

Section 09250 Gypsum Board

Part 1 – General

1.01 SUMMARY

- A. Description of Work: Work of this Section includes, but is not limited to the following:
 - 1. Gypsum board and accessories.
 - 2. Cementitious backer board and accessories.
 - 3. Metal studs and furring.
 - 4. Metal suspension systems.
 - 5. Sound rated construction and accessories.
 - 6. Gypsum board and backer board finishing.
 - 7. Trim and accessories.
- B. Products Furnished but Not Installed Under This Section:
 - 1. Inserts and anchors for suspended ceilings: Furnish to other trades well in advance of time needed for coordination with other Work.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. See Section 06100 Rough Carpentry.
- B. See Section 07900 Sealants.
- C. See Section 09510 Suspended Acoustical Ceilings.

1.03 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications and installation instructions with Project conditions and materials clearly identified or detailed for each required system.
- B. Samples: Submit 12 inch long samples of each type of trim required.

1.04 SYSTEM REQUIREMENTS

- A. Performance Requirements: Fabricate and install systems to provide the following:
 - 1. Wallboard partitions:
 - a. Standard systems: Maximum deflection of 1/240 of partition height.
 - b. Systems to receive water resistant gypsum board or backer board: Maximum deflection of 1/360 of partition height.
 - 2. Interior suspended ceilings and soffits: Maximum deflection of 1/360 of distance between supports.
- B. Fire Resistance Ratings: Where fire resistance classifications are indicated, provide materials and application procedures identical to those listed by UL or tested according to ASTM E119 for type of construction shown.
- C. Acoustical Ratings: Where sound ratings are indicated, provide materials and application procedures identical to those tested by manufacturer to achieve Sound Transmission Class (STC) scheduled or indicated in accordance with ASTM E90.

1.05 QUALITY ASSURANCE

- A. Single Source Responsibility: Provide gypsum board materials, adhesive, clips, attachment devices, and accessories from one manufacturer or items standard with manufacturer of board, except as otherwise specified or accepted.
- B. Installer Qualifications: Not less than 5 years documented, successful experience with work comparable to Work of this Project.
- C. Regulatory Requirements: Comply with applicable requirements of local authorities having jurisdiction over Work.
- D. Reference Standards: Except where required by local code or these Specifications, comply with the following:
 - 1. Applicable requirements of ASTM C754 for installation of steel framing.
 - 2. Install gypsum board in accordance with applicable requirements and recommendations of Gypsum Association GA 216, "Recommended Specifications for the Application and Finishing of Gypsum Board", except for more stringent requirements of manufacturer.

1.06 SAMPLE INSTALLATIONS

- A. Prior to commencing Work and preceding pre-installation conference, provide sample installations of gypsum board Work.
- B. Size and Extent:
 - 1. Provide full extent of gypsum board Work, including partitions and ceilings, within Installation area.
 - 2. Provide gypsum board Work as required for sample installations specified in other Sections.
- C. Materials and Extent: Complete installation, in accordance with final Shop Drawings as required.
- D. Architect's Review: Architect will review sample installations for visual acceptance of materials and workmanship.
- E. Maintain approved sample installations during construction as standard for subsequent Work.
- F. Properly finished and maintained sample installations may be incorporated into completed Work.

1.07 PRE-INSTALLATION CONFERENCE

- A. Prior to commencing Work, at Contractor's direction, meet at site and review installation procedures and coordination with other Work.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Delivery:
 - 1. Deliver material to site promptly without undue exposure to weather.
 - 2. Deliver in manufacturer's unopened containers or bundles, fully identified with name, brand, type and grade.
- B. Storage:
 - 1. Store above ground in dry-ventilated space.
 - 2. Protect materials from soiling, rusting and damage.
 - 3. Store board to be directly applied to masonry walls at 70°F for 24 hours prior to installation.

1.09 PROJECT CONDITIONS

- A. Environmental Requirements:
 - 1. Do not install wallboard when ambient temperature is below 55°F.
 - 2. Maintain ambient temperature above 55°F from one week prior to joint treatment until joint treatment is complete and dry.
 - 3. Provide ventilation, either natural or mechanical, to remove excess moisture during joint treatment.
 - 4. Temperature requirements may be waived only on recommendation of board materials manufacturers.

Part 2 – Products

2.01 PRODUCTS AND MANUFACTURERS

- A. Acceptable Products and Manufacturers – Gypsum Board and Accessories:
 - 1. Listed products establish standard of quality and are manufactured by United States Gypsum Company, Chicago, IL.
 - 2. Equivalent products by following are acceptable:
 - a. Georgia-Pacific Corporation, Atlanta, GA.
 - b. Gold Bond Building Products, Charlotte, NC.

2.02 BOARD MATERIALS

- A. Gypsum Board:
 - 1. ASTM C36, regular type except where Type X fire-resistant type is indicated or required to meet U.L. assembly types.
 - 2. Edges: Tapered.
 - 3. Thickness: 5/8 inch, unless otherwise indicated. Where curved drywall construction is indicated, use 1/4 inch thick facing board as required to provide smooth, uniform surfaces.
 - 4. Acceptable products: Equivalent to Sheetrock Brand SW, Firecode or Firecode “C” Gypsum Panels by USG.
- B. Water-Resistant Gypsum Board: (Gold Bond Board)
 - 1. ASTM C630, regular type except where Type X fire-resistant type is indicated or required to meet U.L. assembly types.
 - 2. Edges: Tapered.
 - 3. Thickness: As indicated.
 - 4. Thickness: 5/8 inch, unless otherwise indicated.
 - 5. Acceptable products: Equivalent to Sheetrock Brand W/R, W/R Firecode “C” or W/R Firecode Type X Gypsum Panels by USG.
- C. Cementitious Backer Board:
 - 1. Aggregated Portland cement board with woven glass fiber mesh facing.
 - 2. Thickness: 1/2 inch nominal.
 - 3. Acceptable product and manufacturers:
 - a. Durock by USG.
 - b. Wonder-Board by Gold Bond Building Products.

2.03 METAL FRAMING AND FURRING MATERIALS

- A. Metal Studs:
 - 1. ASTM C645, “C” shaped, galvanized; gage as follows, except as otherwise required to fulfill performance requirements:

- a. Provide 25 gage studs, except as otherwise indicated or specified. Provide heavier gage as required to comply with performance requirements.
 - b. At door frames, provide 2 – 25 gage minimum studs at each door jamb. Where wall is indicated or specified to be typically framed with 20 gage studs, provide 2 – 20 gage studs at each door jamb.
 - c. Provide 20 gage studs at walls to receive backer board, water resistant gypsum board with ceramic tile facing, or walls indicated to receive stone assemblies.
- B. Floor and Ceiling Runners: Galvanized steel, gage recommended by stud manufacturer for application.
- C. Metal Furring Channels:
1. Hat Shaped:
 - a. ASTM C645, 7/8 inch high, 25 gage, galvanized.
 - b. Provide 20 gage at furring to receive backer board.

2.04 CEILING AND SOFFIT SUPPORT MATERIALS

- A. Hanger Anchorage Devices:
1. Screws, clips, bolts, or other devices applicable to indicated method of structural anchorage for ceiling hangers and whose suitability for use intended has been proven through standard construction practices or by certified test data.
 2. Size devices for 3x calculated load supported except size direct pullout concrete inserts for 5x calculated loads.
- B. Hangers:
1. Steel wire, rods or rigid flats, sizes to comply with requirements of ASTM C754 for ceiling or soffit area and loads to be supported.
 2. Wire: ASTM A641, soft, Class 1 galvanized.
 3. Rods and flats:
 - a. Mild steel components.
 - b. Finish: Galvanized or painted with rust-inhibitive paint for interior Work; galvanized for exterior Work.
- C. Framing System:
1. Main Runners:
 - a. Cold-rolled, "C" shaped steel channels, 16 gage minimum.
 - b. Finish: Galvanized or painted with rust-inhibitive paint.
 - c. Form to required radius at curved ceilings.
 2. Cross Furring: Hat-shaped steel furring channels, ASTM C645, 7/8 inch high, 25 gage, galvanized.
 3. Furring Anchorages: 16 gage galvanized wire ties, manufacturer's standard wire-type clips, bolts, nails or screws recommended by furring manufacturer and complying with ASTM C754.
- D. Framing System Option:
1. At Contractor's option, in lieu of cold rolled runner and cross furring framing system, provide interlocking cold-rolled sheet steel grid complying with ASTM C635, "Heavy Duty" structural classification.
 2. Finish: Manufacturer's standard factory finish.
 3. Acceptable product and manufacturer: Equivalent to 640 Furring System by Chicago Metallic Corp.

2.05 ACCESSORIES

- A. Typical Trim:

1. Material: Galvanized steel, 26 gage minimum.
 2. Acceptable products: Equivalent to the following products by USG:
 - a. Edge beads: 200A or 200B.
 - b. Corner beads: Dur-A-Bead.
 - c. Control joints: 093.
- B. Special Trim and Reveals:
1. Extruded aluminum alloy 6063-T5.
 2. Factory applied finish consisting of chemical conversion coating followed by manufacturer's standard baked-on corrosion-resistant primer.
 3. Acceptable products and manufacturer: Equivalent to Softforms, profiles and models as indicated on Drawings, by Pittcon Industries, Riverdale, MD.
- C. Backer Plates:
1. 6 inch wide x 16 gage minimum, galvanized, size as required; fastened to studs for attachment of surface mounted fittings and accessories.
 2. Elimination of backer plates or direct attachment of accessories or equipment to studs will not be allowed.
- D. Adhesives and Joint Treatment Materials:
1. Joint compound:
 - a. Provide asbestos-free products.
 - b. Drying-type (ready mixed):
 - 1) ASTM C475; ready-mixed taping and topping compounds, regular.
 - 2) Acceptable products and manufacturer: Equivalent to SHEETROCK Taping Joint Compound and Topping Joint Compound, or SHEETROCK All Purpose Joint Compound, all by USG.
 - c. Setting (chemically-hardening) type: Acceptable products and manufacturer: Equivalent to SHEETROCK Setting-Type Joint Compound by USG.
 - d. For backer board, use joint compound material recommended by backer board manufacturer.
 2. Laminating adhesive for multiple layers: Special adhesive or joint compound specifically recommended for laminating gypsum boards.
 3. Reinforcing joint tape:
 - a. ASTM C475, 2 inch nominal width.
 - b. For backer board, provide fiberglass tape as recommended by backer board manufacturer.
- E. Gypsum Board Screws: Comply with ASTM C646.
- F. Backer Board Accessories: Provide fasteners and accessories recommended by backer board manufacturer and required for complete installation.
- G. Acoustical Sealant: Polyisobutylene/polybutene mastic compound, heavy bodied, nondrying, nonhardening, nonskinning compound, specifically recommended as acoustical sealant.
- H. Sound Attenuation Blankets:
1. Mineral fiber, conforming to ASTM C665, Type I.
 2. Surface burning characteristics per ASTM E84:
 - a. Flame spread: 15 or less.
 - b. Smoke developed: 0.
 3. Thicknesses: As indicated.
 4. Product and manufacturer: Thermafiber Sound Attenuation Fire Blankets (SAFB) by USG Acoustical Products Co.
- I. Miscellaneous Accessories: Provide as required for complete installations.

Part 3 – Execution

3.01 EXAMINATION

- A. Examine substrates and adjoining construction, and conditions under which Work is to be installed. Do not proceed with Work until unsatisfactory conditions are corrected.

3.02 INSTALLATION, GENERAL

- A. Install in accordance with reference standards and manufacturer's instructions.

3.03 INSTALLATION TOLERANCES

- A. Do not exceed 1/8 inch in 8'-0" variation from plumb or levels in any exposed line of surface, except at joints between units.
- B. Do not exceed 1/16 inch variation between planes of abutting edges or ends.
- C. Shim as required to comply with specified tolerances.

3.04 METAL SUPPORT INSTALLATION

- A. Metal Runners:
 - 1. Align and secure runner tracks accurately to partition layout at both floor and ceiling.
 - 2. Provide fasteners appropriate to substrate construction as recommended by manufacturer.
 - 3. Partitions extending to bottom of spray fireproofed assemblies:
 - a. Coordinate installation of framing and replacement of removed fireproofing with base building contractor.
 - b. Replace removed fireproofing with new material same as existing, as required to maintain fire rating of assemblies, and as may be directed by authorities having jurisdiction.
- B. Metal Studs:
 - 1. Position metal studs vertically in the runners, spaced at 16 inches o.c., unless otherwise indicated.
 - a. At walls indicated to receive stone cladding, provide studs spaced at 12 inches o.c.
 - 2. Align and plumb partition framing accurately.
 - 3. Locate studs no more than 2 inches from abutting partitions, partition corners and other construction.
 - 4. Bracing of partitions above ceilings:
 - a. Where partitions extend above ceilings, but not to structure, brace top of partitions with diagonal stud braces approximately 36 inches on center.
 - b. Attach stud braces to steel angles securely fastened to structure.
 - 5. Where partitions abut ceiling or deck construction or vertical structural elements, provide slip or cushion type joint between partition and structure as recommended by stud manufacturer to prevent transfer of structural loads or movements to partitions, and to provide lateral support.
 - 6. Provide horizontal bracing where necessary for lateral support.
 - 7. Chase walls:
 - a. Position steel studs vertically in runners, with flanges in same direction and with studs on opposite sides of chase directly across from each other.
 - b. Cut cross-bracing from gypsum board 12 inches high by chase wall width.
 - c. Space cross-bracing 48 inches o.c. vertically and attach to stud web with six screws per brace.

- d. In lieu of gypsum board cross-bracing, 2-1/2 inch steel studs may be used.
 8. Where handrails, cabinets or other wall-hung items are directly attached to partitions, provide backer plates or wood blocking accurately positioned and firmly secured to metal framing supports.
- C. Hat Channel Furring:
1. Install metal furring where indicated and where wallboard finish is installed over masonry or concrete, unless another type of framing is indicated.
 2. Attach hat-shaped furring channels either vertically or horizontally with fasteners through alternate wing flanges (staggered).
 3. Where furring is indicated to receive backer board or water resistant gypsum board with ceramic tile, space at 16 inches o.c.
 4. Install furring channels within 4 inches of floor line and ceiling line.
 5. Attach corner furring channels where furring conditions permit in similar manner.
- D. Ceiling and Soffit Support Systems:
1. Secure hangers or rods to structural support by connecting directly to structure where possible, otherwise connect to inserts, clips or other anchorage devices or fasteners indicated.
 2. Space main runners, hangers and furring according to requirements of ASTM C754, except as otherwise indicated.
 3. Extend runners to within 6 inches of walls.
 4. Wire-tie or clip furring members to main runners and to other structural supports indicated.
 5. Do not permit furring or runners to contact masonry or concrete walls.
 6. Provide 1 inch clearance between furring or runners and abutting walls and partitions.
 7. For proprietary framing system, comply with manufacturer's instructions.
 8. Curved (vaulted) applications:
 - a. Install furring channels to provide indicated radius for finished ceiling.
 - b. Space furring channels maximum 16 inches on center.

3.05 BOARD INSTALLATION

- A. Single Layer Wallboard on Metal Studs:
1. Loosely butt wallboard joints together and neatly fit.
 2. Do not place butt ends against tapered edges.
 3. Maximum allowable gap at end joints: 1/8 inch.
 4. Stagger joints on opposite sides of partitions.
 5. Apply boards on walls vertically or horizontally with face out.
 6. Do not locate vertical joints within 8 inches of external corners of windows, doors, or other openings, except at control joints.
 7. Apply ceiling boards first where gypsum board ceilings and wall occur.
 8. Cut gypsum board to profile of mitered wood frames as indicated.
 9. Cut openings in wallboard to fit electrical outlets, plumbing, light fixtures, and piping snugly and small enough to be covered by plates and escutcheons. Cut both face and back paper.
 10. Screw board in place securely with screws spaced according to manufacturer's recommendation.
- B. Double Layer Wallboard:
1. Fasten base layer to studs with screws and attach face layer using adhesive lamination applied according to manufacturer's instructions.
 2. Screw both layers to metal supports at double layer ceiling applications and where required for fire rated construction.
- C. Single Layer Wallboard on Furring:
1. Apply gypsum board with long dimension at right angles to furring channel.

2. Center end joints over channel web; stagger end joints from those in adjacent rows of boards.
 3. Fasten boards to furring channels with screws spaced according to manufacturer's recommendations.
- D. Water-Resistant Gypsum Board: (Gold Bond Exterior Soffit Board)
1. Complete plumbing rough-in before gypsum board panels are erected.
 2. Separate gypsum panels from rough-in and fixtures by 1/4 inch space.
 3. Make necessary cut-outs and seal all cut or exposed panel edges with thinned-down ceramic tile adhesive or with waterproof flexible sealant, as recommended by gypsum board manufacturer.
 4. Install water-resistant board horizontally.
 5. Prior to tile application, fill openings around pipes, fittings, fixtures, interior angles, and other penetrations with waterproof flexible sealant, as recommended by gypsum board manufacturer. Do not fill 1/4 inch gap at bottom of panels.
 6. Fastener and joint treatment:
 - a. Treat fastener heads and joints with setting-type joint compound.
 - b. For joints to be covered with tile, apply tape and joint compound bedding coat and skim coat only; do not apply finish coats. Do not crown joints or leave excess compound on panels.
 - c. For fastener heads to be covered with tile, apply only one coat of joint compound.
 - d. For fastener heads, joints and edges not to be covered with tile, tape and finish in conventional manner, with setting-type joint compound.
- E. Backer Board Installation:
1. Install to provide substrate for stone cladding and as indicated.
 2. Install in accordance with manufacturer's instructions.
 3. Provide furring strips as required so that board face is plumb. Space strips according to backer board manufacturer's instructions.
 4. Securely fasten boards to substrate as required.
 5. Follow manufacturer's instructions for treatment of edge terminations.
 6. At joints and corners, embed fiberglass tape in skim coat of mortar, unless otherwise recommended.
- F. Curved Gypsum Board:
1. Provide board length such that one single board covers curved surface. Provide board thickness as recommended by manufacturer for minimum bending radius, for wet or dry application.
 2. If wet application is used, evenly spray water on surface to be compressed when board is hung. Stack boards with wet surfaces facing each other and cover stack with polyethylene sheet. Allow boards to set at least one hour before application.
 3. Install boards perpendicular to framing.
 4. On concave installations, start fastening board at center of curve and work outward to ends of boards.
 5. On convex installations, begin board installation at one end of curved surface and fasten board to framing as it is wrapped around curve.
 6. Do not cut openings for penetrations until boards are installed and thoroughly dry

3.06 SOUND RATED CONSTRUCTION

- A. Insulation:
1. Install sound attenuation blankets in sound-rated partitions and ceilings where indicated.
 2. Completely fill space between studs and framing to full height of partition wall or full area of ceiling.
 3. Fit carefully behind electrical outlets and other Work penetrating sound rated construction.
 4. Attach blankets in accordance with manufacturer's instructions.
- B. Wallboard:
1. Install wallboard same as for interior partitions and ceilings.
 2. Coordinate with installation of perimeter sealants.
- C. Perimeter Sealants:
1. At partition walls, provide continuous beads of acoustic sealant at juncture of both faces of runners or plates with floor and ceiling construction, and wherever drywall abuts dissimilar materials; prior to installation of drywall boards.
 2. At ceilings, provide continuous beads of sealant wherever drywall abuts dissimilar materials.
 3. Provide continuous bead of sealant behind faces of control joints prior to installation of surface-applied control joint accessories. Locate sealer at proper depth in joint to allow for insertion of expansion portion of control joint accessory.
 4. After installation of drywall base layers, cut face layer sheets 1/2 inch less than floor-to-ceiling height and position with 1/4 inch open space between drywall and floor, ceiling and dissimilar vertical construction. Fill 1/4 inch open space with continuous sealant beads after installation of face layer.
 5. At openings and cutouts, fill open spaces between drywall and fixtures, cabinets, ducts and other flush or penetrating items, with continuous bead of sealant.
- D. Sound Flanking Paths:
1. Where sound-rated partition walls intersect non-rated drywall partition walls, extend sound-rated construction to completely close sound flanking paths through non-rated construction.
 2. Seal joints between face layers at vertical interior angles of intersecting partitions.

3.07 ACCESSORY INSTALLATION

- A. Trim:
1. Use same fasteners to anchor trim accessory flanges as required to fasten gypsum board to supports, unless otherwise recommended by trim manufacturer.
 2. Install metal corner beads at external corners.
 3. Install metal casing bead trim whenever edge of gypsum board would otherwise be exposed or semi-exposed.
- B. Control Joints:
1. Install control joints at junction of wallboard partitions with walls or partitions of other finish material.
 2. Install control joints within long runs of partitions, ceilings or soffits at approximately 30'-0" on center.
 - a. Where doors in long runs are suitably located, extend control joints from both corners of frame to ceiling.
 3. Where drywall is vertically continuous, as at stairwells, provide horizontal control joints at each floor level.
- C. Special trim: Install as indicated on Drawings and in accordance with manufacturer's instructions.

3.08 FINISHING

- A. Interior Gypsum Board
 - 1. Taping:
 - a. Use setting-type compound, or taping or all-purpose drying-type compound.
 - b. Butter tape compound into inside corners and joints.
 - c. Center tape over joints and press down into fresh compound.
 - d. Remove excess compound.
 - e. Tape joints of gypsum wallboard above suspended ceilings.
 - 2. First coat:
 - a. Use taping or all-purpose drying-type compound.
 - b. Immediately after bedding tape, apply skim coat of compound and allow to dry completely in accordance with manufacturer's instructions.
 - c. Apply first coat of compound over flanges of trim and accessories.
 - d. Apply first coat of compound over exposed fastener heads and finish level with board surface.
 - 3. Second coat:
 - a. Use topping or all-purpose drying-type compound.
 - b. After first coat treatment is dried, apply second coat of compound over tape and trim, feathering compound 2 inches beyond edge of first coat.
 - c. Spot fasteners with second coat of compound.
 - 4. Third coat:
 - a. Use topping or all-purpose drying-type compound.
 - b. After second coat has dried, sand surface lightly and apply thin finish coat to joints, fasteners and trim, feathering compound 2 inches beyond edge of second coat.
 - c. Allow third coat to dry and sand lightly.
- B. Water-Resistant Gypsum Board: See "Water-Resistant Gypsum Board" above.
- C. Backer Board Joint Treatment: Prepare and finish joints in accordance with manufacturer's instructions.

3.09 ADJUSTING

- A. Correct damage and defects that may telegraph through finish Work.
- B. Leave Work smooth and uniform.

END OF SECTION 09250 GYPSUM BOARD

Section 09310 Ceramic Tile

Part 1 – General

1.01 RELATED DOCUMENTS

- A. Drawings and General Provision of Contract, including General and Supplementary Conditions and Division I Specification sections, apply to work of this Section.

1.02 DESCRIPTION OF WORK

- A. Definition: Tile includes ceramic surfacing units made from clay or other ceramic materials.
- B. Extent of tile work is indicated on drawings and schedules. Types of tile work in this section are as follows:
 - 1. Porcelain stone ceramic tile.
- C. Related Work Specified Elsewhere:
 - 1. Section 07900 – JOINT SEALERS.

1.03 QUALITY ASSURANCE

- A. Source of Materials: Provide materials obtained from one source for each type and color of tile, grout and setting materials.
- B. Installer Qualifications: Firm with not less than 2 years of successful experience in installation of tile work similar to requirements for this project and which is acceptable to manufacturer of tile units, as shown by current written statement from manufacturer.
- C. Slip Resistance: Tile usually having greater slip resistance characteristics due to an abrasive admixture, abrasive particles in the surface, grooves or patterns in the surface or a glaze specifically designed for increased coefficient of friction. When coefficient of friction (COF) data are required for a specific project, testing shall conform to ASTM C1028.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's technical information and installation instructions for materials required.
- B. Samples for Initial Selection: Submit manufacturer's color charts consisting of actual tiles or sections of tiles showing full range of colors, textures and patterns available for tile specified. Include samples of grout and accessories requiring color selection.
- C. Samples for Verification: Submit the following:
 - 1. Samples for each type of tile and for each color and texture required, not less than 12" square.
 - 2. Full size samples for each type of trim, accessory and for each color.
- D. Maintenance Instructions: Furnish to the Owner instructions for maintenance of tile as recommended by the manufacturer.

1.05 PRODUCT HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements of ANSI A137.1 for labeling sealed tile packages. Prevent damage or contamination to materials by water, freezing, foreign matter or other causes.

1.06 PROJECT CONDITIONS

- A. Temperature: Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations, generally not less than 50°F in tiled areas during installation and for 7 days after completion. Vent temporary heaters to exterior to prevent damage to tile work from carbon dioxide buildup.
- B. Protection: Restrict traffic from areas where tile is being installed. Protect adjacent work surfaces before tile work begins.

1.07 EXTRA STOCK

- A. Furnish to the Owner 5% extra tile of each color and shape used, including bases, packed in original containers properly marked.

Part 2 – Products

2.01 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include:
 - 1. Ceramic Floor tile:
 - a. Crossville Porcelain Stone
 - b. Mannington
 - 2. Setting and Grouting Materials
 - a. Accucolor premium sanded
 - b. Accucolor TEC XT sanded
 - 3. Integral Waterproofing/Adhesive:
 - a. Accucolor products only.
 - 4. Sheet Waterproofing:
 - a. The Noble Co.; Nobleseal TS
 - 5. Anti-Fracture Membrane:
 - a. Jamo Inc.; Terraflow
 - b. NAC Products Inc.; ECB Membrane
 - c. Terraflow Systems Inc.; Terraflow
 - 6. Self-Leveling Underlayment:
 - a. Ardex Inc.; K-15
 - b. Jamo Inc.; Levelflow
 - c. Southern Grouts & Mortars Inc.; Self Level
 - 7. Tile Cleaners
 - a. Hillyard Chemical Co.
 - b. L & M Surco Mfg. Inc.
- B. See Architectural Finish/Flooring Drawing for Manufacture Contact Person or Call Vocon at (216) 588-0800.

2.02 PRODUCTS, GENERAL

- A. Ceramic Tile Standard: Comply with ANSI A137.1 American National Standard Specifications for Ceramic Tile for types and grades of tile indicated. Furnish tile complying with Standard Grade unless otherwise noted.
- B. Tile Installation Materials Standards: Comply with referenced ANSI Standards indicated.
- C. Colors, Textures and Patterns: For tile and other products requiring selection of colors, surface textures or other appearance characteristics, provide products to match those selected by Architect from manufacturer's standards.
- D. Mounting: Provide factory mounted tile wherever applicable back or edge mounted as standard with manufacturer.

2.03 TILE PRODUCTS

- A. Porcelain Stone Tile : The contractor for tile work shall furnish all labor, materials and equipment necessary to install tile on floors or wall as specified and as indicated on architectural drawings. Installation techniques shall conform to Tile Council of America Handbook for Ceramic Tile Installation. Tile shall be standard grade quality, produced by the dry press method as manufactured by Crossville Porcelain Stone or Creative Materials Corp. They shall conform to requirements of ANSI A137.1-1988.
 - 1. Type: SEE ARCHITECTURAL FINISH LEGEND DRAWING #A4.0
 - 2. Size: VARIES (SEE DRAWING #A4.0).
- B. Trim Units: Provide tile trim units to match adjoining flat tile; wall tile cove base, and any other items shown or required to complete the installation.

2.04 SETTING MATERIALS

- A. Thin-set Portland Cement Mortar: Latex-portland cement mortar, ANSI A118.4.

2.05 GROUTING MATERIALS

- A. Adhesive-Set Wall Tile Grout: Mastic type, one-part grouting composition, "Acri-fil", product of TCA Licensee.
- B. Thin-Set Wall Tile Grout: Dry-set type complying with ANSI A118.6. Use latex additive in grout mix, unless manufacturer recommends otherwise.

2.06 MISCELLANEOUS MATERIALS

- A. Self-Leveling Underlayment: Cementitious type mixture specially compounded to be self-leveling from featheredge to required thickness in one pour; high strength (minimum 3500 psi at 28 days), fast setting, non-shrinking.
- B. Tile Cleaner: Product specifically acceptable to tile and grout manufacturer for application indicated and as recommended by National Tile Promotion Federation, 112 North Alfred St., Alexandria, VA 22134, or Ceramic Tile Institute, 700 North Virgil Ave., Los Angeles, CA 90029.

2.07 MIXING MORTARS AND GROUTS

- A. Mix mortars and grouts to comply with requirements of referenced standards and manufacturers for accurately proportioning materials, water or additive content, mixing equipment and mixer speeds, mixing containers, mixing time, and other procedures needed to produce mortars and grouts of uniform quality with optimum performance characteristics for application indicated.

Part 3 – Execution

3.01 INSPECTION AND PREPARATION

- A. Examine surfaces to receive tile work and conditions under which tile will be installed. Do not proceed with tile work until surfaces and conditions comply with requirements indicated in referenced tile installation standard.
- B. Make sure the work of other trades in or behind tile work has been completed before proceeding.
- C. Prepare surfaces upon which materials will be applied as required to receive work. Remove dirt, grease, oil, paint, and other surface contaminations that will prevent proper bonding, from the substrate surfaces. Removes ridges, fins, projections, high spots and other irregularities that would interfere with proper installation work.
- D. Preparing existing Surfaces: Where tile is to be installed over existing surfaces, make sure that the backing is suitable and perform all necessary preparation work, as described in TCA TR711, 712 or 713, as applicable, in TCA Ceramic Tile Installation handbook. Such work includes cleaning, roughening and removing loose materials. Consult with manufacturers of setting materials intended for use to determine their recommendations and the need for primers. Provide any self-leveling underlayment required to achieve true planes within allowable tolerances. The extent of such preparation shall be predetermined and its cost included in Contract price.

3.02 INSTALLATION

- A. ANSI Tile Installation Standard: Comply with applicable parts of ANSI A108 series of tile installation standards included under America National Standards Specifications for the Installation of Ceramic Tile.
- B. Installation Methods: The following installation methods occur on this project. Except as noted herein or on drawings, work shall conform to designations shown in TCA Ceramic Tile Installation Handbook.
 - 1. On concrete floor slab, with latex-portland cement mortar, TCA F113.
 - 2. On gypsum board wall, with latex-portland cement mortar, TCA W243.
- C. General:
 - 1. Extend tile work into recesses and under or behind equipment and fixtures, to form a complete covering without interruptions. Terminate work neatly at obstructions, edges and corners without disrupting pattern or joint alignments.
 - 2. Accurately form intersections and returns. Perform cutting and drilling of tile work without marring visible surfaces. Carefully grind out 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 that plates, collars, and covers overlap tile.
 - 3. For conventional portland cement mortar method, tile may be set with ether portland cement paste on a plastic bed, or with latex-portland cement mortar on a cured bed.
- D. Jointing Pattern

1. Lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls and trim are same size. Layout tile work and center tile fields in both directions in each space or on each floor or all area. Adjust to minimize tile cutting. Provide uniform joint widths.
 2. For tile mounted in sheets make joints between tile sheets same width as joints within tile sheets so that extent of each sheet is not apparent in finished work.
- E. Waterproofing: Required locations are in wet areas: Suspended shower room floors, pools, fountain basins, planters and elsewhere as may be noted for tiled areas. Use either integral waterproofing/adhesive or sheet type, at installer's option, applied according to manufacturer's printed directions. Extend waterproofing up on vertical surfaces to height indicated.
- F. Expansion Joints:
1. Locate expansion joints and other sealant filled joints, including control, contraction and isolation joints, where indicate, or if not indicated, at spacings and locations recommended in TCA Ceramic Tile Installation Handbook, and approved by Architect.
 2. If it is not possible to locate tile joints over control and construction joints, install a strip of anti-fracture membrane over the joint, in strict compliance with manufacturer's printed instructions.
- G. Grouting: Grout tile to comply with referenced installation standards, using grout materials indicated.

3.03 CLEANING AND PROTECTION

- A. Cleaning: upon completion of placement and grouting, clean ceramic tile surfaces so they are free of foreign matter. Unglazed tile may be cleaned with acid solution only when permitted by tile and grout manufacturer's printed instructions, but no sooner than 14 days after installation. Protect metal surfaces, cast iron and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.
- B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, or otherwise defective tile work.
- C. Protection:
1. When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with Kraft paper or other heavy covering during construction period to prevent staining, damage and wear.
 2. Prohibit foot and wheel traffic from using tiled floors for at least 7 days after grouting is completed.
 3. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION 09310 CERAMIC TILE

Section 09510 Suspended Acoustical Ceilings

Part 1 – General

1.01 SUMMARY

- A. Description of Work: Work of this Section includes, but is not limited to the following:
 - 1. Acoustical panels for lay-in application.
 - 2. Metal framing and suspension systems.
 - 3. Trim and accessories.
- B. Alternates: See Section 01030 for Alternate Work related to Work of this Section.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. See Division 15 mechanical grilles and diffusers.
- B. See Division 16 for light fixtures, fire and smoke detectors and speakers.

1.03 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications and installation instructions for each component.
- B. Shop Drawings:
 - 1. Submit Shop Drawings showing details and reflected ceiling plans.
 - 2. Show location of items of Work requiring coordination with acoustical ceilings or supported by acoustical ceiling systems.
- C. Samples:
 - 1. Panels: Submit 12 inch x 12 inch samples of each type.
 - 2. Exposed framing members and moldings: Submit 12 inch lengths of each type, color and finish.
- D. Qualification Data: Submit installer qualifications verifying years of experience; include list of products having similar scope of work identifying by name, location, date, reference name and phone number.
- E. Test Reports: Submit certified test reports performed by recognized testing laboratory showing that systems have been previously tested and meet or exceed fire resistance ratings.

1.04 SYSTEM REQUIREMENTS

- A. Interface With Other Systems: Coordinate layout and installation of acoustical ceiling units, suspension system components and accessories with other Work supported by, or penetrating through, ceilings, including but not limited to light fixtures, fire and smoke detection system components, HVAC equipment, fire-suppression system components and partition system.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Not less than 5 years documented, successful experience with work comparable to Work of this Project.

1.06 SAMPLE INSTALLATIONS

- A. Prior to commencing Work and preceding pre-installation conference, provide sample installations for suspended acoustical ceiling Work.
- B. Size and Extent: Provide full extent of suspended acoustical ceiling Work within Level 42 Installation area.
- C. Size: Minimum 10 foot square in area acceptable to Architect.
- D. Materials: Complete installations with materials in systems, including panels, suspension system, wall moldings, light fixtures and mechanical grilles and diffusers.
- E. Architect's Review: Architect will review sample installations for visual acceptance of materials and workmanship.
- F. Maintain approved sample installations during construction as standard for subsequent Work.
- G. Properly finished and maintained sample installations may be incorporated into completed Work.

1.07 SEQUENCING/SCHEDULING

- A. Do not install acoustical ceiling until space is enclosed and weatherproof, wetwork in space is completed and nominally dry, and Work above ceilings is complete.
- B. Do not lay out ceiling until flash patching Work has been completed.

1.08 PROJECT CONDITIONS

- A. Verify measurements and dimensions at site.
- B. Survey space to determine variation of floor slabs from levels. Identify high and low points, and coordinate with Architect in field to establish datum for laying out each ceiling area.
- C. Environmental Requirements:
 - 1. Permit panels to reach room temperature and stabilized moisture content before installation.
 - 2. Do not install panels until ambient conditions of temperature and humidity in space will be continuously maintained at values near those indicated for final occupancy.
 - 3. Do not install if ambient temperature is less than 60°F.

1.09 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to site in manufacturer's unopened containers, clearly indicating manufacturer's name, brand, type, style, size, color, texture and other identifying information.
- B. Store materials in dry location, off ground and in manner to prevent damage or deterioration.
- C. Replace materials which have been damaged or are otherwise unfit for use, as directed.

1.10 EXTRA STOCK

- A. Deliver one unopened carton of panels for each 100 cartons (or fraction thereof) installed for each type, pattern and color.

- B. Store at Project site where directed. Ensure manufacturer, product, pattern and color identify cartons.

Part 2 – Products

2.01 PRODUCTS AND MANUFACTURERS

- A. Acceptable Products and Manufacturers:
1. Products specified or indicated on drawings establish standard of quality and are manufactured by Armstrong.
 2. Equivalent building standard products, or equivalent products by other manufacturers, may be acceptable provided they comply with requirements of Contract Documents.

2.02 ACOUSTIC PANELS AND SUSPENSION SYSTEMS

- A. Acoustic Panels:
1. Size: 24 inch x 24 inch x 3/4 inch thick.
 2. Edge profile: Dune #1775, tegular lay-in.
 3. Finish: Factory applied washable vinyl latex paint.
 4. Color: White.
 5. Light reflectance: ASTM C523, LR-1 (75% or over).
 6. Flame spread: ASTM E84, O-25.
 7. Noise-reduction coefficient (NRC Range): ASTM C423, .65 - .75.
 8. Sound transmission class (STC Range): 45-49.
- B. Exposed Suspension System:
1. Description: Armstrong “Suprafine”, ASTM C635, intermediate duty, 9/16 inch face. G.C. to provide sizermatic bracing and clips as required by local jurisdiction.
 2. Materials: Cold-rolled steel with galvanized coating.
 3. Finish and color: Manufacturer’s standard factory finish; white with white regress.

2.03 ACCESSORIES

- A. Trim:
1. Manufacturer’s standard trim, edge moldings and reveal trim to suit suspension system requirements and as indicated on Drawings; same finish as suspension system.
 2. Provide edge moldings to fit penetrations exactly, including circular penetrations.
 3. Expansion joints: Provide framing and closure trim.
- B. Suspension Accessories: Provide splices and stabilizer bars required for suspended grid system.
- C. Grid Attachment Devices:
1. General: Size devices for 5 times loads imposed by complete system.
 2. Hanger anchorage devices: Screws, clips, bolts, or other devices applicable o indicated method of structural anchorage for ceiling hangers and whose suitability for use intended has been proven through standard construction practices or by certified test data.
 3. Hangers:
 - a. As recommended by manufacturer and as required to comply with structural classification.
 - b. Wire hangers: ASTM A641, not less than 12 gage, galvanized carbon steel wire, soft temper, pre-stretched.

Part 3 – Execution

3.01 EXAMINATION

- A. Examine substrates and adjoining construction, and conditions under which Work is to be installed. Do not proceed with Work until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install materials and systems in accordance with final Shop Drawings, manufacturer's instructions and requirements of ASTM C636.
- B. Install system to support imposed loads with maximum deflection of 1/360 of span.
- C. Tolerances:
 - 1. Level completed assembly to tolerance of 1/8 inch in 10 feet.
 - 2. Variation from plumb of grid members caused by eccentric loads: 2 degrees maximum.
- D. Hangers:
 - 1. Coordinate location of hangers with other Work.
 - 2. Space not more than 6 inches from each end and not more than 4 feet on center between ends of members to be supported.
 - 3. Provide additional hangers for support of fixtures and other items supported by ceiling suspension system to prevent eccentric deflection or rotating of supporting runners.
 - 4. Hang system independent of walls, columns, ducts, pipes and conduit.
 - 5. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
 - 6. If ducts or other equipment prevent regular spacing of hangers, reinforce nearest affected hangers to span extra distance.
 - 7. Attach directly to structural elements only; do not attach to metal deck. Loop hangers and wire-tie directly or provide anchors or inserts.
- E. Center system on room axis leaving equal border units, unless otherwise indicated on Drawings.
- F. Edge Molding Installation:
 - 1. Install edge moldings where ceilings abut walls, partitions or other penetration elements.
 - 2. Miter cut inside and outside corners to provide flush, tight, hairline joints.
 - 3. Secure moldings to building construction a 16 inches on center.
- G. Panel Installation:
 - 1. Install panels in place, level, in uniform plane and free from twist, warp and dents.
 - 2. Rest panel edges resting on flanges of tees.
 - 3. Support perimeters on wall moldings.
 - 4. Neatly scribe and cut panels for accurate fit at borders interruptions, and penetrations by other Work.
 - 5. Lay directional patterned units one way with pattern parallel to longest room axis, unless otherwise indicated.

3.03 CLEANING AND PROTECTION

- A. Clean and repair exposed surfaces that have been stained, marred, or otherwise damaged.
- B. Remove and replace Work which cannot be successfully cleaned or repaired.
- C. Protect Work so that it will be without damage at time of acceptance.

END OF SECTION 09510 SUSPENDED ACOUSTICAL CEILINGS

Section 09650 Resilient Flooring

Part 1 – General

1.01 RELATED DOCUMENTS

- A. Drawings and General Provision of Contract, including General and Supplementary Conditions and Division I Specification sections, apply to work of this Section.

1.02 DESCRIPTION OF WORK

- A. Extent of resilient flooring and accessories is shown and scheduled on drawings.

1.03 QUALITY ASSURANCE

- A. Manufacturer: Provide each type of resilient flooring and accessories as produced or recommended by a single manufacturer, including primers, adhesives, sealants, and leveling compounds.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for each type of resilient flooring, accessory and installation material.
- B. Samples for Verification: Submit the following samples of each type, color, and pattern of resilient flooring required, showing full-range of color and pattern variations.
 - 1. Full size tile samples.
 - 2. 6" x 6" samples of rubber tile or sheet flooring tiles.
 - 3. 2-1/2" long samples of resilient flooring accessories.
 - 4. Other materials as required.
- C. Maintenance Instructions: Submit manufacturer's recommended maintenance practices for each type of resilient flooring and accessory required.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to site in original unopened containers bearing manufacturer's identifying label, lot number, color and pattern. Store indoors. For at least 48 hours before installation, keep materials in area where temperature is not less than 65°F.

1.06 PROJECT CONDITIONS

- A. Temperatures: Maintain minimum temperature of 65°F in spaces to receive resilient flooring for at least 48 hours before installation, during installation, and for not less than 48 hours after installation. Subsequently, maintain minimum temperature of 55°F in areas where work is completed.
- B. Coordination: Install resilient flooring and accessories after other finishing operations, including painting, have been completed. Do not install resilient flooring over concrete slabs until the latter have been cured and are sufficiently dry to achieve bond with adhesive as determined by manufacturer's recommended bond and moisture tests.

1.07 EXTRA STOCK

- A. Deliver stock of maintenance materials top Owner, from same manufactured lot as materials installed and enclosed in protective packaging with appropriate identifying labels. Furnish not less than the following for each type, color, pattern and size installed:
 - 1. Tile Flooring: One box for each 50 boxes or fraction thereof.
 - 2. Base: 32 linear feet.

Part 2 – Products

2.01 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include:
 - 1. Vinyl Composition Tile:
 - a. Armstrong World Industries Inc.
 - b. Kentile Floors Inc.
 - c. Tarkett Inc.
 - 2. Vinyl Wall Base (in addition to those above):
 - a. Allstate
 - b. Johnsonite
- B. Products of Armstrong are specified herein to establish appearance characteristics. Similar product of other manufacturers will be acceptable if appearance characteristics are sufficiently comparable, in sole judgement of Vocon Design, Inc.

2.02 MATERIALS AND ACCESSORIES

- A. Colors and Patterns: as selected by Vocon Design, Inc. from manufacturer's standards.
- B. Vinyl Composition Tile: SEE ARCHITECTURAL FINISH LEGEND DRAWING #A4.0.
- C. Vinyl Wall Bases: Allstate or Johnsonite, color integrated wall base (roll stock typical), 4" high, 0.080" thick, standard top set cove or straight type as indicated, matte finish, with matching end stops and preformed or molded corner units.
- D. Resilient Edge Strips: Johnsonite, color (SEE ARCHITECTURAL DRAWING #A4.0)

2.03 INSTALLATION MATERIALS

- A. Adhesive (Cements): Waterproof, stabilized type as recommended by flooring manufacturer to suit material and substrate conditions.
- B. Concrete Slab Primer: Nonstaining type as recommended by flooring manufacturer.
- C. Leveling Compound: Latex type as recommended by flooring manufacturer.

Part 3 – Execution

3.01 INSPECTION

- A. Installer shall inspect subfloor surfaces to determine that they are satisfactory. A satisfactory subfloor surface is defined as one that is smooth and free from cracks, holes, ridges, coatings preventing adhesive bond, and other defects impairing performance or appearance.
- B. Perform bond and moisture tests on concrete subfloors to determine if surfaces are sufficiently cured and dry as well as to ascertain presence of curing compound.
- C. Do not allow resilient flooring work to proceed until subfloor surfaces are satisfactory.

3.02 PREPARATION

- A. Use leveling and patching compounds as recommended by resilient flooring manufacturer for filling small cracks, holes and depressions in subfloors.
- B. Remove spillages and coatings from subfloor surfaces that would prevent adhesive bond, including curing compounds incompatible with resilient flooring adhesive, paint, oils, waxes and sealers.
- C. Broom clean or vacuum surfaces to be covered, and inspect subfloor.
- D. Apply concrete slab primer, if recommended, in compliance with manufacturer's directions.

3.03 INSTALLATION

- A. General:
 - 1. Where carpet occurs adjacent to resilient flooring, install wall base before carpet is laid. Where movable partitions are shown, install resilient flooring before partitions are erected.
 - 2. Install flooring using method indicated in strict compliance with the manufacturer's printed instructions. Extend flooring into toe spaces, door reveals, and into closets and similar openings. Scribe, cut, and fit resilient flooring to columns, walls, partitions, permanent fixtures, built-in furniture and cabinets, pipes and outlets.
 - 3. Maintain reference markers, holes, or openings that are in place or plainly marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other nonpermanent marking device.
 - 4. Tightly cement resilient flooring to subbase without open crack, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or flooring at perimeter of each covered area to assure adhesion.
 - 5. Install resilient flooring on covers for telephone and electrical ducts, and similar items occurring within finished floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on these covers. Tightly cement edges to perimeter of floor around covers and to covers.
- B. Tile Flooring:
 - 1. Lay tile from center marks established with principal walls, discounting minor offsets, so that tile at opposite edges of room are of equal width. Adjust as necessary to avoid use of cut widths less than 1/2 tile at room perimeters. Lay tile square to room axis, unless otherwise shown.
 - 2. Match tiles for color and pattern by using tile from cartons in same sequence as manufactured and packaged if so numbered. Cut tile neatly around all fixture. Broken, cracked, chipped, or deformed tiles are not acceptable. Lay tile with grain running in one direction.

3. Adhere tile flooring to substrates using full spread of adhesive applied in compliance with flooring manufacturer's directions.
- C. Sheet Flooring:
1. Lay sheet flooring to provide as few seams as possible with economical use of materials. Match edges for color shading and pattern at seams in compliance with manufacturer's recommendations.
 2. Adhere sheet flooring to substrates using method approved by flooring manufacturer for type of sheet flooring and substrate condition indicated. Use modified conventional full-spread adhesive method with two-part epoxy adhesive under seams, latex-resin base multi-purpose adhesive elsewhere.
 3. Prepare seams in vinyl sheet flooring in accordance with manufacture's instructions for most inconspicuous appearance, sealing continuously with fluid-applied sealant or adhesive as standard with manufacturer.
- D. Accessories:
1. Apply wall base to walls, columns, pilasters, casework and other permanent fixtures in rooms or areas where base is required. Install base in lengths s long as practicable, with preformed corner units, or fabricated from base materials with mitered or coped inside corners; no joint to occur within 12" from corner. Tightly bond base to substrate throughout length of each piece, with continuous contact at horizontal and vertical surfaces.
 2. On masonry surfaces, or other similar irregular substrates, fill voids along edge of resilient wall base with manufacturer's recommended adhesive filler material.
 3. Place resilient edge strips tightly butted to flooring and secure with adhesive. Install edging stripes at edges of flooring which would otherwise be exposed.
 4. Apply resilient stair nosings as indicated in accordance with manufacturer's installation instructions.
- E. Correcting defects: Correct unsatisfactory conditions in completed work, such as damaged flooring materials, areas which show poor adhesion, lumps appearing due to particles under flooring, uneven surfaces, and other evidence of improper subfloor preparation.

3.04 CLEANING AND PROTECTION

- A. Perform following operations immediately upon completion of resilient flooring:
1. Sweep or vacuum floor thoroughly.
 2. Do not wash floor until time period recommended by resilient flooring manufacturer has elapsed to allow resilient flooring to become well-sealed in adhesive.
 3. Damp-mop floor being careful to remove black marks and excessive soil.
 4. Remove any excess adhesive or other surface blemishes, using appropriate cleaner recommended by resilient flooring manufacturers.
- B. Protect flooring against damage during construction period to comply with resilient flooring manufacturer's directions. Wherever flooring is subjected to rolling loads for initial period following installation, cover with plywood or hardboard. Use dollies to move stationary equipment or furnishings across floors.
- C. Cover resilient flooring with undyed, untreated building paper until inspection for substantial completion.

END OF SECTION 09650 RESILIENT FLOORING

Section 09680 Carpet

Part 1 – General

1.01 RELATED DOCUMENTS

- A. Drawings and General Provision of Contract, including General and Supplementary Conditions and Division I Specification sections, apply to work of this Section.

1.02 DESCRIPTION OF WORK

- A. Extent of carpeting is indicated on drawings and finish schedule, and is defined to include carpet and accessories.
- B. Method of installation is glue-down.

1.03 QUALITY ASSURANCE

- A. Installer Qualifications: Firm with not less than 5 years of experience in installing commercial carpeting of type, quantity and installation methods similar to work of this Section.
- B. Manufacturer Qualifications: Firm whose carpet materials comply with “Use of Materials Bulletin UM-44C” published by U.S. Department of Housing and Urban Development (HUD) and are currently listed in HUD “Certified Products Directory” and so identified by imprint on back of carpet.
- C. General Terminology/Information Standard: Refer to current edition of “Carpet Specifier’s Handbook” by the Carpet and Rug Institute, for definitions of terminology not otherwise defined herein, and for general recommendations and information.
- D. Surface Burning Characteristics: Provide carpet identical to that tested for the following fire performance characteristics, per test method indicated below, by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify carpet with appropriate markings of applicable testing and inspecting organization.
 - 1. Test Method: DOC FF 1-70.
 - 2. Rating: Pass.
- E. Fade Resistance: Where a fade resistance factor is indicated for carpet, provide materials which have been tested by AATCC Test Method 16E, for a maximum gray scale factor of 4 when tested for a period of 40 hours, except as otherwise indicated.
- F. Static Resistance: Provide yarn or yarn blend as indicated in carpet construction, or by inclusion of small percentages of special anti-static yarn, known to be effective in achieving indicated static resistance./ Where rating is not otherwise indicated, provide 3.5 kV resistance for 20% RH at 70°F AATCC 134.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer’s complete technical product data for each type of carpet, cushion and accessory item required.
- B. Shop Drawings: Submit carpet layout and seaming drawings, clearly indicating carpet directions, locations and methods of joining seams, and location and types of edge strips. Indicate columns, doorways, enclosing walls, partitions, built-in cabinets and locations where cutouts are required in carpet.

- C. Samples: Submit 12 inch square samples of each carpet required, and 12 inch long samples of each type exposed edge stripping and accessory item.
- D. Certification: Submit manufacturer's certification stating that carpet materials furnished comply with specified requirements. Include listing of mill register numbers for carpet furnished.
- E. Maintenance Data: Submit manufacturer's printed maintenance recommendations, including methods and frequency recommended for maintaining carpet in optimum conditions under anticipated traffic and use conditions.

1.05 EXTRA STOCK

- A. Overrun: Where carpet is supplied from custom run at mill, produce and deliver at least 5% overrun on calculated yardage. Provide required overrun exclusive of carpet needed for proper installation, waste and usable scraps.

1.06 DELIVERY AND STORAGE

- A. Deliver carpeting materials in original mill protective wrapping with mill register number and tags attached. Store inside, in well ventilated area, protect from weather, moisture and soiling.

1.07 WARRANTY

- A. Provide special project warranty, signed by Contractor, Installer and Manufacturer (Carpet Mill), agreeing to repair or replace defective materials and workmanship of carpeting work during 2-year warranty period following substantial completion. Attach copies of product warranties.

Part 2 – Products

2.01 CARPET

- A. Acceptable Manufacturers: Products listed below are specified herein to establish appearance characteristics. Similar products of other manufacturers will be acceptable if appearance characteristics are sufficiently comparable in sole judgement of Vocon Design, Inc..
 - 1. Lees Carpet
 - a. "CPT-1"-Carpet – see Architectural drawing #A4.0

2.02 CARPET ACCESSORIES

- A. Carpet edge Guard, Nonmetallic: Extruded or molded heavy-duty vinyl or rubber carpet edge guard of size and profile indicated and with minimum 2 inch wide anchorage; colors selected by Interior Designer from among standard colors available within the industry (any manufacturer).
- B. Installation Adhesive: Water-resistant, nonstaining type as recommended by carpet manufacturer, and which complies with flammability requirements for installed carpet.
- C. Seaming Cement: Hot-melt seaming adhesive or similar product recommended by carpet manufacturer, for taping seams and buttering cut edges at backing to form secure seams and prevent pile loss at seams.
- D. Leveling Compound: Use carpet leveling compound "whenever necessary" in areas where the floor is not even. "See Carpet Manuf." For general guidelines on the best compound to use.

Part 3 – Execution

3.01 PRE-INSTALLATION REQUIREMENTS

- A. Examine substrates for moisture content and other conditions under which carpeting is to be installed. Repair minor holes, cracks, depressions or rough areas using material recommended by carpet or adhesive manufacturer. Notify Contractor in writing of major conditions detrimental to proper completion of the work. Do not proceed until unsatisfactory conditions have been corrected.
- B. Clear away debris and scrape up cementitious deposits from surfaces to receive carpeting; vacuum clean immediately before installation. Check concrete surfaces to ensure no dusting through installed carpet; apply sealer where required to prevent dusting.
- C. Sequence carpeting with other work so as to minimize possibility of damage and soiling of carpet during remainder of construction period.

3.02 INSTALLATION

- A. General:
 - 1. Comply with manufacturer's instructions and recommendations for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doors, center seams under doors; do not place seams in traffic direction at doorways.
 - 2. Extend carpet under open-bottomed obstructions and under removable flanges and furnishings, and into alcoves and closets of each space.
 - 3. Provide cutouts where required, and bind cut edges properly where not concealed by protective edge guards or overlapping flanges.
 - 4. Install carpet edge guard where edge of carpet is exposed; anchor guards to substrate.
 - 5. Do not bridge building expansion joints with continuous carpeting; provide for movement.
- B. Glue-Down Installation:
 - 1. Fit sections of carpet into each space before applying adhesive. Trim edges and coat cuts with sealing cement.
 - 2. Apply adhesive uniformly to substrate in accordance with manufacturer's instructions. Butt carpet edges tightly together to form seams without gaps. Roll entire carpet area lightly to eliminate air pockets and ensure uniform bond. Remove adhesive promptly from face of carpet.

3.03 CLEANING AND PROTECTION

- A. Remove and dispose of debris and unusable scraps.
- B. Vacuum carpet using commercial machine with face-beater element. Remove spots and replace carpet where spots cannot be removed. Remove any protruding face yarn using sharp scissors.
- C. Advise Contractor of protection methods and materials needed to ensure that carpeting will be without deterioration or damage at time of substantial completion.
- D. Maintenance Materials: Deliver specified overrun (if any) and usable scraps of carpet to Owner's designated storage space, properly packaged (paper wrapped) and identified. Usable scraps are defined to include roll ends of less than 9 ft length, and pieces of more than 3 sq. ft area and more than 8 inches wide. Dispose of smaller pieces.

END OF SECTION 09680 CARPET

Section 09900 Painting

Part 1 – General

1.01 RELATED DOCUMENTS

- A. Drawings and General Provision of Contract, including General and Supplementary Conditions and Division I Specification sections, apply to work of this Section.

1.02 DESCRIPTION OF WORK

- A. Extent of painting work is indicated on drawings and schedules, and as herein specified.
- B. Definitions:
1. "Paint" as used herein means all coating systems materials, including primers, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.
 2. Surface preparation, priming and coats of paint specified are in addition to shop priming and surface treatment specified under other sections of work, except as noted.
 3. Where items or surfaces are not specifically mentioned, paint the same as similar adjacent materials or area. If color or finish is not designated, Architect will select these from standard colors or finishes available.
- C. Work Included: Surfaces to be painted consist generally of the following:
1. Touch-up of Shop Primer: Perform touch-up not specified elsewhere, and on primed surfaces damaged since previous touch-up.
 2. Exterior and Interior Surfaces:
 - a. Prime Painted and/or galvanized steel surface, only where exposed to view after all finishes are in place.
 - b. Prime painted steel doors.
 - c. Glassfiber reinforced gypsum units.
 - d. Exposed concrete, masonry, and gypsum drywall surfaces only where noted on drawings or finish schedules.
 - e. Exposed finish woodwork.
 - f. Painting for exterior steel.
 3. Certified Bonsal stucco contractor shall paint the exterior FRP one coat stucco system. See Section 09220 for further information.
- D. Painting Not Included: The following categories of work are not included as part of the field-applied finish work or are included in other specification sections:
1. Shop Priming: Ferrous metal items such as structural steel, metal fabrications, roof accessories, and steel doors and frames.
 2. Prefinished Items: Further painting is not required on such prefinished items as aluminum entrances and storefronts, wood doors, preformed copings, aluminum windows, toilet partitions, wall louvers, metal lockers, fire extinguisher cabinets, storage shelving, and various items of mechanical and electrical equipment.
 3. Concealed Parts: Unless otherwise indicated, do not paint moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sensing devices, motor and fan shafts.
 4. Certain Galvanized Items: Cable, chains, and gratings.
- E. Related Work Specified Elsewhere: The following are specified in other sections:
1. Sections 05120 and 05400 – Touch-up of primer on structural steel and steel joists.
 2. Section 09250 – Joint finishing for gypsum drywall work.

- F. Labels: Do not paint over any code-required labels, such as UL or FM, or any equipment identification, performance rating, name, or nomenclature plates.
- G. Traffic markings on paving, curbs, ramps, etc. See Civil Engineering Drawings.

1.03 QUALITY ASSURANCE

- A. Single Source Responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits.
- B. Coordination of Work: Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information or characteristics of finish materials provided for use, to ensure compatible prime coats are used.

1.04 SUBMITTALS

- A. Product Data: Submit list of proposed paint systems and products for each surface and item to be painted, and manufacturer's technical information including paint labels analysis and application instructions for each material proposed for use.
- B. Samples: Before beginning work, Architect will furnish color chips for surfaces to be painted. Use representative colors when preparing samples for review. Submit samples for Architect's review of color and texture only. Provide a listing of material and application for each coat of each finish sample.
 - 1. On 12 x 12 inch hardboard, provide two samples of each color and material, with texture to simulate actual conditions. Resubmit samples as requested by Architect until acceptable sheen, color, and texture is achieved.
 - 2. On actual wood surfaces, provide two 4x 8 inch samples of natural and stained wood finish. Label and identify each as to location and application.
 - 3. On actual wall surfaces and other exterior and interior building components, duplicate painted finishes of prepared samples. Provide full-coat finish samples of at least 100 sq. ft of surface, as directed, until required sheen, color and texture is obtained; simulate finished lighting conditions for review of in-place work. Final acceptance of colors will be from samples applied on the job.
- C. Ferrous Metal: Provide two 4 inch square samples of flat metal surfaces and two 8 inch long samples of solid metal for each type of color and finish; define prime and finish coats.

1.05 DELIVERY AND STORAGE

- A. Deliver materials to job site in original, new packages and containers bearing manufacturer's name and label, and following information:
 - 1. Name or title of material.
 - 2. Manufacturer's stock number and date of manufacture.
 - 3. Manufacturer's name.
 - 4. Contents by volume, for major pigment and vehicle constituents,
 - 5. Thinning instructions.
 - 6. Application instructions.
 - 7. Color name and number.
- B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage of paint in a clean condition, free of foreign materials and residue.

- C. Protect from freezing where necessary. Keep storage area neat and orderly. Remove oily rags and waste daily. Take all precautions to ensure that workmen and work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing and application of paints.

1.06 JOB CONDITIONS

- A. Apply water-base paints only when temperature of surfaces to be painted and surrounding air temperatures are between 50 and 90°F, unless otherwise permitted by paint manufacturer's printed instructions.
- B. Apply solvent-thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45 and 95°F, unless otherwise permitted by paint manufacturer's printed instructions.
- C. Do not paint in snow, rain, fog or mist, or when relative humidity exceeds 85%, or on damp or wet surfaces, unless otherwise permitted by paint manufacturer's printed instructions.
- D. For exterior metals, do not apply coatings in snow, rain, fog or mist, or when relative humidity exceeds 85%, or at temperatures less than 5°F above the dew point, or to damp wet surfaces unless otherwise permitted by paint manufacturer's printed instructions. Allow wet surfaces to dry thoroughly and attain the temperature and conditions specified before proceeding with or continuing the coating operation.
 - 1. Work area may continue during inclement weather only if areas and surfaces to be coated are enclosed and the temperature within the area can be maintained within limits specified by the manufacturer during application and drying periods.
- E. Painting may be continued during inclement weather if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods.

Part 2 – Products

2.01 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include:
 - 1. Benjamin Moore and Co.
 - 2. Sherwin Williams
- B. For Exterior Ferrous Metals: Products specified are manufactured by Tnemec Company, Inc., Kansas City, MO, and are specified as the standard of quality. Equivalent materials of other manufacturers may be substituted only by approval of the Architect or Engineer. No substitute will be accepted which changes the generic type of coating specified. Submitted products will have certified test results indicating equal or improved performance criteria based on ASTM testing procedures.

2.02 MATERIALS

- A. Material Quality: Provide best quality grade of various types of coatings as regularly manufactured by acceptable paint manufacturers. Materials not displaying manufacturer's identification as a standard, best-grade product will not be acceptable.
- B. Color Pigments: Pure, non-fading, applying types to suit substrates and services indicated.

- C. Required Coatings: Refer to par. 3.08 Paint Schedule.
- D. Exterior Coating Material: Exterior exposed steel and miscellaneous metals: Provide long term protective coating system providing galvanic protection and long term color and gloss retention.

Part 3 – Execution

3.01 INSPECTION

- A. Examine areas and conditions underwhich paint is to be applied and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to Applicator. Starting of painting work will be construed as Applicator's acceptance of surfaces and conditions within any particular area.
- B. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable paint film.

3.02 SURFACE PREPARATION

- A. General:
 - 1. Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as herein specified, for each particular substrate condition.
 - 2. Provide barrier coats over incompatible primers or remove and reprime as required. Notify Architect in writing if any anticipated problems in using the specified coating systems with substrates primed by others.
 - 3. Remove hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish painted, or provide surface-applied protection before beginning surface preparation and painting. Remove, if necessary, for complete painting of items and adjacent surfaces. Following completion of painting of each space or area, reinstall removed items.
 - 4. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease before mechanical cleaning. Program cleaning and painting so that contaminants form cleaning process will not fall onto wet, newly-painted surfaces.
 - 5. Ferrous Metal Surfaces: Sand-blast and clean non-galvanized, ferrous metal surfaces, that have not been shop coated, remove oil, grease, dirt, loose mill scale ad other foreign substances. Use solvent or mechanical cleaning methods that comply with the recommendations of the Steel Structural Painting Council. Utilize SSPC's SP6 abrasive blast procedures or chemical phosphate pretreatment on hollow metal doors, windows and railings. Utilize SSPC-SP6 Commercial Blast Methods on all architecturally exposed structural steel.
 - a. Touch-up shop applied prime coats which have been damaged, and bare areas. Wire-brush solvent clean, and touch-up with the same primer as the shop coat.
- B. Wallboard and Gypsum Plaster: Scrape surface irregularities, smooth off taped joints, and spackle nail holes, cracks and gouges.
- C. Wood:
 - 1. Remove dirt, oil and other foreign substrates with scrapers, mineral spirits, and sandpaper, as required. Sand smooth those finished surfaces exposed to view, and dust off. Scrape and clean small, dry seasoned knots and apply a thin coat of white shellac or other recommended knot sealer, before priming. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
 - 2. Prime, stain, or seal wood required to be job-painted immediately upon delivery to job. Prime edges, ends, faces, undersides, and backsides of such wood.

3. When treatment finish is required, use spar varnish for back-priming.
- D. Ferrous Metals:
 1. Clean ferrous surfaces, which are not galvanized or shop-coated, of oil, grease, dirt, loose mill scale and other foreign substrates by solvent or mechanical cleaning.
 2. Touch-up shop-applied prime coats wherever damaged or bare, using same type paint as shop primer.
- E. Galvanized Surfaces: Clean free of oil and surface contaminants with nonpetroleum based solvent.

3.03 MATERIALS AND PREPARATION

- A. Mix and prepare painting materials in accordance with manufacturer's directions.
- B. Maintain containers used in mixing and application of paint in a clean condition, free of foreign materials and residue.
- C. Stir materials before application to produce a mixture of uniform density, and stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.

3.04 APPLICATION

- A. General:
 1. Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited to substrate and type of material being applied.
 2. In most cases, paint color, surface treatments, and finishes are indicated in schedules on the drawings. If not designated, Architect will select these from manufacturer's available colors.
 3. Provide finish coats which are compatible with prime paints used.
 4. Apply additional coats when undercoats, stains or other conditions show thru final coat of paint, until paint film is of uniform finish, color and appearance. Give special attention to insure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
 5. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Paint surfaces behind permanently-fixed equipment or furniture with prime coat only before final installation of equipment.
 6. Paint interior surfaces of ducts, where visible through register or grilles, with flat, nonspecular black paint.
 7. Paint back sides of access panels, and removable or hinged covers to match exposed surfaces.
 8. Finish exterior doors on top, bottom and side edges same as exterior faces, unless otherwise indicated.
 9. Sand lightly between each succeeding enamel or varnish coat.
- B. Scheduling Painting:
 1. Apply first-coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
 2. Allow sufficient time between successive coatings to permit proper drying. DO not re-coat until paint has dried or where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

- C. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as indicated or, if not indicated, as recommended by coating manufacturer.
- D. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to unfinished items exposed in equipment rooms and in occupied spaces, or finished items where color must match adjacent surfaces.
- E. Prime Coats:
 - 1. Apply prime coat of material, which is required to be painted or finished, and which has not been prime coated by others.
 - 2. Omit first coat (primer) on metal surfaces which have been shop-primed and touch-up painted.
 - 3. Re-coat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-thru or other defects due to insufficient sealing.
- F. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other surface imperfections will not be acceptable.
- G. Transparent (clear) Finish: Use multiple coats to produce glass-smooth surface film of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections. Provide satin finish for final coats, unless otherwise indicated.
- H. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or repaint work not in compliance with specified requirements.
- I. Parking and Traffic Marking: Sweep and clean surface to eliminate loose material and dust immediately before painting. Using specified parking and traffic marking paint, provide parking lines, handicap symbols, direction arrows and the like, as indicated or directed. Apply paint with mechanical equipment to produce uniform straight edges. Apply in 1 coat and at rate recommended by manufacturer.

3.05 FIELD QUALITY CONTROL

- A. If material selected does not handle satisfactorily or give proper results, call in the manufacturer's representative and request detailed directions for correcting the problem. Unsatisfactory work must be removed and replaced to entire satisfaction of the Architect without additional cost to the Owner.

3.06 CLEANING AND DISPOSAL

- A. During progress of work, remove from the site discarded paint materials, rubbish, cans and rags at end of each work day.
- B. Upon completion of painting work, clean window glass and other paint spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

3.07 PROTECTION

- A. Protect work of other trades, whether to be painted or not, against damage by painting or finishing work. Correct any damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.

- B. Provide Wet Paint signs as required to protect newly-painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting surfaces.
- C. At completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

3.08 PAINT SCHEDULE

- A. See Architectural Drawings for Finish Schedule and provide the following paint system for the various substrates, in addition to shop-applied primers, unless otherwise indicated.
- B. Interior Paint and Coating Systems:
 - 1. Gypsum Drywall – odorless alkyd semi-gloss:
 - 1 coat Pro-Mar 200 Latex Wall primer
 - 2 coats Pro-Mar 200 Alkyd Semi-Gloss Enamel
 - 2. Plaster – odorless alkyd semi-gloss:
 - 1 coat Wall and Wood Primer
 - 2 coats Pro-Mar 200 Alkyd semi-Gloss Enamel
 - 3. Concrete Unit Masonry – odorless alkyd semi-gloss:
 - 1 coat Heavy Duty Block Filler
 - 2 coats Pro-Mar 200 Alkyd Semi-Gloss Enamel
 - 4. Wood: – odorless alkyd semi-gloss:
 - 1 coat Wall and Wood Primer
 - 2 coats Pro-Mar 200 Alkyd Semi-Gloss Enamel
 - 5. Ferrous Metal: Alkyd Semi-Gloss:
 - 1 coat Kromik Metal Primer (unprimed areas only)
 - 2 coats Pro-Mar 200 Alkyd Semi-Gloss Enamel
- C. Special Coatings:
 - 1. Gypsum Drywall – polyamide epoxy, gloss (HIPAC*):
 - 1 coat Pro-Mar 200 Latex Wall Primer
 - 2 coats Tile-Clad II Enamel
 - 2. Concrete Unit Masonry – polyamide epoxy, gloss (HIPAC*):
 - 1 coat Heavy Duty Block Filler
 - 2 coats Tile-Clad II Enamel

HIPAC – high performance architectural coating
- D. Tnemec Spec for Steel Exterior Metals: Galvanized Ferrous: Exterior exposed steel & Miscellaneous Metals: Provide long-trim protective coating system galvanic protection and long term color and gloss retention:
 - 1. Primer: Tnemec Series 90-97 Tneme-Zinc @ 2.5-3.5 mills DFT (reference structural and miscellaneous metals sections with Tnemec Series 90-97).
 - 2. Intermediate: (or Primer on Galvanized Steel or pre-primed steel): Tnemec Series 161-BF82 Tneme-Fascure @ 3-5 mills DFT.
 - 3. One coat Tnemec Series 74 (color) Endura-Shield @2-4 mills DFT. One coat Tnemec Series 76 Endura-Shield Clear-Coat @ 1-2 mills DFT.
 - 4. Color to be selected by Interior Designer.

END OF SECTION 09900 PAINTING

Section 10520 Fire Protection Specialties

Part 1 – General

1.01 SUMMARY

- A. Description of Work: Work of this Section includes, but is not necessarily limited to, the following:
1. Fire extinguishers.
 2. Accessories.

1.02 SUBMITTALS

- A. Product Data:
1. Submit manufacturer's specifications and installation instructions for each component.
 2. Include photographic catalog cuts for manufacturer's standard components, including hardware, anchors and fasteners,

1.03 SYSTEM REQUIREMENTS

- A. Interface With Other Systems:
1. Coordinate Work with other trades affected by Work of this Section.
 2. Provide items including inserts and anchors, accurately in relation to final locations of components, in a timely manner so as not to delay job progress.
 3. Coordinate with other materials or fixtures mounted within, or adjacent to assemblies or requiring access.
 4. Use Contractor's bench marks.

1.04 QUALITY ASSURANCE

- A. Regulatory Requirements: Conform to applicable requirements of authorities having jurisdiction over Project.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, handle and protect products in accordance with manufacturer's instructions.
- B. Store in protected and dry area in manufacturer's unopened protective shipping packaging.
- C. Support as required to prevent any damage to materials.

Part 2 – Products

2.01 COMPONENTS

- A. Fire Extinguishers:
1. Provide building standard fire extinguishers.
 2. Type: Multi-purpose dry chemical, UL Rating 2A-10BC.

2.02 ACCESSORIES

- A. Fire Extinguisher Mounting Brackets:
1. Provide manufacturer's standard brackets for mounting extinguishers are indicated without cabinets.

2. Provide size as required to accommodate extinguisher.
 3. Building standard mounting brackets are acceptable.
- B. Miscellaneous Accessories: Provide anchors and other accessories as required for complete installation.

Part 3 – Execution

3.01 EXAMINATION

- A. Examine substrates and adjoining construction and conditions under which Work is to be installed. Do not proceed with Work until unsatisfactory conditions are corrected.

3.02 INSTALLATION

- A. Install items in accordance with manufacturer's recommendations and in locations and at mounting heights indicated. If not indicated, locate and mount at heights required to comply with applicable regulations of local governing authorities.
- B. Set Work accurately as measured from established building lines and levels, plumb and in true alignment with previously completed Work.
- C. Anchor securely in place to supporting construction, using concealed anchorage wherever possible.
- D. Extinguishers:
 1. Install extinguishers on brackets as indicated and as required.
 2. Properly charge and tag extinguisher, showing date of installation.
 3. Identify bracket mounted extinguishers with red letter decals spelling-FIRE EXTINGUISHER- applied to wall surface; letter size, style and location as acceptable to Architect.

3.03 CLEANING AND REPAIR

- A. Remove protective coverings when there is no longer danger of damage to Work from other Work.
- B. Restore protective coverings which have been removed or damaged during shipment or installation of Work if other Work is still required to be performed in same location.
- C. Clean exposed to view surfaces prior to final acceptance.
- D. Replace units damaged units as directed.

END OF SECTION 10520 FIRE PROTECTION SPECIALTIES

Section 10800 Toilet Accessories

Part 1 – General

- 1.01 SECTION INCLUDES
- A. Toilet accessories.
 - B. Grab bars.
 - C. Attachment hardware.
- 1.02 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION
- A. Placement of concealed anchor devices.
 - B. Placement of backing plate reinforcement
- 1.03 REFERENCES
- A. ANSI A117.1 - Safety Standards for the Handicapped.
 - B. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - C. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - D. ASTM A269 - Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - E. ASTM A366 - Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.
 - F. ASTM B456 - Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
 - G. NEMA LD-3 - High Pressure Decorative Laminates.
- 1.04 SUBMITTALS
- A. Submit under provisions of Section 01340. PRIOR TO ORDERING, Contractor shall coordinate through KeyBank Construction Manager for approval.
 - B. Product Data: Provide data on accessories describing size, finish, details of function, attachment methods.
 - C. Samples: Submit two samples of each component, illustrating color and finish.
 - D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and maintenance.
- 1.05 REGULATORY REQUIREMENTS
- A. Conform to ANSI A117.1 code for access for the handicapped.
- 1.06 FIELD MEASUREMENTS

- A. Verify that field measurements are as instructed by the manufacturer.

1.07 COORDINATION

- A. Coordinate work under provisions of Section 01039
- B. Coordinate the work with the placement of internal wall reinforcement to receive anchor attachments.

Part 2 – Products

2.01 MANUFACTURERS

- A. Bobrick
- B. Kimberly-Clark
- C. Kohler
- D. Fort Howard

2.02 MATERIALS

- A. Sheet Steel: ASTM A366.
- B. Stainless Steel Sheet: ASTM A167, Type 304.
- C. Tubing: ASTM A269, stainless steel
- D. Plastic Laminate: NEMA LD-3,[General Purpose.
- E. Adhesive: Two-component epoxy type, waterproof.
- F. Fasteners, Screws, and Bolts: Hot dip galvanized, tamper-proof.
- G. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.
- H. Primer: Special bonding as required by manufacture.

2.03 FABRICATION

- A. Weld and grind joints of fabricated components, smooth.
- B. Form exposed surfaces from single sheet of stock, free of joints. Form surfaces flat without distortion. Maintain surfaces without scratches or dents.
- C. Fabricate grab bars of tubing, free of visible joints, return to wall with end attachment flanges. Form bar with 1 ½ inches clear of wall surface. [Knurl grip surfaces.]
- D. Shop assemble components and package complete with anchors and fittings.
- E. Provide steel anchor plates, adapters, and anchor components for installation.

2.04 KEYING

- A. Supply two keys for each accessory to Owner.
- B. Master key all accessories.

2.05 FINISHES

- A. Galvanizing: ASTM A123 to 1.25 oz/sq yd (380g/sq m). Galvanize ferrous metal and fastening devices.
- B. Shop Primed Ferrous Metals: Pretreated and clean, spray applies one coat primer and bake.
- C. Enamel: Pretreated to clean condition, apply one coat primer and minimum two coats electrostatic baked enamel.
- D. Chrome/Nickel Plating: ASTM B456, Type SC 2 satin finish.
- E. Stainless Steel: No. 4 satin luster finish.
- F. Back paint components where contact is made with building finishes to prevent electrolysis

Part 3 – Execution

3.01 EXAMINATION

- A. Verify that site conditions are ready to receive work and dimensions are as instructed by the manufacturer.
- B. **Verify exact location of accessories for installation KeyBank Construction Manager for approval.**

3.02 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

- A. Install accessories in accordance with manufacturers' instructions and ANSI A117.1.
- B. Install plumb and level, securely and rigidly anchored to substrate.

3.04 SCHEDULE

SEE ARCHITECTURAL DRAWING FOR SPPECIFICATION OF PRODUCTS USED.

END OF SECTION 10800 TOILET ACCESSORIES

Section 11400 Appliances

Part 1 – General

1.01 DESCRIPTION OF WORK

- A. Extent of nonresidential equipment required is indicated on drawings and includes the following. Descriptions given apply to as many of each item as are required for the project.
1. Microwave Oven
 2. Full Size Refrigerator

1.02 QUALITY ASSURANCE

- A. Certification labels: provide nonresidential equipment which complies with standards and bears certification labels as follows:
1. Energy ratings: provide energy guide labels with energy cost analysis (Annual Operating Costs) and efficiency information as required by Federal Trade Commission.
 2. UL Standards: provide nonresidential equipment with UL Labels.

1.03 SUBMITTALS

- A. Product Data: submit manufacturer's specifications, installation instructions, and maintenance instructions for each item of nonresidential equipment.

1.04 DELIVERY AND STORAGE

- A. Deliver products to project site in manufacturer's undamaged protective containers, after spaces to receive them have been fully enclosed.

1.05 WARRANTIES

- A. Submit manufacturer's standard written warranty for each item of nonresidential equipment.

Part 2 – Products

2.01 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include:
1. Kenmore

2.02 MATERIALS AND FABRICATION

- A. Colors: provide manufacturer's standard colors as indicated. Wherever nonresidential equipment by more than one manufacturer is installed in same space, provide units with color matching largest equipment item, unless otherwise indicated.
- B. Microwave Oven: .9 cu ft capacity 120 volt, 1300 watt input, 800 watt output, 12.5 ampere, with 4 stage program cooking, digital timer and 10 power control levels. Provide 5 years warranty. Mounted under wall cabinet w/ under cabinet kit. Color: White.
1. Product/manufacturer: microwave oven Model# 20-63252, as manufactured by Kenmore.

- C. Refrigerator: 21.0 Cu. Ft. Top-Freezer refrigerator with water chiller dispenser. Size: 67 ½" H.x 33" D.x 31 ½" W. Color: White.
 - 1. Product/manufacturer: bottom-mount refrigerator model #46-67172 **OR SIMILAR LATEST MODEL** as manufactured by Kenmore.
 - 2. General Contractor to provide & install water supply line.

Part 3 – Execution

3.01 INSTALLATION

- A. General: comply with manufacturer's instructions and recommendations.
- B. Built-in equipment: securely anchor units to supporting cabinetry or countertops using concealed fasteners. Verify that clearances are adequate for proper functioning and rough openings are completely concealed.
- C. Freestanding equipment: place units in final locations after finishes have been completed in each area. Verify that clearances are adequate for proper operation of equipment.
- D. Utilities: Refer to Division 16 for Electrical Requirements.
- E. General Contractor to coordinate with Manufacturer Recommendations for supply lines & power requirements.

3.02 ADJUST AND CLEAN

- A. Testing: Test each item to verify proper operation. Make necessary adjustments.
- B. Accessories: Verify that accessory items required have been furnished.
- C. Cleaning: Remove packing material and leave units in clean condition, ready for operation.

END OF SECTION 11400 APPLIANCES

Section 12500 Window Treatment

Part 1 – General

1.01 DESCRIPTION

- A. 1" Horizontal Aluminum Mini-Blind with lifetime warranty and antistatic dust protection window shade system. Contractor to provide and install 4 ½" Rope Cleats at each window blind location.
- B. One manufacturer who shall take full responsibility for the total project shall provide all shade systems specified in this section.

1.02 SUBMITTALS

- A. Submit shop drawings indicating opening sizes, tolerances required, installation of blind at window opening, method of attachment, clearances, and operation.
- B. Submit two samples illustrating slat materials and finish, color, cord, rod, type and color.

1.03 DELIVERY, STORAGE AND HANDLING

- A. Deliver blinds wrapped and crated in a manner to prevent damage to components or marring of surfaces.
- B. Store in a clean, dry area, laid flat and blocked off ground to prevent sagging, twisting, or warping.

1.04 EXTRA MATERIALS

- A. Furnish ten additional slats of each color selected.

Part 2 – Products

2.01 ACCEPTABLE MANUFACTURERS

- A. Bali Products are specified herein to establish appearance characteristics. Similar products of other manufacturers will be acceptable if appearance characteristics are sufficiently comparable in sole judgement of Vocon Design, Inc.

2.02 SHADE SYSTEM:

- A. 1" Horizontal Aluminum Mini-Blind with lifetime warranty and antistatic dust protection window shade system as manufactured by Bali. Contractor to provide 4 ½" Rope Cleats as manufactured by Stanley.
 - 1. Provide fully factory assembled shade unit consisting of 2 end brackets, shade tube, extruded aluminum type. Removal must not require the disassembly of the shade unit.
 - 2. Headrail shall be .025" thick aluminum, "U" shaped 1" high x 1 ½" wide. All hardware shall be enclosed in Headrail.
 - 3. Guardian Tilter mechanism shall be of .042" thick Tomized steel housing with a self-lubricating nylon, automatically disengaging worm and gear mechanism to eliminate overdrive.
 - 4. Cord Lock shall be .042" thick Tomized steel and shall be crushproof.
 - 5. Drum and Cradle shall be provided for each ladder.
 - a. Drums shall be of .031" thick Tomized steel.

- b. Cradles shall be .042" thick Tomized steel.
6. Installation Brackets shall be of at least .048" thick Tomized steel with a rivet-hinged safety locking front cover to permit removal of Headrail without lateral movement.
7. Ladders (slat supports): Distance between slats shall not exceed 19.6 mm (nominally 15.7 slats per vertical foot).
8. Slats shall be of 5000 Series magnesium aluminum alloy, which includes recycled aluminum materials. Slats shall be nominally 1" wide .0075"+/- .0003" thick (prior to coating); after coating, the thickness of the slats shall be nominally .0085".
9. A coating includes a paint process, which disrupts the natural static attraction of airborne dust particles, reducing dust build-up on the slat from 50-70 percent.
10. Bottomrail shall be of .031" thick Tomized steel.
11. 4 ½" Rope Cleats: #EDP 76-6485, finish: US2C (verify with Vocon Design)

Part 3 – Execution

3.01 INSTALLATION

- A. Do not commence fabrication until field measurements are confirmed.
- B. Install blinds in accordance with manufacturer's instructions.
- C. Adjust blinds for smooth operation and leave in clean condition.

END OF SECTION 12500 WINDOW TREATMENT

Section 15010 General Mechanical Requirements

Part 1 – General

1.01 GENERAL

- A. Specifications are applicable to all contractors and/or subcontractors for mechanical systems.
- B. Check other plans and specifications and fully coordinate with other trades, Owner and Architect requirements.
- C. Conform to all general and special conditions of contract as specified by Architect and/or Owner.
- D. Visit site, check facilities and conditions and make all necessary observations and measurements. Note conditions under which work is to be performed and take all items into consideration in bid.
- E. Systems are to be complete and workable in all respects, placed in operation and properly adjusted.
- F. Each contractor shall provide for his own clean-up, removal and legal disposal of all rubbish daily.
- G. Contractor shall protect his work, the existing and adjacent property against weather.
- H. Any work damaged by failure to provide protection required, shall be removed and replaced with new material at the Contractor's expense.
- I. Contractor must confirm all utility company requirements and connection points in field, prior to starting work.
- J. Arrange for and obtain Owner's and Insurance Representative's permission for any service shutdowns.
- K. The Contractor shall be solely responsible for construction means, methods, sequences of construction and the safety of workmen.
- L. No piping, ductwork, wiring, etc., shall be installed or routed above electrical panels and equipment or through elevator equipment rooms.
- M. The Mechanical Contractor shall coordinate with the Electrical Contractor and obtain a written approval identifying the electrical characteristics of all mechanical equipment prior to ordering of equipment. No additional payment will be made for lack of contractor coordination of electrical characteristics.
- N. Work related to the existing building shall be coordinated to minimize interference or interruption of normal building use by Owner. Refer to Architectural plans for phasing requirements.

1.02 CODES, PERMITS, STANDARDS AND REGULATIONS

- A. Conform to all applicable codes (Local, State, National Codes, NFPA, OSHA, ETC.), Government Regulations, Utility Company Requirements, and Applicable Standards.
- B. Obtain permits and pay all fees. Arrange for all required inspections and approvals.

1.03 RELATED WORK SPECIFIED ELSEWHERE:

- A. Openings and chases, when shown on Architectural drawings.
- B. Temporary water service, sanitary facilities, fire protection and heating during construction.
- C. Poured-in-place concrete.
- D. Finished painting.
- E. Electric power wiring.

1.04 DRAWINGS

- A. The systems as shown on mechanical drawings are diagrammatic. Confirm all dimensions by field measurement.
- B. The exact locations for fixtures, equipment and piping which is not covered by drawings, shall be obtained from the Architect or his representative in the field and the work shall be laid out accordingly.
- C. Drawings and specifications are intended to supplement one another. Any materials or labor called for in one but not the other shall be furnished as if both were mentioned in the specifications and shown on the drawings.

1.05 BASE EQUIPMENT, MATERIALS AND SUBSTITUTIONS

- A. All equipment and materials shall be new, free of defects and U.L. Labeled.
- B. Base bid manufacturers are included in the specifications or listed in schedules on the drawings. All other manufacturers are considered a substitution.
- C. The name or make of any article, device, material, form of construction, fixture, etc., stated in this specification, whether or not the words "OR APPROVED EQUAL" are used, shall be known as a "STANDARD".
- D. All proposals shall be based on "STANDARDS" specified.
- E. The equipment schedules on the drawings indicate manufacturer's equipment model numbers that this design has been based on. The use of other manufacturer's equipment that is listed as acceptable alternates that entails General Trades, Structural, Mechanical, Electrical, etc., revisions is this Contractor's responsibility. The Contractor submitting the acceptable alternates, which necessitates changes in installing such submitted alternate equipment, shall pay any additional cost of such changes even though such costs may be part of another division of work.
- F. Substitutions are subject to the approval of the Owner. If a substitution is submitted, it is the Contractor's responsibility to evaluate it and certify that the substitution is equivalent in all respects to the base specifications.
- G. If substitutions are approved by the Owner, notify all other contractors, subcontractors, etc., effected by the substitution and fully coordinate with them. Any costs resulting from substitution, whether by this Contractor or others, shall be the responsibility of and paid for by the substituting Contractor. Approved shop drawings do not absolve this contractor from this responsibility.
- H. All equipment shall be installed in full accordance with the manufacturer's data and installation instructions. It is this Contractor's responsibility to check and conform to these requirements prior to starting work.

1.06 WARRANTY

- A. Fully warrant all materials, equipment and workmanship for one (1) year from date of acceptance.
- B. Extend all manufacturers' warranties to Owner; including five (5) year compressor and ten (10) year heat exchanger extended warranty on HVAC equipment.
- C. Repair or replace without charge to the Owner all items found defective during the warranty period. In the case of replacement or repair due to failure within the warranty period, the warranty on that portion of the work shall be extended for a minimum period of one (1) year from the date of such replacement or repair.

1.07 SHOP DRAWING SUBMITTALS

- A. Submit shop drawings for Mechanical and Plumbing Systems, including but not limited to sheet metal, plumbing fixtures and equipment with adequate details and scales to clearly show construction. Indicate the operating characteristics for each required item. Clearly identify each item on the submittal as to mark, location and use, using same identification as provided on the Construction Documents.
- B. Contractor shall review and indicate his approval of each shop drawing prior to submittal for review. The Engineer will not review shop drawings unless the Contractor's approval is noted. Do not start work or fabrication until shop drawings have been reviewed by the Engineer and returned to the Contractor.
- C. Submittals will be reviewed only for general compliance with the contract documents and not for dimensions or quantities. The submittal review shall not relieve the contractor of responsibility for purchase of any item in full compliance with the contract documents or its complete and proper installation.
- D. Where submittals vary from the contract requirements, the Contractor shall clearly indicate on submittal or accompanying documents the nature and reason for the variations.
- E. Each manufacturer or his representative must check the application of his equipment and certify at time of shop drawing submittal that the equipment specified has been properly applied and can be installed, serviced and maintained where indicated on the drawings. Advise Engineer in writing with submittal drawings of any potential problems. The manufacturer shall be responsible for any changes that might be necessary because of physical characteristics of equipment that have not been called to the Engineer's attention at the time of submittal.

1.08 RECORD DRAWINGS

- A. Each contractor or subcontractor shall keep one (1) complete set of the contract drawings on the job site on which he shall regularly record any deviations or changes from such contract drawings made during construction.
- B. These drawings shall record the installed location of all concealed equipment, piping, electric service, sewers, wastes, vents, ducts, conduit, etc., by measured dimensions to each such item from column centerlines or readily identifiable and accessible walls or corners of the building. Plans also shall show invert elevation of sewers and top elevation of all other below-grade lines.
- C. Record drawings shall be kept clean and undamaged and shall not be used for any purpose other than recording deviations from working drawings and exact locations of concealed work.

- D. After the project is completed, these drawings shall be delivered to the Architect in good condition, as a permanent record of the installation as actually constructed.

Part 2 – Products

NOT USED

Part 3 – Execution

NOT USED

END OF SECTION 15010 GENERAL MECHANICAL REQUIREMENTS

Section 15050 Basic Materials and Methods

Part 1 – General

1.01 GENERAL

- A. Provide all materials, labor, equipment, and accessories required to furnish and install the mechanical items identified in this section.
- B. This section includes Basic Mechanical Materials and Methods to complement other DIVISION 15 SECTIONS in this specification and requirements indicated on the Mechanical Drawings.
- C. See Section 15010 General Mechanical Requirements

Part 2 – Products

2.01 EXCAVATION AND BACKFILL

- A. Perform all excavation and backfill required for installation of below grade piping.
- B. Excavate as required to install piping at required depth and pitch. Pipe to be laid on sand bedding to give uniform bearing along the length of pipe (sand inside the building and interlocking aggregate outside the building).
- C. Backfill with bedding material to a minimum of twelve (12) inches above top of pipe and compact. Balance of backfill in outdoor grass areas shall be clean earth up to six (6) inches above surrounding grades. Backfill below finished floors shall be sand and outdoors under paving shall be interlocking aggregate. All backfill shall be compacted in maximum twelve (12) inch layers.
- D. All other excavations shall be backfilled with clean earth, excluding rubbish and boulders. Backfill shall be thoroughly tamped and puddled.
- E. Patch floor to match existing adjacent surfaces.
- F. If the floor is a supported floor construction type, all under-slab piping must be suspended from structural slab above with void below piping. Piping shall not be placed directly upon sub-base material. Refer to structural drawings for hanger details.

2.02 SUPPORTS AND HANGERS

- G. Hangers and supports are to be provided to properly support, secure and align piping and to meet field conditions and as manufactured by Grinnell or Michigan.
- H. Spacing to comply with ASHRAE Standards and Local Code Requirements.

2.03 ESCUTCHEONS

- A. Fit all pipe passing through walls, floors or ceilings in finished rooms with steel or brass escutcheons. Where surface is to receive a paint finish make escutcheons prime painted; otherwise make escutcheons nickel or chrome plated. Where piping is insulated, fit escutcheons outside insulation.

2.04 PIPE IDENTIFICATION

- A. Identify all pipes and valves in equipment rooms, above accessible ceilings and in accessible shafts.
- B. Color code identification bands or marker backgrounds to identify contents of pipe and direction of flow located near each valve and fitting, on both sides of pipe passing through walls and on long runs at not over 20 foot intervals.

2.05 CUTTING, PATCHING AND DRILLING

- A. All cutting and patching of the building construction required for this work shall be by this Contractor unless shown on Architectural drawings and confirmed as to size and location prior to new construction. Cutting shall be in a neat and workmanlike manner.
- B. Neatly saw cut all rectangular openings, set sleeve through opening, and finish patch or provide trim flange around opening.
- C. Neatly saw cut floors and patch floor to match existing, including floor covering.
- D. Contractor shall field verify slab-on-grade or supported floor construction type prior to cutting. Under no circumstances shall this Contractor cut a structural floor slab, whether on grade or supported, without prior written approval from the Architect. If floor slab indicated to be cut on mechanical plans is found to be structural in nature, do not cut. Contact Architect immediately for further directions.
- E. Core drill and sleeve all round openings.
- F. Do not cut any structural components without Architect's written approval, including, but not limited to roof joists, columns, floor joists, beams, girders, structural floor slabs, etc.
- G. Patch and finish to match adjacent areas that have been cut, damaged or modified as a result of the installation of the mechanical systems. Firestop all penetrations of fire rated construction in a code approved manner.
- H. All Contractors shall confirm with Owner, prior to bid, times available for noise producing work such as cutting and core drilling of floors, walls, etc., as well as times for work which requires access into adjoining tenant spaces. Include any premium time in bid.
- I. The Mechanical Contractor shall coordinate with the general Contractor prior to construction. The Mechanical Contractor shall provide information regarding openings in walls, floors, etc., concrete equipment pads and foundations to the general Contractor. If the Mechanical Contractor fails to comply with this request, or if incorrect information is given, the necessary cutting and patching will be performed by the general Contractor, at the Mechanical Contractor's expense.

Part 3 – Execution

NOT USED

END OF SECTION 15050 BASIC MATERIALS AND METHODS

Section 15100 Mechanical Insulation

Part 1 – General

1.01 GENERAL

- A. Furnish all material, labor and equipment as required to install complete plumbing and HVAC insulation as indicated on Mechanical Drawings and in these specifications.
- B. Install in full accordance with manufacturer's recommendations.
- C. See Section 15010 General Mechanical Requirements.

Part 2 – Products

2.01 PLUMBING INSULATION (AS MANUFACTURED BY OWENS CORNING, KNAUF OR SCHULLER)

- A. Insulate all above grade hot and cold water piping with molded fiberglass having an all service jacket.
 - 1. Insulation Thickness Schedule:
 - a) Less than (<) 1-1/2" diameter pipe: 3/4" thick.
 - b) 1-1/2"-8" diameter pipe: 1" thick.
- B. Insulated all above grade, horizontal rain conductors and roof drain sumps with one (1") thick molded fiberglass having type ASJ jacket and manufactured by Owens-Corning Fiberglass Company.
- C. Include insulation of fittings and valves. Keep vapor barriers intact. Apply to manufacturer's recommendations.
- D. Handicapped lavatory insulation - insulate all exposed waste and water supply piping under lavatory with safety covers per ADA requirements as manufactured by Plumberex Specialty Products, McGuire Or Truebro.

2.02 HVAC INSULATION (AS MANUFACTURED BY OWENS CORNING, KNAUF, SCHULLER, ARMSTRONG, OR RUBATEX)

- A. Insulate all non-lined supply, return and outside air ducts with 1 1/2" thick foil faced reinforced Kraft jacket, fiberglass duct wrap fully secured to duct. Lap and tape seams and secure tightly to the ducts with wire or stickpins.
- B. All insulation to be applied in full accordance with the manufacturer's recommendations and comply with 25/50 Flame and Smoke Hazard Ratings per ASTM E-84, NFPA 255 and UL 723.
- C. Insulate refrigerant suction line with 1/2" elastomeric foam insulation with joints and seams sealed vapor tight.
- D. Insulate air conditioning condensate drain piping with 1/2" thick molded fiberglass insulation.

Part 3 – Execution

NOT USED

END OF SECTION 15100 MECHANICAL INSULATION

Section 15200 Piping and Valves

Part 1 – General

1.01 GENERAL

- A. Furnish all material, labor, equipment, and accessories as required to install complete plumbing and HVAC piping systems as indicated on Mechanical Drawings and in these specifications.
- B. Install in full accordance with Local Code Requirements, other specification section requirements and manufacturer's recommendations.
- C. See Section 15010 General Mechanical Requirements

Part 2 – Products

2.01 SANITARY AND STORM SEWERS

- A. Install sanitary and storm sewers, stacks, vents, drains, cleanouts, etc., as indicated on the drawings.
- B. Sewers to be pitched a minimum of 1/4" per foot for 3" sizes and under and 1/8" per foot for 4" sizes and larger or to grades indicated on drawings.
- C. Changes in direction and branch connections shall be made with approved drainage fittings compatible with the piping system material in which it is installed.
- D. All fixtures and sanitary drains shall be vented as indicated on drawings and in accordance with code.
- E. Vents are to be extended through roof as indicated on drawings and flashed with 4 lb. Lead with vent flashing top turned down two (2) inches minimum inside pipe.
- F. PVC piping shall not be installed unless permitted by code and shall not be installed in return air plenums.
- G. Sanitary/storm sewer and vent material shall be as follows:
 - 1. Below grade storm and sanitary inside building
 - a) PVC-DWV Plastic ASTM D-1785 with ASTM D-2665 DWV solvent weld socket fittings.
 - 2. Above grade sanitary/storm sewer and vent material shall be as follows:
 - a) No-hub cast iron pipe CISPI 1-301-78.
 - b) SCH. 40 galvanized steel pipe ASTM A-120-83 with cast iron screwed fittings ANSI B-16.22 1983.
 - 3. Site storm and sanitary sewers
 - a) Up to 15" - PVC Plastic ASTM D-3034 SDR 35 with ASTM D-3212 gasket joints.

2.02 DOMESTIC WATER PIPING

- A. Install domestic water piping as indicated on drawings. Include all fittings, valves, hangers, and other accessories including water meter and backflow preventer. Extend domestic water piping to all fixtures and equipment required for complete installation.
- B. Include unions, or other disconnect means, stops or valves for isolation of fixtures and equipment. Valves to be fully compatible with piping for service intended as manufactured by Nibco, Crane or Milwaukee. Include hose or drain valves at low points where fixtures cannot be used for drainage.
- C. Install shock absorbers at each quick closing fixture and where required to prevent water hammer as manufactured by J.R. Smith, Sioux Chief or Zurn.
- D. Hangers on insulated pipe to be outside of insulation, sized accordingly and with a sufficient saddle to protect insulation as manufactured by Grinnell or Michigan.
- E. Domestic water piping shall be as follows:
 - 1. Above grade - type "L" Hard Copper ASTM B 88-832 with wrought copper fittings ASTM B 16.22 1980 and non-lead or antimony solder joints.
 - 2. Below grade – type "K" Soft Copper without joints.
- F. Flush, vent and sanitize all water piping with chlorine as required per AWWA, Local Building Department and Health Department Codes.
- G. Domestic hot and cold water under concrete floor to be covered with sand so that piping will not become embedded in floor slab.
- H. All piping under concrete floor shall be type "K" soft copper, continuous. No splices of fittings will be allowed.
- I. Extreme caution must be taken so that no copper piping and insulation under concrete floors becomes crushed, cut, split or deformed during the pouring of the floor slab.

2.03 GAS PIPING

- A. Install gas piping.
- B. Including meter and regulator as indicated on drawings and connect to all gas using equipment.
- C. Equipment connections at each unit shall include gas cock, union and dirt leg.
- D. Construct concrete base to below frost line for meter installation.
- E. All gas piping shall conform to recommended practice and regulations of the NFPA, Local Gas Co. and State Code.
- F. Gas piping shall be as follows:
 - 1. Above-grade inside or outside building, low pressure.
 - a) SCHEDULE 40 seamless black steel pipe, beveled ends.
 - 1) 2" and smaller - screwed fittings, wrought iron.
 - 2. Inside building, medium pressure
 - a) SCHEDULE 40 black steel with welded black steel fittings.
 - 3. Below grade outside building, low and medium pressure gas service
 - a) Polyethylene plastic ASTM D-2513 with stab couplings or fusion weld joints.
 - 4. Valves shall not be located above accessible ceiling spaces, whether or not such spaces are used as a plenum.

5. Exterior exposed bare steel pipe shall be painted with two (2) coats of rust inhibitive paint.
6. All welding shall be performed by state certified welders.

2.04 REFRIGERANT PIPING

- A. Install refrigerant piping between condensing unit and DX coil. Piping shall be refrigerant grade type "L" copper with silver soldered joints. Pipe per manufacturer's piping diagrams and recommendations.
- B. Isolate piping from structure with one (1) inch insulation between all piping and support points.
- C. After completion, pressure test piping, purge and evacuate system twice and charge system with refrigerant.
- D. Install piping in as short and direct arrangement as possible to minimize pressure drop.
- E. Install unions to allow removal of solenoid valves, pressure-reducing valves, expansion valves, and at connections to compressors and evaporators.
- F. Install flexible connectors at inlet and discharge connection of compressors.
- G. Fill the pipe and fittings during brazing with nitrogen or carbon dioxide to prevent formation of scale.

2.05 CONDENSATE PIPING

- H. Piping shall be type "L" copper with silver soldered joints.

Part 3 – Execution

NOT USED

END OF SECTION 15200 PIPING AND VALVES

Section 15400 Plumbing Fixtures and Equipment

Part 1 – General

1.01 GENERAL

- A. Furnish all fixtures and equipment indicated and scheduled on drawings, complete with all accessories, controls, etc., as required.
- B. Install in full accordance with Manufacturer's Recommendations and place in satisfactory operation.
- C. See Section 15010 General Mechanical Requirements

Part 2 – Products

2.01 PRODUCTS

- A. Water Closets (As manufactured by American Standard, Kohler or Crane).
WC-1: HANDICAPPED FLOOR MOUNTED, TANK TYPE
American Standard Cadet No. 2377.100 Siphon Jet, pressure assisted with white, open front commercial grade seat with check hinge.
- B. Lavatories (As manufactured by American Standard, Kohler or Crane)
LAV-1: WALL HUNG
American Standard Lucerne No. 0355.012 with floor mounted carrier, concealed arms, American Standard Reliant No. 2385.130 single lever faucet with grid drain and tailpiece.
- C. Mop Basin (As manufactured by Fiat, Mustee Or Florestone)
MB-1: FLOOR MOUNTED
Fiat No. MSB 2424 With Chicago No. 897 faucet and Fiat rim guard, mop hanger, hose with bracket, and stainless steel splashguard on wall.
- D. Sink (As manufactured by Just, Moen, or Elkay),
SK-1: Just #SI-ADA-2119-A-GR, 21"X19" O.D., 16"X16" I.D. 6 ½" Deep. 18 Gauge Stainless Steel Type 304, 3-Hole Center Punch, self-rimming, with J-35 cup strainer and Chicago No. 2300-8 faucet fitting with L8 8" swing spout and No. E3 Soft Flo Aerator.
- E. Drinking fountain (As manufactured by Halsey Taylor, Oasis or Elkay)
DF-1: Handicapped bi-level Elkay model EDFP217RAC. Two-level wall mounted drinking fountain with cane apron. Constructed of #18 gauge, type 304 stainless steel polished to a lustrous satin finish.
- F. Floor Drains (As manufactured by J.R. Smith, Josam, Mifab, or Zurn)
FD-1: (GENERAL SERVICE)
J.R. Smith Series 2005 (6" diameter for poured floors, 6" square for floors with a straight line pattern), flat strainer with nickel bronze finish, flashing clamp and ½" trap primer connection.
- G. Cleanouts (As manufactured by J.R. Smith, Josam, Mifab or Zurn)
CO-1: FLOOR MOUNTED
J.R. Smith Series 4020 (poured floors or series 4040 finished floor with a straight line pattern) with satin finish bronze top. Provide carpet marker type cover for carpeted areas.

CO-2: WALL MOUNTED

J.R. Smith Series 4402 with round stainless steel cover and screw.

- H. Wall Hydrant (As manufactured by J.R. Smith, Josam or Zurn)

WH-1: EXTERIOR WALL MOUNTED (EXPOSED)

J.R. Smith series 5609QT, non-freeze type with integral vacuum breaker, vandal resistant, ¾" hose thread, ¾" male inlet, nickel bronze finish and adjustable wall clamp.

- I. Trap Primer Valves (As Manufactured By Precision Plumbing Products, Sioux Chief Or Zurn)

TPV-1: Precision Plumbing Products Oregon No. 1.

- J. RD-1: Roof Drain, JR Smith Model 1015, Duco cast Iron body with adjustable extension sleeve, sump receiver, aluminum dome.

- K. OD-1: Overflow Roof Drain, JR Smith Model 1080, Duco cast Iron body with adjustable extension sleeve, 4" high water dam, sump receiver, aluminum dome

- L. DO-1: Overflow outlet, JR Smith Model 1770, Duco cast bronze nozzle and flange with bird screen.

Part 3 – Execution

NOT USED

END OF SECTION 15400 PLUMBING FIXTURES AND EQUIPMENT

Section 15700 HVAC Systems and Equipment

Part 1 – General

1.01 GENERAL

- A. Furnish all equipment, materials, labor, tools, etc., for the complete HVAC system. Install complete and place in operation.
- B. Contractors bidding this project shall visit this site and familiarize themselves with all conditions affecting their work. Submission of a bid on this project shall be construed as having such knowledge.
- C. Verify exact conditions in field and coordinate with these drawings and other trades before beginning new work.
- D. Determine exact locations for all new and relocated equipment, piping, conduits and ductwork in field.
- E. Coordinate work of this contract with other trades. Conflicts shall immediately be brought to the attention of the Architect. Architect's resolution to conflicts shall be final.
- F. Any discrepancies between what is shown on drawings or specified and the actual conditions in the field shall immediately be brought to the attention of the Architect before proceeding.
- G. Building and surfaces damaged during installation shall be repaired, replaced, and/or restored to original condition after completion of work and before acceptance by Owner.
- H. See Section 15010 General Mechanical Requirements

Part 2 – Products

2.01 EQUIPMENT

- A. Mechanical Contractor to furnish all HVAC equipment indicated and/or scheduled on the drawings complete with bases, isolators, supports and other required accessories.
- B. Install complete and place in proper operation per manufacturer's recommendations, lubricate and adjust as required. Furnish and install clean set of filters prior to balancing.
- C. Equipment to be make and model as scheduled unless alternate equipment of equivalent quality and performance is submitted as a substitution prior to bidding. All substitutions are subject to acceptance without qualification by Owner, Engineer and Architect.
- D. Contractor shall perform routine service inspection of all existing HVAC equipment to remain. Lubricate bearings, service control systems, replace fan belts and install new filters in each rooftop unit.
- E. Contractor shall field verify refrigerant charge and add refrigerant if the charge is less than manufacturer's specifications.

- F. Submit service report to tenant indicating condition of unit and report any major component failures or malfunctions. Report shall include cost to service all malfunctioning or damaged items listed. Cost shall include parts and labor. Equipment shall be placed in full operation with controls calibrated upon completion of project.

2.02 COOLING COIL CONDENSATE DRAINS

- A. Provide each air conditioning unit with a four (4) inch deep trapped condensate drain with cleanout. Terminate over floor drain or as required per Local Code.

2.03 See Equipment Schedules On Mechanical Drawings.

Part 3 – Execution

NOT USED

END OF SECTION 15700 HVAC SYSTEMS AND EQUIPMENT

Section 15800 Air Distribution System

Part 1 – General

1.01 GENERAL

- A. Furnish all materials, labor, equipment and accessories required to install complete air distribution systems.
- B. Determine exact locations for all new and relocated ductwork and accessories in field.
- C. Coordinate work of this contract with other trades.
- D. Any discrepancies between what is shown on drawings or specified and the actual conditions in the field shall immediately be brought to the attention of the Architect before proceeding.
- E. Building and surfaces damaged during installation shall be repaired, replaced, and/or restored to original condition after completion of work and before acceptance by Owner.
- F. See Section 15010 General Mechanical Requirements

Part 2 – Products

2.01 DUCTWORK

- A. Fabricate and erect all ductwork to ASHRAE and SMACNA Standards from No. 1 Galvanized Steel. Comply With NFPA 90a Requirements.
- B. Ductwork shall be SMACNA low-pressure construction 2" static pressure rating with Seal Class B Seams and Joints.
- C. Include all acoustic; airfoil shaped perforated aluminum turning vanes, manual dampers, flexible connectors, grilles and diffusers, acoustic lining, and other sheet metal accessories for the project.
- D. All branch connection fittings in rectangular ductwork shall be 45 Degree Transition Type, Conical Fittings or Spin-In Fittings with Integral Air Scoops. Butt Fittings Are Not Acceptable.
- E. Install two (2) inch deep secondary drain pan below all furnaces and domestic water heaters. Pipe three-fourth (3/4) inch drain to floor drain independently of the all other drains.
- F. Exhaust duct outlets shall be installed a minimum of 10'-0" from all outside air intakes.

2.02 DUCT LINER

- A. Acoustic Line All Rectangular Ducts indicated on Drawings with One (1) Inch Thick Non-Flaking, Coated Medium Density Liner, apply to Manufacturer's Recommendations.
- B. Duct dimensions indicated on drawings are clear inside dimensions (free area).

2.03 DUCT ACCESSORIES

- A. FLEXIBLE DUCTWORK (as manufactured by Clevaflex, Flexmaster or Wiremold).

1. Flexible ducts shall be independently supported from the structure and connected with plastic draw bands and tightened. Flexible ducts shall be limited to 48" maximum straight lengths. Flexible ducts shall be constructed of 1 1/2" insulation with vinyl vapor barrier jacket and rated at 10" W.C. for sizes through 12", U.L. Listed, and Meet 25/50 Flame and Smoke Test. Flexible ducts are not permitted in rooms without ceilings.
 - B. DAMPERS (as manufactured by Ruskin, Nailor Or Safe-Air)
 1. Fabricate in accordance with SMACNA Standards. Provide end bearings and locking, indicating quadrant regulators. Blade to be single thickness with continuous hinge or rod.
 - C. CONTROL DAMPERS (as manufactured by Ruskin, Nailor Or Safe-Air)
 1. Fabricate blade of double thickness sheet metal, opposed blade type with self-aligning rod and end bearing suitable for use with an actuator.
 - D. BACKDRAFT DAMPERS (as manufactured by Ruskin, Nailor Or Safe-Air)
 1. Multiple blade, parallel type damper constructed of galvanized steel with felt or flexible vinyl sealed edges, ball bearings, pivot pin and adjustment device for varying pressures.
- 2.04 LOUVERS (As manufactured by American Warming, Arrow or Ruskin)
- A. Extruded Aluminum, Storm-Proof, Drainable Type, with a 6" deep frame, channel frame, 1/2" bird screen mounted on the interior face and prime coat finish. Final color selected by Architect. Weatherproof all joints around louver.
- 2.05 FIRESTOPPING
- A. See Section 15050 Basic Materials And Methods.

Part 3 – Execution

NOT USED

END OF SECTION 15800 AIR DISTRIBUTION SYSTEM

Section 15900 HVAC Instrumentation and Controls

Part 1 – General

1.01 GENERAL

- A. Furnish and install complete temperature control for all HVAC systems.
- B. Provide new control devices including thermostats, damper operators, motors, temperature sensors, staging relays and other related devices for a complete operational system per the operating sequence and industry standards.
- C. Mount all controls furnished as accessories to equipment and provide all control wiring required for proper operation. All wiring shall be in conduit per N.E.C. and Local Code Requirements.

1.02 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section. Each contractor is responsible to completely coordinate work of other trades with work of this Division.

1.03 SUMMARY

- A. This section includes control equipment for HVAC systems and components, including control components for terminal heating and cooling units not supplied with factory-wired controls.

1.04 SYSTEM DESCRIPTION

- A. Control system consists of sensors, indicators, actuators, final control elements, interface equipment, other apparatus, and accessories to control mechanical systems.

1.05 WARRANTY

- A. Labor & materials for control system specified shall be warranted free from defects for a period of twelve (12) months after final completion acceptance by the Owner. Control system failures during the warranty period shall be adjusted, repaired, or replaced at no charge or reduction in service to the Owner. The Contractor shall respond to the Owner's request for warranty service within 24 hours during customary business hours.

1.06 TRAINING

- A. The Contractor shall provide a course outline and training manuals for all training classes at least four weeks prior to the first class. The Owner reserves the right to modify any or all of the training course outline and training materials. Review and approval by Owner and Engineer and shall be completed at least three weeks prior to first class.
- B. The Contractor shall include four (4) hours of training in his bid.

Part 2 – Products

2.01 ACCEPTABLE MANUFACTURERS

- A. Acceptable Systems Are:

CONTROL SYSTEM MANUFACTURER

1. TRANE COMPANY
2. CARRIER

Part 3 – Execution

3.01 INSTALLATION REQUIREMENTS

- A. Install equipment, piping, wiring/conduit parallel to building lines (i.e. horizontal, vertical, and parallel to walls) wherever possible. Provide sufficient slack and flexible connections to allow for vibration of piping and equipment.
- B. Install all equipment in readily accessible location as defined by Chapter 1 Article 100 Part A of the NEC. Control panels shall be attached to structural walls unless mounted in equipment enclosure specifically designed for that purpose.
- C. Verify integrity of all wiring to ensure continuity and freedom from shorts and grounds.
- D. All equipment, installation, and wiring shall comply with acceptable industry specifications and standards for performance, reliability, and compatibility and be executed in strict adherence to Local Codes And Standard Practices and shall be per the National Electrical Code (NEC) and per applicable State And Local Codes. Where exposed, EMT conduit shall be run parallel to building lines properly supported and sized at a maximum of 40% fill. In no cases shall field installed conduit smaller than 1/2" trade size be allowed.

3.02 SEQUENCE OF OPERATION

- A. FURNACE/CONDENSING UNIT (F-1 & F-2)
 - 1. Unit shall operate in occupied or unoccupied modes based upon time clock sequence as determined by owner.
 - 2. Unoccupied mode - The supply fan will be off, the outdoor air damper will go to 100% closed position and unit will cycle on with call for heating or cooling.
 - 3. Occupied mode - The supply fan shall run continuously, the outdoor air damper will open to the minimum air position and the unit will go into the heating or cooling mode, based upon room thermostat setpoint temperature.
 - 4. Upon a call for heating, the gas burner shall fire.
 - 5. A low temperature thermostat will de-energize the supply fan and close the outside air damper if the mixed air temperature is sensed at 40 degrees F or colder.
 - 6. A duct mounted, photoelectric smoke detector (furnished by electrical contractor and installed by mechanical contractor) shall shut down the unit, close the outside air damper and send a signal to the fire alarm panel when activated. Both safeties with require manual reset, and will activate an alarm at the local control panel.
 - 7. ECONOMIZER CYCLE
In the cooling mode when the ambient temperature are 50°F and below the compressor shall be locked down and the outside air motor operated damper and return air motor operated damper shall modulate in order to provide free cooling. Relief damper shall modulate open to minimize building pressure and maintain +0.05 SP.
- B. JANITOR CLOSET/TOILET ROOM EXHAUST FAN (EF-1)
 - 1. Interlock fan with motion sensors (on/off) located in restrooms and janitor's closet provided by Electrical Contractor.
- C. CONFERENCE ROOM ZONING (VVT-1)
 - 1. Mechanical Contractor shall wire wall mounted thermostat (24 V) to control VVT box. Electrical Contractor to provide dedicated circuit with junction box located above the ceiling for Mechanical Contractor.
- D. ETO ROOM AIR CONDITIONING UNIT (AC-1)
 - 1. Wall-mounted thermostat by manufacturer shall control AC-1 to cycle cooling to maintain space set point temperature.

- E. UNIT HEATER-ELECTRIC (EH-1, 2, 3, 4,5)
 - 1. Unit-mounted controls by manufacturer shall control heater to cycle heating to maintain space set point.

END OF SECTION 15900 HVAC INSTRUMENTATION AND CONTROLS

Section 15950 Testing, Adjusting and Balancing

Part 1 – General

1.01 GENERAL

- A. After installation, check all equipment and perform start up in accordance with the manufacturer's instructions.
- B. All piping shall be tested and free of leaks as required by the local authority having jurisdiction.
- C. Work that is scheduled to be concealed or insulated shall remain uncovered until required tests have been completed. If the construction schedule requires, arrange for tests on sections of the system at a time.
- D. Balance all systems, calibrate controls, check for proper operation and sequence under all conditions and make all necessary adjustments.
- E. Instruct Owner in operation of systems and submit operating and maintenance manual for all equipment and systems.
- F. Submit air report from independent AABC OR NEBB certified subcontractor for all air and water systems per AABC OR NEBB Standards.
- G. See Section 15010 General Mechanical Requirements

1.02 BALANCING, START UP AND INSTRUCTIONS

- A. After equipment is placed in operation, systems shall be balanced to within 10% of design flow with report submitted to Owner. Balancing shall be performed by an independent AABC or NEBB certified contractor.
- B. Balance the air systems prior to balancing hydronic, steam, and refrigerant systems.
- C. Test, adjust and balance cooling systems during summer season and heating systems during winter season. Balance systems when the outside air conditions are within 5 degrees F wet bulb temperature of the maximum summer design condition and within 10 degrees F dry bulb temperature of the minimum winter design condition.
- D. Start up and place all systems in operation and tag all switches and controls with permanent labels.
- E. Instruct Owner on proper operation and preventative maintenance of system.

Part 2 – Products

NOT USED

Part 3 – Execution

NOT USED

END OF SECTION 15950 TESTING, ADJUSTING AND BALANCING

Section 16010 General Electrical Provisions

Part 1 – General

1.01 GENERAL

- A. Requirements specified in Division 1, Instructions to Bidders, Supplemental General Conditions, Special Conditions, Addenda, Alternates, Contract and Proposal, along with Division 16 and all its sections, comprise the contract documents for the electrical contract. Drawings and all their revisions up to the bid submittal date become a binding part of the contract, along with these specifications as though they were one, and anything implied by the specifications shall be interpreted as also implied by the drawings and vice versa. Provide necessary items for complete installation of all electrically operated equipment listed in the specifications or shown on the contract drawings.
- B. The architectural, structural, mechanical, plumbing and equipment drawings and specifications are incorporated into, and become a part of this division. This contractor shall examine all such drawings and specifications and become thoroughly familiar with the provisions contained therein. The submission of his bid shall indicate such knowledge.
- C. Electrical drawings are diagrammatic. They are intended to show the approximate locations of equipment and conduit. Dimensions given on the plans, in figures, shall take precedence over scaled dimensions and shall be verified in the field. The electrical contractor shall layout all equipment rooms to make sure the equipment, as purchased, fits in the room or space shown. Exact location of all equipment shall be verified in the field and routing of conduits shall suit field conditions.
- D. Until the time of installation, the architect reserves the right to make minor changes in the location of conduit and equipment without additional cost to the contract.
- E. The electrical drawings and specifications are intended to supplement each other. Material and labor necessary to the project shall be furnished and installed even though not specifically mentioned in both. Labor and/or materials neither shown nor specified, but obviously necessary for the completion and proper functioning of the system, shall be furnished and installed by the electrical contractor.
- F. Arrange all equipment substantially as shown on the drawings. Make deviations only where necessary to avoid interference. Check all equipment sizes against available space prior to shipment to avoid interference.
- G. Examine the work of other trades insofar as their work comes in contact with or is covered by this work in no case attach to, or finish against any defective work or install work in a manner which will prevent proper installation of the work of other trades.
- H. Electrical contractor shall verify with other trades all electrical characteristics of equipment requiring electrical connections, contractor shall verify voltage, phase and horsepower and shall notify engineer of any discrepancies prior to start of work. Electrical contractor shall provide disconnecting means and overload protection for all equipment, unless furnished integral with equipment package.
- I. It is the intent of these drawings that this is a complete electrical job, any errors or omissions shall be brought to the attention of the engineer prior to bidding the job.

1.02 VISIT TO THE SITE

- A. This contractor shall visit the site of the work and familiarize himself with all conditions affecting his work. The submission of his proposal shall indicate such knowledge. No additional payment shall be made on claims that arise from a lack of knowledge of the existing conditions.

1.03 CODE AND PERMITS

- A. Installation shall be in full accordance with all codes, rules and regulations of municipal, city, county, state and public utilities and all other authorities having jurisdiction over the premises.
- B. Comply with any specification requirements that are in excess but not in conflict with code requirements.
- C. The contractor shall secure and pay for all permits, plan reviews and certificates of inspection in connection with his work, required by the foregoing authorities. Before final payment of the contract is allowed, all certificates shall be delivered to the architect in duplicate.
- D. Electrical material and equipment shall bear the UL label except where UL does not label such types of material and equipment.

1.04 SHOP DRAWINGS SUBMITTALS

- A. The electrical contractor shall submit five (5) sets of shop drawings, the shop drawings of the following equipment using the indicated numbering system and titles, shall be submitted through the architect to the engineer and then resubmitted for final approval if necessary. Shop drawings shall be submitted for the following items:
 - 1. Wiring devices
 - 2. Panel boards and safety switches
 - 3. Contactors, time switches and photocell
 - 4. Lighting fixtures
- B. All submitted shop drawings (manufacturers' equipment descriptive sheets or vendors' prepared drawings) shall have the general contractor's or subcontractor's "stamp of approval" indicating that the item submitted is as called for on the plans and specifications, is approved by the general contractor or subcontractor, the date of approval and initialed by the person approving the submittal and the name of the company submitting said equipment for approval.
- C. Submit bound brochures complete with a table of contents. Loose or stapled together sheets are not acceptable. Any submittals not in brochure form or not as specified shall be returned at the contractor's expense for resubmittal.
- D. All descriptive literature shall be submitted in a three (3) hole brochure with a cover identifying the following:
 - 1. Name of the job.
 - 2. Location of the job, address, city and state.
 - 3. Name and address of the company submitting the brochures.
 - 4. Date of the submittal.
- E. Every effort shall be made, in checking the shop drawings, to detect and correct all errors, omissions and inaccuracies. Failure to do this will not relieve the electrical contractor of the responsibility for the proper and complete installation in accordance with the contract documents.

1.05 AS-BUILT DRAWINGS

- A. Submit to the architect one set of reproducible (mylars) electrical drawings showing the as-built conditions.

1.06 STANDARDS AND SUBSTITUTIONS

- A. Wherever the words “approved by”, “approved equal”, “as directed” or similar phrases are used in the following specifications, they shall be understood to refer to the owner as the approving agency. The name or make of any equipment or materials named in this specification (whether or not the words “or approved equal” are used) shall be known as the “standard”.
- B. These specifications establish quality standard of materials and equipment to be provided. Specific items are identified by manufacturer, trade name or catalog designation. This contractor shall submit his base bid price based upon standard specified equipment described herein and as detailed on drawings and associated contract documents. These specifications are not to be considered proprietary the contractor may submit information on materials and manufacturers (other than those listed) for review by the architect and engineer no later than ten (10) days before bids are submitted. In addition, samples of proposed equipment may be required to be submitted to the engineer for review no later than ten (10) days before bids are submitted. Manufacturers of products accepted by the architect and engineer will be listed in an addendum to the specifications as an acceptable substitution equipment accepted as detailed below and shall be shown as a separate add or deduct price to be factored into the base bid price by the architect and owner if accepted.
- C. Should the contractor propose to furnish materials and equipment other than those specified or approved by addendum, submit a written request for substitutions to the architect at the bid opening. The request shall be an alternate to the original bid; be accompanied with complete descriptive (manufacturer, brand name, catalog number, etc.) And technical data for all items. Failure by this contractor to submit the requisite documentation detailed above shall be understood by the architect and engineer to indicate that substitute equipment will not be presented by the contractor for consideration. Such substitutions will not be considered after the bid opening date and delay of project will not be permitted for further inspection and evaluation after this date.
- D. Where such substitutions alter the design or space requirements indicated on the drawings, include all items of cost for the revised design and construction including cost of all allied trades involved.
- E. Acceptance or rejection of the proposed substitutions shall be subject to approval of the architect and engineer. If requested, the contractor shall submit (at his cost) inspection samples of both the specified and proposed substitute items.
- F. In all cases where substitutions are permitted, the contractor shall bear any extra cost of evaluating the quality of the material and equipment to be provided.

Part 2 – Products

NOT USED

Part 3 – Execution

NOT USED

END OF SECTION 16010 GENERAL ELECTRICAL PROVISIONS

Section 16050 Basic Electrical Materials and Methods

Part 1 – General

1.01 GENERAL

- A. See Section 16010 General Electrical Provisions

Part 2 – Products

2.01 NAMEPLATES

- A. General: furnish and mount on each panel board, large junction box, safety switch, starter, remote control, push button station, and all similar controls, a nameplate descriptive of the equipment or equipment controlled.
- B. Provide black and white nameplates constructed from laminated phenolic with a white center core. Letters shall be engraved in the phenolic to form white letters 3/8" high. Fasten the nameplates with an adhesive type fastener.

2.02 MOUNTING ACCESSORIES

- A. This contractor shall furnish and install all angle iron, channel iron, rods, supports, hangers, concrete or plywood required to install, mount and support any electrical equipment or device called for on the plans.
- B. Supporting material shall be complete with hangers, connectors, bolts, clamps and necessary accessories to make a complete installation. Supporting material shall be galvanized, painted or otherwise suitably finished. Products by Binkley, steel city or Raco will be acceptable.
- C. All surface-mounted equipment on block walls shall be mounted on 3/4" plywood backboard. All floor-mounted equipment shall be installed on a 4" high concrete housekeeping pad.

Part 3 – Execution

3.01 EXECUTION

- A. The electrical work for construction proposed shall conform to all Federal (OSHA), State, all specific safety requirements and the requirements of the current edition of the NEC.
- B. Check the HVAC and plumbing specifications for electrical requirements and include the same in the contract cost.
- C. Equipment connections, starters, disconnect switches, control transformers and pushbutton stations for the equipment furnished by the owner or under a separate contract shall be installed and connected under this division, as indicated on the contract drawings.
- D. All cutting, patching, excavating, backfilling and concrete work related to this contract will be the responsibility of the electrical contractor. This contractor shall assume the responsibility of providing the sleeves, chases and openings necessary for the electrical installation and for their

repair in an acceptable manner, as determined by the architect. All holes shall be core-drilled. Provide fire stop in all openings created through fire-rated walls, floors or ceilings.

- E. This contractor shall be responsible for providing all required access panels necessary for his work, coordinate with architect prior to installation.

3.02 MATERIALS AND WORKMANSHIP

- A. All work shall be installed in a practical and workmanlike manner, by mechanics skilled in the several trades necessary.
- B. All materials shall be new and free from defects and shall be the best of their several kinds unless specified or indicated on the drawings to the contrary.
- C. During each phase and at the completion of the construction, this contractor shall remove all debris and excess materials caused by his work. He shall leave the area of operation broom clean.
- D. All electrical equipment shall bear the Underwriters Laboratories label or ETL label.
- E. This contractor shall guarantee his workmanship and material (lamps excepted) for a period of one year from the date of building opening and leave his work in perfect order at the completion. Should defects develop within the guarantee period, the contractor shall, upon notice of the same, remedy the defects and have all damages to other work or furnishings caused by the repairs corrected at his expense to the condition before such damage.

3.03 SCOPE OF WORK

- A. The electrical contractor shall provide all labor, material, storage, unpacking and placement; to include but not be limited to, the following items:
 - 1. Emergency lighting and power.
 - 2. Complete power and lighting distribution system including all panels and feeders.
 - 3. Complete branch circuit wiring system.
 - 4. Complete power wiring for all air conditioning equipment, plumbing system, heating equipment, ventilating and exhaust equipment.
 - 5. Complete lighting fixture installation, including all incandescent, fluorescent and HID lamps.
 - 6. Complete telephone and communication conduit system including boxes, plates, jacks, etc., as specified, shown on the drawings and required by the local telephone company and/or owner.
 - 7. Temporary electrical power and lighting as required for construction.
 - 8. Testing of all cables and circuit wiring after installation.
 - 9. Exit light system.
 - 10. Wiring devices.
 - 11. Lighting controls.
 - 12. Grounding of the electrical system.
 - 13. Outdoor lighting and controls.
 - 14. Telephone and electric services.

3.04 TEMPORARY SERVICE

- A. The electrical contractor shall furnish, install and remove as required all temporary power and temporary lighting in all areas and individual rooms when needed by the individual trades in the performance of their work. This contractor shall provide a minimum of twenty (20) footcandles of illumination for temporary lighting. Any additional lighting required by individual trades shall be provided by the individual trades including power for the lighting. The electrical work for construction purposes shall conform to all federal (OSHA), state, specific safety requirements, as well as the requirements of the national electric code and national electrical safety code. The

electrical contractor shall obtain and pay for all required applications, permits and inspections pertaining to this work. This cost shall be included in the contractor's price.

- B. New light fixtures shall not be used for temporary lighting.

END OF SECTION 16050 BASIC ELECTRICAL MATERIALS AND METHODS

Section 16060 Grounding and Bonding

Part 1 – General

1.01 GROUNDING

- A. Ground all equipment per N.E.C.
- B. Ground each outside lighting pole separately with one ground rod and a #6 ground wire.
- C. All conduits shall contain a code-sized ground wire size per N.E.C. in addition to the conductors shown on the plans. Where circuit conductors are increased in size for voltage drop, the ground wire size shall be increased proportionately.
- D. Where an isolated, insulated ground is required a separate isolated green ground shall be run from the panel isolated ground bus to the isolated ground connection of the device served. In no case shall the system ground (green wire and associated outlet boxes, conduit and building steel) be allowed to contact the isolated ground (green wire with white stripe).

Part 2 – Products

NOT USED

Part 3 – Execution

NOT USED

END OF SECTION 16060 GROUNDING AND BONDING

Section 16080 Electrical Testing

Part 1 – General

1.01 TESTING AND PLACING IN SERVICE

- A. Any material or equipment failing a test shall be repaired or replaced at the contractor's expense.
- B. Tests shall include the following:
 - 1. Measure the load on each phase of the main service and each phase of every feeder under full load conditions.
 - 2. Measure the no-load and full-load voltages (phase to phase, phase to neutral and phase to ground for each phase of each service, of each separately derived system, and at each panelboard or transformer).
 - 3. Measure the ground resistance of the main service grounding electrode and the ground resistance of each separately derived system's grounding electrode.
 - 4. Make insulation resistance tests on all motors.

1.02 INTERFERENCES

- A. Before the installation of any item begins, the electrical contractor shall carefully ascertain that it does not interfere with clearances for the erection of finish beams, columns, pilasters, walls or other structural or architectural members as shown on the architectural drawings. If any work is installed and the architectural design cannot be followed, this contractor shall, at his own expense, make changes in his work as directed by the architect to permit the completion of the architectural work in accordance with drawings and specifications.
- B. It shall be the duty of this contractor to report any interference between his work and that of any of the other contractors as soon as they are discovered. The architect shall determine which equipment will be relocated, regardless of which was installed first. His decision will be final.

1.03 QUALITY ASSURANCE

- A. All products shall be new and of the type and quality specified. Where manufacturer, brand name, type of catalog number specify materials, equipment, apparatus or other products, such designation shall establish the standards of the desired quality and style. It is the intent of these specifications to establish a standard of quality of materials and equipment installed.

Part 2 – Products

NOT USED

Part 3 – Execution

NOT USED

END OF SECTION 16080 ELECTRICAL TESTING

Section 16120 Conductors and Cables

Part 1 – General

1.01 GENERAL

- A. See Section 16010 General Electrical Provisions

Part 2 – Products

2.01 WIRE AND CABLE

- A. Color code conductors (except control and instrumentation conductors) as follows:
208/120 SYSTEM
- | | |
|---------|-------|
| PHASE A | BLACK |
| PHASE B | RED |
| PHASE C | BLUE |
| NEUTRAL | WHITE |
| GROUND | GREEN |
- #12 and #10 conductors shall have continuous insulation color, as listed above.
 - Color code conductors larger than above, which do not have continuous insulation color by application of at least two laps of colored tape on each conductor at all points of access including junction boxes. Color tape shall be the equal of 3M products scotch #35.
 - Conductors shall be soft annealed copper insulated for 600 volts unless specifically indicated otherwise. Aluminum conductors are not allowed on this project.
- B. Insulation type shall be type THW for wire sizes #8 AWG and larger and THHN or THWN for #10awg and smaller. THHN shall not be used in wet or damp locations.
- C. Flexible cord shall be heavy duty type so with an equipment ground conductor in addition to the current carrying conductors.
- D. Provide #12 conductors, unless otherwise indicated.
- E. Control conductors shall be #14 minimum for NEC Class I and #16 for NEC class ii.
- F. Conductors #8 AWG and larger shall be stranded.
- G. Conductors #10 AWG and smaller shall be solid.
- H. Install wiring in conduit.
- I. Connect #10 and smaller wires with constant pressure expandable spring type connectors, "Scotchlok" by 3M or B-cap by Buchanan.
- J. Connect #8 and larger wires with compression connectors or splices as manufactured by Burndy or T&B.
- K. Insulate splicing connectors to at least 200% of the wire insulation. Use pre-stretched tubing connector insulators, 3M PST for #2 and larger conductors.

- L. Pull conductors using recognized methods and equipment leaving at least 6" wire at all junction boxes for connections.
 - 1. Cleanout each conduit system before pulling wires.
- M. Form and tie all wiring in panel boards.
- N. There shall be no wire nut joints or splices made inside switchboards/panel boards.
- O. Branch circuit wire sizes (and conduits) shall be increased from those indicated on the plans to prevent excessive voltage drop. Branch circuits shall be installed with wires of sufficient size so that voltage drop between the panel and the loads does not exceed limit of 3%.
- P. Wire sizes shall be based on the 60 degrees c. Ampacities for wire sizes no. 14-1 A.W.G., and 75 degrees c. Ampacities for wire sizes #1/0 A.W.G. and larger.
- Q. Circuits may be multi-plexed in conduit provided wire is properly derated and conduit sized per code. Under no circumstances shall more than (9) current carrying conductors be run in a single conduit.

Part 3 – Execution

NOT USED

END OF SECTION 16120 CONDUCTORS AND CABLES

Section 16130 Raceways and Boxes

Part 1 – General

1.01 RACEWAYS

- A. See Section 16010 General Electrical Provisions

Part 2 – Products

2.01 RACEWAYS

- A. All wire shall be run in accordance with code in corrosion resistant, rigid, threaded, metal conduit or electrical metallic tubing (E.M.T.) unless otherwise specifically stated herein.
 - 1. Conduit in exterior walls, below floor slab, or underground shall be rigid, threaded, galvanized, heavy wall type.
 - 2. Carlon PVC type 40 heavy wall conduit with ground wire may be used below floor slab or underground in lieu of rigid, threaded, galvanized conduit. PVC 40 conduit shall not be run in or above floor slab. PVC conduit shall terminate below floor slab with rigid, threaded metal conduit adapter. Conduit above slab shall be metal.
 - 3. Conduit run exposed to the weather shall be heavy wall, metal threaded type.
- B. Conduit size shall be 3/4" minimum.
- C. Conduit shall be securely fastened in place.
- D. All conduits shall be concealed in walls, floor and ceilings wherever possible. Exposed conduit in finished areas will not be permitted. Exposed conduit will be permitted in unfinished areas with the specific approval of the architect.
- E. Use flexible conduit for the connection to recessed or semi-recessed lighting fixtures (6' length maximum). Use liquid tight metal conduit for all connections to motors and other equipment subject to vibration and in areas subject to moisture.
- F. Use watertight joints with buried and concrete encased conduit. All buried conduits outside of buildings shall have a minimum of 24" or cover. Metal conduits buried in earth shall be painted (two coats) with heavy asphaltum paint.
- G. Support runs of conduit as detailed in the appropriate table of the national electrical code (NEC).
- H. Install exposed runs of conduit and conduit above lay-in ceilings parallel or perpendicular to the walls, structural members of intersections of vertical planes and ceilings. Provide right angle turns using fittings or symmetrical bends. Support conduits within 1" of all changes in direction.
- I. If a conduit is suspended, it shall be supported on trapeze hangers, which use "all-thread" rods from the structural steel. The use of ceiling support wire or similar material will not be accepted.
- J. Install empty conduit for future use as indicated on the drawings. Conduit shall be complete with jet line or pull rope, junction/outlet boxes, tile rings and appropriate cover plates.
- K. Provide pitch pockets where conduits penetrate the roof.
- L. Thread lubrication/sealant is required on outdoor and underground threaded metal joints.

- M. Install fire seal fittings where conduits penetrate concrete floor slabs or masonry walls required to be fire rated.
- N. Horizontal portion of conduit exposed on the roof and feeding equipment shall not be more than 5'-0" unless the written approval from architect or engineer is obtained.

2.02 PULL AND JUNCTION BOXES

- A. Install pull and junction boxes where shown on the drawings, and where required for changes in direction, at junction points, and to facilitate wire pulling. Furnish box sizes in accordance with NEC unless larger boxes are indicated.
- B. Provide steel boxes and removable covers of code gage, hot rolled sheet steel, hot dipped galvanized inside and outside, for above ground work. Furnish weatherproof boxes when installed above ground outside.
- C. Provide cast iron boxes, hot dipped galvanized inside and outside where shown on the drawings. Furnish removable covers with gaskets and stainless steel, brass or bronze screws.
- D. Provide concrete boxes for underground work unless otherwise indicated on the drawings. Furnish steel frames and covers with the cover attached to the frame with hexagon head, brass or bronze cap screws, 3/8" in. Diameter. Provide a rubber gasket for sealing between the cover and the frame. Paint the cover with two coats of heavy asphaltum.

2.03 OUTLET BOXES

- A. Use sheet steel boxes, zinc coated or cadmium plated, for concealed interior work.
- B. Use cast boxes, zinc-cadmium finish malleable iron, for exposed interior work, and for exposed or concealed work in wet, damp or exterior locations. Cast boxes shall be series FD by Crouse Hinds or Appleton.
- C. Wall box sizes (minimum) shall be 4" square x 2-1/2" deep where wall construction permits. Where wall construction dictates, the width may be reduced to 2-1/8" or 1-1/2" under special conditions.
- D. Fixture outlets in ceilings (minimum) shall be 4" octagonal x 1-1/2" deep (4-11/16" octagonal x 2-1/2" deep where required to accommodate larger conduit or larger number of wires).
- E. Gang boxes shall be one piece (minimum), 2-1/8" deep.
- F. Flush mount boxes in all finished walls, install the plaster rings in drywalled plastered walls and raised covers as required in walls with other finishes so that the cover plates fit tightly against boxes or rings, 3/16" maximum gaps are allowed for noncombustible walls.
- G. Adjust location of outlets in masonry or tile construction to occur in the nearest joint to the height specified. Heights shall meet A.D.A. requirements.
- H. Support all boxes to maintain proper alignment and rigidity.
- I. Clean boxes of all foreign matter prior to the installation or wiring of devices.
- J. Mounting heights on the drawings are to the centerline of the box unless otherwise noted.

Part 3 – Execution

NOT USED

END OF SECTION 16130 RACEWAYS AND BOXES

Section 16140 Wire Devices

Part 1 – General

1.01 WIRE DEVICES

- A. Wiring device color shall be selected by Architect, unless otherwise indicated.
- B. Provide totally enclosed, 20 AMPERE, 120/277 Volt, Quiet A/C general use snap switches.
- C. Switches shall be specification grade as manufactured by Hubbell, P&S, OR Leviton.
- D. Provide NEMA configuration 5-20R DUPLEX 125 Volt grounding type receptacles rated for 20 amperes unless otherwise indicated on the drawings.
- E. Receptacles shall be specification grade as manufactured by Hubbell, P&S or Leviton.
- F. Receptacles requiring amperages, voltages or configurations different from the duplex convenience receptacles above shall be as indicated on the drawings.
- G. Provide other receptacles of a quality, material and workmanship equal to that specified for duplex convenience receptacles.
- H. Provide cover or device plates for outlet boxes as follows unless otherwise noted:
 - 1. Finished areas: thermoplastic – color to match device.
 - 2. Unfinished areas: zinc coated sheet metal, aluminum, or cast metal as appropriate for the type of box.
 - 3. Exterior areas: copper free aluminum with gray, powder epoxy finish, gasket, weatherproof, Crouse-hinds “WLRD” for duplex receptacles and WLRS for single receptacles or equal.
 - 4. Telephone, communication, and signal outlet plates, shall match those used for receptacles and switches. All outlet and/or junction boxes shall be complete with a cover plate by this contractor.
 - 5. Where devices are ganged, they shall be installed under a common cover plate.
- I. Locate the switches approximately 4'-0" above the finished floor elevation or nearest block course (within A.D.A Requirements), unless otherwise indicated. The long dimension of the switches shall be vertical.
- J. Locate receptacles approximately 1'-6" above the finished floor elevation or nearest block course (within A.D.A. Requirements), unless noted otherwise. The long dimension of receptacles shall be vertical.

Part 2 – Products

NOT USED

Part 3 – Execution

NOT USED

END OF SECTION 16140 WIRE DEVICES

Section 16215
Electrical Power Monitoring and Control

Part 1 – General

1.01 ELECTRIC SERVICE

- A. Provide trenching and backfill to the power company specifications.
- B. Concrete encase conduits where required by the power company and where indicated on the plans.
- C. Provide metering to power company specifications.
- D. Pay the cost of all power company charges connected with permanent electric service to the building.
- E. Coordinate all work with the power company and perform any work necessary to assure a complete, working installation. The entire service installation shall be in complete conformance with the power company's requirements.
- F. Verify the exact routing of the secondary service, and all service requirements, with the power company prior to bidding.

Part 2 – Products

NOT USED

Part 3 – Execution

NOT USED

END OF SECTION 16215 ELECTRICAL POWER MONITORING AND CONTROL

Section 16410 Enclosed Switches and Circuit Breakers

Part 1 – General

1.01 GENERAL

- A. See Section 16010 General Electrical Provisions

Part 2 – Products

2.01 SAFETY SWITCHES

- A. Safety switches shall be the enclosed heavy-duty type (TYPE HD) with quick-make, quick-break mechanism and external pad lockable operating handle.
- B. Safety switches shall be rated for 240 or 600 volts as applicable. They shall be horsepower rated when used in motor circuits.
- C. Safety switches shall be fusible or non-fusible 2, 3, or 4 pole as indicated on the drawings.
- D. Safety switches shall be single throw unless otherwise indicated on the drawings.
- E. Enclosures shall be NEMA 1 indoors and NEMA 3R outdoors unless otherwise indicated on drawings.
- F. Manufacturer shall be SQUARE D, SIEMENS, GENERAL ELECTRIC, OR CUTLER-HAMMER. All safety switches shall be by one manufacturer.
- G. Mount the safety switches securely between 3' x 6' levels above the floor unless otherwise indicated on the drawings.
- H. Switches on block walls shall be mounted on a 3/4" plywood backboard, where located indoors.

Part 3 – Execution

NOT USED

END OF SECTION 16410 ENCLOSED SWITCHES AND CIRCUIT BREAKERS

Section 16420 Enclosed Controllers

Part 1 – General

1.01 GENERAL

- A. See Section 16010 General Electrical Provisions

Part 2 – Products

2.01 MOTOR STARTERS

- A. Provide motor starters (magnetic or fused combination) and control equipment where shown. Starters shall be provided with 120 volt coils, 3 overloads, control transformer with fused 120 volt secondary control circuit, (2) N.O. and (2) N.C. auxiliary contacts, hand-off-auto selector switch and running pilot light, unless otherwise noted. Wire thru control devices furnished by other trades. Since other trades furnish motor driven equipment, the control indicated on the drawings shall be considered as for bidding purposes only. Wire to conform to the actual equipment supplied and installed by the other trades. All fuses shall be dual element type. Provide "blown fuse" indicator lamps in cover.
- B. Starters shall be SQUARE D, CUTLER-HAMMER, GENERAL ELECTRIC, OR SIEMENS.
- C. The temperature control contractor shall determine the exact number of normally open and normally closed auxiliary contacts in each starter.
- D. Coordinate all equipment indicated on the electrical drawings with mechanical equipment schedules and specifications and provide motor starters for all equipment indicated as being interlocked or started from a remote location.
- E. Starters supplied, as an integral part of equipment shall be furnished under the division providing the equipment. Wiring and disconnect shall be by this contractor. All other starters and auxiliary control equipment shall be supplied and wired by this contractor unless otherwise noted.

Part 3 – Execution

NOT USED

END OF SECTION 16420 ENCLOSED CONTROLLERS

Section 16442 Panelboards

Part 1 – General

1.01 PANELBOARDS

- A. Panelboards shall be enclosed dead front safety type with features and ratings as scheduled on the drawings.
- B. Panels known as “LOAD CENTERS” are unacceptable.
- C. Molded case circuit breakers shall be as scheduled on the drawings and specified in this division.
- D. All bus bars shall be rectangular solid copper.
- E. Space, where shown in panel schedules, designates space for future protective devices and shall include bus and support.
- F. Install cabinets so that center of the top breaker does not exceed 6’-6” above the finished floor.
- G. Entries on directory cards shall be typed, complete and accurate.
- H. All bolted connections shall be torqued in accordance with manufacturer’s standards.
- I. Electrical contractor shall arrange circuits as near as possible to circuit numbers on the drawings. At completion of job, electrical contractor shall take current reading checks of respective phases. A minimum of circuit connections shall be rearranged to balance, as closely as possible, the load in the panel.
- J. All breakers shall be bolt-on type.
- K. Manufacturer shall be SQUARE D, SIEMENS, CUTLER-HAMMER, OR GENERAL ELECTRIC (with the exception of the ‘AE’ series).

Part 2 – Products

NOT USED

Part 3 – Execution

NOT USED

END OF SECTION 16442 PANELBOARDS

Section 16491 Fuses

Part 1 – General

1.01 GENERAL

- A. See Section 16010 General Electrical Provisions

Part 2 – Products

2.01 FUSES

- A. The contractor shall furnish a complete set of fuses for all switches, plus fusible equipment furnished by other trades. Unless indicated otherwise on plans, the fuses shall be of the following types:
 - 1. Fuses 601 TO 6000 AMPS shall be UL CLASS. Trade type shall be KRP-C as manufactured by the BUSSMANN Company.
 - 2. Fuses 1/10 TO 600 AMPS shall be UL CLASS RK1. Trade type shall be low peak LPS-RK (600V) AND LPN-RK (250V) as manufactured by BUSSMANN Company.
 - 3. All other fuses shall be dual-element current-limiting type with 200,000 amperes symmetrical interrupting capacity.
- B. Fuses shall be manufactured by BUSSMANN, GOULD-SHAWMUTT, and or RELIANCE.
- C. Spare fuses amounting to a duplicate set of each size installed shall be turned over to the owner upon completion of the project. Provide and place in a spare fuse cabinet similar to BUSSMAN # SFC.
- D. This contractor shall replace all fuses blown during construction.

Part 3 – Execution

NOT USED

END OF SECTION 16491 FUSES

Section 16511 Interior Lighting

Part 1 – General

1.01 GENERAL

- A. See Section 16010 General Electrical Provisions

Part 2 – Products

2.01 LIGHTING FIXTURES

- A. Linear fluorescent lamps for new light fixtures shall be T8, 3500K of the following manufacturers:
1. GENERAL ELECTRIC "STARCOAT" SP35 SERIES
 2. OSRAM/SYLVANIA "OCTRON" 735 SERIES
 3. PHILLIPS TL735 SERIES
- B. Compact fluorescent lamps for new light fixtures shall be 3500K of the following manufacturers:
1. GENERAL ELECTRIC "BIAX" SPX35 SERIES (4 PIN BASE)
 2. OSRAM/SYLVANIA "DULUX" 835 SERIES (4 PIN BASE)
 3. PHILLIPS "PL" OR "PL-T" 3500K SERIES (4 PIN BASE)
- C. All lighting fixtures shall be furnished and installed by electrical contractor as indicated on the lighting fixture schedule, including lamps. Lamps shall be of same manufacturer for all types.
- D. All fixtures shall bear the underwriter's laboratories label and shall be installed according to manufacturer's instructions.
- E. Ballasts for linear fluorescent lamps shall be electronic, parallel, instant-start, normal output type, less than 10% THD, CBM and ETL certified, as manufactured by MAGNETEK, MOTOROLA OR ADVANCE.
- F. Ballasts for "T5" compact fluorescent lamps shall be electronic, parallel, instant-start, normal output type, less than 10% THD, CBM and ETL certified as manufactured by MAGNETEK, MOTOROLA OR ADVANCE.
- G. Ballasts for "T4" compact fluorescent lamps shall be electronic, parallel, rapid-start, normal output type, less than 10% THD, CBM and ETL certified, as manufactured by MAGNETEK, ADVANCE, ENERGY SAVINGS, INC. OR ROBERTSON.
- H. High intensity discharge ballasts shall be constant wattage type.
- I. This contractor shall provide and install all necessary support media for all lighting fixtures including structural steel, angle, rods, etc. In general, fluorescent and high intensity discharge fixtures shall be supported in a manner acceptable to the local inspection authorities. All fixtures shall be firmly supported from beams or joists.
1. Provide all necessary backing, blocking and supports for wall mounted fixtures.
 2. Fixtures shall not be supported from roof deck.
- J. All fixtures shall be U.L. listed and approved for the purpose intended.

- K. Recessed fixtures in fire rated ceiling or supply air plenums shall be approved for the fire rating of the ceiling. Provide airtight gaskets to seal around openings.
- L. All adjustable fixtures shall be aimed and adjusted during evening hours to the satisfaction of the architect and KeyBank Construction Manager.

Part 3 – Execution

NOT USED

END OF SECTION 16511 INTERIOR LIGHTING

Section 16750 Voice and Data Communication

Part 1 – General

- A. See Section 16010 General Electrical Provisions

Part 2 – Products

2.01 TELEPHONE SYSTEM

- A. Electrical contractor to provide telephone service conduit or duct to telephone board as shown on plans. Service conduit size and quantity shall be as determined by local telephone company.
- B. This contractor shall provide and install all conduits with pull wires, outlet boxes, and metal cabinets and pull boxes. Provide a complete conduit system with pull wire as indicated on drawings.
- C. All plates shall be standard telephone type with jack. Provide plates of same material and finish as specified for receptacles. Wall phone plates shall have mounting studs.
- D. Provide plywood terminal board as shown on drawings.
- E. A conduit run shall have not more than three (3) bends in a run between outlet boxes or between outlet box and a metal cabinet or pull box. When a run requires more than three (3) bends, a pull box of suitable size shall be placed in suitable location to meet the above conditions.

Part 3 – Execution

NOT USED

END OF SECTION 16750 VOICE AND DATA COMMUNICATION

