver total design gpm.
 - 1. Measure total water flow.
 - a. Position valves for full flow through coils.
 - b. Measure flow by main flow meter, if installed.
 - c. If main flow meter is not installed, determine flow by pump TDH or exchanger pressure drop.
 - 2. Measure pump TDH as follows:
 - a. Measure discharge pressure directly at the pump outlet flange or in discharge pipe prior to any valves.
 - b. Measure inlet pressure directly at the pump inlet flange or in suction pipe prior to any valves or strainers.
 - c. Convert pressure to head and correct for differences in gage heights.
 - d. Verify pump impeller size by measuring the TDH with the discharge valve closed. Note the point on manufacturer's pump curve at zero flow and verify that the pump has the intended impeller size.
 - e. With valves open, read pump TDH. Adjust pump discharge valve until design water flow is achieved.
 - 3. Monitor motor performance during procedures and do not operate motor in an overloaded condition.
- D. Adjust flow-measuring devices installed in mains and branches to design water flows.
 - 1. Measure flow in main and branch pipes.
 - 2. Adjust main and branch balance valves for design flow.
 - 3. Re-measure each main and branch after all have been adjusted.
- E. Adjust flow-measuring devices installed at terminals for each space to design water flows.
 - 1. Measure flow at terminals.
 - 2. Adjust each terminal to design flow.
 - 3. Re-measure each terminal after it is adjusted.
 - 4. Position control valves to bypass the coil and adjust the bypass valve to maintain design flow.
 - 5. Perform temperature tests after flows have been balanced.
- F. For systems with pressure-independent valves at terminals:
 - 1. Measure differential pressure and verify that it is within manufacturer's specified range.
 - 2. Perform temperature tests after flows have been verified.
- G. For systems without pressure-independent valves or flow-measuring devices at terminals:
 - 1. Measure and balance coils by either coil pressure drop or temperature method.
 - 2. If balanced by coil pressure drop, perform temperature tests after flows have been verified.
- H. Verify final system conditions as follows:
 - 1. Re-measure and confirm that total water flow is within design.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

2. Re-measure final pumps' operating data, TDH, volts, amps, and static profile.
3. Mark final settings.

- I. Verify that memory stops have been set.

3.11 PROCEDURES FOR MOTORS

- A. Motors 1/2 HP and Larger: Test at final balanced conditions and record the following data:

1. Manufacturer's name, model number, and serial number.
2. Motor horsepower rating.
3. Motor rpm.
4. Phase and hertz.
5. Nameplate and measured voltage, each phase.
6. Nameplate and measured amperage, each phase.
7. Starter size and thermal-protection-element rating.
8. Service factor and frame size.

- B. Motors Driven by Variable-Frequency Controllers: Test manual bypass of controller to prove proper operation.

3.12 PROCEDURES FOR CONDENSING UNITS

- A. Verify proper rotation of fans.
- B. Measure entering- and leaving-air temperatures.
- C. Record fan and motor operating data.

3.13 PROCEDURES FOR BOILERS

- A. Hydronic Boilers:
 1. Measure and record entering- and leaving-water temperatures.
 2. Measure and record water flow.
 3. Record relief valve pressure setting.

3.14 PROCEDURES FOR HEAT-TRANSFER COILS

- A. Measure, adjust, and record the following data for each water coil:
 1. Entering- and leaving-water temperature.
 2. Water flow rate.
 3. Water pressure drop for major (more than 20 gpm) equipment coils, excluding unitary equipment such as reheat coils, unit heaters, and fan-coil units.
 4. Dry-bulb temperature of entering and leaving air.
 5. Wet-bulb temperature of entering and leaving air for cooling coils.
 6. Airflow.
- B. Measure, adjust, and record the following data for each electric heating coil:

TESTING, ADJUSTING, AND BALANCING FOR HVAC

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Nameplate data.
2. Airflow.
3. Entering- and leaving-air temperature at full load.
4. Voltage and amperage input of each phase at full load.
5. Calculated kilowatt at full load.
6. Fuse or circuit-breaker rating for overload protection.

C. Measure, adjust, and record the following data for each steam coil:

1. Dry-bulb temperature of entering and leaving air.
2. Airflow.
3. Inlet steam pressure.

D. Measure, adjust, and record the following data for each refrigerant coil:

1. Dry-bulb temperature of entering and leaving air.
2. Wet-bulb temperature of entering and leaving air.
3. Airflow.

3.15 CONTROLS VERIFICATION

A. In conjunction with system balancing, perform the following:

1. Verify temperature control system is operating within the design limitations.
2. Confirm that the sequences of operation are in compliance with Contract Documents.
3. Verify that controllers are calibrated and function as intended.
4. Verify that controller set points are as indicated.
5. Verify the operation of lockout or interlock systems.
6. Verify the operation of valve and damper actuators.
7. Verify that controlled devices are properly installed and connected to correct controller.
8. Verify that controlled devices travel freely and are in position indicated by controller: open, closed, or modulating.
9. Verify location and installation of sensors to ensure that they sense only intended temperature, humidity, or pressure.

B. Reporting: Include a summary of verifications performed, remaining deficiencies, and variations from indicated conditions.

3.16 TOLERANCES

A. Set HVAC system's airflow rates and water flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.
2. Air Outlets and Inlets: Plus or minus 10 percent.
3. Heating-Water Flow Rate: Plus or minus 10 percent.

B. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.

3.17 FINAL REPORT

- A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.
 - 1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
 - 2. Include a list of instruments used for procedures, along with proof of calibration.
 - 3. Certify validity and accuracy of field data.
- B. Final Report Contents: In addition to certified field-report data, include the following:
 - 1. Pump curves.
 - 2. Fan curves.
 - 3. Manufacturers' test data.
 - 4. Field test reports prepared by system and equipment installers.
 - 5. Other information relative to equipment performance; do not include Shop Drawings and Product Data.
- C. General Report Data: In addition to form titles and entries, include the following data:
 - 1. Title page.
 - 2. Name and address of the TAB specialist.
 - 3. Project name.
 - 4. Project location.
 - 5. Architect's name and address.
 - 6. Engineer's name and address.
 - 7. Contractor's name and address.
 - 8. Report date.
 - 9. Signature of TAB supervisor who certifies the report.
 - 10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
 - 11. Summary of contents including the following:
 - a. Indicated versus final performance.
 - b. Notable characteristics of systems.
 - c. Description of system operation sequence if it varies from the Contract Documents.
 - 12. Nomenclature sheets for each item of equipment.
 - 13. Data for terminal units, including manufacturer's name, type, size, and fittings.
 - 14. Notes to explain why certain final data in the body of reports vary from indicated values.
 - 15. Test conditions for fans and pump performance forms including the following:
 - a. Settings for outdoor-, return-, and exhaust-air dampers.
 - b. Conditions of filters.
 - c. Cooling coil, wet- and dry-bulb conditions.
 - d. Face and bypass damper settings at coils.
 - e. Fan drive settings including settings and percentage of maximum pitch diameter.
 - f. Inlet vane settings for variable-air-volume systems.
 - g. Settings for supply-air, static-pressure controller.
 - h. Other system operating conditions that affect performance.
- D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Quantities of outdoor, supply, return, and exhaust airflows.
2. Water and steam flow rates.
3. Duct, outlet, and inlet sizes.
4. Pipe and valve sizes and locations.
5. Terminal units.
6. Balancing stations.
7. Position of balancing devices.

E. Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:

1. Unit Data:
 - a. Unit identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and unit size.
 - e. Manufacturer's serial number.
 - f. Unit arrangement and class.
 - g. Discharge arrangement.
 - h. Sheave make, size in inches, and bore.
 - i. Center-to-center dimensions of sheave and amount of adjustments in inches.
 - j. Number, make, and size of belts.
 - k. Number, type, and size of filters.
2. Motor Data:
 - a. Motor make, and frame type and size.
 - b. Horsepower and rpm.
 - c. Volts, phase, and hertz.
 - d. Full-load amperage and service factor.
 - e. Sheave make, size in inches, and bore.
 - f. Center-to-center dimensions of sheave and amount of adjustments in inches.
3. Test Data (Indicated and Actual Values):
 - a. Total airflow rate in cfm.
 - b. Total system static pressure in inches wg.
 - c. Fan rpm.
 - d. Discharge static pressure in inches wg.
 - e. Filter static-pressure differential in inches wg.
 - f. Preheat-coil static-pressure differential in inches wg.
 - g. Cooling-coil static-pressure differential in inches wg.
 - h. Heating-coil static-pressure differential in inches wg.
 - i. Outdoor airflow in cfm.
 - j. Return airflow in cfm.
 - k. Outdoor-air damper position.
 - l. Return-air damper position.
 - m. Vortex damper position.

F. Apparatus-Coil Test Reports:

1. Coil Data:
 - a. System identification.
 - b. Location.

TESTING, ADJUSTING, AND
BALANCING FOR HVAC

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- c. Coil type.
- d. Number of rows.
- e. Fin spacing in fins per inch o.c.
- f. Make and model number.
- g. Face area in sq. ft..
- h. Tube size in NPS.
- i. Tube and fin materials.
- j. Circuiting arrangement.

2. Test Data (Indicated and Actual Values):

- a. Airflow rate in cfm.
- b. Average face velocity in fpm.
- c. Air pressure drop in inches wg.
- d. Outdoor-air, wet- and dry-bulb temperatures in deg F.
- e. Return-air, wet- and dry-bulb temperatures in deg F.
- f. Entering-air, wet- and dry-bulb temperatures in deg F.
- g. Leaving-air, wet- and dry-bulb temperatures in deg F.
- h. Water flow rate in gpm.
- i. Water pressure differential in feet of head or psig.
- j. Entering-water temperature in deg F.
- k. Leaving-water temperature in deg F.
- l. Refrigerant expansion valve and refrigerant types.
- m. Refrigerant suction pressure in psig.
- n. Refrigerant suction temperature in deg F.
- o. Inlet steam pressure in psig.

G. Gas-Fired Heat Apparatus Test Reports: In addition to manufacturer's factory startup equipment reports, include the following:

1. Unit Data:

- a. System identification.
- b. Location.
- c. Make and type.
- d. Model number and unit size.
- e. Manufacturer's serial number.
- f. Fuel type in input data.
- g. Output capacity in Btu/h.
- h. Ignition type.
- i. Burner-control types.
- j. Motor horsepower and rpm.
- k. Motor volts, phase, and hertz.
- l. Motor full-load amperage and service factor.
- m. Sheave make, size in inches, and bore.
- n. Center-to-center dimensions of sheave and amount of adjustments in inches.

2. Test Data (Indicated and Actual Values):

- a. Total airflow rate in cfm.
- b. Entering-air temperature in deg F.
- c. Leaving-air temperature in deg F.
- d. Air temperature differential in deg F.
- e. Entering-air static pressure in inches wg.
- f. Leaving-air static pressure in inches wg.

TESTING, ADJUSTING, AND
BALANCING FOR HVAC

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- g. Air static-pressure differential in inches wg.
 - h. Low-fire fuel input in Btu/h.
 - i. High-fire fuel input in Btu/h.
 - j. Manifold pressure in psig.
 - k. High-temperature-limit setting in deg F.
 - l. Operating set point in Btu/h.
 - m. Motor voltage at each connection.
 - n. Motor amperage for each phase.
 - o. Heating value of fuel in Btu/h.
- H. Fan Test Reports: For supply, return, and exhaust fans, include the following:
- 1. Fan Data:
 - a. System identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and size.
 - e. Manufacturer's serial number.
 - f. Arrangement and class.
 - g. Sheave make, size in inches, and bore.
 - h. Center-to-center dimensions of sheave and amount of adjustments in inches.
 - 2. Motor Data:
 - a. Motor make, and frame type and size.
 - b. Horsepower and rpm.
 - c. Volts, phase, and hertz.
 - d. Full-load amperage and service factor.
 - e. Sheave make, size in inches, and bore.
 - f. Center-to-center dimensions of sheave, and amount of adjustments in inches.
 - g. Number, make, and size of belts.
 - 3. Test Data (Indicated and Actual Values):
 - a. Total airflow rate in cfm.
 - b. Total system static pressure in inches wg.
 - c. Fan rpm.
 - d. Discharge static pressure in inches wg.
 - e. Suction static pressure in inches wg.
- I. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:
- 1. Report Data:
 - a. System and air-handling-unit number.
 - b. Location and zone.
 - c. Traverse air temperature in deg F.
 - d. Duct static pressure in inches wg.
 - e. Duct size in inches.
 - f. Duct area in sq. ft..
 - g. Indicated airflow rate in cfm.
 - h. Indicated velocity in fpm.
 - i. Actual airflow rate in cfm.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- j. Actual average velocity in fpm.
- k. Barometric pressure in psig.

J. Air-Terminal-Device Reports:

1. Unit Data:

- a. System and air-handling unit identification.
- b. Location and zone.
- c. Apparatus used for test.
- d. Area served.
- e. Make.
- f. Number from system diagram.
- g. Type and model number.
- h. Size.
- i. Effective area in sq. ft..

2. Test Data (Indicated and Actual Values):

- a. Airflow rate in cfm.
- b. Air velocity in fpm.
- c. Preliminary airflow rate as needed in cfm.
- d. Preliminary velocity as needed in fpm.
- e. Final airflow rate in cfm.
- f. Final velocity in fpm.
- g. Space temperature in deg F.

K. System-Coil Reports: For reheat coils and water coils of terminal units, include the following:

1. Unit Data:

- a. System and air-handling-unit identification.
- b. Location and zone.
- c. Room or riser served.
- d. Coil make and size.
- e. Flowmeter type.

2. Test Data (Indicated and Actual Values):

- a. Airflow rate in cfm.
- b. Entering-water temperature in deg F.
- c. Leaving-water temperature in deg F.
- d. Water pressure drop in feet of head or psig.
- e. Entering-air temperature in deg F.
- f. Leaving-air temperature in deg F.

L. Pump Test Reports: Calculate impeller size by plotting the shutoff head on pump curves and include the following:

1. Unit Data:

- a. Unit identification.
- b. Location.
- c. Service.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- d. Make and size.
- e. Model number and serial number.
- f. Water flow rate in gpm.
- g. Water pressure differential in feet of head or psig.
- h. Required net positive suction head in feet of head or psig.
- i. Pump rpm.
- j. Impeller diameter in inches.
- k. Motor make and frame size.
- l. Motor horsepower and rpm.
- m. Voltage at each connection.
- n. Amperage for each phase.
- o. Full-load amperage and service factor.
- p. Seal type.

2. Test Data (Indicated and Actual Values):

- a. Static head in feet of head or psig.
- b. Pump shutoff pressure in feet of head or psig.
- c. Actual impeller size in inches.
- d. Full-open flow rate in gpm.
- e. Full-open pressure in feet of head or psig.
- f. Final discharge pressure in feet of head or psig.
- g. Final suction pressure in feet of head or psig.
- h. Final total pressure in feet of head or psig.
- i. Final water flow rate in gpm.
- j. Voltage at each connection.
- k. Amperage for each phase.

M. Instrument Calibration Reports:

1. Report Data:

- a. Instrument type and make.
- b. Serial number.
- c. Application.
- d. Dates of use.
- e. Dates of calibration.

3.18 ADDITIONAL TESTS

- A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.
- B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

END OF SECTION 23 05 93

SECTION 23 07 13 - DUCT INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes insulating the following duct services:
 - 1. Indoor, concealed supply and outdoor air.
 - 2. Indoor, exposed supply and outdoor air.
- B. Related Sections:
 - 1. Section 230719 "HVAC Piping Insulation."
 - 2. Section 233113 "Metal Ducts" for duct liners.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied if any).

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.5 COORDINATION

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."
- B. Coordinate clearance requirements with duct Installer for duct insulation application. Before preparing ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.6 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in "Duct Insulation Schedule, General," "Indoor Duct and Plenum Insulation Schedule," and "Aboveground, Outdoor Duct and Plenum Insulation Schedule" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C553, Type II and ASTM C1290, Type III with factory-applied ASJ jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation.
 - b. Johns Manville; a Berkshire Hathaway company.
 - c. Knauf Insulation.
 - d. Owens Corning.
- G. Mineral-Fiber Board Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C612, Type IA or Type IB. For duct and plenum applications, provide insulation with factory-applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation.
 - b. Johns Manville; a Berkshire Hathaway company.
 - c. Knauf Insulation.
 - d. Owens Corning.

2.2 FACTORY-APPLIED JACKETS

- A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C1136, Type I.

2.3 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C921, Type I, unless otherwise indicated.
- B. Metal Jacket:
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ITW Insulation Systems; Illinois Tool Works, Inc.
 - b. RPR Products, Inc.
 2. Aluminum Jacket: Comply with ASTM B209, Alloy 3003, 3005, 3105, or 5005, Temper H-14.
 - a. Sheet and roll stock ready for shop or field sizing.
 - b. Finish and thickness are indicated in field-applied jacket schedules.
 - c. Moisture Barrier for Outdoor Applications: 3-mil-thick, heat-bonded polyethylene and kraft paper.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
 1. Verify that systems to be insulated have been tested and are free of defects.
 2. Verify that surfaces to be insulated are clean and dry.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.
- B. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Keep insulation materials dry during application and finishing.
- G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- H. Install insulation with least number of joints practical.
- I. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
 - 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
- J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- K. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth.
 - 2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
 - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.
 - a. For below ambient services, apply vapor-barrier mastic over staples.
 - 4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
 - 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct flanges and fittings.
- L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

DUCT INSULATION

3.4 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
 - 1. Seal penetrations with flashing sealant.
 - 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 - 3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
 - 4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
 - 1. Seal penetrations with flashing sealant.
 - 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 - 3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
 - 4. Seal jacket to wall flashing with flashing sealant.
- C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- D. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.
 - 1. Comply with requirements in Section 078413 "Penetration Firestopping."
- E. Insulation Installation at Floor Penetrations:
 - 1. Duct: For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches.
 - 2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.5 INSTALLATION OF MINERAL-FIBER INSULATION

- A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.
 - 1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 50 percent coverage of duct and plenum surfaces.
 - 2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
 - a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
 - b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
 - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
 - d. Do not overcompress insulation during installation.
 - e. Impale insulation over pins and attach speed washers.
 - f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
 4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
 - a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
 - b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.
 5. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.
 6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
 7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch-wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.
- B. Board Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.
1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 50 percent coverage of duct and plenum surfaces.
 2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
 3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
 - a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- b. On duct sides with dimensions larger than 18 inches, space pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
 - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
 - d. Do not overcompress insulation during installation.
 - e. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
- 4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
 - a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
 - b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.
- 5. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
- 6. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch-wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

3.6 FIELD-APPLIED JACKET INSTALLATION

- A. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

3.7 DUCT INSULATION SCHEDULE, GENERAL

- A. Plenums and Ducts Requiring Insulation:
 - 1. Indoor, concealed supply and outdoor air.
- B. Items Not Insulated:
 - 1. Fibrous-glass ducts.
 - 2. Metal ducts with duct liner of sufficient thickness to comply with energy code and ASHRAE/IESNA 90.1.
 - 3. Factory-insulated flexible ducts.

DUCT INSULATION

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

4. Factory-insulated plenums and casings.
5. Flexible connectors.
6. Vibration-control devices.
7. Factory-insulated access panels and doors.

3.8 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

- A. Concealed, round and flat-oval, supply-air duct insulation shall be the following:
 1. Mineral-Fiber Blanket: 1-1/2 inches thick and 1.5-lb/cu. ft. nominal density.
- B. Concealed, rectangular, supply-air duct insulation shall be one of the following:
 1. Mineral-Fiber Blanket: 1-1/2 inches thick and 1.5-lb/cu. ft. nominal density.
 2. Mineral-Fiber Board: 1-1/2 inches thick and 2-lb/cu. ft. nominal density.

END OF SECTION 23 07 13

SECTION 23 07 19 - HVAC PIPING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes insulation for HVAC piping systems.
- B. Related Sections:
 - 1. Section 230713 "Duct Insulation" for duct insulation.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory and field applied if any).

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.5 COORDINATION

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.6 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come into contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested in accordance with ASTM C871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable in accordance with ASTM C795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C534/C534M, Type I for tubular materials, Type II for sheet materials.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Aeroflex USA, Inc.
 - b. Airex Manufacturing.
 - c. Armacell LLC.
 - d. K-Flex USA.
- G. Mineral-Fiber, Preformed Pipe: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C547.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Johns Manville; a Berkshire Hathaway company.
 - b. Knauf Insulation.
 - c. Owens Corning.
 - 2. Preformed Pipe Insulation: Type I, Grade A with factory-applied ASJ-SSL.
 - 3. 850 deg F.
 - 4. Factory fabricate shapes in accordance with ASTM C450 and ASTM C585.
 - 5. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

2.2 FACTORY-APPLIED JACKETS

- A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
 - 1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C1136, Type I.

2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C1136, Type I.
3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C1136, Type II.

2.3 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C1136, Type I, unless otherwise indicated.
- B. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Johns Manville; a Berkshire Hathaway company.
 - b. P.I.C. Plastics, Inc.
 - c. Proto Corporation.
 - d. Speedline Corporation.
 2. Adhesive: As recommended by jacket material manufacturer.
 3. Color: White.
 4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
 - a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.
- C. Metal Jacket:
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. ITW Insulation Systems; Illinois Tool Works, Inc.
 - b. RPR Products, Inc.
 2. Aluminum Jacket: Comply with ASTM B209, Alloy 3003, 3005, 3105, or 5005, Temper H-14.
 - a. Sheet and roll stock ready for shop or field sizing.
 - b. Finish and thickness are indicated in field-applied jacket schedules.
 - c. Factory-Fabricated Fitting Covers:
 - 1) Same material, finish, and thickness as jacket.
 - 2) Preformed two-piece or gore, 45- and 90-degree, short- and long-radius elbows.
 - 3) Tee covers.
 - 4) Flange and union covers.
 - 5) End caps.
 - 6) Beveled collars.
 - 7) Valve covers.

- 8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
 1. Verify that systems to be insulated have been tested and are free of defects.
 2. Verify that surfaces to be insulated are clean and dry.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Coordinate insulation installation with the tradesman installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- C. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and of thicknesses required for each item of pipe system, as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during storage, application, and finishing. Replace insulation materials that get wet.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends attached to structure with vapor-barrier mastic.
 - 3. Install insert materials and insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth.
 - 2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward-clinching staples along both edges of strip, spaced 4 inches o.c.
 - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward-clinching staples along edge at 4 inches o.c.
 - a. For below-ambient services, apply vapor-barrier mastic over staples.
 - 4. Cover joints and seams with tape, in accordance with insulation material manufacturer's written instructions, to maintain vapor seal.
 - 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation more than 25 percent of its nominal thickness.
- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches in similar fashion to butt joints.
- P. For above-ambient services, do not install insulation to the following:
 - 1. Vibration-control devices.
 - 2. Testing agency labels and stamps.
 - 3. Nameplates and data plates.

3.4 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
 - 1. Seal penetrations with flashing sealant.
 - 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 - 3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
 - 4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.
- C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
 - 1. Seal penetrations with flashing sealant.
 - 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 - 3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
 - 4. Seal jacket to wall flashing with flashing sealant.
- D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.
 - 1. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping and fire-resistive joint sealers.
- F. Insulation Installation at Floor Penetrations:
 - 1. Pipe: Install insulation continuously through floor penetrations.
 - 2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.5 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials, except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, Mechanical Couplings, and Unions:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Install insulation over fittings, valves, strainers, flanges, mechanical couplings, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
 2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as that of adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
 3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as that used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
 4. Insulate valves using preformed fitting insulation of same material, density, and thickness as that used for adjacent pipe. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
 5. Insulate strainers using preformed fitting insulation of same material, density, and thickness as that used for adjacent pipe. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers, so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
 6. Insulate flanges, mechanical couplings, and unions using a section of oversized preformed pipe insulation to fit. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Stencil or label the outside insulation jacket of each union with the word "union" matching size and color of pipe labels.
 7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
 8. For services not specified to receive a field-applied jacket, except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing, using PVC tape.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- D. Install removable insulation covers. Installation shall conform to the following:
1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as that of adjoining pipe insulation.
 2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union at least 2 times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless steel or aluminum bands. Select band material compatible with insulation and jacket.
 3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.

4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.6 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- B. Insulation Installation on Pipe Flanges:
 1. Install pipe insulation to outer diameter of pipe flange.
 2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
 3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as that of pipe insulation.
 4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- C. Insulation Installation on Pipe Fittings and Elbows:
 1. Install mitered sections of pipe insulation.
 2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- D. Insulation Installation on Valves and Pipe Specialties:
 1. Install preformed valve covers manufactured of same material as that of pipe insulation when available.
 2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
 3. Install insulation to flanges as specified for flange insulation application.
 4. Secure insulation to valves and specialties, and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.7 INSTALLATION OF MINERAL-FIBER INSULATION

- A. Insulation Installation on Straight Pipes and Tubes:
 1. Secure each layer of preformed pipe insulation to pipe with wire or bands, and tighten bands without deforming insulation materials.
 2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.

3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward-clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive, as recommended by insulation material manufacturer, and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as that of straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as that of straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.8 FIELD-APPLIED JACKET INSTALLATION

- A. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless steel bands 12 inches o.c. and at end joints.

3.9 PIPING INSULATION SCHEDULE, GENERAL

- A. Insulation conductivity and thickness per pipe size shall comply with schedules in this Section or with requirements of authorities having jurisdiction, whichever is more stringent.
- B. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
- C. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Underground piping.
2. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.10 INDOOR PIPING INSULATION SCHEDULE

- A. Condensate and Equipment Drain Water below 60 Deg F:
 1. All Pipe Sizes: Insulation shall be the following:
 - a. Flexible Elastomeric: 3/4 inch thick.
- B. Heating-Hot-Water Supply and Return, 200 Deg F and Below:
 1. NPS 12 and Smaller: Insulation shall be the following:
 - a. Mineral-Fiber, Preformed Pipe, Type I: 1-1/2 inches thick.
- C. Refrigerant Suction and Hot-Gas Piping:
 1. All Pipe Sizes: Insulation shall be the following:
 - a. Flexible Elastomeric: 1 inch thick.
- D. Refrigerant Suction and Hot-Gas Flexible Tubing:
 1. All Pipe Sizes: Insulation shall be the following:
 - a. Flexible Elastomeric: 1 inch thick.
- E. Refrigerant Liquid Piping:
 1. All Pipe Sizes: Insulation shall be the following:
 - a. Flexible Elastomeric: 1 inch thick.

3.11 OUTDOOR, ABOVEGROUND PIPING INSULATION SCHEDULE

- A. Refrigerant Suction and Hot-Gas Piping:
 1. All Pipe Sizes: Insulation shall be the following:
 - a. Flexible Elastomeric: 2 inches thick.
- B. Refrigerant Suction and Hot-Gas Flexible Tubing:
 1. All Pipe Sizes: Insulation shall be the following:
 - a. Flexible Elastomeric: 2 inches thick.
- C. Refrigerant Liquid Piping:
 1. All Pipe Sizes: Insulation shall be the following:

HVAC PIPING INSULATION

- a. Flexible Elastomeric: 1 inch thick.

3.12 INDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Piping, Concealed:
 - 1. None.
- D. Piping, Exposed:
 - 1. PVC: 30 mils thick.

3.13 OUTDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Piping, Exposed:
 - 1. Aluminum, Stucco Embossed: 0.024 inch thick.

END OF SECTION 23 07 19

SECTION 23 08 00 - COMMISSIONING OF HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes commissioning process requirements for HVAC&R systems, assemblies, and equipment.
- B. Related Sections:
 - 1. Section 018100 "General Commissioning Requirements" for general commissioning process requirements.

1.3 DEFINITIONS

- A. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.
- B. CxA: Commissioning Authority.
- C. HVAC&R: Heating, Ventilating, Air Conditioning, and Refrigeration.
- D. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

1.4 INFORMATIONAL SUBMITTALS

- A. Certificates of readiness.
- B. Certificates of completion of installation, prestart, and startup activities.

1.5 CONTRACTOR'S RESPONSIBILITIES

- A. Perform commissioning tests at the direction of the CxA.
- B. Attend construction phase controls coordination meeting.
- C. Attend testing, adjusting, and balancing review and coordination meeting.
- D. Participate in HVAC&R systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CxA.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- E. Provide information requested by the CxA for final commissioning documentation.
- F. Provide measuring instruments and logging devices to record test data, and provide data acquisition equipment to record data for the complete range of testing for the required test period.

1.6 CxA'S RESPONSIBILITIES

- A. Provide Project-specific construction checklists and commissioning process test procedures for actual HVAC&R systems, assemblies, equipment, and components to be furnished and installed as part of the construction contract.
- B. Direct commissioning testing.
- C. Verify testing, adjusting, and balancing of Work are complete.
- D. Provide test data, inspection reports, and certificates in Systems Manual.

1.7 COMMISSIONING DOCUMENTATION

- A. Provide the following information to the CxA for inclusion in the commissioning plan:
 - 1. Plan for delivery and review of submittals, systems manuals, and other documents and reports.
 - 2. Identification of installed systems, assemblies, equipment, and components including design changes that occurred during the construction phase.
 - 3. Process and schedule for completing construction checklists and manufacturer's prestart and startup checklists for HVAC&R systems, assemblies, equipment, and components to be verified and tested.
 - 4. Certificate of completion certifying that installation, prestart checks, and startup procedures have been completed.
 - 5. Certificate of readiness certifying that HVAC&R systems, subsystems, equipment, and associated controls are ready for testing.
 - 6. Test and inspection reports and certificates.
 - 7. Corrective action documents.
 - 8. Verification of testing, adjusting, and balancing reports.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TESTING PREPARATION

- A. Certify that HVAC&R systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.
- B. Certify that HVAC&R instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.

COMMISSIONING OF HVAC

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- C. Certify that testing, adjusting, and balancing procedures have been completed and that testing, adjusting, and balancing reports have been submitted, discrepancies corrected, and corrective work approved.
- D. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).
- E. Inspect and verify the position of each device and interlock identified on checklists.
- F. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.
- G. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the CxA.

3.2 Testing AND BALANCING VERIFICATION

- A. Prior to performance of testing and balancing Work, provide copies of reports, sample forms, checklists, and certificates to the CxA.
- B. Notify the CxA at least 10 days in advance of testing and balancing Work, and provide access for the CxA to witness testing and balancing Work.
- C. Provide technicians, instrumentation, and tools to verify testing and balancing of HVAC&R systems at the direction of the CxA.
 - 1. The CxA will notify testing and balancing Subcontractor 10 days in advance of the date of field verification. Notice will not include data points to be verified.
 - 2. The testing and balancing Subcontractor shall use the same instruments (by model and serial number) that were used when original data were collected.
 - 3. Failure of an item includes, other than sound, a deviation of more than 10 percent. Failure of more than 10 percent of selected items shall result in rejection of final testing, adjusting, and balancing report. For sound pressure readings, a deviation of 3 dB shall result in rejection of final testing. Variations in background noise must be considered.
 - 4. Remedy the deficiency and notify the CxA so verification of failed portions can be performed.

3.3 GENERAL TESTING REQUIREMENTS

- A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CxA.
- B. Scope of HVAC&R testing shall include entire HVAC&R installation, from central equipment for heat generation and refrigeration through distribution systems to each conditioned space. Testing shall include measuring capacities and effectiveness of operational and control functions.
- C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.

- D. The CxA along with the HVAC&R Subcontractor, testing and balancing Contractor, and HVAC&R Instrumentation and Control Subcontractor shall prepare detailed testing plans, procedures, and checklists for HVAC&R systems, subsystems, and equipment.
- E. Tests will be performed using design conditions whenever possible.
- F. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by the CxA and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.
- G. The CxA may direct that set points be altered when simulating conditions is not practical.
- H. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.
- I. If tests cannot be completed because of a deficiency outside the scope of the HVAC&R system, document the deficiency and report it to the Owner. After deficiencies are resolved, reschedule tests.
- J. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.4 HVAC&R systems, subsystems, and equipment Testing Procedures

- A. Boiler Testing and Acceptance Procedures: Testing requirements are specified in HVAC boiler Sections. Provide submittals, test data, inspector record, and boiler certification to the CxA.
- B. HVAC&R Instrumentation and Control System Testing: Field testing plans and testing requirements are specified in Section 230923 "Direct Digital Controls (DDC) System for HVAC." Assist the CxA with preparation of testing plans.
- C. Pipe system cleaning, flushing, hydrostatic tests, and chemical treatment requirements are specified in HVAC piping Sections. HVAC&R Subcontractor shall prepare a pipe system cleaning, flushing, and hydrostatic testing plan. Provide cleaning, flushing, testing, and treating plan and final reports to the CxA. Plan shall include the following:
 - 1. Sequence of testing and testing procedures for each section of pipe to be tested, identified by pipe zone or sector identification marker. Markers shall be keyed to Drawings for each pipe sector, showing the physical location of each designated pipe test section. Drawings keyed to pipe zones or sectors shall be formatted to allow each section of piping to be physically located and identified when referred to in pipe system cleaning, flushing, hydrostatic testing, and chemical treatment plan.
 - 2. Description of equipment for flushing operations.
 - 3. Minimum flushing water velocity.
 - 4. Tracking checklist for managing and ensuring that all pipe sections have been cleaned, flushed, hydrostatically tested, and chemically treated.
- D. Refrigeration System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of chillers, cooling towers, refrigerant compressors and condensers, heat pumps, and other refrigeration systems. The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- E. HVAC&R Distribution System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of air, steam, and hydronic distribution systems; special exhaust; and other distribution systems, including HVAC&R terminal equipment and unitary equipment.

END OF SECTION 23 08 00

SECTION 23 09 23 - DIRECT DIGITAL CONTROL (DDC) SYSTEM FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. DDC system for monitoring and controlling of HVAC systems.

1.3 DEFINITIONS

- A. Algorithm: A logical procedure for solving a recurrent mathematical problem. A prescribed set of well-defined rules or processes for solving a problem in a finite number of steps.
- B. Analog: A continuously varying signal value, such as current, flow, pressure, or temperature.
- C. BACnet Specific Definitions:
 - 1. BACnet: Building Automation Control Network Protocol, ASHRAE 135. A communications protocol allowing devices to communicate data over and services over a network.
 - 2. BACnet Interoperability Building Blocks (BIBBs): BIBB defines a small portion of BACnet functionality that is needed to perform a particular task. BIBBs are combined to build the BACnet functional requirements for a device.
 - 3. BACnet/IP: Defines and allows using a reserved UDP socket to transmit BACnet messages over IP networks. A BACnet/IP network is a collection of one or more IP subnetworks that share the same BACnet network number.
 - 4. BACnet Testing Laboratories (BTL): Organization responsible for testing products for compliance with ASHRAE 135, operated under direction of BACnet International.
 - 5. PICS (Protocol Implementation Conformance Statement): Written document that identifies the particular options specified by BACnet that are implemented in a device.
- D. Binary: Two-state signal where a high signal level represents "ON" or "OPEN" condition and a low signal level represents "OFF" or "CLOSED" condition. "Digital" is sometimes used interchangeably with "Binary" to indicate a two-state signal.
- E. Controller: Generic term for any standalone, microprocessor-based, digital controller residing on a network, used for local or global control. Three types of controllers are indicated: Network Controller, Programmable Application Controller, and Application-Specific Controller.
- F. Control System Integrator: An entity that assists in expansion of existing enterprise system and support of additional operator interfaces to I/O being added to existing enterprise system.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- G. COV: Changes of value.
- H. DDC System Provider: Authorized representative of, and trained by, DDC system manufacturer and responsible for execution of DDC system Work indicated.
- I. Distributed Control: Processing of system data is decentralized and control decisions are made at subsystem level. System operational programs and information are provided to remote subsystems and status is reported back. On loss of communication, subsystems shall be capable of operating in a standalone mode using the last best available data.
- J. DOCSIS: Data-Over Cable Service Interface Specifications.
- K. E/P: Voltage to pneumatic.
- L. Gateway: Bidirectional protocol translator that connects control systems that use different communication protocols.
- M. HLC: Heavy load conditions.
- N. I/O: System through which information is received and transmitted. I/O refers to analog input (AI), binary input (BI), analog output (AO) and binary output (BO). Analog signals are continuous and represent control influences such as flow, level, moisture, pressure, and temperature. Binary signals convert electronic signals to digital pulses (values) and generally represent two-position operating and alarm status. "Digital," (DI and (DO), is sometimes used interchangeably with "Binary," (BI) and (BO), respectively.
- O. I/P: Current to pneumatic.
- P. LAN: Local area network.
- Q. LNS: LonWorks Network Services.
- R. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.
- S. Mobile Device: A data-enabled phone or tablet computer capable of connecting to a cellular data network and running a native control application or accessing a web interface.
- T. Modbus TCP/IP: An open protocol for exchange of process data.
- U. MS/TP: Master-slave/token-passing, IEE 8802-3. Datalink protocol LAN option that uses twisted-pair wire for low-speed communication.
- V. MTBF: Mean time between failures.
- W. Network Controller: Digital controller, which supports a family of programmable application controllers and application-specific controllers, that communicates on peer-to-peer network for transmission of global data.
- X. Network Repeater: Device that receives data packet from one network and rebroadcasts it to another network. No routing information is added to protocol.
- Y. Peer to Peer: Networking architecture that treats all network stations as equal partners.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- Z. PUE: Performance usage effectiveness.
- AA. RAM: Random access memory.
- BB. RF: Radio frequency.
- CC. Router: Device connecting two or more networks at network layer.
- DD. Server: Computer used to maintain system configuration, historical and programming database.
- EE. TCP/IP: Transport control protocol/Internet protocol.
- FF. UPS: Uninterruptible power supply.
- GG. USB: Universal Serial Bus.
- HH. User Datagram Protocol (UDP): This protocol assumes that the IP is used as the underlying protocol.
- II. VAV: Variable air volume.
- JJ. WLED: White light emitting diode.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product include the following:
 - 1. Construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 - 2. Operating characteristics, electrical characteristics, and furnished accessories indicating process operating range, accuracy over range, control signal over range, default control signal with loss of power, calibration data specific to each unique application, electrical power requirements, and limitations of ambient operating environment, including temperature and humidity.
 - 3. Product description with complete technical data, performance curves, and product specification sheets.
 - 4. Installation, operation and maintenance instructions including factors effecting performance.
 - 5. Bill of materials of indicating quantity, manufacturer, and extended model number for each unique product.
 - a. Workstations.
 - b. Servers.
 - c. Gateways.
 - d. Routers.
 - e. DDC controllers.
 - f. Enclosures.
 - g. Electrical power devices.
 - h. Accessories.
 - 6. When manufacturer's product datasheets apply to a product series rather than a specific product model, clearly indicate and highlight only applicable information.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

7. Each submitted piece of product literature shall clearly cross reference specification and drawings that submittal is to cover.

B. Shop Drawings:

1. General Requirements:

- a. Include cover drawing with Project name, location, Owner, Architect, Contractor and issue date with each Shop Drawings submission.
- b. Include a drawing index sheet listing each drawing number and title that matches information in each title block.
- c. Drawings Size: 11"x17".

2. Include plans, elevations, sections, and mounting details where applicable.
3. Include details of product assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
4. Detail means of vibration isolation and show attachments to rotating equipment.
5. Plan Drawings indicating the following:

- a. Screened backgrounds of walls, structural grid lines, HVAC equipment, ductwork and piping.
- b. Room names and numbers with coordinated placement to avoid interference with control products indicated.
- c. Each desktop workstation, server, gateway, router, DDC controller, control panel instrument connecting to DDC controller, and damper and valve connecting to DDC controller, if included in Project.
- d. Exact placement of products in rooms, ducts, and piping to reflect proposed installed condition.
- e. Network communication cable and raceway routing.
- f. Proposed routing of wiring, cabling, conduit, and tubing, coordinated with building services for review before installation.

6. Schematic drawings for each controlled HVAC system indicating the following:

- a. I/O points labeled with point names shown. Indicate instrument range, normal operating set points, and alarm set points. Indicate fail position of each damper and valve, if included in Project.
- b. I/O listed in table format showing point name, type of device, manufacturer, model number, and cross-reference to product data sheet number.
- c. A graphic showing location of control I/O in proper relationship to HVAC system.
- d. Wiring diagram with each I/O point having a unique identification and indicating labels for all wiring terminals.
- e. Unique identification of each I/O that shall be consistently used between different drawings showing same point.
- f. Elementary wiring diagrams of controls for HVAC equipment motor circuits including interlocks, switches, relays and interface to DDC controllers.
- g. Narrative sequence of operation.
- h. Graphic sequence of operation, showing all inputs and output logical blocks.

7. Control panel drawings indicating the following:

- a. Panel dimensions, materials, size, and location of field cable, raceways, and tubing connections.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- b. Interior subpanel layout, drawn to scale and showing all internal components, cabling and wiring raceways, nameplates and allocated spare space.
 - c. Front, rear, and side elevations and nameplate legend.
 - d. Unique drawing for each panel.
- 8. DDC system network riser diagram indicating the following:
 - a. Each device connected to network with unique identification for each.
 - b. Interconnection of each different network in DDC system.
 - c. For each network, indicate communication protocol, speed and physical means of interconnecting network devices, such as copper cable type, or optical fiber cable type. Indicate raceway type and size for each.
 - d. Each network port for connection of an operator workstation or other type of operator interface with unique identification for each.
- 9. DDC system electrical power riser diagram indicating the following:
 - a. Each point of connection to field power with requirements (volts/phase/hertz/amperes/connection type) listed for each.
 - b. Each control power supply including, as applicable, transformers, power-line conditioners, transient voltage suppression and high filter noise units, DC power supplies, and UPS units with unique identification for each.
 - c. Each product requiring power with requirements (volts/phase/hertz/amperes/connection type) listed for each.
 - d. Power wiring type and size, race type, and size for each.
- 10. Monitoring and control signal diagrams indicating the following:
 - a. Control signal cable and wiring between controllers and I/O.
 - b. Point-to-point schematic wiring diagrams for each product.
 - c. Control signal tubing to sensors, switches and transmitters.
 - d. Process signal tubing to sensors, switches and transmitters.
- 11. Color graphics indicating the following:
 - a. Itemized list of color graphic displays to be provided.
 - b. For each display screen to be provided, a true color copy showing layout of pictures, graphics and data displayed.
 - c. Intended operator access between related hierarchical display screens.

C. System Description:

- 1. Full description of DDC system architecture, network configuration, operator interfaces and peripherals, servers, controller types and applications, gateways, routers and other network devices, and power supplies.
- 2. Complete listing and description of each report, log and trend for format and timing and events which initiate generation.
- 3. System and product operation under each potential failure condition including, but not limited to, the following:
 - a. Loss of power.
 - b. Loss of network communication signal.
 - c. Loss of controller signals to inputs and outpoints.
 - d. Operator workstation failure.
 - e. Server failure.

DIRECT DIGITAL CONTROL (DDC)
SYSTEM FOR HVAC

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- f. Gateway failure.
 - g. Network failure
 - h. Controller failure.
 - i. Instrument failure.
 - j. Control damper and valve actuator failure.
- 4. Complete bibliography of documentation and media to be delivered to Owner.
 - 5. Description of testing plans and procedures.
 - 6. Description of Owner training.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For DDC system to include in emergency, operation and maintenance manuals.

- 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 - a. Project Record Drawings of as-built versions of submittal Shop Drawings provided in electronic PDF format.
 - b. Testing and commissioning reports and checklists of completed final versions of reports, checklists, and trend logs.
 - c. As-built versions of submittal Product Data.
 - d. Names, addresses, e-mail addresses and 24-hour telephone numbers of Installer and service representatives for DDC system and products.
 - e. Operator's manual with procedures for operating control systems including logging on and off, handling alarms, producing point reports, trending data, overriding computer control and changing set points and variables.
 - f. Programming manuals with description of programming language and syntax, of statements for algorithms and calculations used, of point database creation and modification, of program creation and modification, and of editor use.
 - g. Engineering, installation, and maintenance manuals that explain how to:
 - 1) Design and install new points, panels, and other hardware.
 - 2) Perform preventive maintenance and calibration.
 - 3) Debug hardware problems.
 - 4) Repair or replace hardware.
 - h. Documentation of all programs created using custom programming language including set points, tuning parameters, and object database.
 - i. Backup copy of graphic files, programs, and database on electronic media such as DVDs.
 - j. List of recommended spare parts with part numbers and suppliers.
 - k. Complete original-issue documentation, installation, and maintenance information for furnished third-party hardware including computer equipment and sensors.
 - l. Complete original-issue copies of furnished software, including operating systems, custom programming language, operator workstation software, and graphics software.
 - m. Licenses, guarantees, and warranty documents.
 - n. Recommended preventive maintenance procedures for system components, including schedule of tasks such as inspection, cleaning, and calibration; time between tasks; and task descriptions.
 - o. Owner training materials.

1.6 WARRANTY

- A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace products that fail in materials or workmanship within specified warranty period.
 - 1. Failures shall be adjusted, repaired, or replaced at no additional cost or reduction in service to Owner.
 - 2. Include updates or upgrades to software and firmware if necessary to resolve deficiencies.
 - a. Install updates only after receiving Owner's written authorization.
 - 3. Warranty Period: Two year(s) from date of Substantial Completion.
 - a. For Gateway: Two-year parts and labor warranty for each.

PART 2 - PRODUCTS

2.1 DDC SYSTEM MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Honeywell International Inc., Enterprise Building Integrator (EBI) and ComfortPoint Open installed and project managed by Honeywell Corporate Branch Office.

2.2 DDC SYSTEM DESCRIPTION

- A. Microprocessor-based monitoring and control including analog/digital conversion and program logic. A control loop or subsystem in which digital and analog information is received and processed by a microprocessor, and digital control signals are generated based on control algorithms and transmitted to field devices to achieve a set of predefined conditions.
 - 1. DDC system shall consist of a peer-to-peer network of distributed DDC controllers, operator interfaces, and software.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.3 WEB ACCESS

- A. DDC system shall be Web compatible.
 - 1. Web-Based Access to DDC System:
 - a. DDC system software shall be based on server thin-client architecture, designed around open standards of Web technology. DDC system server shall be accessed using a Web browser over DDC system network, using Owner's LAN, and remotely over Internet through Owner's LAN.
 - b. Intent of thin-client architecture is to provide operators complete access to DDC system via a Web browser. No special software other than a Web browser shall be

- required to access graphics, point displays, and trends; to configure trends, points, and controllers; and to edit programming.
- c. Web access shall be password protected.

2.4 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional to design DDC system to satisfy requirements indicated.

1. System Performance Objectives:

- a. DDC system shall manage HVAC systems.
- b. DDC system control shall operate HVAC systems to achieve optimum operating costs while using least possible energy and maintaining specified performance.
- c. DDC system shall respond to power failures, HVAC equipment failures, and adverse and emergency conditions encountered through connected I/O points.
- d. DDC system shall operate while unattended by an operator and through operator interaction.
- e. DDC system shall record trends and transaction of events and produce report information such as performance, energy, occupancies, and equipment operation.
- f. Provide all labor, materials, equipment and services necessary for a complete Building Automation System (BAS) comprised of various types of BTL-listed BACnet-communicating Direct Digital Control (DDC) controllers (referred to as "BAS Controllers"), BTL-listed BACnet-communicating Operator Interface software, conventional electric/electronic controls, and equipment-mounted controls, as indicated. The system shall be fully functional and include all software and hardware for all specified capabilities.
- g. All Advanced Application and Application Specific Controllers shall be connected to NC's via BACnet MS/TP.
 - 1) A sufficient number of NC's shall be provided to support the number of Advanced Application and Application Specific Controllers.
 - 2) No more than 28 Advanced Application and Application Specific Controllers shall be connected to a single NC network (e.g., that connected to a single MS/TP port on an NC).
 - 3) Controllers for terminal equipment (e.g., VAV boxes) shall be connected to the same NC used to control the associated AHU (i.e., the AHU which feeds supply air to the terminal equipment)
- h. A sufficient number of BAS Controllers shall be provided to meet the memory needs of the project programming, alarming and trending (24 samples for each point) along with 25% spare capacity for future use.

- B. Surface-Burning Characteristics: Products installed in ducts, equipment, and return-air paths shall comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

- 1. Flame-Spread Index: 25 or less.
- 2. Smoke-Developed Index: 50 or less.

- C. DDC System Data Storage:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Include capability to archive not less than 24 consecutive months of historical data for all I/O points connected to system, including alarms, event histories, transaction logs, trends and other information indicated.
 2. Local Storage:
 - a. Provide workstation with data storage indicated. Server(s) shall use IT industry standard database platforms and be capable of functions described in "DDC Data Access" Paragraph.
- D. DDC Data Access:
1. When logged into the system, operator shall be able to also interact with any DDC controller connected to DDC system as required for functional operation of DDC system.
 2. System(s) shall be used for application configuration; for archiving, reporting and trending of data; for operator transaction archiving and reporting; for network information management; for alarm annunciation; and for operator interface tasks and controls application management.
- E. Precision of I/O Reported Values: Values reported in database and displayed shall have following precision:
1. Current:
 - a. Milliampere: Nearest 1/100th of a milliampere.
 - b. Amperes: Nearest 1/10th of an ampere up to 100 A; nearest ampere for 100 A and more.
 2. Flow:
 - a. Air: Nearest 1/10th of a cfm through 100 cfm; nearest cfm between 100 and 1000 cfm; nearest 10 cfm between 1000 and 10,000 cfm; nearest 100 cfm above 10,000 cfm.
 - b. Water: Nearest 1/10th gpm through 100 gpm; nearest gpm between 100 and 1000 gpm; nearest 10 gpm between 1000 and 10,000 gpm; nearest 100 gpm above 10,000 gpm.
 3. Speed:
 - a. Rotation (rpm): Nearest 1 rpm.
 - b. Velocity: Nearest 1/10th fpm through 100 fpm; nearest fpm between 100 and 1000 fpm; nearest 10 fpm above 1000 fpm.
 4. Position, Dampers and Valves (Percentage Open): Nearest 1 percent.
 5. Pressure:
 - a. Air, Ducts and Equipment: Nearest 1/10th in. w.c..
 - b. Water: Nearest 1/10 psig through 100 psig; nearest psig above 100 psig.
 6. Temperature:
 - a. Air, Ducts and Equipment: Nearest 1/10th of a degree.
 - b. Outdoor: Nearest degree.
 - c. Space: Nearest 1/10th of a degree.
 - d. Heating Hot Water: Nearest degree.

7. Voltage: Nearest 1/10 volt up to 100 V; nearest volt above 100 V.

F. Continuity of Operation after Electric Power Interruption:

1. Equipment and associated factory-installed controls, field-installed controls, electrical equipment, and power supply connected to building normal and backup power systems shall automatically return equipment and associated controls to operating state occurring immediately before loss of normal power, without need for manual intervention by operator when power is restored either through backup power source or through normal power if restored before backup power is brought online.

2.5 DDC SYSTEM OPERATOR INTERFACES

A. Operator Means of System Access: Operator shall be able to access entire DDC system through any of multiple means, including, but not limited to, the following:

1. Desktop and portable workstation with hardwired connection through LAN port.
2. Portable operator terminal with hardwired connection through LAN port.
3. Remote connection through web access.

B. Access to system, regardless of operator means used, shall be transparent to operator.

C. Network Ports: For hardwired connection of desktop or portable workstation. Network port shall be easily accessible, properly protected, clearly labeled, and installed at the following locations:

1. Each mechanical equipment room.
2. Each different roof level with roof-mounted air-handling units or rooftop units.

D. Desktop Workstations:

1. Connect to DDC system Level one LAN through a communications port directly on LAN or through a communications port on a DDC controller.
2. Able to communicate with any device located on any DDC system LAN.

E. Critical Alarm Reporting:

1. Operator-selected critical alarms shall be sent by DDC system to notify operator of critical alarms that require immediate attention.
2. DDC system shall send alarm notification to multiple recipients that are assigned for each alarm.
3. DDC system shall notify recipients by any or all means, including e-mail, text message and prerecorded phone message to mobile and landline phone numbers.

F. Simultaneous Operator Use: Capable of accommodating up to five simultaneous operators that are accessing DDC system through any one of operator interfaces indicated.

2.6 NETWORK COMMUNICATION PROTOCOL

A. Network communication protocol(s) used throughout entire DDC system shall be open to Owner and available to other companies for use in making future modifications to DDC system.

B. ASHRAE 135 Protocol:

1. ASHRAE 135 communication protocol shall be sole and native protocol used throughout entire DDC system.
2. DDC system shall not require use of gateways except to integrate HVAC equipment and other building systems and equipment, not required to use ASHRAE 135 communication protocol.
3. If used, gateways shall connect to DDC system using ASHRAE 135 communication protocol and Project object properties and read/write services indicated by interoperability schedule.
4. Operator workstations, controllers and other network devices shall be tested and listed by BACnet Testing Laboratories.

2.7 DESKTOP WORKSTATIONS

- A. Description: A tower or all-in-one computer designed for normal use at a single, semipermanent location.

2.8 SYSTEM SOFTWARE

- A. System Software Minimum Requirements:

1. Real-time multitasking and multiuser 64-bit operating system that allows concurrent multiple operator workstations operating and concurrent execution of multiple real-time programs and custom program development.
2. Operating system shall be capable of operating DOS and Microsoft Windows applications.
3. Database management software shall manage all data on an integrated and non-redundant basis. Additions and deletions to database shall be without detriment to existing data. Include cross linkages so no data required by a program can be deleted by an operator until that data have been deleted from respective programs.
4. Network communications software shall manage and control multiple network communications to provide exchange of global information and execution of global programs.
5. Operator interface software shall include day-to-day operator transaction processing, alarm and report handling, operator privilege level and data segregation control, custom programming, and online data modification capability.
6. Scheduling software shall schedule centrally based time and event, temporary, and exception day programs.
7. The system shall be qualified and supported on a leading Virtual Machine platform such as VMware ESX and Windows HyperV. This support shall include operations of the server software, and also related communications gateways and storage devices.
8. Completed test plans demonstrating the offered solutions support for Virtual Machine platforms shall be available. Also characterizations of performance results and required Virtual Machine settings shall be available.
9. This shall enable the IBMS system server to optionally operate in high availability architecture with no single point of failure.
 - a. The system must be capable of running a pair of similarly configured computers in a hot backup configuration where at any point in time, one is the acting Primary and the other acting as the Hot Backup.
 - b. Simply scanning I/O on two separate systems and processing independently is not acceptable. The database duplication must be performed on a per-transaction basis for several reasons:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- c. To ensure that the duplicated Backup database is consistent at all times with the Primary database
 - d. To avoid unnecessary loading of field devices caused by duplicate polling
 - e. To avoid a Windows Operating System issue or PC hardware fault, from causing the failure of the IBMS system
 - f. It must be possible to remove one of the redundant systems for maintenance without interrupting operation, and upon its reinstatement, re-synchronize the databases, again without interruption to system operation. A method of manually initiating a fail over must be provided to assist with such maintenance operations.
 - g. Failure of either system must be announced audibly and visually via the alarming subsystem.
- 10. To accommodate recoverable faults, the failed system must be able to reboot automatically after non-fatal errors and assume the role of acting as Hot Backup automatically.
 - 11. The system must be capable of supporting fully duplicated communications links to Operator Workstations and field devices that support this type of connection.
 - 12. The system and its associated Operator Workstations must be capable of connecting to two fully independent Ethernets run in parallel. No repeater or bridge connection between the Ethernets is acceptable as a means of achieving this function.
 - 13. Operator Workstations must be capable of switching automatically between the two server computers in the event of a fail over and switching between two Ethernets automatically in the event of an Ethernet failure.
 - 14. A method shall be provided for monitoring and control of points on remote IBMS servers. Specifically, real-time and history values in any IBMS server must be available to any other server for monitoring and control. Features supported must include:
 - 1) Access: Access to data shall be global, such that users at Operator Workstations on one server can access data, history, point detail displays, etc. for points on any other server. It shall not be necessary to configure system wide, more than one point for each data value or signal, regardless of the number of servers accessing the data.
 - 2) Security/Filtering: It shall be possible to nominate sets of points to be accessed on a server-by-server and user-by-user basis. The mechanism shall be the same as the mechanism to control individual operator and workstation access to data for single server systems.
 - 3) Alarms / Messages: Operators and workstations at any server must be able to see alarms from any other server. It shall not be necessary to configure alarms more than once, regardless of the number of servers accessing the data.
 - 4) Trending: It shall be possible to configure real time and historical trends that combine data from any connected server on a single trend. It shall not be necessary to configure more than one point for each data value or signal, regardless of the number of servers accessing the data.
 - 5) Graphics / Reports / Applications: All graphics, reports, and applications at a server shall have the same distributed access to data on other servers as described above for operators and workstations. It shall not be necessary to configure more than one point for each data value or signal, regardless of the number of servers accessing the data.
 - 6) Cardholders: All cardholders in the IBMS shall be distributed to all servers so that cardholders need only be enrolled into one server and will automatically then have access to all other servers if desired. Access requirements for all servers will be set up at the time of enrolment in one server.

- 7) Events: All system and operator events across the IBMS array of connected system servers, shall be centrally stored into a Central Event Server, which can be queried by operators to provide a single unified view of alarms, operator changes and system events
 - 8) SoA web services: The important web services that enable extension of the IBMS system, must also provide seamless access to points, alarms and history from any Distributed System Server, without needing to directly address each individual server. The data across the Distributed System Servers shall be seamlessly integrated into the Web Services and should only need to be licensed once (for the entire system).
 - 9) Accessing points in existing system should not require re-licensing of existing points.
 - b. The system shall support identical point names on any of the connected servers in this distributed system. With the exception of scope of operator responsibility assignment, there shall be no engineering effort to connect these distributed systems. Self-discovery of all points and alarms in this distributed design shall ensure that zero manual or engineering of linked points or parameters is required.
 - c. Connections between servers can be made through local Ethernet connections, the plant's LAN, or the corporate LAN and WAN. Connections must be optionally redundant. Both redundant and non-redundant servers must be supported, and no additional engineering effort shall be required to connect both kinds of servers.
15. The IBMS system must make all diagnostic information viewable through an easy to use user interface and shall be able to be easily exported as a stand-alone collection of material for later analysis. The capabilities shall include the ability to run automated tests, record the reproduction of a failure, as well as collection and organization of all available diagnostic information (files, logs, and system settings).
- a. Automated tests shall be possible to determine the health of the IBMS. The automated tests shall automatically set the appropriate debugging parameters and store the results for viewing at any time. The results shall be stored in a file that can be sent for assistance in remotely diagnosing an issue.
 - b. The ability to record all system information at the time of issue reproduction shall be automated from within the diagnostic framework. The recordings shall be capable of being defined to capture the necessary level of system information at the time of issue reproduction.
 - c. All available IBMS diagnostic information shall be collected and organized for viewing as well as to create a diagnostic package to simplify remote issue resolution. This information shall include the following:
 - d. Communications traces to selected controllers
 - e. All system log files
 - f. Details on system software installation
 - g. Application status information
 - h. It shall not be necessary to be an expert user in the system to gather diagnostic information.

B. Operator Interface Software:

1. Minimize operator training through use of English language prorating and English language point identification.
2. Minimize use of a typewriter-style keyboard through use of a pointing device similar to a mouse.
3. Operator sign-off shall be a manual operation or, if no keyboard or mouse activity takes place, an automatic sign-off.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

4. Automatic sign-off period shall be programmable from one to 60 minutes in one-minute increments on a per operator basis.
5. Operator sign-on and sign-off activity shall be recorded and sent to printer.
6. Security Access:
 - a. Operator access to DDC system shall be under password control.
 - b. An alphanumeric password shall be field assignable to each operator.
 - c. Operators shall be able to access DDC system by entry of proper password.
 - d. Operator password shall be same regardless of which computer or other interface means is used.
 - e. Additions or changes made to passwords shall be updated automatically.
 - f. Each operator shall be assigned an access level to restrict access to data and functions the operator is capable of performing.
 - g. Software shall have at least five access levels.
 - h. Each menu item shall be assigned an access level so that a one-for-one correspondence between operator assigned access level(s) and menu item access level(s) is required to gain access to menu item.
 - i. Display menu items to operator with those capable of access highlighted. Menu and operator access level assignments shall be online programmable and under password control.
7. Operators shall be able to perform commands including, but not limited to, the following:
 - a. Start or stop selected equipment.
 - b. Adjust set points.
 - c. Add, modify, and delete time programming.
 - d. Enable and disable process execution.
 - e. Lock and unlock alarm reporting for each point.
 - f. Enable and disable totalization for each point.
 - g. Enable and disable trending for each point.
 - h. Override control loop set points.
 - i. Enter temporary override schedules.
 - j. Define holiday schedules.
 - k. Change time and date.
 - l. Enter and modify analog alarm limits.
 - m. Enter and modify analog warning limits.
 - n. View limits.
 - o. Enable and disable demand limiting.
 - p. Enable and disable duty cycle.
 - q. Display logic programming for each control sequence.
8. Reporting:
 - a. Generated automatically and manually.
 - b. Sent to displays, printers and disk files.
 - c. Types of Reporting:
 - 1) General listing of points.
 - 2) List points currently in alarm.
 - 3) List of off-line points.
 - 4) List points currently in override status.
 - 5) List of disabled points.
 - 6) List points currently locked out.
 - 7) List of items defined in a "Follow-Up" file.
 - 8) List weekly schedules.

DIRECT DIGITAL CONTROL (DDC)
SYSTEM FOR HVAC

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- 9) List holiday programming.
- 10) List of limits and deadbands.

- 9. Summaries: For specific points, for a logical point group, for an operator selected group(s), or for entire system without restriction due to hardware configuration.
- 10. The system must be provided with a zero footprint thin client that is browser agnostic. No Java Runtime applications shall be required. This thin client shall be supported operating a full workstation experience from devices such as, but not limited to:
 - a. Android smart phone
 - b. Apple iPhone 6 or above
 - c. All tablet computers with a modern HTML5 browser.
 - d. The solution without any changes, must work on all modern web browsers including Safari, Mozilla, Firefox. Edge and IE.

C. Graphic Interface Software:

- 1. Include a full interactive graphical selection means of accessing and displaying system data to operator. Include at least five levels with the penetration path operator assignable (for example, site, building, floor, air-handling unit, and supply temperature loop). Native language descriptors assigned to menu items are to be operator defined and modifiable under password control.
- 2. Include a hierarchical-linked dynamic graphic operator interface for accessing and displaying system data and commanding and modifying equipment operation. Interface shall use a pointing device with pull-down or penetrating menus, color and animation to facilitate operator understanding of system.
- 3. Include at least 10 levels of graphic penetration with the hierarchy operator assignable.
- 4. Descriptors for graphics, points, alarms and such shall be modified through operator's workstation under password control.
- 5. Graphic displays shall be online user definable and modifiable using the hardware and software provided.
- 6. Data to be displayed within a graphic shall be assignable regardless of physical hardware address, communication or point type.
- 7. Graphics are to be online programmable and under password control.
- 8. Points may be assignable to multiple graphics where necessary to facilitate operator understanding of system operation.
- 9. Graphics shall also contain software points.
- 10. Penetration within a graphic hierarchy shall display each graphic name as graphics are selected to facilitate operator understanding.
- 11. Back-trace feature shall permit operator to move upward in the hierarchy using a pointing device. Back trace shall show all previous penetration levels. Include operator with option of showing each graphic full screen size with back trace as horizontal header or by showing a "stack" of graphics, each with a back trace.
- 12. Display operator accessed data on the monitor.
- 13. Operator shall select further penetration using pointing device to click on a site, building, floor, area, equipment, and so on. Defined and linked graphic below that selection shall then be displayed.
- 14. Include operator with means to directly access graphics without going through penetration path.
- 15. Dynamic data shall be assignable to graphics.
- 16. Display points (physical and software) with dynamic data provided by DDC system with appropriate text descriptors, status or value, and engineering unit.
- 17. Use color, rotation, or other highly visible means, to denote status and alarm states. Color shall be variable for each class of points, as chosen by operator.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

18. Points shall be dynamic with operator adjustable update rates on a per point basis from one second to over a minute.
19. For operators with appropriate privilege, points shall be commanded directly from display using pointing device.
 - a. For an analog command point such as set point, current conditions and limits shall be displayed and operator can position new set point using pointing device.
 - b. For a digital command point such as valve position, valve shall show its current state such as open or closed and operator could select alternative position using pointing device.
 - c. Keyboard equivalent shall be available for those operators with that preference.
20. Operator shall optionally be able to split or resize viewing screen into quadrants to show one graphic on one quadrant of screen and other graphics or spreadsheet, bar chart, word processing, curve plot and other information on other quadrants on screen. This feature shall allow real-time monitoring of one part of system while displaying other parts of system or data to better facilitate overall system operation.
21. Help Features:
 - a. On-line context-sensitive help utility to facilitate operator training and understanding.
 - b. Bridge to further explanation of selected keywords. Document shall contain text and graphics to clarify system operation.
 - 1) If help feature does not have ability to bridge on keywords for more information, a complete set of user manuals shall be provided in an indexed word-processing program, which shall run concurrently with operating system software.
 - c. Available for Every Menu Item:
 - 1) Index items for each system menu item.
22. Graphic generation software shall allow operator to add, modify, or delete system graphic displays.
 - a. Include libraries of symbols depicting HVAC symbols such as fans, coils, filters, dampers, valves pumps, and electrical symbols.
 - b. Graphic development package shall use a pointing device in conjunction with a drawing program to allow operator to perform the following:
 - 1) Define background screens.
 - 2) Define connecting lines and curves.
 - 3) Locate, orient and size descriptive text.
 - 4) Define and display colors for all elements.
 - 5) Establish correlation between symbols or text and associated system points or other displays.

D. Project-Specific Graphics: Graphics documentation including, but not limited to, the following:

1. Site plan showing each building, and additional site elements, which are being controlled or monitored by DDC system.
2. Plan for each building floor, including interstitial floors, and each roof level of each building, showing the following:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- a. Room layouts with room identification and name.
 - b. Locations and identification of all monitored and controlled HVAC equipment and other equipment being monitored and controlled by DDC system.
 - c. Location and identification of each hardware point being controlled or monitored by DDC system.
3. Control schematic for each of following, including a graphic system schematic representation with point identification, set point and dynamic value indication.
 4. Graphic display for each piece of equipment connected to DDC system through a data communications link. Include dynamic indication of all points associated with equipment.
 5. DDC system network riser diagram that shows schematic layout for entire system including all networks and all controllers.
 6. Displays created in the Graphic Display Building editor shall be usable in a Web Browser such as Google Chrome without modification. All displays shall be usable in this manner enabling operators to completely operate the system through a web browser via the internet. Displays may also incorporate data from an intranet, the Internet, or ActiveX documents along with other building data.

E. Alarm Handling Software:

1. Include alarm handling software to report all alarm conditions monitored and transmitted through DDC controllers.
2. Include first in, first out handling of alarms according to alarm priority ranking, with most critical alarms first, and with buffer storage in case of simultaneous and multiple alarms.
3. Alarm handling shall be active at all times to ensure that alarms are processed even if an operator is not currently signed on to DDC system.
4. Alarms display shall include the following:
 - a. Indication of alarm condition such as "Abnormal Off," "Hi Alarm," and "Low Alarm."
 - b. "Analog Value" or "Status" group and point identification with native language point descriptor such as "Space Temperature, Building 110, 2nd Floor, Room 212."
5. Alarms shall be directed to appropriate operator workstations, printers, and individual operators by privilege level and segregation assignments.
6. Send e-mail alarm messages to designated operators.
7. Send e-mail, page, text and voice messages to designated operators for critical alarms.
8. Alarms and events shall be categorized and processed by class.
 - a. Class 1:
 - 1) Associated with fire, security and other extremely critical equipment monitoring functions; have alarm, trouble, return to normal, and acknowledge conditions printed and displayed.
 - 2) Unacknowledged alarms to be placed in unacknowledged alarm buffer.
 - 3) All conditions shall cause an audible sound and shall require individual acknowledgment to silence audible sound.
 - b. Class 2:
 - 1) Critical, but not life-safety related, and processed same as Class 1 alarms, except do not require individual acknowledgment.
 - 2) Acknowledgement may be through a multiple alarm acknowledgment.
 - c. Class 3:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- 1) General alarms; printed, displayed and placed in unacknowledged alarm buffer queues.
- 2) Each new alarm received shall cause an audible sound. Audible sound shall be silenced by "acknowledging" alarm or by pressing a "silence" key.
- 3) Acknowledgement of queued alarms shall be either on an individual basis or through a multiple alarm acknowledgement.
- 4) Alarms returning to normal condition shall be printed and not cause an audible sound or require acknowledgment.

d. Class 4:

- 1) Routine maintenance or other types of warning alarms.
- 2) Alarms to be printed only, with no display, no audible sound and no acknowledgment required.

9. Include an unacknowledged alarm indicator on display to alert operator that there are unacknowledged alarms in system. Operator shall be able to acknowledge alarms on an individual basis or through a multiple alarm acknowledge key, depending on alarm class.
10. To ensure that no alarm records are lost, it shall be possible to assign a backup printer to accept alarms in case of failure of primary printer.
11. The system shall allow you to temporarily hide a distracting/nuisance alarm without requiring other options or custom engineered solutions. This is a standard feature. When you shelve an alarm it is silenced, acknowledged, and removed from normal view. However, alarm messages, if configured, are still shown on the Message Summary. Also, further instances of the same alarm are combined with the existing shelved alarm, which continues to remain shelved. A shelved alarm is automatically unshelved at the end of the shelving period, which depends on a number of factors, such as the reason it was shelved. Alternatively, you can manually unshelve it before the shelving period has expired.

F. Reports and Logs:

1. Include reporting software package that allows operator to select, modify, or create reports using DDC system I/O point data available.
2. Each report shall be definable as to data content, format, interval and date.
3. Report data shall be sampled and stored on DDC controller, within storage limits of DDC controller, and then uploaded to archive on workstation for historical reporting.
4. Operator shall be able to obtain real-time logs of all I/O points by type or status, such as alarm, point lockout, or normal.
5. Reports and logs shall be stored on workstation hard drives in a format that is readily accessible by other standard software applications, including spreadsheets and word processing.
6. Reports and logs shall be readily printed and set to be printed either on operator command or at a specific time each day.

G. Standard Reports: Standard DDC system reports shall be provided and operator shall be able to customize reports later.

1. All I/O: With current status and values.
2. Alarm: All current alarms, except those in alarm lockout.
3. Disabled I/O: All I/O points that are disabled.
4. Alarm Lockout I/O: All I/O points in alarm lockout, whether manual or automatic.
5. Alarm Lockout I/O in Alarm: All I/O in alarm lockout that are currently in alarm.
6. Logs:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- a. Alarm history.
- b. System messages.
- c. System events.
- d. Trends.

H. Standard Trends:

1. Trend all I/O point present values, set points, and other parameters indicated for trending.
2. Trends shall be associated into groups, and a trend report shall be set up for each group.
3. Trends shall be stored within DDC controller and uploaded to hard drives automatically on reaching 75 of DDC controller buffer limit, or by operator request, or by archiving time schedule.
4. Preset trend intervals for each I/O point after review with Owner.
5. Trend intervals shall be operator selectable from 10 seconds up to 60 minutes. Minimum number of consecutive trend values stored at one time shall be 100 per variable.
6. When drive storage memory is full, most recent data shall overwrite oldest data.
7. Archived and real-time trend data shall be available for viewing numerically and graphically by operators.

I. Custom Trends: Operator shall be able to define a custom trend log for any I/O point in DDC system.

1. Each trend shall include interval, start time, and stop time.
2. Data shall be sampled and stored on DDC controller, within storage limits of DDC controller, and then uploaded to archive on workstation hard drives.
3. Data shall be retrievable for use in spreadsheets and standard database programs.

J. Programming Software:

1. Include programming software to execute sequences of operation indicated.
2. Include programming routines in simple and easy to follow logic with detailed text comments describing what the logic does and how it corresponds to sequence of operation.
3. Programming software shall be as follows:
 - a. Graphic Based: Programming shall use a library of function blocks made from preprogrammed code designed for DDC control systems.
 - 1) Function blocks shall be assembled with interconnection lines that represent to control sequence in a flowchart.
 - 2) Programming tools shall be viewable in real time to show present values and logical results of each function block.
4. Include means for detecting programming errors and testing software control strategies with a simulation tool before implementing in actual control. Simulation tool may be inherent with programming software or as a separate product.

2.9 ASHRAE 135 GATEWAYS

- A. Include BACnet communication ports, whenever available as an equipment OEM standard option, for integration via a single communication cable. BACnet-controlled plant equipment includes, but is not limited to, boilers and variable-speed drives.

DIRECT DIGITAL CONTROL (DDC)
SYSTEM FOR HVAC

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- B. Include with each gateway an interoperability schedule showing each point or event on legacy side that BACnet "client" will read, and each parameter that BACnet network will write to. Describe this interoperability of BACnet services, or BIBBs, defined in ASHRAE 135, Annex K.
- C. Gateway Minimum Requirements:
 - 1. Read and view all readable object properties on non-BACnet network to BACnet network and vice versa where applicable.
 - 2. Write to all writeable object properties on non-BACnet network from BACnet network and vice versa where applicable.
 - 3. Include single-pass (only one protocol to BACnet without intermediary protocols) translation from non-BACnet protocol to BACnet and vice versa.
 - 4. Comply with requirements of Data Sharing Read Property, Data Sharing Write Property, Device Management Dynamic Device Binding-B, and Device Management Communication Control BIBBs according to ASHRAE 135.
 - 5. Hardware, software, software licenses, and configuration tools for operator-to-gateway communications.
 - 6. Backup programming and parameters on CD media and the ability to modify, download, backup, and restore gateway configuration.

2.10 DDC CONTROLLERS

- A. DDC system shall consist of a combination of network controllers, programmable application controllers and application-specific controllers to satisfy performance requirements indicated.
- B. DDC controllers shall perform monitoring, control, energy optimization and other requirements indicated.
- C. DDC controllers shall use a multitasking, multiuser, real-time digital control microprocessor with a distributed network database and intelligence.
- D. Each DDC controller shall be capable of full and complete operation as a completely independent unit and as a part of a DDC system wide distributed network.
- E. Environment Requirements:
 - 1. Controller hardware shall be suitable for the anticipated ambient conditions.
 - 2. Controllers located in conditioned space shall be rated for operation at 32 to 120 deg F.
 - 3. Controllers located outdoors shall be rated for operation at 40 to 150 deg F.
- F. Power and Noise Immunity:
 - 1. Controller shall operate at 90 to 110 percent of nominal voltage rating and shall perform an orderly shutdown below 80 percent of nominal voltage.
 - 2. Operation shall be protected against electrical noise of 5 to 120 Hz and from keyed radios with up to 5 W of power located within 36 inches of enclosure.
- G. Maintenance and Support: Include the following features to facilitate maintenance and support:
 - 1. Mount microprocessor components on circuit cards for ease of removal and replacement.
 - 2. Means to quickly and easily disconnect controller from network.
 - 3. Means to quickly and easily access connect to field test equipment.

DIRECT DIGITAL CONTROL (DDC)
SYSTEM FOR HVAC

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

4. Visual indication that controller electric power is on, of communication fault or trouble, and that controller is receiving and sending signals to network.

H. Input and Output Point Interface:

1. Hardwired input and output points shall connect to network, programmable application and application-specific controllers.
2. Input and output points shall be protected so shorting of point to itself, to another point, or to ground will not damage controller.
3. Input and output points shall be protected from voltage up to 24 V of any duration so that contact will not damage controller.
4. AIs:
 - a. AIs shall include monitoring of low-voltage (zero- to 10-V dc), current (4 to 20 mA) and resistance signals from thermistor and RTD sensors.
 - b. AIs shall be compatible with, and field configurable to, sensor and transmitters installed.
 - c. Controller AIs shall perform analog-to-digital (A-to-D) conversion with a minimum resolution of 8 bits or better to comply with accuracy requirements indicated.
 - d. Signal conditioning including transient rejection shall be provided for each AI.
 - e. Capable of being individually calibrated for zero and span.
 - f. Incorporate common-mode noise rejection of at least 50 dB from zero to 100 Hz for differential inputs, and normal-mode noise rejection of at least 20 dB at 60 Hz from a source impedance of 10000 ohms.
5. AOs:
 - a. Controller AOs shall perform analog-to-digital (A-to-D) conversion with a minimum resolution of 8 bits or better to comply with accuracy requirements indicated.
 - b. Output signals shall have a range of 4 to 20 mA dc or zero- to 10-V dc as required to include proper control of output device.
 - c. Capable of being individually calibrated for zero and span.
 - d. AOs shall not exhibit a drift of greater than 0.4 percent of range per year.
6. BIs:
 - a. Controller BIs shall accept contact closures and shall ignore transients of less than 5-ms duration.
 - b. Isolation and protection against an applied steady-state voltage of up to 180-V ac peak.
 - c. BIs shall include a wetting current of at least 12 mA to be compatible with commonly available control devices and shall be protected against effects of contact bounce and noise.
 - d. BIs shall sense "dry contact" closure without external power (other than that provided by the controller) being applied.
 - e. Pulse accumulation input points shall comply with all requirements of BIs and accept up to 10 pulses per second for pulse accumulation. Buffer shall be provided to totalize pulses. Pulse accumulator shall accept rates of at least 20 pulses per second. The totalized value shall be reset to zero on operator's command.
7. BOs:
 - a. Controller BOs shall include relay contact closures or triac outputs for momentary and maintained operation of output devices.

- 1) Relay contact closures shall have a minimum duration of 0.1 second. Relays shall include at least 180 V of isolation. Electromagnetic interference suppression shall be provided on all output lines to limit transients to non-damaging levels. Minimum contact rating shall be 1 A at 24-V ac.
 - 2) Triac outputs shall include at least 180 V of isolation. Minimum contact rating shall be 1 A at 24-V ac.
- b. BOs shall include for two-state operation or a pulsed low-voltage signal for pulse-width modulation control.
 - c. BOs shall be selectable for either normally open or normally closed operation.
 - d. Include tristate outputs (two coordinated BOs) for control of three-point floating-type electronic actuators without feedback.
 - e. Limit use of three-point floating devices to VAV terminal unit control applications. Control algorithms shall operate actuator to one end of its stroke once every 24 hours for verification of operator tracking.

2.11 NETWORK CONTROLLERS

A. General Network Controller Requirements:

1. Include adequate number of controllers to achieve performance indicated.
2. System shall consist of one or more independent, standalone, microprocessor-based network controllers to manage global strategies indicated.
3. Controller shall have enough memory to support its operating system, database, and programming requirements.
4. Data shall be shared between networked controllers and other network devices.
5. Operating system of controller shall manage input and output communication signals to allow distributed controllers to share real and virtual object information and allow for central monitoring and alarms.
6. Controllers shall have a real-time clock.
7. Controller shall continually check status of its processor and memory circuits. If an abnormal operation is detected, controller shall assume a predetermined failure mode and generate an alarm notification.
8. Controllers shall be fully programmable.

B. Operator Interface:

1. Controller shall be equipped with a service communications port for connection to a portable operator's workstation or mobile device.

C. Serviceability:

1. Controller shall be equipped with diagnostic LEDs or other form of local visual indication of power, communication, and processor.
2. Wiring and cable connections shall be made to field-removable, modular terminal strips or to a termination card connected by a ribbon cable.
3. Controller shall maintain BIOS and programming information in event of a power loss for at least 72 hours.

2.12 PROGRAMMABLE APPLICATION CONTROLLERS

A. General Programmable Application Controller Requirements:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Include adequate number of controllers to achieve performance indicated.
2. Controller shall have enough memory to support its operating system, database, and programming requirements.
3. Data shall be shared between networked controllers and other network devices.
4. Operating system of controller shall manage input and output communication signals to allow distributed controllers to share real and virtual object information and allow for central monitoring and alarms.
5. Controllers shall have a real-time clock.
6. Controller shall continually check status of its processor and memory circuits. If an abnormal operation is detected, controller shall assume a predetermined failure mode and generate an alarm notification.
7. Controllers shall be fully programmable.
8. Dual Core Processor – The NC shall be designed with a dual core processor to segregate and isolate the BACnet IP communications from the B-BC control application, IO control and communications, and connected B-ASC and B-AAC device communication and data sharing. NCs not designed with a dual-core processor that ensures BACnet IP communication issues cannot impact local control and communication to connected B-ASC, and B-AAC MS/TP devices shall be provided in a redundant controller design with a dedicated router with BBMD enabled to manage subnet traffic to the redundant NC controller pair.
9. DDC Redundancy – The NC shall have the capable of being provided in a redundant configuration for the critical central plant (chiller, boiler, and associated pump control), and AHUs serving critical areas per the drawings and specifications. Redundant operation shall include continuous synchronization between the two NCs with a 5 second change over from the active to the back-up NC. The NCs specified in the drawings with redundant configuration shall include two separate power supplies, and two separate network connections. Common IO shall be utilized between the two redundant NCs with no disruption to the control operation, or impact to the IO under control during a redundant NC change-over event. NCs not supporting automated redundant configuration shall be implemented with two controllers designed with redundant IO and automated monitoring for change-over operation from the failed controller to the back-up controller with alarming and notifications to the operators to indicate the system status.

B. Communication:

1. Programmable application controllers shall communicate with other devices on network.

C. Cybersecurity

1. Cyber Security: The Ethernet Network connected, NC, DDC Plant Controller shall enforce a PKI Certificate program to help improve cyber security and protect the controller software and firmware access per the following:
2. PKI Certificate program and certificate issuing portal shall have restricted access
3. PKI Certificate portal shall require User ID application to site administrator for user authentication, and strong password enforcement with periodic update required.
4. PKI Certificates shall be required for connectivity to the plant controller Web Browser interface
5. PKI Certificate shall be required to download new firmware into the plant controller
6. Certificates for the controller may be valid for up to 10 years, while certificates for PC's and smart, or browser enabled devices that will connect to the plant controller shall enforce certificate renewal with a one-year term and expiry.
7. Certificate expiry shall include a mechanism to support a customer/user expiry and renewal notification, and certificate expiry will not prohibit controller operation, but will restrict operation as described above regarding NC application, browser access, and firmware update.

DIRECT DIGITAL CONTROL (DDC)
SYSTEM FOR HVAC

8. PKI Certificate program enforcement shall also be required for service and programming tools that would update the NC software application, or internal firmware.

D. Operator Interface:

1. Controller shall be equipped with a service communications port for connection to a portable operator's workstation or mobile device.

E. Serviceability:

1. Controller shall be equipped with diagnostic LEDs or other form of local visual indication of power, communication, and processor.
2. Wiring and cable connections shall be made to field-removable, modular terminal strips or to a termination card connected by a ribbon cable.
3. Controller shall maintain BIOS and programming information in event of a power loss for at least 72 hours.

2.13 APPLICATION-SPECIFIC CONTROLLERS

- A. Description: Microprocessor-based controllers, which through hardware or firmware design are dedicated to control a specific piece of equipment. Controllers are not fully user-programmable but are configurable and customizable for operation of equipment they are designed to control.

1. Capable of standalone operation and shall continue to include control functions without being connected to network.
2. Data shall be shared between networked controllers and other network devices.
3. An Application Specific Controller is a BTL-listed BACnet B-ASC device dedicated for use with specific equipment and applications. It shall be provided with non-volatile memory for operating system software; read/write memory for all other purposes; factory-provided control software; and communications support for Operator Interface, and the Controller Network.
 - a. Application Specific Controllers shall not be used for systems/equipment that require custom application programming to meet the Sequence of Operation (i.e., if an Application Specific Controller is used the factory-provided control software/program must be able to perform the Sequence of Operation without "upper level" control from another BAS Controller).
 - b. Application Specific Controllers shall only be used for terminal/zone equipment such as fan coil units, and heat pumps (i.e., when the factory-provided control software meets the Sequence of Operation); or where explicitly allowed by the Sequence of Operation.

- B. Communication: Application-specific controllers shall communicate with other application-specific controller and devices on network, and to programmable application and network controllers.

- C. Operator Interface: Controller shall be equipped with a service communications port for connection to a portable operator's workstation.

D. Serviceability:

1. Controller shall be equipped with diagnostic LEDs or other form of local visual indication of power, communication, and processor.

2. Wiring and cable connections shall be made to field-removable, modular terminal strips or to a termination card connected by a ribbon cable.
3. Controller shall use nonvolatile memory and maintain all BIOS and programming information in event of power loss.

2.14 CONTROLLER SOFTWARE

A. General Controller Software Requirements:

1. Software applications shall reside and operate in controllers. Editing of applications shall occur at operator workstations.
2. I/O points shall be identified by up to 30-character point name and up to 16-character point descriptor. Same names shall be used at operator workstations.
3. Control functions shall be executed within controllers using DDC algorithms.
4. Controllers shall be configured to use stored default values to ensure fail-safe operation. Default values shall be used when there is a failure of a connected input instrument or loss of communication of a global point value.
5. Note that Service Software for BACnet MS/TP devices shall be able to "tunnel" through NC's (i.e., a PC need not be directly connected to the MS/TP device or MS/TP network to perform its functions).
6. Allowable Products – Honeywell ComfortPoint Open "Studio" (configuration/programming), "HMI Web Display Builder" (graphics screen editor), and "CPO Online" (programming simulation); or equivalents.

B. Security:

1. Operator access shall be secured using individual security passwords and user names.
2. Passwords shall restrict operator to points, applications, and system functions as assigned by system manager.
3. Operator log-on and log-off attempts shall be recorded.
4. System shall protect itself from unauthorized use by automatically logging off after last keystroke. The delay time shall be operator-definable.

C. Scheduling: Include capability to schedule each point or group of points in system. Each schedule shall consist of the following:

1. Weekly Schedule:

- a. Include separate schedules for each day of week.
- b. Each schedule should include the capability for start, stop, optimal start, optimal stop, and night economizer.
- c. Each schedule may consist of up to 10 events.
- d. When a group of objects are scheduled together, include capability to adjust start and stop times for each member.

2. Exception Schedules:

- a. Include ability for operator to designate any day of the year as an exception schedule.
- b. Exception schedules may be defined up to a year in advance. Once an exception schedule is executed, it will be discarded and replaced by regular schedule for that day of week.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

3. Holiday Schedules:
 - a. Include capability for operator to define up to 99 special or holiday schedules.
 - b. Schedules may be placed on scheduling calendar and will be repeated each year.
 - c. Operator shall be able to define length of each holiday period.
- D. System Coordination:
 1. Include standard application for proper coordination of equipment.
 2. Application shall include operator with a method of grouping together equipment based on function and location.
 3. Group may then be used for scheduling and other applications.
- E. Binary Alarms:
 1. Each binary point shall be set to alarm based on operator-specified state.
 2. Include capability to automatically and manually disable alarming.
- F. Analog Alarms:
 1. Each analog object shall have both high and low alarm limits.
 2. Alarming shall be able to be automatically and manually disabled.
- G. Alarm Reporting:
 1. Operator shall be able to determine action to be taken in event of an alarm.
 2. Alarms shall be routed to appropriate operator workstations based on time and other conditions.
 3. Alarm shall be able to start programs, print, be logged in event log, generate custom messages, and display graphics.
- H. Remote Communication:
 1. System shall have ability to dial out in the event of an alarm.
- I. Electric Power Demand Limiting within the controller or alternately via system software:
 1. Demand-limiting program shall monitor building or other operator-defined electric power consumption from signals connected to electric power meter or from a watt transducer or current transformer.
 2. Demand-limiting program shall predict probable power demand such that action can be taken to prevent exceeding demand limit. When demand prediction exceeds demand limit, action will be taken to reduce loads in a predetermined manner. When demand prediction indicates demand limit will not be exceeded, action will be taken to restore loads in a predetermined manner.
 3. Demand reduction shall be accomplished by the following means:
 - a. Reset air-handling unit supply temperature set points.
 - b. Reset space temperature set points.
 - c. De-energize equipment based on priority.
 4. Demand-limiting parameters, frequency of calculations, time intervals, and other relevant variables shall be based on the means by which electric power service provider computes demand charges.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

5. Include demand-limiting prediction and control for any individual meter monitored by system or for total of any combination of meters.
6. Include means operator to make the following changes online:
 - a. Addition and deletion of loads controlled.
 - b. Changes in demand intervals.
 - c. Changes in demand limit for meter(s).
 - d. Maximum shutoff time for equipment.
 - e. Minimum shutoff time for equipment.
 - f. Select rotational or sequential shedding and restoring.
 - g. Shed and restore priority.
7. Include the following information and reports, to be available on an hourly, daily, weekly, monthly and annual basis:
 - a. Total electric consumption.
 - b. Peak demand.
 - c. Date and time of peak demand.
 - d. Daily peak demand.
- J. Sequencing: Include application software based on sequences of operation indicated to properly sequence boilers, and other applicable HVAC equipment.
- K. Control Loops:
 1. Support any of the following control loops, as applicable to control required:
 - a. Two-position (on/off, open/close, slow/fast) control.
 - b. Proportional control.
 - c. Proportional plus integral (PI) control.
 - d. Proportional plus integral plus derivative (PID) control.
 - 1) Include PID algorithms with direct or reverse action and anti-windup.
 - 2) Algorithm shall calculate a time-varying analog value used to position an output or stage a series of outputs.
 - 3) Controlled variable, set point, and PID gains shall be operator-selectable.
- L. Staggered Start: Application shall prevent all controlled equipment from simultaneously restarting after a power outage. Order which equipment (or groups of equipment) is started, along with the time delay between starts, shall be operator-selectable.
- M. Anti-Short Cycling:
 1. BO points shall be protected from short cycling.
 2. Feature shall allow minimum on-time and off-time to be selected.
- N. On and Off Control with Differential:
 1. Include an algorithm that allows a BO to be cycled based on a controlled variable and set point.
 2. Algorithm shall be direct- or reverse-acting and incorporate an adjustable differential.
- O. Run-Time Totalization:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Include software to totalize run-times for BI points.
2. A high run-time alarm shall be assigned, if required, by operator.

2.15 ENCLOSURES

A. General Enclosure Requirements:

1. House each controller and associated control accessories in a single enclosure. Enclosure shall serve as central tie-in point for control devices such as switches, transmitters, transducers, power supplies and transformers.
2. Do not house more than one controller in a single enclosure.
3. Include enclosure door with key locking mechanism. Key locks alike for all enclosures and include one pair of keys per enclosure.
4. Include wall-mounted enclosures with brackets suitable for mounting enclosures to wall or freestanding support stand as indicated.
5. Supply each enclosure with a complete set of as-built schematics and wiring diagrams and product literature located in a pocket on inside of door.

B. Internal Arrangement:

1. Internal layout of enclosure shall group and protect pneumatic, electric, and electronic components associated with a controller, but not an integral part of controller.
2. Arrange layout to group similar products together.
3. Include a barrier between line-voltage and low-voltage electrical and electronic products.
4. Factory or shop install products, tubing, cabling and wiring complying with requirements and standards indicated.
5. Terminate field cable and wire using heavy-duty terminal blocks.
6. Include spare terminals, equal to not less than 10 percent of used terminals.
7. Include spade lugs for stranded cable and wire.
8. Install a maximum of two wires on each side of a terminal.
9. Include enclosure field power supply with a toggle-type switch located at entrance inside enclosure to disconnect power.
10. Include enclosure with a line-voltage nominal 20-A GFCI duplex receptacle for service and testing tools. Wire receptacle on hot side of enclosure disconnect switch and include with a 5-A circuit breaker.
11. Mount products within enclosure on removable internal panel(s).
12. Include products mounted in enclosures with engraved, laminated phenolic nameplates (black letters on a white background). The nameplates shall have at least 1/4-inch-high lettering.
13. Route tubing cable and wire located inside enclosure within a raceway with a continuous removable cover.
14. Label each end of cable, wire and tubing in enclosure following an approved identification system that extends from field I/O connection and all intermediate connections throughout length to controller connection.
15. Size enclosure internal panel to include at least 25 percent spare area on face of panel.

2.16 IDENTIFICATION

A. Control Equipment, Instruments, and Control Devices:

1. Self-adhesive label bearing unique identification.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- a. Include instruments with unique identification identified by equipment being controlled or monitored, followed by point identification.
 2. Legend shall consist of white lettering on black background.
 3. Laminated acrylic or melamine plastic sign shall be engraved phenolic consisting of three layers of rigid laminate. Top and bottom layers are color-coded black with contrasting white center exposed by engraving through outer layer and shall be fastened with drive pins.
 4. Instruments, control devices and actuators with Project-specific identification tags having unique identification numbers following requirements indicated and provided by original manufacturer do not require additional identification.
 5. All BAS components, including controllers, sensors and other devices, shall be identified with nameplate designations to match the shop drawings.
 6. Wiring shall be identified at each point of termination using a printed tag to match that shown on the drawings and affixed using a heat shrink sleeve.
- B. Valve Tags:
1. Brass tags and brass chains attached to valve.
 2. Tags shall be at least 1.5 inches in diameter.
 3. Include tag with unique valve identification indicating control influence such as flow, level, pressure, or temperature; followed by location of valve, and followed by three-digit sequential number. For example: TV-1.001.
 4. Valves with Project-specific identification tags having unique identification numbers following requirements indicated and provided by original manufacturer do not require an additional tag.
- C. Raceway and Boxes:
1. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 1. Verify compatibility with and suitability of substrates.
- B. Examine roughing-in for products to verify actual locations of connections before installation.
 1. Examine roughing-in for instruments installed in piping to verify actual locations of connections before installation.
 2. Examine roughing-in for instruments installed in duct systems to verify actual locations of connections before installation.
- C. Examine walls, floors, roofs, and ceilings for suitable conditions where product will be installed.
- D. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

DIRECT DIGITAL CONTROL (DDC) SYSTEM FOR HVAC

- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 DDC SYSTEM INTERFACE WITH OTHER SYSTEMS AND EQUIPMENT

A. Communication Interface to Equipment with Integral Controls:

1. DDC system shall have communication interface with equipment having integral controls and having a communication interface for remote monitoring or control.
2. Equipment to Be Connected:
 - a. Air-terminal units specified in Section 233600 "Air Terminal Units."
 - b. Boilers specified in Section 235216 "Condensing Boilers."
 - c. Roof-top units specified in Section 237416 "Packaged, Large-capacity Rooftop Air-Conditioning Units."

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install products to satisfy more stringent of all requirements indicated.
- B. Install products level, plumb, parallel, and perpendicular with building construction.
- C. If codes and referenced standards are more stringent than requirements indicated, comply with requirements in codes and referenced standards.
- D. Fabricate openings and install sleeves in ceilings, floors, roof, and walls required by installation of products. Before proceeding with drilling, punching, and cutting, check for concealed work to avoid damage. Patch, flash, grout, seal, and refinish openings to match adjacent condition.
- E. Firestop Penetrations Made in Fire-Rated Assemblies: Comply with requirements in Section 078413 "Penetration Firestopping."
- F. Seal penetrations made in acoustically rated assemblies. Comply with requirements in Section 079200 "Joint Sealants."
- G. Welding Requirements:
 1. Restrict welding and burning to supports and bracing.
 2. No equipment shall be cut or welded without approval. Welding or cutting will not be approved if there is risk of damage to adjacent Work.
 3. Welding, where approved, shall be by inert-gas electric arc process and shall be performed by qualified welders according to applicable welding codes.
 4. If requested on-site, show satisfactory evidence of welder certificates indicating ability to perform welding work intended.
- H. Fastening Hardware:
 1. Stillson wrenches, pliers, and other tools that damage surfaces of rods, nuts, and other parts are prohibited for work of assembling and tightening fasteners.
 2. Tighten bolts and nuts firmly and uniformly. Do not overstress threads by excessive force or by oversized wrenches.
 3. Lubricate threads of bolts, nuts and screws with graphite and oil before assembly.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- I. If product locations are not indicated, install products in locations that are accessible and that will permit service and maintenance from floor, equipment platforms, or catwalks without removal of permanently installed furniture and equipment.

3.4 WORKSTATION INSTALLATION

A. Desktop Workstations Installation:

1. Install workstation(s) at location(s) directed by Owner.
2. Install multiple-receptacle power strip with cord for use in connecting multiple workstation components to a single duplex electrical power receptacle.
3. Install software on workstation(s) and verify software functions properly.
4. Develop Project-specific graphics, trends, reports, logs and historical database.
5. Power workstation through a dedicated UPS unit. Locate UPS adjacent to workstation.

B. Color Graphics Application:

1. Use system schematics indicated as starting point to create graphics.
2. Develop Project-specific library of symbols for representing system equipment and products.
3. Incorporate digital images of Project-completed installation into graphics where beneficial to enhance effect.
4. Submit sketch of graphic layout with description of all text for each graphic for Owner's review before creating graphic using graphics software.
5. Seek Owner input in graphics development once using graphics software.
6. Final editing shall be done on-site with Owner's review and feedback.
7. Refine graphics as necessary for Owner acceptance.
8. On receiving Owner acceptance, print a hard copy for inclusion in operation and maintenance manual. Prepare a scanned copy PDF file of each graphic and include with softcopy of DDC system operation and maintenance manual.

3.5 GATEWAY INSTALLATION

A. Install gateways if required for DDC system communication interface requirements indicated.

1. Install gateway(s) required to suit indicated requirements.

B. Test gateway to verify that communication interface functions properly.

3.6 CONTROLLER INSTALLATION

A. Install controllers in enclosures to comply with indicated requirements.

B. Connect controllers to field power supply.

C. Install controller with latest version of applicable software and configure to execute requirements indicated.

D. Test and adjust controllers to verify operation of connected I/O to achieve performance indicated requirements while executing sequences of operation.

DIRECT DIGITAL CONTROL (DDC) SYSTEM FOR HVAC

E. Installation of Network Controllers:

1. Quantity and location of network controllers shall be determined by DDC system manufacturer to satisfy requirements indicated.
2. Install controllers in a protected location that is easily accessible by operators.
3. Top of controller shall be within 72 inches of finished floor.

F. Installation of Programmable Application Controllers:

1. Quantity and location of programmable application controllers shall be determined by DDC system manufacturer to satisfy requirements indicated.
2. Install controllers in a protected location that is easily accessible by operators.
3. Top of controller shall be within 72 inches of finished floor.

G. Application-Specific Controllers:

1. Quantity and location of application-specific controllers shall be determined by DDC system manufacturer to satisfy requirements indicated.
2. For controllers not mounted directly on equipment being controlled, install controllers in a protected location that is easily accessible by operators.

3.7 ENCLOSURES INSTALLATION

A. Install the following items in enclosures, to comply with indicated requirements:

1. Gateways.
2. Controllers.
3. Electrical power devices.
4. UPS units.
5. Relays.
6. Accessories.
7. Actuators

B. Align top of adjacent enclosures of like size.

3.8 ELECTRIC POWER CONNECTIONS

- A. Connect electrical power to DDC system products requiring electrical power connections.
- B. Design of electrical power to products not indicated with electric power is delegated to DDC system provider and installing trade. Work shall comply with NFPA 70 and other requirements indicated.
- C. Comply with requirements in Section 262816 "Enclosed Switches and Circuit Breakers" for electrical power circuit breakers.
- D. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for electrical power conductors and cables.
- E. Comply with requirements in Section 260533 "Raceways and Boxes for Electrical Systems" for electrical power raceways and boxes.

3.9 IDENTIFICATION

- A. Install self-adhesive labels with unique identification on face for each of the following:
 - 1. Operator workstation.
 - 2. Server.
 - 3. Printer.
 - 4. Gateway.
 - 5. Router.
 - 6. Protocol analyzer.
 - 7. DDC controller.
 - 8. Enclosure.
 - 9. Electrical power device.
 - 10. UPS unit.
 - 11. Accessory.
- B. Install unique instrument identification on face of each instrument connected to a DDC controller.
- C. Install unique identification on face of each control damper and valve actuator connected to a DDC controller.
- D. Where product is installed above accessible tile ceiling, also install matching identification on face of ceiling grid located directly below.
- E. Where product is installed above an inaccessible ceiling, also install identification on face of access door directly below.

3.10 NETWORK NAMING AND NUMBERING

- A. Coordinate with Owner and provide unique naming and addressing for networks and devices.
- B. ASHRAE 135 Networks:
 - 1. MAC Address:
 - a. Every network device shall have an assigned and documented MAC address unique to its network.
 - b. Ethernet Networks: Document MAC address assigned at its creation.
 - c. ARCNET or MS/TP networks: Assign from 00 to 64.
 - 2. Network Numbering:
 - a. Assign unique numbers to each new network.
 - b. Provide ability for changing network number through device switches or operator interface.
 - c. DDC system, with all possible connected LANs, can contain up to 65,534 unique networks.
 - 3. Device Object Identifier Property Number:
 - a. Assign unique device object identifier property numbers or device instances for each device network.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- b. Provide for future modification of device instance number by device switches or operator interface.
 - c. LAN shall support up to 4,194,302 unique devices.
- 4. Device Object Name Property Text:
 - a. Device object name property field shall support 32 minimum printable characters.
 - b. Assign unique device "Object Name" property names with plain-English descriptive names for each device.
 - 1) Example 1: Device object name for device controlling boiler plant at Building 1000 would be "HW System B1000."
 - 2) Example 2: Device object name for a VAV terminal unit controller could be "VAV unit 102".
- 5. Object Name Property Text for Other Than Device Objects:
 - a. Object name property field shall support 32 minimum printable characters.
 - b. Assign object name properties with plain-English names descriptive of application.
 - 1) Example 1: "Zone 1 Temperature."
 - 2) Example 2 "Fan Start and Stop."
- 6. Object Identifier Property Number for Other Than Device Objects:
 - a. Assign object identifier property numbers according to Drawings or tables indicated.
 - b. If not indicated, object identifier property numbers may be assigned at Installer's discretion but must be approved by Owner in advance, be documented and be unique for like object types within device.

3.11 CONTROL WIRE, CABLE AND RACEWAYS INSTALLATION

- A. Comply with NECA 1.
- B. Wire and Cable Installation:
 - 1. Comply with installation requirements in Section 260523 "Control-Voltage Electrical Power Cables."
 - 2. Comply with installation requirements in Section 271313 "Communications Copper Backbone Cabling."
 - 3. Comply with installation requirements in Section 271513 "Communications Copper Horizontal Cabling."
 - 4. Terminate wiring in a junction box.
 - a. Clamp cable over jacket in junction box.
 - b. Individual conductors in the stripped section of the cable shall be slack between the clamping point and terminal block.
 - 5. Terminate field wiring and cable not directly connected to instruments and control devices having integral wiring terminals using terminal blocks.
 - 6. Install signal transmission components according to IEEE C2, REA Form 511a, NFPA 70, and as indicated.

7. Use shielded cable to transmitters.
8. Use shielded cable to temperature sensors.
9. Perform continuity and meager testing on wire and cable after installation.

C. Conduit Installation:

1. Comply with Section "260533 "Raceways and Boxes for Electrical Systems" for control-voltage conductors.
2. Comply with Section 270528 "Pathways for Communications Systems" for balanced twisted pair cabling and optical fiber installation.

3.12 DDC SYSTEM I/O CHECKOUT PROCEDURES

A. Check installed products before continuity tests, leak tests and calibration.

B. Check instruments for proper location and accessibility.

C. Check instruments for proper installation on direction of flow, elevation, orientation, insertion depth, or other applicable considerations that will impact performance.

D. Check instrument tubing for proper isolation, fittings, slope, dirt legs, drains, material and support.

E. For pneumatic products, verify that air supply for each product is properly installed.

F. Control Damper Checkout:

1. Verify that control dampers are installed correctly for flow direction.
2. Verify that proper blade alignment, either parallel or opposed, has been provided.
3. Verify that damper frame attachment is properly secured and sealed.
4. Verify that damper actuator and linkage attachment is secure.
5. Verify that actuator wiring is complete, enclosed and connected to correct power source.
6. Verify that damper blade travel is unobstructed.

G. Control Valve Checkout:

1. Verify that control valves are installed correctly for flow direction.
2. Verify that valve body attachment is properly secured and sealed.
3. Verify that valve actuator and linkage attachment is secure.
4. Verify that actuator wiring is complete, enclosed and connected to correct power source.
5. Verify that valve ball, disc or plug travel is unobstructed.

H. After piping systems have been tested and put into service, but before insulating and balancing, inspect each valve for leaks. Adjust or replace packing to stop leaks. Replace the valve if leaks persist. Related Work

1. Duct Smoke Detectors: Duct smoke detectors and control for fan shutdown are specified in the Fire Alarm System specification. Wiring from each fire alarm system fan shutdown relay module to the associated fan motor starter to shut down the fan upon actuation of the module is to be provided under this section.
2. Fire/Smoke Dampers: Power for electric fire/smoke dampers and control of fire/smoke dampers are specified in Power Wiring and Fire Alarm System specifications.

3. Smoke Control: Except when described elsewhere in this section, control of motors and dampers for smoke control is specified under the Fire Alarm system specification. However, the contractor shall coordinate any fire alarm control of HVAC equipment that is also controlled under this section (e.g., an AHU) so that both controls operate as intended and with priority of control given to the fire alarm system.
4. Test and Balance: Provide assistance to the efforts specified in Test and Balance specification. This assistance shall include on-site instruction on operator interface to the IBMS, the provision of software and any special hardware (e.g., cables, signal converters) to allow for PC operator interface to the IBMS, and instruction on access to all setpoints or parameters that need to be adjusted for balancing.

3.13 DDC SYSTEM I/O ADJUSTMENT, CALIBRATION AND TESTING:

- A. Calibrate each instrument installed that is not factory calibrated and provided with calibration documentation.
- B. Provide a written description of proposed field procedures and equipment for calibrating each type of instrument. Submit procedures before calibration and adjustment.
- C. For each analog instrument, make a three-point test of calibration for both linearity and accuracy.
- D. Equipment and procedures used for calibration shall comply with instrument manufacturer's written instructions.
- E. Provide diagnostic and test equipment for calibration and adjustment.
- F. Field instruments and equipment used to test and calibrate installed instruments shall have accuracy at least twice the instrument accuracy being calibrated. An installed instrument with an accuracy of 1 percent shall be checked by an instrument with an accuracy of 0.5 percent.
- G. Calibrate each instrument according to instrument instruction manual supplied by manufacturer.
- H. If after calibration indicated performance cannot be achieved, replace out-of-tolerance instruments.
- I. Comply with field testing requirements and procedures indicated by ASHRAE's Guideline 11, "Field Testing of HVAC Control Components," in the absence of specific requirements, and to supplement requirements indicated.
- J. Analog Signals:
 1. Check analog voltage signals using a precision voltage meter at zero, 50, and 100 percent.
 2. Check analog current signals using a precision current meter at zero, 50, and 100 percent.
 3. Check resistance signals for temperature sensors at zero, 50, and 100 percent of operating span using a precision-resistant source.
- K. Digital Signals:
 1. Check digital signals using a jumper wire.
 2. Check digital signals using an ohmmeter to test for contact making or breaking.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

L. Control Dampers:

1. Stroke and adjust control dampers following manufacturer's recommended procedure, from 100 percent open to 100 percent closed and back to 100 percent open.
2. Stroke control dampers with pilot positioners. Adjust damper and positioner following manufacturer's recommended procedure, so damper is 100 percent closed, 50 percent closed and 100 percent open at proper air pressure.
3. Check and document open and close cycle times for applications with a cycle time less than 30 seconds.
4. For control dampers equipped with positive position indication, check feedback signal at multiple positions to confirm proper position indication.

M. Control Valves:

1. Stroke and adjust control valves following manufacturer's recommended procedure, from 100 percent open to 100 percent closed and back to 100 percent open.
2. Stroke control valves with pilot positioners. Adjust valve and positioner following manufacturer's recommended procedure, so valve is 100 percent closed, 50 percent closed and 100 percent open at proper air pressures.
3. Check and document open and close cycle times for applications with a cycle time less than 30 seconds.
4. For control valves equipped with positive position indication, check feedback signal at multiple positions to confirm proper position indication.

N. Meters: Check sensors at zero, 50, and 100 percent of Project design values.

O. Sensors: Check sensors at zero, 50, and 100 percent of Project design values.

P. Switches: Calibrate switches to make or break contact at set points indicated.

Q. Transmitters:

1. Check and calibrate transmitters at zero, 50, and 100 percent of Project design values.
2. Calibrate resistance temperature transmitters at zero, 50, and 100 percent of span using a precision-resistant source.

3.14 DDC SYSTEM CONTROLLER CHECKOUT

A. Verify power supply.

1. Verify voltage, phase and hertz.
2. Verify that protection from power surges is installed and functioning.
3. Verify that ground fault protection is installed.
4. If applicable, verify if connected to UPS unit.
5. If applicable, verify if connected to a backup power source.
6. If applicable, verify that power conditioning units, transient voltage suppression and high-frequency noise filter units are installed.

B. Verify that wire and cabling is properly secured to terminals and labeled with unique identification.

C. Verify that spare I/O capacity is provided.

DIRECT DIGITAL CONTROL (DDC)
SYSTEM FOR HVAC

3.15 DDC CONTROLLER I/O CONTROL LOOP TESTS

A. Testing:

1. Test every I/O point connected to DDC controller to verify that safety and operating control set points are as indicated and as required to operate controlled system safely and at optimum performance.
2. Test every I/O point throughout its full operating range.
3. Test every control loop to verify operation is stable and accurate.
4. Adjust control loop proportional, integral and derivative settings to achieve optimum performance while complying with performance requirements indicated. Document testing of each control loop's precision and stability via trend logs.
5. Test and adjust every control loop for proper operation according to sequence of operation.
6. Test software and hardware interlocks for proper operation. Correct deficiencies.
7. Operate each analog point at the following:
 - a. Upper quarter of range.
 - b. Lower quarter of range.
 - c. At midpoint of range.
8. Exercise each binary point.
9. For every I/O point in DDC system, read and record each value at operator workstation, at DDC controller and at field instrument simultaneously. Value displayed at operator workstation, at DDC controller and at field instrument shall match.
10. Prepare and submit a report documenting results for each I/O point in DDC system and include in each I/O point a description of corrective measures and adjustments made to achieve desired results.

3.16 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.17 MAINTENANCE SERVICE

- A. Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by DDC system manufacturer's authorized service representative. Include quarterly preventive maintenance, repair or replacement of worn or defective components, cleaning, calibration and adjusting as required for proper operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

3.18 SOFTWARE SERVICE AGREEMENT

- A. Technical Support: Beginning at Substantial Completion, service agreement shall include software support for two year(s).
- B. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within two year(s) from date of Substantial

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

Completion. Upgrading software shall include operating system and new or revised licenses for using software.

1. Upgrade Notice: At least 30 days to allow Owner to schedule and access system and to upgrade computer equipment if necessary.

3.19 DEMONSTRATION

- A. Engage a factory-authorized service representative with complete knowledge of Project-specific system installed to train Owner's maintenance personnel to adjust, operate, and maintain DDC system.

END OF SECTION 23 09 23

SECTION 23 11 23 - FACILITY NATURAL-GAS PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Pipes, tubes, and fittings.
 - 2. Piping specialties.
 - 3. Piping and tubing joining materials.
 - 4. Manual gas shutoff valves.
 - 5. Pressure regulators.
 - 6. Dielectric fittings.

1.3 DEFINITIONS

- A. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of the following:
 - 1. Piping specialties.
 - 2. Corrugated, stainless-steel tubing with associated components.
 - 3. Valves. Include pressure rating, capacity, settings, and electrical connection data of selected models.
 - 4. Pressure regulators. Indicate pressure ratings and capacities.
 - 5. Dielectric fittings.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For pressure regulators and earthquake valves to include in emergency, operation, and maintenance manuals.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Handling Flammable Liquids: Remove and dispose of liquids from existing natural-gas piping according to requirements of authorities having jurisdiction.
- B. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- C. Store and handle pipes and tubes having factory-applied protective coatings to avoid damaging coating, and protect from direct sunlight.
- D. Protect stored PE pipes and valves from direct sunlight.

1.7 PROJECT CONDITIONS

- A. Perform site survey, research public utility records, and verify existing utility locations. Contact utility-locating service for area where Project is located.
- B. Interruption of Existing Natural-Gas Service: Do not interrupt natural-gas service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide purging and startup of natural-gas supply according to requirements indicated:
 - 1. Notify Owner no fewer than two days in advance of proposed interruption of natural-gas service.
 - 2. Do not proceed with interruption of natural-gas service without Owner's written permission.

1.8 COORDINATION

- A. Coordinate sizes and locations of concrete bases with actual equipment provided.
- B. Coordinate requirements for access panels and doors for valves installed concealed behind finished surfaces. Comply with requirements in Section 083113 "Access Doors and Frames."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Minimum Operating-Pressure Ratings:
 - 1. Piping and Valves: 100 psig minimum unless otherwise indicated.
 - 2. Service Regulators: 65 psig minimum unless otherwise indicated.
- B. Natural-Gas System Pressure within Buildings: 0.5 psig or less.

2.2 PIPES, TUBES, AND FITTINGS

A. Steel Pipe: ASTM A53/A53M, black steel, Schedule 40, Type E or S, Grade B.

1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern.
2. Wrought-Steel Welding Fittings: ASTM A234/A234M for butt welding and socket welding.
3. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends.
4. Forged-Steel Flanges and Flanged Fittings: ASME B16.5, minimum Class 150, including bolts, nuts, and gaskets of the following material group, end connections, and facings:
 - a. Material Group: 1.1.
 - b. End Connections: Threaded or butt welding to match pipe.
 - c. Lapped Face: Not permitted underground.
 - d. Gasket Materials: ASME B16.20, metallic, flat, asbestos free, aluminum o-rings, and spiral-wound metal gaskets.
 - e. Bolts and Nuts: ASME B18.2.1, carbon steel aboveground and stainless steel underground.

B. PE Pipe: ASTM D2513, SDR 11.

1. PE Fittings: ASTM D2683, socket-fusion type or ASTM D3261, butt-fusion type with dimensions matching PE pipe.
2. PE Transition Fittings: Factory-fabricated fittings with PE pipe complying with ASTM D2513, SDR 11; and steel pipe complying with ASTM A53/A53M, black steel, Schedule 40, Type E or S, Grade B.
3. Anodeless Service-Line Risers: Factory fabricated and leak tested.
 - a. Underground Portion: PE pipe complying with ASTM D2513, SDR 11 inlet.
 - b. Casing: Steel pipe complying with ASTM A53/A53M, Schedule 40, black steel, Type E or S, Grade B, with corrosion-protective coating covering.
 - c. Aboveground Portion: PE transition fitting.
 - d. Outlet shall be threaded or flanged or suitable for welded connection.
 - e. Tracer wire connection.
 - f. Ultraviolet shield.
 - g. Stake supports with factory finish to match steel pipe casing or carrier pipe.
4. Steel Mechanical Couplings: Capable of joining plain-end PE pipe to PE pipe, steel pipe to PE pipe, or steel pipe to steel pipe.
 - a. Stainless-steel flanges and tube with epoxy finish.
 - b. Buna-nitrile seals.
 - c. Stainless-steel bolts, washers, and nuts.
 - d. Factory-installed anode for steel-body couplings installed underground.

2.3 PIPING SPECIALTIES

A. Appliance Flexible Connectors:

1. Indoor, Fixed-Appliance Flexible Connectors: Comply with ANSI Z21.24.
2. Indoor, Movable-Appliance Flexible Connectors: Comply with ANSI Z21.69.
3. Outdoor, Appliance Flexible Connectors: Comply with ANSI Z21.75.
4. Corrugated stainless-steel tubing with polymer coating.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

5. Operating-Pressure Rating: 0.5 psig.
6. End Fittings: Zinc-coated steel.
7. Threaded Ends: Comply with ASME B1.20.1.
8. Maximum Length: 72 inches

B. Quick-Disconnect Devices: Comply with ANSI Z21.41.

1. Copper-alloy convenience outlet and matching plug connector.
2. Nitrile seals.
3. Hand operated with automatic shutoff when disconnected.
4. For indoor or outdoor applications.
5. Adjustable, retractable restraining cable.

C. Y-Pattern Strainers:

1. Body: ASTM A126, Class B, cast iron with bolted cover and bottom drain connection.
2. End Connections: Threaded ends for NPS 2 and smaller; flanged ends for NPS 2-1/2 and larger.
3. Strainer Screen: 60-mesh startup strainer, and perforated stainless-steel basket with 50 percent free area.
4. CWP Rating: 125 psig.

2.4 JOINING MATERIALS

- A. Joint Compound and Tape: Suitable for natural gas.
- B. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- C. Brazing Filler Metals: Alloy with melting point greater than 1000 deg F complying with AWS A5.8/A5.8M. Brazing alloys containing more than 0.05 percent phosphorus are prohibited.

2.5 MANUAL GAS SHUTOFF VALVES

- A. See "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles for where each valve type is applied in various services.
- B. General Requirements for Metallic Valves, NPS 2 and Smaller: Comply with ASME B16.33.
1. CWP Rating: 125 psig.
 2. Threaded Ends: Comply with ASME B1.20.1.
 3. Dryseal Threads on Flare Ends: Comply with ASME B1.20.3.
 4. Tamperproof Feature: Locking feature for valves indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
 5. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction for valves 1 inch and smaller.
 6. Service Mark: Valves 1-1/4 inches to NPS 2 shall have initials "WOG" permanently marked on valve body.
- C. General Requirements for Metallic Valves, NPS 2-1/2 and Larger: Comply with ASME B16.38.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. CWP Rating: 125 psig.
 2. Flanged Ends: Comply with ASME B16.5 for steel flanges.
 3. Tamperproof Feature: Locking feature for valves indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
 4. Service Mark: Initials "WOG" shall be permanently marked on valve body.
- D. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim: MSS SP-110.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. A.Y. McDonald Mfg. Co.
 - b. Apollo Flow Controls; Conbraco Industries, Inc.
 - c. BrassCraft Manufacturing Co.; a Masco company.
 2. Body: Bronze, complying with ASTM B584.
 3. Ball: Chrome-plated bronze.
 4. Stem: Bronze; blowout proof.
 5. Seats: Reinforced TFE; blowout proof.
 6. Packing: Threaded-body packnut design with adjustable-stem packing.
 7. Ends: Threaded, flared, or socket as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
 8. CWP Rating: 600 psig.
 9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
 10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.
- E. Bronze Plug Valves: MSS SP-78.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. A.Y. McDonald Mfg. Co.
 - b. Lee Brass Company.
 2. Body: Bronze, complying with ASTM B584.
 3. Plug: Bronze.
 4. Ends: Threaded, socket, or flanged as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
 5. Operator: Square head or lug type with tamperproof feature where indicated.
 6. Pressure Class: 125 psig.
 7. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
 8. Service: Suitable for natural-gas service with "WOG" indicated on valve body.
- F. Cast-Iron, Nonlubricated Plug Valves: MSS SP-78.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. A.Y. McDonald Mfg. Co.
 - b. Mueller Co.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

2. Body: Cast iron, complying with ASTM A126, Class B.
3. Plug: Bronze or nickel-plated cast iron.
4. Seat: Coated with thermoplastic.
5. Stem Seal: Compatible with natural gas.
6. Ends: Threaded or flanged as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
7. Operator: Square head or lug type with tamperproof feature where indicated.
8. Pressure Class: 125 psig.
9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

G. PE Ball Valves: Comply with ASME B16.40.

1. Body: PE.
2. Ball: PE.
3. Stem: Acetal.
4. Seats and Seals: Nitrile.
5. Ends: Plain or fusible to match piping.
6. CWP Rating: 80 psig.
7. Operating Temperature: Minus 20 to plus 140 deg F.
8. Operator: Nut or flat head for key operation.
9. Include plastic valve extension.
10. Include tamperproof locking feature for valves where indicated on Drawings.

H. Valve Boxes:

1. Cast-iron, two-section box.
2. Top section with cover with "GAS" lettering.
3. Bottom section with base to fit over valve and barrel a minimum of 5 inches in diameter.
4. Adjustable cast-iron extensions of length required for depth of bury.
5. Include tee-handle, steel operating wrench with socket end fitting valve nut or flat head, and with stem of length required to operate valve.

2.6 PRESSURE REGULATORS

A. General Requirements:

1. Single stage and suitable for natural gas.
2. Steel jacket and corrosion-resistant components.
3. Elevation compensator.
4. End Connections: Threaded for regulators NPS 2 and smaller; flanged for regulators NPS 2-1/2 and larger.

B. Line Pressure Regulators: Comply with ANSI Z21.80.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Meter Company.
 - b. Fisher Control Valves & Instruments; a brand of Emerson Process Management.
 - c. Maxitrol Company.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

2. Body and Diaphragm Case: Cast iron or die-cast aluminum.
3. Springs: Zinc-plated steel; interchangeable.
4. Diaphragm Plate: Zinc-plated steel.
5. Seat Disc: Nitrile rubber resistant to gas impurities, abrasion, and deformation at the valve port.
6. Orifice: Aluminum; interchangeable.
7. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
8. Single-port, self-contained regulator with orifice no larger than required at maximum pressure inlet, and no pressure sensing piping external to the regulator.
9. Pressure regulator shall maintain discharge pressure setting downstream, and not exceed 150 percent of design discharge pressure at shutoff.
10. Overpressure Protection Device: Factory mounted on pressure regulator.
11. Atmospheric Vent: Factory- or field-installed, stainless-steel screen in opening if not connected to vent piping.
12. Maximum Inlet Pressure: 2 psig.

C. Appliance Pressure Regulators: Comply with ANSI Z21.18.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Canadian Meter Company Inc.
 - b. Eaton.
 - c. Maxitrol Company.
2. Body and Diaphragm Case: Die-cast aluminum.
3. Springs: Zinc-plated steel; interchangeable.
4. Diaphragm Plate: Zinc-plated steel.
5. Seat Disc: Nitrile rubber.
6. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
7. Factory-Applied Finish: Minimum three-layer polyester and polyurethane paint finish.
8. Regulator may include vent limiting device, instead of vent connection, if approved by authorities having jurisdiction.
9. Maximum Inlet Pressure: 1 psig.

2.7 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

B. Dielectric Unions:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. A.Y. McDonald Mfg. Co.
 - b. Capitol Manufacturing Company.
 - c. Central Plastics Company.
 - d. WATTS.
 - e. Wilkins.
 - f. Zurn Industries, LLC.
2. Description:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- a. Standard: ASSE 1079.
- b. Pressure Rating: 125 psig minimum at 180 deg F.
- c. End Connections: Solder-joint copper alloy and threaded ferrous.

C. Dielectric Flanges:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Capitol Manufacturing Company.
 - b. Central Plastics Company.
 - c. WATTS.
 - d. Wilkins.
- 2. Description:
 - a. Standard: ASSE 1079.
 - b. Factory-fabricated, bolted, companion-flange assembly.
 - c. Pressure Rating: 125 psig minimum at 180 deg F.
 - d. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

2.8 LABELING AND IDENTIFYING

- A. Detectable Warning Tape: Acid- and alkali-resistant, PE film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored yellow.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in for natural-gas piping system to verify actual locations of piping connections before equipment installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Inspect natural-gas piping according to NFPA 54 to determine that natural-gas utilization devices are turned off in piping section affected.
- B. Comply with NFPA 54 requirements for prevention of accidental ignition.

3.3 OUTDOOR PIPING INSTALLATION

- A. Comply with NFPA 54 for installation and purging of natural-gas piping.

FACILITY NATURAL-GAS PIPING

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- B. Install underground, natural-gas piping buried at least 36 inches below finished grade. Comply with requirements in Section 312000 "Earth Moving" for excavating, trenching, and backfilling.
 - 1. If natural-gas piping is installed less than 36 inches below finished grade, install it in containment conduit.
- C. Install underground, PE, natural-gas piping according to ASTM D2774.
- D. Install fittings for changes in direction and branch connections.
- E. Install pressure gage downstream from each service regulator. Pressure gages are specified in Section 230519 "Meters and Gages for HVAC Piping."

3.4 INDOOR PIPING INSTALLATION

- A. Comply with NFPA 54 for installation and purging of natural-gas piping.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Arrange for pipe spaces, chases, slots, sleeves, and openings in building structure during progress of construction, to allow for mechanical installations.
- D. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- E. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- G. Locate valves for easy access.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Verify final equipment locations for roughing-in.
- K. Comply with requirements in Sections specifying gas-fired appliances and equipment for roughing-in requirements.
- L. Drips and Sediment Traps: Install drips at points where condensate may collect, including service-meter outlets. Locate where accessible to permit cleaning and emptying. Do not install where condensate is subject to freezing.
 - 1. Construct drips and sediment traps using tee fitting with bottom outlet plugged or capped. Use nipple a minimum length of 3 pipe diameters, but not less than 3 inches long and same size as connected pipe. Install with space below bottom of drip to remove plug or cap.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- M. Extend relief vent connections for service regulators, line regulators, and overpressure protection devices to outdoors and terminate with weatherproof vent cap.
- N. Conceal pipe installations in walls, pipe spaces, utility spaces, above ceilings, below grade or floors, and in floor channels unless indicated to be exposed to view.
- O. Concealed Location Installations: Except as specified below, install concealed natural-gas piping and piping installed under the building in containment conduit constructed of steel pipe with welded joints as described in Part 2. Install a vent pipe from containment conduit to outdoors and terminate with weatherproof vent cap.
 - 1. Above Accessible Ceilings: Natural-gas piping, fittings, valves, and regulators may be installed in accessible spaces without containment conduit.
 - 2. In Floor Channels: Install natural-gas piping in floor channels. Channels must have cover and be open to space above cover for ventilation.
 - 3. In Walls or Partitions: Protect tubing installed inside partitions or hollow walls from physical damage using steel striker barriers at rigid supports.
 - a. Exception: Tubing passing through partitions or walls does not require striker barriers.
 - 4. Prohibited Locations:
 - a. Do not install natural-gas piping in or through circulating air ducts, clothes or trash chutes, chimneys or gas vents (flues), ventilating ducts, or dumbwaiter or elevator shafts.
 - b. Do not install natural-gas piping in solid walls or partitions.
- P. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.
- Q. Connect branch piping from top or side of horizontal piping.
- R. Install unions in pipes NPS 2 and smaller, adjacent to each valve, at final connection to each piece of equipment. Unions are not required at flanged connections.
- S. Do not use natural-gas piping as grounding electrode.
- T. Install strainer on inlet of each line-pressure regulator and automatic or electrically operated valve.
- U. Install pressure gage downstream from each line regulator. Pressure gages are specified in Section 230519 "Meters and Gages for HVAC Piping."
- V. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."
- W. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."
- X. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 230518 "Escutcheons for HVAC Piping."

3.5 VALVE INSTALLATION

- A. Install manual gas shutoff valve for each gas appliance ahead of corrugated stainless-steel tubing, aluminum, or copper connector.
- B. Install regulators and overpressure protection devices with maintenance access space adequate for servicing and testing.
- C. Install earthquake valves aboveground outside buildings according to listing.
- D. Install anode for metallic valves in underground PE piping.

3.6 PIPING JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Threaded Joints:
 - 1. Thread pipe with tapered pipe threads complying with ASME B1.20.1.
 - 2. Cut threads full and clean using sharp dies.
 - 3. Ream threaded pipe ends to remove burrs and restore full inside diameter of pipe.
 - 4. Apply appropriate tape or thread compound to external pipe threads unless dryseal threading is specified.
 - 5. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- D. Welded Joints:
 - 1. Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators.
 - 2. Bevel plain ends of steel pipe.
 - 3. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.
- E. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D2657.
 - 1. Plain-End Pipe and Fittings: Use butt fusion.
 - 2. Plain-End Pipe and Socket Fittings: Use socket fusion.

3.7 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements for seismic-restraint devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."
- B. Comply with requirements for pipe hangers and supports specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- C. Install hangers for steel piping, with maximum horizontal spacing and minimum rod diameters, to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- D. Support horizontal piping within 12 inches of each fitting.
- E. Support vertical runs of steel piping to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- F. Support vertical runs of corrugated stainless-steel tubing to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.8 CONNECTIONS

- A. Connect to utility's gas main according to utility's procedures and requirements.
- B. Install natural-gas piping electrically continuous, and bonded to gas appliance equipment grounding conductor of the circuit powering the appliance according to NFPA 70.
- C. Install piping adjacent to appliances to allow service and maintenance of appliances.
- D. Connect piping to appliances using manual gas shutoff valves and unions. Install valve within 72 inches of each gas-fired appliance and equipment. Install union between valve and appliances or equipment.
- E. Sediment Traps: Install tee fitting with capped nipple in bottom to form drip, as close as practical to inlet of each appliance.

3.9 LABELING AND IDENTIFYING

- A. Comply with requirements in Section 230553 "Identification for HVAC Piping and Equipment" for piping and valve identification.
- B. Install detectable warning tape directly above gas piping, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.10 PAINTING

- A. Paint exposed, exterior metal piping, valves, service regulators, service meters and meter bars, and piping specialties, except components, with factory-applied paint or protective coating.
 - 1. Alkyd System: MPI EXT 5.1D.
 - a. Prime Coat: Alkyd anticorrosive metal primer.
 - b. Intermediate Coat: Exterior alkyd enamel matching topcoat.
 - c. Topcoat: Exterior alkyd enamel (gloss).
 - d. Color: Gray.
- B. Damage and Touchup: Repair marred and damaged factory-applied finishes with materials and by procedures to match original factory finish.

3.11 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. Test, inspect, and purge natural gas according to NFPA 54 and authorities having jurisdiction.
- C. Natural-gas piping will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

3.12 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain earthquake valves.

3.13 OUTDOOR PIPING SCHEDULE

- A. Underground natural-gas piping shall be the following:
 - 1. PE pipe and fittings joined by heat fusion, or mechanical couplings; service-line risers with tracer wire terminated in an accessible location.
- B. Aboveground natural-gas piping shall be the following:
 - 1. Steel pipe with malleable-iron fittings and threaded joints.
 - 2. Steel pipe with wrought-steel fittings and welded joints.

3.14 INDOOR PIPING SCHEDULE FOR SYSTEM PRESSURES LESS THAN 0.5 PSIG

- A. Aboveground, branch piping NPS 1 and smaller shall be the following:
 - 1. Steel pipe with malleable-iron fittings and threaded joints.
- B. Aboveground, distribution piping shall be the following:
 - 1. Steel pipe with malleable-iron fittings and threaded joints.
 - 2. Steel pipe with wrought-steel fittings and welded joints.

3.15 ABOVEGROUND MANUAL GAS SHUTOFF VALVE SCHEDULE

- A. Valves for pipe sizes NPS 2 and smaller at service meter shall be one of the following:
 - 1. Two-piece, full-port, bronze ball valves with bronze trim.
 - 2. Bronze plug valve.
- B. Valves for pipe sizes NPS 2-1/2 and larger at service meter shall be one of the following:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Two-piece, full-port, bronze ball valves with bronze trim.
 2. Bronze plug valve.
 3. Cast-iron, nonlubricated plug valve.
- C. Distribution piping valves for pipe sizes NPS 2 and smaller shall be one of the following:
1. Two-piece, full-port, bronze ball valves with bronze trim.
 2. Bronze plug valve.
- D. Distribution piping valves for pipe sizes NPS 2-1/2 and larger shall be one of the following:
1. Two-piece, full-port, bronze ball valves with bronze trim.
 2. Bronze plug valve.
 3. Cast-iron, nonlubricated plug valve.
- E. Valves in branch piping for single appliance shall be one of the following:
1. Two-piece, full-port, bronze ball valves with bronze trim.
 2. Bronze plug valve.

END OF SECTION 23 11 23

SECTION 23 21 13 - HYDRONIC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes pipe and fitting materials and joining methods for the following:
 - 1. Copper tube and fittings.
 - 2. Steel pipe and fittings.
 - 3. Joining materials.
 - 4. Dielectric fittings.
 - 5. Bypass chemical feeder.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of the following:
 - 1. Pipe.
 - 2. Fittings.
 - 3. Joining materials.
 - 4. Bypass chemical feeder.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Hydronic piping components and installation shall be capable of withstanding the following minimum working pressure and temperature unless otherwise indicated:
 - 1. Hot-Water Heating Piping: 100 psig at 200 deg F.
 - 2. Makeup-Water Piping: 80 psig at 73 deg F.
 - 3. Condensate-Drain Piping: 150 deg F.
 - 4. Blowdown-Drain Piping: 180 deg F.
 - 5. Air-Vent Piping: 180 deg F.
 - 6. Safety-Valve-Inlet and -Outlet Piping: Equal to the pressure of the piping system to which it is attached.

2.2 COPPER TUBE AND FITTINGS

- A. Drawn-Temper Copper Tubing: ASTM B 88, Type L.

HYDRONIC PIPING

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- B. DWV Copper Tubing: ASTM B 306, Type DWV.
- C. Copper or Bronze Pressure-Seal Fittings:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Elkhart Products Corporation.
 - b. Mueller Industries, Inc.
 - c. NIBCO INC.
 - d. Viega LLC.
 - 2. Housing: Copper.
 - 3. O-Rings and Pipe Stops: EPDM.
 - 4. Tools: Manufacturer's special tools.
 - 5. Minimum 200-psig working-pressure rating at 250 deg F.
- D. Wrought-Copper Unions: ASME B16.22.

2.3 STEEL PIPE AND FITTINGS

- A. Steel Pipe: ASTM A 53/A 53M, black steel with plain ends; welded and seamless, Grade B, and wall thickness as indicated in "Piping Applications" Article.
- B. Cast-Iron Threaded Fittings: ASME B16.4; Classes 125 and 250 as indicated in "Piping Applications" Article.
- C. Malleable-Iron Threaded Fittings: ASME B16.3, Classes 150 and 300 as indicated in "Piping Applications" Article.
- D. Malleable-Iron Unions: ASME B16.39; Classes 150, 250, and 300 as indicated in "Piping Applications" Article.
- E. Cast-Iron Pipe Flanges and Flanged Fittings: ASME B16.1, Classes 25, 125, and 250; raised ground face, and bolt holes spot faced as indicated in "Piping Applications" Article.
- F. Wrought-Steel Fittings: ASTM A 234/A 234M, wall thickness to match adjoining pipe.
- G. Wrought Cast- and Forged-Steel Flanges and Flanged Fittings: ASME B16.5, including bolts, nuts, and gaskets of the following material group, end connections, and facings:
 - 1. Material Group: 1.1.
 - 2. End Connections: Butt welding.
 - 3. Facings: Raised face.
- H. Grooved Mechanical-Joint Fittings and Couplings:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Anvil International.
 - b. Grinnell G-Fire by Johnson Controls Company.
 - c. Victaulic Company.

HYDRONIC PIPING

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

2. Joint Fittings: ASTM A 536, Grade 65-45-12 ductile iron; ASTM A 47/A 47M, Grade 32510 malleable iron; ASTM A 53/A 53M, Type F, E, or S, Grade B fabricated steel; or ASTM A 106/A 106M, Grade B steel fittings with grooves or shoulders constructed to accept grooved-end couplings; with nuts, bolts, locking pin, locking toggle, or lugs to secure grooved pipe and fittings.
 3. Couplings: Ductile- or malleable-iron housing and EPDM gasket of central cavity pressure-responsive design; with nuts, bolts, locking pin, locking toggle, or lugs to secure grooved pipe and fittings.
- I. Steel Pipe Nipples: ASTM A 733, made of same materials and wall thicknesses as pipe in which they are installed.

2.4 JOINING MATERIALS

- A. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
1. ASME B16.21, nonmetallic, flat, asbestos free, 1/8-inch maximum thickness unless otherwise indicated.
 - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
 - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
- B. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- C. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.
- D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- E. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for joining copper with copper; or BAg-1, silver alloy for joining copper with bronze or steel.
- F. Welding Filler Metals: Comply with AWS D10.12M/D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- G. Solvent Cements for CPVC Piping: ASTM F 493.

2.5 DIELECTRIC FITTINGS

- A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
- B. Dielectric Unions:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. A.Y. McDonald Mfg. Co.
 - b. Capitol Manufacturing Company.
 - c. Central Plastics Company.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- d. [WATTS.](#)
- e. [Wilkins.](#)

2. Description:

- a. Standard: ASSE 1079.
- b. Pressure Rating: 150 psig.
- c. End Connections: Solder-joint copper alloy and threaded ferrous.

C. Dielectric Flanges:

1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:

- a. [Capitol Manufacturing Company.](#)
- b. [Central Plastics Company.](#)
- c. [WATTS.](#)
- d. [Wilkins.](#)
- e. [Zurn Industries, LLC.](#)

2. Description:

- a. Standard: ASSE 1079.
- b. Factory-fabricated, bolted, companion-flange assembly.
- c. Pressure Rating: 150 psig.
- d. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

D. Dielectric-Flange Insulating Kits:

1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:

- a. [Advance Products & Systems, Inc.](#)
- b. [Calpico, Inc.](#)
- c. [Central Plastics Company.](#)

2. Description:

- a. Nonconducting materials for field assembly of companion flanges.
- b. Pressure Rating: 150 psig.
- c. Gasket: Neoprene or phenolic.
- d. Bolt Sleeves: Phenolic or polyethylene.
- e. Washers: Phenolic with steel backing washers.

2.6 BYPASS CHEMICAL FEEDER

A. Description: Welded steel construction; 125-psig working pressure; 5-gal. capacity; with fill funnel and inlet, outlet, and drain valves.

1. Chemicals: Specially formulated, based on analysis of makeup water, to prevent accumulation of scale and corrosion in piping and connected equipment.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

- A. Hot-water heating piping, aboveground, NPS 2 and smaller, shall be the following:
 - 1. Type L, drawn-temper copper tubing, wrought-copper fittings, and brazed joints.
- B. Hot-water heating piping, aboveground, NPS 2-1/2 and larger, shall be any of the following:
 - 1. Type L, drawn-temper copper tubing, wrought-copper fittings, and brazed joints.
 - 2. Schedule 40 steel pipe, wrought-steel fittings and wrought-cast or forged-steel flanges and flange fittings, and welded and flanged joints.
 - 3. Schedule 40 steel pipe; grooved, mechanical joint coupling and fittings; and grooved, mechanical joints.
- C. Makeup-water piping installed aboveground shall be the following:
 - 1. Type L, drawn-temper copper tubing, wrought-copper fittings, and soldered joints.
- D. Condensate-Drain Piping: Type DWV, drawn-temper copper tubing, wrought-copper fittings, and soldered joints.
- E. Blowdown-Drain Piping: Same materials and joining methods as for piping specified for the service in which blowdown drain is installed.
- F. Air-Vent Piping:
 - 1. Inlet: Same as service where installed with metal-to-plastic transition fittings for plastic piping systems according to piping manufacturer's written instructions.
 - 2. Outlet: Type K, annealed-temper copper tubing with soldered or flared joints.
- G. Safety-Valve-Inlet and -Outlet Piping for Hot-Water Piping: Same materials and joining methods as for piping specified for the service in which safety valve is installed with metal-to-plastic transition fittings for plastic piping systems according to piping manufacturer's written instructions.

3.2 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- E. Install piping to permit valve servicing.
- F. Install piping at indicated slopes.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Install piping to allow application of insulation.
- J. Select system components with pressure rating equal to or greater than system operating pressure.
- K. Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.
- L. Install drains, consisting of a tee fitting, NPS 3/4 ball valve, and short NPS 3/4 threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.
- M. Install piping at a uniform grade of 0.2 percent upward in direction of flow.
- N. Reduce pipe sizes using eccentric reducer fitting installed with level side up.
- O. Install branch connections to mains using tee fittings in main pipe, with the branch connected to the bottom of the main pipe. For up-feed risers, connect the branch to the top of the main pipe.
- P. Install valves according to the following:
 - 1. Section 230523.12 "Ball Valves for HVAC Piping."
 - 2. Section 230523.13 "Butterfly Valves for HVAC Piping."
 - 3. Section 230523.14 "Check Valves for HVAC Piping."
- Q. Install unions in piping, NPS 2 and smaller, adjacent to valves, at final connections of equipment, and elsewhere as indicated.
- R. Install flanges in piping, NPS 2-1/2 and larger, at final connections of equipment and elsewhere as indicated.
- S. Install shutoff valve immediately upstream of each dielectric fitting.
- T. Comply with requirements in Section 230516 "Expansion Fittings and Loops for HVAC Piping" for installation of expansion loops, expansion joints, anchors, and pipe alignment guides.
- U. Comply with requirements in Section 230553 "Identification for HVAC Piping and Equipment" for identifying piping.
- V. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."
- W. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- X. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 230518 "Escutcheons for HVAC Piping."

3.3 DIELECTRIC FITTING INSTALLATION

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- B. Dielectric Fittings for NPS 2 and Smaller: Use dielectric unions.
- C. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flanges.
- D. Dielectric Fittings for NPS 5 and Larger: Use dielectric flange kits.

3.4 INSTALLATION OF HANGERS AND SUPPORTS

- A. Comply with requirements for seismic-restraint devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."
- B. Comply with requirements in Section 230529 "Hangers and Supports for HVAC Piping and Equipment" for hangers, supports, and anchor devices.
- C. Install the following pipe attachments:
 - 1. Adjustable steel clevis hangers for individual horizontal piping less than 20 feet long.
 - 2. Adjustable roller hangers and spring hangers for individual horizontal piping 20 feet or longer.
 - 3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet or longer, supported on a trapeze.
 - 4. Spring hangers to support vertical runs.
 - 5. Provide copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.
 - 6. On plastic pipe, install pads or cushions on bearing surfaces to prevent hanger from scratching pipe.
- D. Install hangers for copper tubing and steel piping, with maximum horizontal spacing and minimum rod diameters, to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- E. Install hangers for plastic piping, with maximum horizontal spacing and minimum rod diameters, to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- F. Support horizontal piping within 12 inches of each fitting and coupling.
- G. Support vertical runs of copper tubing and steel piping to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.5 PIPE JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

HYDRONIC PIPING

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- D. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8/A5.8M.
- E. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- F. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- G. Grooved Joints: Assemble joints with coupling and gasket, lubricant, and bolts. Cut or roll grooves in ends of pipe based on pipe and coupling manufacturer's written instructions for pipe wall thickness. Use grooved-end fittings and rigid, grooved-end-pipe couplings.
- H. Pressure-Sealed Joints: Use manufacturer-recommended tool and procedure. Leave insertion marks on pipe after assembly.

3.6 TERMINAL EQUIPMENT CONNECTIONS

- A. Sizes for supply and return piping connections shall be the same as or larger than equipment connections.
- B. Install control valves in accessible locations close to connected equipment.
- C. Install bypass piping with globe valve around control valve. If parallel control valves are installed, only one bypass is required.
- D. Install ports for pressure gages and thermometers at coil inlet and outlet connections. Comply with requirements in Section 230519 "Meters and Gages for HVAC Piping."

3.7 CHEMICAL TREATMENT

- A. Perform an analysis of makeup water to determine type and quantities of chemical treatment needed to keep system free of scale, corrosion, and fouling, and to sustain the following water characteristics:
 - 1. pH: 9.0 to 10.5.
 - 2. "P" Alkalinity: 100 to 500 ppm.
 - 3. Boron: 100 to 200 ppm.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

4. Chemical Oxygen Demand: Maximum of 100 ppm. Revise this value if closed system contains glycol.
5. Corrosion Inhibitor:
 - a. Sodium Nitrate: 1000 to 1500 ppm.
6. Soluble Copper: Maximum of 0.20 ppm.
7. Tolyriazole Copper and Yellow Metal Corrosion Inhibitor: Minimum of 10 ppm.
8. Total Suspended Solids: Maximum of 10 ppm.
9. Ammonia: Maximum of 20 ppm.
10. Free Caustic Alkalinity: Maximum of 20 ppm.
11. Microbiological Limits:
 - a. Total Aerobic Plate Count: Maximum of 1000 organisms/mL.
 - b. Total Anaerobic Plate Count: Maximum of 100 organisms/mL.
 - c. Nitrate Reducers: 100 organisms/mL.
 - d. Sulfate Reducers: Maximum of zero organisms/mL.
 - e. Iron Bacteria: Maximum of zero organisms/mL.

B. Install bypass chemical feeders in each hydronic system where indicated.

1. Install in upright position with top of funnel not more than 48 inches above the floor.
2. Install feeder in minimum NPS 3/4 bypass line, from main with full-size, full-port, ball valve in the main between bypass connections.
3. Install NPS 3/4 pipe from chemical feeder drain to nearest equipment drain and include a full-size, full-port, ball valve.

C. Fill system with fresh water and add liquid alkaline compound with emulsifying agents and detergents to remove grease and petroleum products from piping. Circulate solution for a minimum of 24 hours, drain, clean strainer screens, and refill with fresh water.

D. Add initial chemical treatment and maintain water quality in ranges noted above for the first year of operation.

3.8 FIELD QUALITY CONTROL

A. Prepare hydronic piping according to ASME B31.9 and as follows:

1. Leave joints, including welds, uninsulated and exposed for examination during test.
2. Provide temporary restraints for expansion joints that cannot sustain reactions due to test pressure. If temporary restraints are impractical, isolate expansion joints from testing.
3. Flush hydronic piping systems with clean water; then remove and clean or replace strainer screens.
4. Isolate equipment from piping. If a valve is used to isolate equipment, its closure shall be capable of sealing against test pressure without damage to valve. Install blinds in flanged joints to isolate equipment.
5. Install safety valve, set at a pressure no more than one-third higher than test pressure, to protect against damage by expanding liquid or other source of overpressure during test.

B. Perform the following tests on hydronic piping:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Use ambient temperature water as a testing medium unless there is risk of damage due to freezing. Another liquid that is safe for workers and compatible with piping may be used.
 2. While filling system, use vents installed at high points of system to release air. Use drains installed at low points for complete draining of test liquid.
 3. Isolate expansion tanks and determine that hydronic system is full of water.
 4. Subject piping system to hydrostatic test pressure that is not less than 1.5 times the system's working pressure. Test pressure shall not exceed maximum pressure for any vessel, pump, valve, or other component in system under test. Verify that stress due to pressure at bottom of vertical runs does not exceed 90 percent of specified minimum yield strength or 1.7 times the "SE" value in Appendix A in ASME B31.9, "Building Services Piping."
 5. After hydrostatic test pressure has been applied for at least 10 minutes, examine piping, joints, and connections for leakage. Eliminate leaks by tightening, repairing, or replacing components, and repeat hydrostatic test until there are no leaks.
 6. Prepare written report of testing.
- C. Perform the following before operating the system:
1. Open manual valves fully.
 2. Inspect pumps for proper rotation.
 3. Set makeup pressure-reducing valves for required system pressure.
 4. Inspect air vents at high points of system and determine if all are installed and operating freely (automatic type), or bleed air completely (manual type).
 5. Set temperature controls so all coils are calling for full flow.
 6. Inspect and set operating temperatures of hydronic equipment, such as boilers, chillers, cooling towers, to specified values.
 7. Verify lubrication of motors and bearings.

END OF SECTION 23 21 13

SECTION 23 21 16 - HYDRONIC PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Hydronic specialty valves.
2. Air-control devices.
3. Strainers.
4. Connectors.

B. Related Requirements:

1. Section 230516 "Expansion Fittings and Loops for HVAC Piping" for expansion fittings and loops.
2. Section 230523.12 "Ball Valves for HVAC Piping" for specification and installation requirements for ball valves common to most piping systems.
3. Section 230523.13 "Butterfly Valves for HVAC Piping" for specification and installation requirements for butterfly valves common to most piping systems.
4. Section 230523.14 "Check Valves for HVAC Piping" for specification and installation requirements for check valves common to most piping systems.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product:

1. Include construction details and material descriptions for hydronic piping specialties.
2. Include rated capacities, operating characteristics, and furnished specialties and accessories.
3. Include flow and pressure drop curves based on manufacturer's testing for calibrated-orifice balancing valves and automatic flow-control valves.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For hydronic piping specialties to include in emergency, operation, and maintenance manuals.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1.5 QUALITY ASSURANCE

- A. Safety Valves and Pressure Vessels: Shall bear the appropriate ASME label. Fabricate and stamp air separators and expansion tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

PART 2 - PRODUCTS

2.1 HYDRONIC SPECIALTY VALVES

A. Bronze, Calibrated-Orifice, Balancing Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Armstrong Pumps, Inc.
 - b. Bell & Gossett; a Xylem brand.
 - c. Flow Design, Inc.
 - d. Griswold Controls.
 - e. HCI; Hydronics Components Inc.
 - f. Nexus Valve, Inc.
 - g. Tour & Andersson; available through Victaulic Company.
 - h. Victaulic Company.
2. Body: Bronze, ball or plug type with calibrated orifice or venturi.
3. Ball: Brass or stainless steel.
4. Plug: Resin.
5. Seat: PTFE.
6. End Connections: Threaded or socket.
7. Pressure Gage Connections: Integral seals for portable differential pressure meter.
8. Handle Style: Lever, with memory stop to retain set position.
9. CWP Rating: Minimum 125 psig.
10. Maximum Operating Temperature: 250 deg F.

B. Cast-Iron or Steel, Calibrated-Orifice, Balancing Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Armstrong Pumps, Inc.
 - b. Bell & Gossett; a Xylem brand.
 - c. Flow Design, Inc.
 - d. Griswold Controls.
 - e. HCI; Hydronics Components Inc.
 - f. Nexus Valve, Inc.
 - g. Tour & Andersson; available through Victaulic Company.
 - h. Victaulic Company.
2. Body: Cast-iron or steel body, ball, plug, or globe pattern with calibrated orifice or venturi.
3. Ball: Brass or stainless steel.
4. Stem Seals: EPDM O-rings.
5. Disc: Glass and carbon-filled PTFE.

HYDRONIC PIPING SPECIALTIES

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

6. Seat: PTFE.
7. End Connections: Flanged or grooved.
8. Pressure Gage Connections: Integral seals for portable differential pressure meter.
9. Handle Style: Lever, with memory stop to retain set position.
10. CWP Rating: Minimum 125 psig.
11. Maximum Operating Temperature: 250 deg F.

C. Automatic Flow-Control Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Caleffi.
 - b. Flow Design, Inc.
 - c. Griswold Controls.
 - d. HCI; Hydronics Components Inc.
 - e. Nexus Valve, Inc.
 - f. NIBCO INC.
 - g. Oventrop Corporation.
2. Body: Brass or ferrous metal.
3. Flow Control Assembly:
 - a. Piston and Spring Assembly: Stainless steel, tamper proof, self-cleaning, and removable.
4. Combination Assemblies: Include bronze or brass-alloy ball valve.
5. Identification Tag: Marked with zone identification, valve number, and flow rate.
6. Size: Same as pipe in which installed.
7. Performance: Maintain constant flow within plus or minus 10 percent, regardless of system pressure fluctuations.
8. Minimum CWP Rating: 175 psig.
9. Maximum Operating Temperature: 200 deg F.

D. Diaphragm-Operated, Pressure-Reducing Valves: ASME labeled.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AMTROL, Inc.
 - b. Apollo Flow Controls; Conbraco Industries, Inc.
 - c. Armstrong Pumps, Inc.
 - d. Bell & Gossett; a Xylem brand.
 - e. Victaulic Company.
 - f. WATTS.
2. Body: Bronze or brass.
3. Disc: Glass and carbon-filled PTFE.
4. Seat: Brass.
5. Stem Seals: EPDM O-rings.
6. Diaphragm: EPT.
7. Low inlet-pressure check valve.
8. Inlet Strainer: Stainless steel, removable without system shutdown.
9. Valve Seat and Stem: Noncorrosive.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

10. Valve Size, Capacity, and Operating Pressure: Selected to suit system in which installed, with operating pressure and capacity factory set and field adjustable.

E. Diaphragm-Operated Safety Valves: ASME labeled.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AMTROL, Inc.
 - b. Apollo Flow Controls; Conbraco Industries, Inc.
 - c. Armstrong Pumps, Inc.
 - d. Bell & Gossett; a Xylem brand.
 - e. WATTS.
2. Body: Bronze or brass.
3. Disc: Glass and carbon-filled PTFE.
4. Seat: Brass.
5. Stem Seals: EPDM O-rings.
6. Diaphragm: EPT.
7. Wetted, Internal Work Parts: Brass and rubber.
8. Inlet Strainer: Stainless steel , removable without system shutdown.
9. Valve Seat and Stem: Noncorrosive.
10. Valve Size, Capacity, and Operating Pressure: Comply with ASME Boiler and Pressure Vessel Code: Section IV, and selected to suit system in which installed, with operating pressure and capacity factory set and field adjustable.

2.2 AIR-CONTROL DEVICES

A. Manual Air Vents:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AMTROL, Inc.
 - b. Apollo Flow Controls; Conbraco Industries, Inc.
 - c. Armstrong Pumps, Inc.
 - d. Bell & Gossett; a Xylem brand.
 - e. HCI; Hydronics Components Inc.
 - f. Nexus Valve, Inc.
2. Body: Bronze.
3. Internal Parts: Nonferrous.
4. Operator: Screwdriver or thumbscrew.
5. Inlet Connection: NPS 1/2.
6. Discharge Connection: NPS 1/8.
7. CWP Rating: 150 psig.
8. Maximum Operating Temperature: 225 deg F.

B. Automatic Air Vents:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

HYDRONIC PIPING SPECIALTIES

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- a. [AMTROL, Inc.](#)
 - b. [Armstrong Pumps, Inc.](#)
 - c. [Bell & Gossett; a Xylem brand.](#)
 - d. [Nexus Valve, Inc.](#)
 2. Body: Bronze or cast iron.
 3. Internal Parts: Nonferrous.
 4. Operator: Noncorrosive metal float.
 5. Inlet Connection: NPS 1/2.
 6. Discharge Connection: NPS 1/4.
 7. CWP Rating: 150 psig.
 8. Maximum Operating Temperature: 240 deg F.
- C. Bladder-Type ASME Expansion Tanks:
1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - a. [AMTROL, Inc.](#)
 - b. [Armstrong Pumps, Inc.](#)
 - c. [Bell & Gossett; a Xylem brand.](#)
 - d. Wessels.
 2. Tank: Welded steel, rated for 125-psig working pressure and 375 deg F maximum operating temperature. Factory test after taps are fabricated and supports installed and are labeled according to ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
 3. Bladder: Securely sealed into tank to separate air charge from system water to maintain required expansion capacity.
 4. Air-Charge Fittings: Schrader valve, stainless steel with EPDM seats.
- D. Air-Charge Fittings: Schrader valve, stainless steel with EPDM seats.
- E. Tangential-Type Air Separators:
1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - a. [AMTROL, Inc.](#)
 - b. [Armstrong Pumps, Inc.](#)
 - c. [Bell & Gossett; a Xylem brand.](#)
 2. Tank: Welded steel; ASME constructed and labeled for 125-psig minimum working pressure and 375 deg F maximum operating temperature.
 3. Air Collector Tube: Perforated stainless steel, constructed to direct released air into expansion tank.
 4. Tangential Inlet and Outlet Connections: Threaded for NPS 2 and smaller; flanged connections for NPS 2-1/2 and larger.
 5. Blowdown Connection: Threaded.
 6. Size: Match system flow capacity.

2.3 STRAINERS

A. Y-Pattern Strainers:

1. Body: ASTM A126, Class B, cast iron with bolted cover and bottom drain connection.
2. End Connections: Threaded ends for NPS 2 and smaller; flanged ends for NPS 2-1/2 and larger.
3. Strainer Screen: Stainless-steel, 40-mesh strainer, or perforated stainless-steel basket.
4. CWP Rating: 125 psig.

2.4 CONNECTORS

A. Spherical, Rubber, Flexible Connectors:

1. Body: Fiber-reinforced rubber body.
2. End Connections: Steel flanges drilled to align with Classes 150 and 300 steel flanges.
3. Performance: Capable of misalignment.
4. CWP Rating: 150 psig.
5. Maximum Operating Temperature: 250 deg F.

PART 3 - EXECUTION

3.1 VALVE APPLICATIONS

- A. Install shutoff-duty valves at each branch connection to supply mains and at supply connection to each piece of equipment.
- B. Install calibrated-orifice, balancing valves at each branch connection to return main.
- C. Install calibrated-orifice, balancing valves in the return pipe of each heating or cooling terminal.
- D. Install check valves at each pump discharge and elsewhere as required to control flow direction.
- E. Install safety valves at hot-water generators and elsewhere as required by ASME Boiler and Pressure Vessel Code. Install drip-pan elbow on safety-valve outlet and pipe without valves to the outdoors; pipe drain to nearest floor drain or as indicated on Drawings. Comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1, for installation requirements.
- F. Install pressure-reducing valves at makeup-water connection to regulate system fill pressure.

3.2 HYDRONIC SPECIALTIES INSTALLATION

- A. Install automatic air vents at high points of system piping in mechanical equipment rooms only. Install manual vents at heat-transfer coils and elsewhere as required for air venting.
- B. Install piping from boiler air outlet, air separator, or air purger to expansion tank with a 2 percent upward slope toward tank.
- C. Install tangential air separator in pump suction. Install blowdown piping with gate or full-port ball valve; extend full size to nearest floor drain.

HYDRONIC PIPING SPECIALTIES

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- D. Install expansion tanks on the floor. Vent and purge air from hydronic system, and ensure that tank is properly charged with air to suit system Project requirements.

END OF SECTION 23 21 16

SECTION 23 21 23 - HYDRONIC PUMPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Separately coupled, horizontally mounted, in-line centrifugal pumps.
 - 2. Wet-rotor pumps.
 - 3. Automatic condensate pump units.

1.3 DEFINITIONS

- A. ECM: Electronically commutated motor.
- B. EPDM: Ethylene propylene diene monomer.
- C. EPR: Ethylene propylene rubber.
- D. FKM: Fluoroelastomer polymer.
- E. HI: Hydraulic Institute.
- F. NBR: Nitrile rubber or Buna-N.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of pump.
 - 1. Include certified performance curves and rated capacities, operating characteristics, furnished specialties, final impeller dimensions, and accessories for each type of product indicated.
 - 2. Indicate pump's operating point on curves.
- B. Shop Drawings: For each pump.
 - 1. Show pump layout and connections.
 - 2. Include setting drawings with templates for installing foundation and anchor bolts and other anchorages.
 - 3. Include diagrams for power, signal, and control wiring.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For pumps to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 SEPARATELY COUPLED, HORIZONTALLY MOUNTED, IN-LINE CENTRIFUGAL PUMPS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Armstrong Pumps, Inc.
 - 2. Bell & Gossett, a xylem brand
- B. Source Limitations: Obtain pumps from single source from single manufacturer.
- C. Description: Factory-assembled and -tested, centrifugal, overhung-impeller, separately coupled, in-line pump as defined in HI 1.1-1.2 and HI 1.3; designed for installation with pump and motor shafts mounted horizontally.
- D. Pump Construction:
 - 1. Casing: Radially split, cast bronze, with threaded gauge tapings at inlet and outlet, and threaded companion-flange connections.
 - 2. Impeller: ASTM B584, cast bronze; statically and dynamically balanced, and keyed to shaft. For pumps that are not frequency-drive controlled, trim impeller to match specified performance.
 - 3. Pump Shaft: Carbon steel, with copper-alloy shaft sleeve.
 - 4. Seal: Mechanical seal consisting of carbon rotating ring against a ceramic seat held by a stainless steel spring, and EPR bellows and gasket.
 - 5. Pump Bearings: Permanently lubricated ball bearings.
- E. Shaft Coupling: Molded-rubber insert with interlocking spider capable of absorbing vibration.
- F. Motor: Comply with NEMA designation, temperature rating, service factor, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."
 - 1. Enclosure Type: Totally enclosed, fan cooled.
 - 2. NEMA Premium Efficient motors as defined in NEMA MG 1.
 - 3. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
 - 4. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in electrical Sections.
 - 5. Single-speed motor.

HYDRONIC PUMPS

2.3 WET-ROTOR PUMPS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Armstrong Pumps, Inc.
 2. Bell & Gossett, a xylem brand
 3. Grundfos Pumps Corporation.
- B. Source Limitations: Obtain pumps from single source from single manufacturer.
- C. Description: Factory-assembled and -tested, wet-rotor pump. Pump and motor to form an integral unit with bearings lubricated by the pumped liquid.
- D. Pump Construction:
1. Body: Type 304 stainless steel.
 2. Impeller: Type 304 stainless steel.
 3. Pump Shaft: Type 304 stainless steel.
 4. Bearings. Double-sintered carbon.
- E. Motor: Variable speed.
1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and use.
 2. Comply with NEMA designation, temperature rating, service factor, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."
 - a. Efficiency: Premium Efficiency.
 3. Integral pump motor variable-speed control.
 4. ECM.

2.4 AUTOMATIC CONDENSATE PUMP UNITS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Crane Pumps & Systems.
 2. Grundfos Pumps Corporation.
 3. Little Giant Pump Co.
- B. Source Limitations: Obtain pump units from single source from single manufacturer.
- C. Description: Packaged units with corrosion-resistant pump, plastic tank with cover, and automatic controls. Collects and removes condensate from fan coil units, air handling units, condensing boilers, and similar components. Include factory- or field-installed check valve and 72-inch-minimum, electrical power cord with plug.

2.5 INTEGRAL PUMP MOTOR VARIABLE-SPEED CONTROLLERS

- A. Where specified or scheduled, provide pumps with an integral pump motor speed controller.
1. Motor: Operates as constant- or variable-speed pump with speed regulated by an integrated variable-speed drive.
 2. Integrated Pump Controller: Supports direct communication with the building management system (BMS) with built-in support for the following protocols: BACnet MS/TP.
 3. Commissioning and pump set up access to pump controls via the following:
 - a. A web interface (data exchange).
 - b. A user interface located on the face of speed controller to adjust modes and mode values.
 - c. An electronic display that reads real-time mode set values, flow, head, speed, and power and that locks out unauthorized adjustment of pump.
 4. Provide electronics with "Auto" as factory default but slope of the proportional curve will automatically match the required system curve, constant pressure control (delta-p/c), variable differential pressure control (delta-p/v), constant curve duty (uncontrolled pump), and rpm regulation. RPM (speed) regulation can be accomplished by the following:
 - a. Manual (via user interface or HTML).
 - b. Remote via 0 to 10 V dc.
 - c. Data protocol communications with the BMS.
 5. Pump Electronics: Standard with multiple digital inputs and one external digital output to be available for additional mechanical room control and pump status monitoring.
 6. Controller: Mounted on or adjacent to the motor. Provide enclosure rated to UL Type 12.
 7. Electronically Protected Pumps: Rated for continuous duty and with built-in startup circuit. Provide overcurrent, line surge and current limit protection, thermal monitoring, heat sink status and over temperature protection.
 8. Pump capable of being monitored continuously via integrated Internet link.
 9. Integrated pump controller system to have the following features:
 - a. Controller software shall be capable of sensorless control in variable-volume systems without need for pump-mounted (internal/external) or remotely mounted differential pressure sensor.
 - b. Integrated Pump Controller Sensorless Control: Operates under Quadratic Pressure Control (QPC) to ensure that head reduction with reducing flow conforms to quadratic control curve.
 - c. Controller:
 - 1) Minimum head of 40 percent of design duty head.
 - 2) User-adjustable control mode settings and minimum/maximum head set points using built-in programming interface.
 - d. Controller Integrated Control Software:
 - 1) Capable of controlling pump performance for non-overloading power at every point of operation.
 - 2) Capable of maintaining flow rate data.

2.6 ELECTRONICALLY COMMUTATED MOTOR (ECM)

- A. Provide pumps so they are specified or scheduled with ECM.
 - 1. Synchronous, constant torque, ECM with permanent magnet rotor. Rotor magnets to be time-stable, nontoxic ceramic magnets (Sr-Fe).
 - 2. Driven by a frequency converter with an integrated power factor correction filter. Conventional induction motors will not be acceptable.
 - 3. Each motor with an integrated variable-frequency drive, tested as one unit by manufacturer.
 - 4. Motor speed adjustable over full range from 0 rpm to maximum scheduled speed.
 - 5. Variable motor speed to be controlled by a 0- to 10 V-dc or 4- to 20-mA input.
 - 6. Integrated motor protection verified by UL to protect the pump against over-/undervoltage, overtemperature of motor and/or electronics, overcurrent, locked rotor, and dry run (no-load condition).

PART 3 - EXECUTION

3.1 PUMP INSTALLATION

- A. Comply with HI 1.4.
- B. Install pumps to provide access for periodic maintenance including removing motors, impellers, couplings, and accessories.
- C. Independently support pumps and piping so weight of piping is not supported by pumps and weight of pumps is not supported by piping.
- D. Automatic Condensate Pump Units: Install units for collecting condensate and extend to open drain.
- E. Equipment Mounting: Install in-line pumps with continuous-thread hanger rods and elastomeric hangers of size required to support weight of in-line pumps.
 - 1. Comply with requirements for hangers and supports specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

3.2 ALIGNMENT

- A. Perform alignment service. When required by manufacturer to maintain warranty coverage, engage a factory-authorized service representative to perform it.
- B. Comply with requirements in HI standards for alignment of pump and motor shaft. Add shims to the motor feet and bolt motor to base frame. Do not use grout between motor feet and base frame.
- C. Comply with pump and coupling manufacturers' written instructions.
- D. After alignment is correct, tighten foundation bolts evenly but not too firmly. Completely fill baseplate with nonshrink, nonmetallic grout while metal blocks and shims or wedges are in place. After grout has cured, fully tighten foundation bolts.

3.3 PIPING CONNECTIONS

- A. Where installing piping adjacent to pump, allow space for service and maintenance.
- B. Connect piping to pumps. Install valves that are same size as piping connected to pumps.
- C. Install suction and discharge pipe sizes equal to or greater than diameter of pump nozzles.
- D. Install check, shutoff, and throttling valves on discharge side of pumps.
- E. Install Y-type strainer and shutoff valve on suction side of pumps.
 - 1. Use startup strainer for initial system startup. Install permanent strainer element before turnover of system to Owner.
- F. Install flexible connectors on suction and discharge sides of base-mounted pumps between pump casing and valves.
- G. Install pressure gauges on pump suction and discharge or at integral pressure-gauge tapping, or install single gauge with multiple-input selector valve.
- H. Install check valve on each condensate pump unit discharge unless unit has a factory-installed check valve.

3.4 ELECTRICAL CONNECTIONS

- A. Connect wiring in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. Ground equipment in accordance with Section 260526 "Grounding and Bonding for Electrical Systems."
- C. Install electrical devices furnished by manufacturer, but not factory mounted, in accordance with NFPA 70 and NECA 1.
- D. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.
 - 1. Nameplate shall be laminated acrylic or melamine plastic signs with a black background and engraved white letters at least 1/2 inch high.

3.5 CONTROL CONNECTIONS

- A. Install control and electrical power wiring to field-mounted control devices.
- B. Connect control wiring in accordance with Section 260523 "Control-Voltage Electrical Power Cables."

3.6 STARTUP SERVICE

- A. Perform startup service.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Complete installation and startup checks in accordance with manufacturer's written instructions.
2. Check piping connections for tightness.
3. Clean strainers on suction piping. Use startup strainer for initial startup.
4. Perform the following startup checks for each pump before starting:
 - a. Verify bearing lubrication.
 - b. Verify that pump is free to rotate by hand and that pump for handling hot liquid is free to rotate with pump hot and cold. If pump is bound or drags, do not operate until cause of trouble is determined and corrected.
 - c. Verify that pump is rotating in correct direction.
5. Prime pump by opening suction valves and closing drains, and prepare pump for operation.
6. Start motor.
7. Open discharge valve slowly.

3.7 FIELD QUALITY CONTROL

- A. Perform tests and inspections with the assistance of a factory-authorized service representative.
- B. Hydronic pumps will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports.

3.8 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain hydronic pumps.

END OF SECTION 23 21 23

SECTION 23 23 00 - REFRIGERANT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Refrigerant pipes and fittings.
 - 2. Refrigerant piping valves and specialties.
 - 3. Refrigerants.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of valve, refrigerant piping, and piping specialty.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For refrigerant valves and piping specialties to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to 2010 ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
- B. Comply with ASHRAE 15, "Safety Code for Refrigeration Systems."
- C. Comply with ASME B31.5, "Refrigeration Piping and Heat Transfer Components."

1.6 PRODUCT STORAGE AND HANDLING

- A. Store piping with end caps in place to ensure that piping interior and exterior are clean when installed.

1.7 PERFORMANCE REQUIREMENTS

- A. Line Test Pressure for Refrigerant R-410A:
 - 1. Suction Lines for Air-Conditioning Applications: 300 psig.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

2. Suction Lines for Heat-Pump Applications: 535 psig.
3. Hot-Gas and Liquid Lines: 535 psig.

1.8 COPPER TUBE AND FITTINGS

- A. Copper Tube: ASTM B 280, Type ACR.
- B. Wrought-Copper Fittings: ASME B16.22.
- C. Wrought-Copper Unions: ASME B16.22.
- D. Brazing Filler Metals: AWS A5.8/A5.8M.
- E. Flexible Connectors:
 1. Body: Tin-bronze bellows with woven, flexible, tinned-bronze-wire-reinforced protective jacket.
 2. End Connections: Socket ends.
 3. Offset Performance: Capable of minimum 3/4-inch misalignment in minimum 7-inch-long assembly.
 4. Working Pressure Rating: Factory test at minimum 500 psig.
 5. Maximum Operating Temperature: 250 deg F.

1.9 REFRIGERANTS

- A. ASHRAE 34, R-410A: Pentafluoroethane/Difluoromethane.

PART 2 - EXECUTION

2.1 PIPING APPLICATIONS FOR REFRIGERANT R-410A

- A. Suction Lines NPS 1-1/2 and Smaller for Conventional Air-Conditioning Applications: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed joints.
- B. Hot-Gas and Liquid Lines: Copper, Type ACR, annealed- or drawn-temper tubing and wrought-copper fittings with brazed joints.

2.2 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems; indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.
- B. Install refrigerant piping according to ASHRAE 15.
- C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

REFRIGERANT PIPING

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping adjacent to machines to allow service and maintenance.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Select system components with pressure rating equal to or greater than system operating pressure.
- J. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.
- K. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in Section 083113 "Access Doors and Frames" if valves or equipment requiring maintenance is concealed behind finished surfaces.
- L. Install refrigerant piping in protective conduit where installed belowground.
- M. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.
- N. Slope refrigerant piping as follows:
 - 1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
 - 2. Install horizontal suction lines with a uniform slope downward to compressor.
 - 3. Liquid lines may be installed level.
- O. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.
- P. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.
- Q. Identify refrigerant piping and valves according to Section 230553 "Identification for HVAC Piping and Equipment."
- R. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."
- S. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."
- T. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 230518 "Escutcheons for HVAC Piping."

REFRIGERANT PIPING

2.3 PIPE JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."
 - 1. Use Type BCuP (copper-phosphorus) alloy for joining copper socket fittings with copper pipe.
 - 2. Use Type BAg (cadmium-free silver) alloy for joining copper with bronze or steel.
- D. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

2.4 INSTALLATION OF HANGERS AND SUPPORTS

- A. Comply with requirements for seismic restraints in Section 230548 "Vibration and Seismic Controls for HVAC."
- B. Comply with Section 230529 "Hangers and Supports for HVAC Piping and Equipment" for hangers, supports, and anchor devices.
- C. Install the following pipe attachments:
 - 1. Adjustable steel clevis hangers for individual horizontal runs less than 20 feet long.
 - 2. Roller hangers and spring hangers for individual horizontal runs 20 feet or longer.
 - 3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet or longer, supported on a trapeze.
 - 4. Spring hangers to support vertical runs.
 - 5. Copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.
- D. Install hangers for copper tubing, with maximum horizontal spacing and minimum rod diameters, to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- E. Support horizontal piping within 12 inches of each fitting.
- F. Support vertical runs of copper tubing to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

2.5 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Comply with ASME B31.5, Chapter VI.
 - 2. Test refrigerant piping, specialties, and receivers. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.

3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in "Performance Requirements" Article.
 - a. Fill system with nitrogen to the required test pressure.
 - b. System shall maintain test pressure at the manifold gage throughout duration of test.
 - c. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
 - d. Remake leaking joints using new materials, and retest until satisfactory results are achieved.

- B. Prepare test and inspection reports.

2.6 SYSTEM CHARGING

- A. Charge system using the following procedures:
 1. Install core in filter dryers after leak test but before evacuation.
 2. Evacuate entire refrigerant system with a vacuum pump to 500 micrometers. If vacuum holds for 12 hours, system is ready for charging.
 3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig.
 4. Charge system with a new filter-dryer core in charging line.

2.7 ADJUSTING

- A. Adjust thermostatic expansion valve to obtain proper evaporator superheat.
- B. Adjust high- and low-pressure switch settings to avoid short cycling in response to fluctuating suction pressure.
- C. Adjust set-point temperature of air-conditioning or chilled-water controllers to the system design temperature.

END OF SECTION 23 23 00

SECTION 23 31 13 - METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Single-wall rectangular ducts and fittings.
 - 2. Single-wall round ducts and fittings.
 - 3. Sheet metal materials.
 - 4. Duct liner.
 - 5. Sealants and gaskets.
 - 6. Hangers and supports.
 - 7. Seismic-restraint devices.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of the following products:
 - 1. Liners and adhesives.
 - 2. Sealants and gaskets.
 - 3. Seismic-restraint devices.
- B. Shop Drawings:
 - 1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
 - 2. Factory- and shop-fabricated ducts and fittings.
 - 3. Duct layout indicating sizes, configuration, liner material, and static-pressure classes.
 - 4. Elevation of top of ducts.
 - 5. Dimensions of main duct runs from building grid lines.
 - 6. Fittings.
 - 7. Reinforcement and spacing.
 - 8. Seam and joint construction.
 - 9. Penetrations through fire-rated and other partitions.
 - 10. Equipment installation based on equipment being used on Project.
 - 11. Locations for duct accessories, including dampers, turning vanes, and access doors and panels.
 - 12. Hangers and supports, including methods for duct and building attachment, seismic restraints, and vibration isolation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Duct hangers and supports and seismic restraints shall withstand the effects of gravity and seismic loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and ASCE/SEI 7. Seismically brace duct hangers and supports in accordance with SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical Systems."
- B. Airstream Surfaces: Surfaces in contact with airstream shall comply with requirements in ASHRAE 62.1.
- C. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment," and Section 7 - "Construction and System Startup."
- D. ASHRAE/IES Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6.4.4 - "HVAC System Construction and Insulation."
- E. Duct Dimensions: Unless otherwise indicated, all duct dimensions indicated on Drawings are inside clear dimensions and do not include insulation or duct wall thickness.

2.2 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
 - 1. Construct ducts of galvanized sheet steel unless otherwise indicated.
- B. Transverse Joints: Fabricate joints in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 - 1. For ducts with longest side less than 36 inches, select joint types in accordance with Figure 2-1.
 - 2. For ducts with longest side 36 inches or greater, use flange joint connector Type T-22, T-24, T-24A, T-25a, or T-25b. Factory-fabricated flanged duct connection system may be used if submitted and approved by engineer of record.
- C. Longitudinal Seams: Select seam types and fabricate in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible." All longitudinal seams shall be Pittsburgh lock seams unless otherwise specified for specific application.
- D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Ch. 4, "Fittings and Other Construction," for static-pressure class, applicable sealing

requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 SINGLE-WALL ROUND DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Ch. 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.
 - 1. Construct ducts of galvanized sheet steel unless otherwise indicated.
- B. Transverse Joints: Select joint types and fabricate in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- C. Longitudinal Seams: Select seam types and fabricate in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- D. Tees and Laterals: Select types and fabricate in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.4 SHEET METAL MATERIALS

- A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A653/A653M.
 - 1. Galvanized Coating Designation: G90.
 - 2. Finishes for Surfaces Exposed to View: Mill phosphatized.
- C. Reinforcement Shapes and Plates: ASTM A36/A36M, steel plates, shapes, and bars; black and galvanized.
 - 1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.
- D. Tie Rods: Galvanized steel, 1/4-inch-minimum diameter for lengths 36 inches or less; 3/8-inch-minimum diameter for lengths longer than 36 inches.

2.5 DUCT LINER

- A. Fibrous-Glass Duct Liner: Comply with ASTM C1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standard."
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation.
 - b. Johns Manville; a Berkshire Hathaway company.
 - c. Knauf Insulation.
 - d. Owens Corning.
 2. Maximum Thermal Conductivity:
 - a. Type I, Flexible: 0.27 Btu x in./h x sq. ft. x deg F at 75 deg F mean temperature.
 3. Water-Based Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C916.
 - a. Adhesive shall have a VOC content of 80 g/L or less.
 - b. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Shop Application of Duct Liner: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 7-11, "Flexible Duct Liner Installation."
1. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.
 2. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
 3. Butt transverse joints without gaps, and coat joint with adhesive.
 4. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.
 5. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and dimensions of standard liner make longitudinal joints necessary.
 6. Secure liner with mechanical fasteners 4 inches from corners and at intervals not exceeding 12 inches transversely; at 3 inches from transverse joints and at intervals not exceeding 18 inches longitudinally.
 7. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:
 - a. Fan discharges.
 - b. Intervals of lined duct preceding unlined duct.
 - c. Upstream edges of transverse joints in ducts where air velocities are higher than 2500 fpm or where indicated.
 8. Terminate inner ducts with buildouts attached to fire-damper sleeves, dampers, turning vane assemblies, or other devices. Fabricated buildouts (metal hat sections) or other buildout means are optional; when used, secure buildouts to duct walls with bolts, screws, rivets, or welds.

METAL DUCTS

2.6 SEALANT AND GASKETS

- A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested in accordance with UL 723; certified by an NRTL.
- B. Water-Based Joint and Seam Sealant:
 - 1. Application Method: Brush on.
 - 2. Solids Content: Minimum 65 percent.
 - 3. Shore A Hardness: Minimum 20.
 - 4. Water resistant.
 - 5. Mold and mildew resistant.
 - 6. VOC: Maximum 75 g/L (less water).
 - 7. Maximum Static-Pressure Class: 10 inch wg, positive and negative.
 - 8. Service: Indoor or outdoor.
 - 9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.
- C. Flanged Joint Sealant: Comply with ASTM C920.
 - 1. General: Single-component, acid-curing, silicone, elastomeric.
 - 2. Type: S.
 - 3. Grade: NS.
 - 4. Class: 25.
 - 5. Use: O.
 - 6. Sealant shall have a VOC content of 420 g/L or less.
 - 7. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- D. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

2.7 HANGERS AND SUPPORTS

- A. Hanger Rods for Noncorrosive Environments: Galvanized-steel rods and nuts.
- B. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."
- C. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A603.
- D. Steel Cable End Connections: Galvanized-steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.
- E. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- F. Trapeze and Riser Supports:
 - 1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.

METAL DUCTS

2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

2.8 SEISMIC-RESTRAINT DEVICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. B-line, an Eaton business.
 2. CADDY; a brand of nVent.
 3. Ductmate Industries, Inc.
 4. Hilti, Inc.
 5. Mason Industries, Inc.
 6. Unistrut; Part of Atkore International.
- B. General Requirements for Restraint Components: Rated strengths, features, and applications shall be as defined in reports by an evaluation service member of the ICC Evaluation Service.
1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.
- C. Channel Support System: Shop- or field-fabricated support assembly made of slotted steel channels rated in tension, compression, and torsion forces and with accessories for attachment to braced component at one end and to building structure at the other end. Include matching components and corrosion-resistant coating.
- D. Restraint Cables: ASTM A603, galvanized-steel cables with end connections made of galvanized-steel assemblies with brackets, swivel, and bolts designed for restraining cable service; and with an automatic-locking and clamping device or double-cable clips.
- E. Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections to hanger rod.
- F. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type. Select anchor bolts with strength required for anchor and as tested in accordance with ASTM E488/E488M.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and coordination drawings.
- B. Install ducts in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
- C. Install ducts in maximum practical lengths with fewest possible joints.

METAL DUCTS

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- D. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
- E. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
- F. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- G. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- H. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.
- I. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.
- J. Install fire, combination fire/smoke, and smoke dampers where indicated on Drawings and as required by code, and by local authorities having jurisdiction. Comply with requirements in Section 233300 "Air Duct Accessories" for fire and smoke dampers and specific installation requirements of the damper UL listing.
- K. Install heating coils, cooling coils, air filters, dampers, and all other duct-mounted accessories in air ducts where indicated on Drawings.
- L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials both before and after installation. Comply with SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction," Appendix G, "Duct Cleanliness for New Construction Guidelines."
- M. Elbows: Use long-radius elbows wherever they fit.
 - 1. Fabricate 90-degree rectangular mitered elbows to include turning vanes.
 - 2. Fabricate 90-degree round elbows with a minimum of three segments for 12 inches and smaller and a minimum of five segments for 14 inches and larger.
- N. Branch Connections: Use lateral or conical branch connections.

3.2 INSTALLATION OF EXPOSED DUCTWORK

- A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.
- B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.
- C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.
- D. Maintain consistency, symmetry, and uniformity in arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.

METAL DUCTS

- E. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.3 DUCT SEALING

- A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

3.4 HANGER AND SUPPORT INSTALLATION

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."
- B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
 - 1. Where practical, install concrete inserts before placing concrete.
 - 2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
 - 3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
 - 4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
 - 5. Do not use powder-actuated concrete fasteners for seismic restraints.
- C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.
- D. Hangers Exposed to View: Threaded rod and angle or channel supports.
- E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.
- F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.5 SEISMIC-RESTRAINT-DEVICE INSTALLATION

- A. Install ducts with hangers and braces designed to support the duct and to restrain against seismic forces required by applicable building codes. Comply with SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical Systems."
 - 1. Space lateral supports a maximum of 40 feet o.c., and longitudinal supports a maximum of 80 feet o.c.
 - 2. Brace a change of direction longer than 12 feet.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- B. Select seismic-restraint devices with capacities adequate to carry present and future static and seismic loads.
- C. Install cables so they do not bend across edges of adjacent equipment or building structure.
- D. Install cable restraints on ducts that are suspended with vibration isolators.
- E. Install seismic-restraint devices using methods approved by an evaluation service member of the ICC Evaluation Service.
- F. Attachment to Structure: If specific attachment is not indicated, anchor bracing and restraints to structure, to flanges of beams, to upper truss chords of bar joists, or to concrete members.
- G. Drilling for and Setting Anchors:
 - 1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcement or embedded items during drilling. Notify Architect if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
 - 2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
 - 3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
 - 4. Set anchors to manufacturer's recommended torque, using a torque wrench.
 - 5. Install zinc-coated steel anchors for interior applications and stainless-steel anchors for applications exposed to weather.

3.6 CONNECTIONS

- A. Make connections to equipment with flexible connectors complying with Section 233300 "Air Duct Accessories."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.7 STARTUP

- A. Air Balance: Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC."

3.8 DUCT SCHEDULE

- A. Fabricate ducts with galvanized sheet steel except as otherwise indicated and as follows:
 - 1. Fabricate all ducts to achieve SMACNA pressure class, seal class, and leakage class as indicated below.
- B. Supply Ducts:

METAL DUCTS

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. Ducts Connected to Fan Coil Units, Furnaces, Heat Pumps, and Terminal Units:
 - a. Pressure Class: Positive 1-inch wg.
 2. Ducts Connected to Variable-Air-Volume Air-Handling Units:
 - a. Pressure Class: Positive 3-inch wg.
 3. Ducts Connected to Equipment Not Listed Above:
 - a. Pressure Class: Positive 2-inch wg.
- C. Return Ducts:
1. Ducts Connected to Air-Handling Units:
 - a. Pressure Class: Positive or negative 2-inch wg.
 2. Ducts Connected to Equipment Not Listed above:
 - a. Pressure Class: Positive or negative 2-inch wg.
- D. Exhaust Ducts:
1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:
 - a. Pressure Class: Negative 1-inch wg.
- E. Intermediate Reinforcement:
1. Galvanized-Steel Ducts: Galvanized steel.
- F. Liner:
1. Supply-Air Ducts: Fibrous glass, Type I, inch(es thick.
 2. Return-Air Ducts: Fibrous glass, Type I, inch(es thick.
 3. Exhaust-Air Ducts: Fibrous glass, Type I, inch(es thick.
 4. Transfer Ducts: Fibrous glass, Type I, inch(es thick.
- G. Elbow Configuration:
1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
 - a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
 - b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
 - c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
 2. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "Round Duct Elbows."

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.

- 1) Radius-to Diameter Ratio: 1.5.

- b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.
- c. Round Elbows, 14 Inches and Larger in Diameter: Standing seam.

H. Branch Configuration:

- 1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-6, "Branch Connection."
 - a. Rectangular Main to Rectangular Branch: 45-degree entry.
 - b. Rectangular Main to Round Branch: Conical spin in.
- 2. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees." Saddle taps are permitted in existing duct.
 - a. Velocity 1000 fpm or Lower: 90-degree tap.
 - b. Velocity 1000 to 1500 fpm: Conical tap.
 - c. Velocity 1500 fpm or Higher: 45-degree lateral.

END OF SECTION 23 31 13

SECTION 23 33 00 - AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Manual volume dampers.
 - 2. Fire dampers.
 - 3. Flange connectors.
 - 4. Turning vanes.
 - 5. Duct-mounted access doors.
 - 6. Flexible connectors.
 - 7. Duct accessory hardware.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. For duct silencers, include pressure drop and dynamic insertion loss data. Include breakout noise calculations for high transmission loss casings.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For air duct accessories to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

- A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

2.2 MATERIALS

- A. Galvanized Sheet Steel: Comply with ASTM A653/A653M.
 - 1. Galvanized Coating Designation: G90.
 - 2. Exposed-Surface Finish: Mill phosphatized.
- B. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.
- C. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.3 MANUAL VOLUME DAMPERS

- A. Standard, Steel, Manual Volume Dampers:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Warming and Ventilating; a Mestek Architectural Group company.
 - b. Cesco Products; a division of MESTEK, Inc.
 - c. Nailor Industries Inc.
 - d. Pottorff.
 - e. Ruskin Company.
 - f. United Enertech.
 - g. Vent Products Co., Inc.
 - 2. Standard leakage rating.
 - 3. Suitable for horizontal or vertical applications.
 - 4. Frames:
 - a. Frame: Hat-shaped, 0.094-inch-thick, galvanized sheet steel.
 - b. Mitered and welded corners.
 - c. Flanges for attaching to walls and flangeless frames for installing in ducts.
 - 5. Blades:
 - a. Multiple or single blade.
 - b. Parallel- or opposed-blade design.
 - c. Stiffen damper blades for stability.
 - d. Galvanized-steel, 0.064 inch thick.
 - 6. Blade Axles: Galvanized steel.
 - 7. Bearings:
 - a. Oil-impregnated bronze.
 - b. Dampers in ducts with pressure classes of 3-inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
 - 8. Tie Bars and Brackets: Galvanized steel.

2.4 FIRE DAMPERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. CL WARD & Family Inc.
 2. Greenheck Fan Corporation.
 3. Pottorff.
 4. Ruskin Company.
- B. Type: Static and dynamic; rated and labeled in accordance with UL 555 by an NRTL.
- C. Closing rating in ducts up to 4-inch wg static pressure class and minimum 2000 fpm velocity.
- D. Fire Rating: 1-1/2 hours.
- E. Frame: Curtain type with blades outside airstream; fabricated with roll-formed galvanized steel; with mitered and interlocking corners; gauge in accordance with UL listing.
- F. Mounting Sleeve: Factory- or field-installed, galvanized sheet steel; gauge in accordance with UL listing.
- G. Mounting Orientation: Vertical or horizontal as indicated.
- H. Blades: Roll-formed galvanized sheet steel, interlocking. Material gauge is to be in accordance with UL listing.
- I. Horizontal Dampers: Include blade lock and stainless steel closure spring.
- J. Heat-Responsive Device:
1. Replaceable, 165 deg F rated, fusible links.

2.5 FLANGE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. CL WARD & Family Inc.
 2. Ductmate Industries, Inc.
 3. Ward Industries; a brand of Hart & Cooley, Inc.
- B. Description: Add-on or roll-formed, factory-fabricated, slide-on transverse flange connectors, gaskets, and components.
- C. Material: Galvanized steel.
- D. Gauge and Shape: Match connecting ductwork.

2.6 TURNING VANES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. CL WARD & Family Inc.
 2. Ductmate Industries, Inc.
 3. Duro Dyne Inc.
 4. Ward Industries; a brand of Hart & Cooley, Inc.
- B. Manufactured Turning Vanes for Metal Ducts: Curved blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
1. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.
- C. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 4-3, "Vanes and Vane Runners," and 4-4, "Vane Support in Elbows."
- D. Vane Construction: Single wall.
- E. Vane Construction: Single wall for ducts up to 48 inches wide and double wall for larger dimensions.

2.7 DUCT-MOUNTED ACCESS DOORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. CL WARD & Family Inc.
 2. Ductmate Industries, Inc.
 3. Duro Dyne Inc.
 4. Ruskin Company.
 5. Ward Industries; a brand of Hart & Cooley, Inc.
- B. Duct-Mounted Access Doors: Fabricate access panels according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 7-2, "Duct Access Doors and Panels," and 7-3, "Access Doors - Round Duct."
1. Door:
 - a. Double wall, rectangular.
 - b. Galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class.
 - c. Vision panel.
 - d. Hinges and Latches: 1-by-1-inch butt or piano hinge and cam latches.
 - e. Fabricate doors airtight and suitable for duct pressure class.
 2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
 3. Number of Hinges and Locks:
 - a. Access Doors Less Than 12 Inches Square: No hinges and two sash locks.
 - b. Access Doors up to 18 Inches Square: Continuous and two sash locks.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

C. Pressure Relief Access Door:

1. Door and Frame Material: Galvanized sheet steel.
2. Door: Single wall with metal thickness applicable for duct pressure class.
3. Operation: Open outward for positive-pressure ducts and inward for negative-pressure ducts.
4. Factory set at 3.0- to 8.0-inch wg.
5. Doors close when pressures are within set-point range.
6. Hinge: Continuous piano.
7. Latches: Cam.
8. Seal: Neoprene or foam rubber.
9. Insulation Fill: 1-inch-thick, fibrous-glass or polystyrene-foam board.

2.8 FLEXIBLE CONNECTORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. CL WARD & Family Inc.
2. Ductmate Industries, Inc.
3. Duro Dyne Inc.
4. DynAir; a Carlisle Company.
5. Ventfabrics, Inc.
6. Ward Industries; a brand of Hart & Cooley, Inc.

B. Materials: Flame-retardant or noncombustible fabrics.

C. Coatings and Adhesives: Comply with UL 181, Class 1.

D. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches wide attached to two strips of 2-3/4-inch-wide, 0.028-inch-thick, galvanized sheet steel or 0.032-inch-thick aluminum sheets. Provide metal compatible with connected ducts.

2.9 DUCT ACCESSORY HARDWARE

A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.

B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.

AIR DUCT ACCESSORIES

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.
- C. Install backdraft dampers at inlet of exhaust fans or exhaust ducts as close as possible to exhaust fan unless otherwise indicated.
- D. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.
 - 1. Install steel volume dampers in steel ducts.
- E. Set dampers to fully open position before testing, adjusting, and balancing.
- F. Install test holes at fan inlets and outlets and elsewhere as indicated.
- G. Install fire dampers according to UL listing.
- H. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:
 - 1. On both sides of duct coils.
 - 2. At outdoor-air intakes and mixed-air plenums.
 - 3. At drain pans and seals.
 - 4. Downstream from manual volume dampers, control dampers, backdraft dampers, and equipment.
 - 5. Adjacent to and close enough to fire or smoke dampers, to reset or reinstall fusible links. Access doors for access to fire or smoke dampers having fusible links shall be pressure relief access doors and shall be outward operation for access doors installed upstream from dampers and inward operation for access doors installed downstream from dampers.
 - 6. Upstream from turning vanes.
 - 7. Control devices requiring inspection.
 - 8. Elsewhere as indicated.
- I. Install access doors with swing against duct static pressure.
- J. Access Door Sizes:
 - 1. One-Hand or Inspection Access: 8 by 5 inches.
 - 2. Two-Hand Access: 12 by 6 inches.
 - 3. Head and Hand Access: 18 by 10 inches.
 - 4. Head and Shoulders Access: 21 by 14 inches.
 - 5. Body Access: 25 by 14 inches.
 - 6. Body plus Ladder Access: 25 by 17 inches.
- K. Label access doors according to Section 230553 "Identification for HVAC Piping and Equipment" to indicate the purpose of access door.
- L. Install flexible connectors to connect ducts to equipment.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- M. For fans developing static pressures of 5-inch wg and more, cover flexible connectors with loaded vinyl sheet held in place with metal straps.
- N. Install duct test holes where required for testing and balancing purposes.

3.2 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. Operate dampers to verify full range of movement.
 - 2. Inspect locations of access doors and verify that purpose of access door can be performed.
 - 3. Operate fire, smoke, and combination fire and smoke dampers to verify full range of movement and verify that proper heat-response device is installed.
 - 4. Inspect turning vanes for proper and secure installation.
 - 5. Operate remote damper operators to verify full range of movement of operator and damper.

END OF SECTION 23 33 00

SECTION 23 33 46 - FLEXIBLE DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Insulated flexible ducts.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

- A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- C. Comply with the Air Diffusion Council's "ADC Flexible Air Duct Test Code FD 72-R1."
- D. Comply with ASTM E96/E96M, "Test Methods for Water Vapor Transmission of Materials."

2.2 INSULATED FLEXIBLE DUCTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Flexmaster U.S.A., Inc.
 - 2. McGill AirFlow LLC.
 - 3. Thermaflex; a Flex-Tek Group company.
 - 4. Ward Industries; a brand of Hart & Cooley, Inc.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- B. Insulated, Flexible Duct: UL 181, Class 1, black polymer film supported by helically wound, spring-steel wire; fibrous-glass insulation; polyethylene vapor-barrier film.
 - 1. Pressure Rating: 4-inch wg positive and 0.5-inch wg negative.
 - 2. Maximum Air Velocity: 4000 fpm.
 - 3. Temperature Range: Minus 20 to plus 175 deg F.
 - 4. Insulation R-Value: R4.2.

2.3 FLEXIBLE DUCT CONNECTORS

- A. Clamps: Nylon strap in sizes 3 through 18 inches, to suit duct size.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install flexible ducts according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.
- B. Install in indoor applications only. Flexible ductwork should not be exposed to UV lighting.
- C. Connect terminal units to supply ducts directly or with maximum 12-inch lengths of flexible duct. Do not use flexible ducts to change directions.
- D. Connect flexible ducts to metal ducts with draw bands.
- E. Install duct test holes where required for testing and balancing purposes.
- F. Installation:
 - 1. Install ducts fully extended.
 - 2. Do not bend ducts across sharp corners.
 - 3. Bends of flexible ducting shall not exceed a minimum of one duct diameter.
 - 4. Avoid contact with metal fixtures, water lines, pipes, or conduits.
 - 5. Install flexible ducts in a direct line, without sags, twists, or turns.
- G. Supporting Flexible Ducts:
 - 1. Suspend flexible ducts with bands 1-1/2 inches wide or wider and spaced a maximum of 48 inches apart. Maximum centerline sag between supports shall not exceed 1/2 inch per 12 inches.
 - 2. Install extra supports at bends placed approximately one duct diameter from center line of the bend.
 - 3. Ducts may rest on ceiling joists or truss supports. Spacing between supports shall not exceed the maximum spacing per manufacturer's written installation instructions.
 - 4. Vertically installed ducts shall be stabilized by support straps at a maximum of 72 inches o.c.

END OF SECTION 23 33 46

SECTION 23 34 23 - HVAC POWER VENTILATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Centrifugal ventilators - roof downblast.
 - 2. Sidewall propeller fans.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Construction details, material descriptions, dimensions of individual components and profiles, and finishes for fans.
 - 2. Rated capacities, operating characteristics, and furnished specialties and accessories.
 - 3. Certified fan performance curves with system operating conditions indicated.
 - 4. Certified fan sound-power ratings.
 - 5. Motor ratings and electrical characteristics, plus motor and electrical accessories.
 - 6. Material thickness and finishes, including color charts.
 - 7. Dampers, including housings, linkages, and operators.
 - 8. Prefabricated roof curbs.
 - 9. Fan speed controllers.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For HVAC power ventilators to include in normal and emergency operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

2.2 CENTRIFUGAL VENTILATORS - ROOF DOWNBLAST

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

1. [Acme Engineering & Manufacturing Corp.](#)
 2. [Greenheck Fan Corporation.](#)
 3. [Loren Cook Company.](#)
- B. Housing: Downblast; removable spun-aluminum dome top and outlet baffle; square, one-piece aluminum base with venturi inlet cone.
- C. Fan Wheels: Aluminum hub and wheel with backward-inclined blades.
- D. Accessories:
1. Variable-Frequency Motor Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
 2. Disconnect Switch: Nonfusible type, with thermal-overload protection mounted inside fan housing, factory wired through an internal aluminum conduit.
 3. Bird Screens: Removable, 1/2-inch mesh, aluminum or brass wire.
 4. Dampers: Counterbalanced, parallel-blade, backdraft dampers mounted in curb base; factory set to close when fan stops.
- E. Prefabricated Roof Curbs: Galvanized steel; mitered and welded corners; 1-1/2-inch-thick, rigid, fiberglass insulation adhered to inside walls; and 1-1/2-inch wood nailer. Size as required to suit roof opening and fan base.
1. Configuration: Self-flashing without a cant strip, with mounting flange.
 2. Overall Height: 12 inches.
 3. Metal Liner: Galvanized steel.
 4. Mounting Pedestal: Galvanized steel with removable access panel.

2.3 SIDEWALL PROPELLER FANS

- A. [Manufacturers:](#) Subject to compliance with requirements, provide products by the following:
1. Continental Fans.
- B. Housing: Galvanized-steel sheet with flanged edges and integral orifice ring, with baked-enamel finish coat applied after assembly.
- C. Fan Wheel: Replaceable, extruded-aluminum, airfoil blades fastened to cast-aluminum hub; factory set pitch angle of blades.
- D. Fan Drive: Direct-drive motor mounted in airstream, factory wired to disconnect switch located on outside of fan housing.
- E. Accessories:
1. Disconnect Switch: Nonfusible type, with thermal-overload protection mounted inside fan housing, factory wired through an internal aluminum conduit.
 2. Dampers: Counterbalanced, parallel-blade, backdraft dampers factory set to close when fan stops.
 3. Wall Sleeve: Galvanized steel to match fan and accessory size.
 4. Weathershield Hood: Galvanized steel to match fan and accessory size.
 5. Weathershield Front Guard: Galvanized steel with expanded metal screen.

HVAC POWER VENTILATORS

2.4 MOTORS

- A. Comply with NEMA designation, temperature rating, service factor, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

2.5 SOURCE QUALITY CONTROL

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- B. AMCA Certification: Fans shall comply with AMCA 11 and bear the AMCA-Certified Ratings Seal.
- C. Fan Sound Ratings: Comply with AMCA 311, and label fans with the AMCA-Certified Ratings Seal. Sound ratings shall comply with AMCA 301. The fans shall be tested according to AMCA 300.
- D. Fan Performance Ratings: Comply with AMCA 211 and label fans with AMCA-Certified Rating Seal. The fans shall be tested for air performance - flow rate, fan pressure, power, fan efficiency, air density, speed of rotation, and fan efficiency - according to AMCA 210/ASHRAE 51.
- E. Operating Limits: Classify according to AMCA 99.
- F. UL Standards: Power ventilators shall comply with UL 705. Power ventilators for use for restaurant kitchen exhaust shall also comply with UL 762.

PART 3 - EXECUTION

3.1 INSTALLATION OF HVAC POWER VENTILATORS

- A. Install power ventilators level and plumb.
- B. Secure roof-mounted fans to roof curbs with zinc-plated hardware.
- C. Install units with clearances for service and maintenance.
- D. Label units according to requirements specified in Section 230553 "Identification for HVAC Piping and Equipment."

3.2 DUCTWORK CONNECTIONS

- A. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Section 233300 "Air Duct Accessories."

3.3 ELECTRICAL CONNECTIONS

- A. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- C. Install electrical devices furnished by manufacturer, but not factory mounted, according to NFPA 70 and NECA 1.
 - 1. Nameplate shall be laminated acrylic or melamine plastic signs with a black background and engraved white letters at least 1/2 inch high.

3.4 CONTROL CONNECTIONS

- A. Install control and electrical power wiring to field-mounted control devices.
- B. Connect control wiring according to Section 260523 "Control-Voltage Electrical Power Cables."

3.5 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. Verify that shipping, blocking, and bracing are removed.
 - 2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
 - 3. Verify that there is adequate maintenance and access space.
 - 4. Verify that cleaning and adjusting are complete.
 - 5. Adjust damper linkages for proper damper operation.
 - 6. Verify lubrication for bearings and other moving parts.
 - 7. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.
 - 8. Disable automatic temperature-control operators, energize motor and adjust fan to indicated rpm, and measure and record motor voltage and amperage.
 - 9. Shut unit down and reconnect automatic temperature-control operators.
 - 10. Remove and replace malfunctioning units and retest as specified above.
- C. Test and adjust controls and safeties. Controls and equipment will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

3.6 ADJUSTING

- A. Adjust damper linkages for proper damper operation.

COUNTY OF MONTEREY HEALTH DEPARTMENT
ALISAL INTEGRATED HEALTH CENTER
331 N. SANBORN RD., SALINAS

- B. Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing procedures.
- C. Lubricate bearings.

3.7 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain centrifugal fans.

END OF SECTION 23 34 23

SECTION 23 36 00 - AIR TERMINAL UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Modulating, single-duct air terminal units.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of air terminal unit.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for air terminal units.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For air terminal units to include in emergency, operation, and maintenance manuals.
 - 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 - a. Instructions for resetting minimum and maximum air volumes.
 - b. Instructions for adjusting software set points.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-up."