A. This section includes: Consolideck LS (Basis of Design) a hardener, densifier and sealer SUBMITTALS A. Product Data: Manufacturer's data sheets on each product to be used, including: preparation instructions, storage and handling requirements and installation methods.

A. Consolideck LS; a product of Prosoco - www.consolideck.com http://www.consolideck.com.

PREPARATION

A. Concrete surfaces must be clean and structurally sound. Remove all foreign materials including bond breakers, curing agents, surface grease and oil, and construction debris using the appropriate Consolideck® surface prep cleaner. B. Follow the appropriate cleaner with thorough water rinsing. If a d-limonene based cleaner/stripper is used, clean treated surfaces with Consolideck® Cleaner/Degreaser C. Application may begin as soon as prepared surfaces are dry and free of ponded water.

APPLICATION A. Follow the application instructions to pre-test each slab. Pre-testing will confirm suitability of surface preparation and application procedures proposed for general application. Pre-testing will also determine the average coverage rates to be maintained over the entire project. Let surfaces dry thoroughly before inspection and approval. B. Follow all manufacturer's recommendations for applications and cleanup. END OF SECTION 09600

SECTION 09650 - RESILIENT BASE SECTION INCLUDES A. Resilient base and flooring accessories.

SUBMITTALS A. Product Data: Provide data on specified products, describing physical and performance characteristics, sizes and colors available. B. Samples: Submit samples illustrating color and pattern for each material in full color

range for selection by Architect. Include samples for all accessories. C. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention D. Submit shop drawings, seaming plans, coving details, manufacturer's technical data and

installation and maintenance instructions for base and accessories. 2.1 MATERIALS - BASE A. Base: Rubber, coved; molded external corners:

Johnsonite Wall Base, Height: 4 inch Thickness: 1/8 inch thick

Length: Continuous roll when available Manufacturers: Roppe or Johnsonite . Refer Drawings. B. Base Accessories: All accessories to be of same material, size, and color matched to

ACCESSORIES A. Subfloor Filler: White premix latex type recommended by adhesive material Primers and Adhesives: Waterproof; types recommended by flooring manufacturer. Tile Reducer Strips: Johnsonite CB-XX-C or equal; color as selected by Architect. Sealer and Wax: Wax and Sealers by Owner.

Concrete Slab Primer: Non-staining type as recommended by flooring manufacturer. Leveling Compound: Latex type as recommended by flooring manufacturer. EXAMINATION Verify the project if cleaned and ready to receive the wall base. Install as per

manufacturers recommendations END OF SECTION 09650

Thickness: 090 inch nominal

SECTION 09772 - FIBERGLASS REINFORCED WALL PANELS SECTION INCLUDES A. Prefinished reinforced plastic sheets adhered to unfinished gypsum or plywood

 B. Installation of sheets and accessories. WARRANTY

A. Furnish one year guarantee against defects in material and workmanship. SUBMITTALS: Refer Finish Drawings for Selections. A. Product Data: Provide samples of product, storage, handling and Installation methods. B. Submit appropriate section of panel for each finish selected indicating the thickness, color, texture and pattern required.

MANUFACTURER:

A. Basis of Design: Marlite or approved equal. www.marlite.com. 2.3 PANELS A. Fiberglass reinforced thermosetting polyester resin panel sheets complying with ASTM D

Width: 4'-0" in lengths of 8'. Color: As chosen by Architect from Standard colors available. Surface: Pebbled

BASE, MOULDINGS AND CORNER GUARDS Provide base, top caps, inside corners, divider bars and outside corners and all accessories to match the panel colors in lengths to suit project conditions. INSTALLATION A. Examine backup surfaces to determine corners are plumb and straight and surfaces are

smooth. Level wall surfaces, remove protrusions and fill indentations. DO NOT TEXTURE WALLS TO RECEIVE THIS PRODUCT! Refer Section 09260 Install products in accordance with manufacture's written instructions and in proper relationship with adjacent construction, including the following: 1. For adhesive installation to substrate, provide temporary support to prevent panel

 Touch-up, repair or replace damaged units until satisfactory results are obtained Remove excess sealant from panels and molding. Wipe panel down using damp cloth END OF SECTION 09772.

SECTION 09900 - PAINTING SECTION INCLUDES

A. Surface preparation and field application of paints and coatings. 1.2 SUBMITTALS Product Data: Provide data on all finishing products. Samples: Submit manufacturer's color charts illustrating full range of colors and textures available for each surface finishing product scheduled.

Manufacturer's Instructions: Indicate special preparation procedures, substrate conditions requiring special attention. SCOPE OF WORK TO INCLUDE

A. Paint all exterior exposed PVC, steel and copper piping and conduits. This includes items Paint all steel roof jacks and mechanical hoods unless prefinished.

The painter shall sand, prime and paint all exposed structural steel. Care shall be taken to remove runs, drips, cracks, scratches, labels and markings in the shop primer. PVC Pipes - Acrylic Latex Paint - 2 Coats MANUFACTURERS

A. Sherwin Williams or approved equal. MATERIALS

Exterior Galvanized Metal:

A. Coatings: Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating; good flow and brushing properties; capable of drying or curing free of streaks or

B. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial Patching Materials: Latex filler.

Fastener Head Cover Materials: Latex filler V.O.C. (VOLATILE ORGANIC COMPOUND) COMPLIANCE A. Products listed in following schedule and/or substitutes proposed for use by Contractor must be formulated to meet all applicable ordinances and regulations regarding maximum V.O.C. content. Utilize products which have been specially formulated to need such requirements.

SCHEDULE - EXTERIOR SURFACES: Products referenced are manufactured by Sherwin Williams unless noted otherwise - other approved supplier may EXTERIOR SURFACES

a. Primer: One coat galvanized metal primer - Galvite® HS (B50WZ30) Finish: Two coats industrial enamel (B54 Series) 2. Exterior Galvanized Metal (Acrylic Topcoat): b. Finish: Two coats DTM Acrylic Gloss or Semi-Gloss (B66 Series) PPG

Pitt-Tech Int/Ext High Gloss DTM Industrial Enamel 90-374 Series or PPG Pitt-Tech Plus Interior/Exterior Semi-Gloss DTM Industrial Enamel 90-1210 Exterior Ferrous Metal (ALKYD Topcoat): a. Primer: One coat KEM Kromik Universal Metal Primer (B50 WZ1 Series)

Finish: Two coats industrial enamel (B54 Series) PPG Speedhide Gloss Oil Int/Ext Gloss 6-282 Series Exterior Ferrous Metal (Acrylic topcoat) a. Primer: One coat KEM Kromik Universal Metal Primer (B50 Series) Finish: Two coats DTM Acrylic Gloss or Semi-Gloss (B66 Series)

Interior/Exterior Semi-Gloss DTM Industrial Enamel 90-1210 B. INTERIOR SURFACES Interior Gypsum Wallboard: Texture: Blown Orange Peel (light) b. Primer: One coat Prep-Rite High Build interior latex primer surfacer (B28W601) 2. Interior Wood Doors, Trim, Woodwork and Cabinets:

New Wood for paint Primer: One coat wall and wood primer (B49W2) Finish: Two coats Promar 200 Alkyd Semi-Gloss Enamel (B34W251) Metal Frames, Doors, Windows and Exposed Steel: (Alkyd Topcoat): a. Primer: Touch up factory applied primer or apply one coat KEM Kromik

Metal Primer to unprimed metal (B50 Series) b. Finish: (gloss) Two coats industrial enamel (B54 Series) or (semi-gloss) two coats DTM Alkyd Enamel (B55 Series). 4. Ferrous metal frames, doors, windows, and exposed steel (acrylic topcoat): Primer: One coat DTM Acrylic Primer finish (B66W)

Finish: Two coats Acrylic Gloss or Semi-Gloss (B66 Series). Aluminum frames, windows and exposed metal, where scheduled for paint: a. Primer: Self priming

b. Finish: Two coats DTM Acrylic Gloss or Semi-Gloss (B66 Series) END OF SECTION 09900

SECTION 10100 - METAL TOILET PARTITIONS SECTION INCLUDES - A. Metal Toilet Partitions - Floor Mounted SUBMITTALS

Product Data: Provide cut sheets for each product specified including limitations and manufacturer's installation instructions. MATERIALS

A. Metal Toilet Partitions: Knickerbocker, Ampco or an Architect approved equal. Provide one (1) coat hook per door Wall Brackets: Provide continuous "T" brackets for toilet partitions - typical.

SECTION 10400 - SIGNS AND IDENTIFICATION DEVICES SUMMARY A. Provide identifying devices complete, including the following:

END OF SECTION 10100

1. Room identification signs. SUBMITTALS A. Shop Drawings: Submit full-size template drawing for approval of letter size, stock, spacing, settling screws, electrical requirement/location, etc.

Samples: At the same time shop drawings are submitted, submit sample of sign or letter conforming to specification requirements as letter size, spacing and style. MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements indicated, provide products of one of the following: ASI Sign Systems, Grand Prairie, TX Seton, 1-800-243-6624.

In-Pro Corporation or Equal. ROOM IDENTIFICATION SIGNS A. Sign Face: Clear acrylic, 0.125 inch thick, matte first surface. Adhesive: Pressure sensitive adhesive film, second surface. Laminating Back Plate: Acrylic, 0.125 inch thick.

Fabrication Options Back Panel: Over-size back panel, ½ inch on all sides. Tactile Graphics and Test: a. Fabrication: Provide tactile copy and grade 2 braille raised 1/32 inch minimum from plaque first surface by manufacturer's stratification process as

(a) Photo-mechanical method b. Provide lettering and graphics precisely formed, uniformly opaque to comply with relevant TAS/ADA regulations and requirements indicated for size, style, spacing, content, position and colors. Non-Tactile Graphics and Text:

 Test or graphic technique (a) Screen process using surface method. b. Provide lettering and graphics precisely formed, uniformly opaque and consistent in size, style, spacing, content, position and colors.

Overall panel size: 8 x 8 inches. Panel colors: Architect to choose from Standard Colors Available. 8. Refer Details for correct mounting heights and locations. END OF SECTION 10400

SECTION 10520 - FIRE-PROTECTION SPECIALTIES

FIRE-PROTECTION CABINET

A. This Section includes the following: Portable fire extinguishers - BY OWNER Fire-protection cabinets. SUBMITTALS

A. Product Data: For each type of product indicated. Include rating, classification, door hardware cabinet type, trim style, panel style and details of installation. Show location of knockouts for hose valves.

B. Samples: For each exposed cabinet finish. PORTABLE FIRE EXTINGUISHERS - By Owner Refer to wall types for cabinet type (fire rated, etc.) A. Manufacturers or approved equal:

Larsen's Manufacturing Company. JL Industries. Potter Roener, Division of Smith Industries, DAC General: Provide fire extinguishers of type, size, and capacity for each fire-protection cabinet indicated: 5 lb. Type ABC Fire Extinguishers or as per applicable codes. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B.

A. Basis-of-Design Product: Larsen's; 2409-R3, Vertical Duo or a comparable product by one of the following:

B. Manufacturers: JL Industries, Inc. Larsen's Manufacturing Company

SUMMARY

Potter Roemer; Div. of Smith Industries, Inc. Cabinet Type: Suitable for fire extinguisher Cabinet Type: Larsen's listed as basis of Design. Match fire rating of cabinet with rating of fire rated walls - typical.

1. Larsen's Manufacturing Company 2409-R3 - semi-recessed, 3" wall cavity Door Glazing: Clear glass - tempered only if required. Door Style: Vertical duo = VD Finish: White

Trim Style: 2 1/2" rolled edge semi-recessed. Door Material: Steel trim and door material white. END OF SECTION 10520 SECTION 10800 - TOILET AND BATH ACCESSORIES

Bobrick; ASI and Bradley are acceptable manufacturers. SUBMITTALS A. Product Data: For each product indicated. B. Product Schedule: Indicating types, quantities, sizes and installation locations by room of each accessory required. Use room and product designations indicated on Drawings. TOILET AND BATH ACCESSORIES

A. This Section includes the following: Toilet and bath accessories. Basis of Design =

A. Refer to Drawings for all accessories. END OF SECTION 10800 SECTION 13122 - METAL BUILDING SYSTEMS SECTION INCLUDES A. Provide and erect metal building system as per the plans and specifications. Pay

specific attention to clear dimensions required. SUBMITTALS Submit column layout, column reactions and anchor bolt layout for approval by Engineer. B. Metal building supplier to furnish letter of certification by Texas Professional Engineer prior to building fabrication. Metal building manufacturer to supply all required erection details to General Contractor

and Engineer of record. Design and Certification of all insulation to meet IECC 2015 standards. WARRANTY A. Provide a manufacturer's standard roof weather tightness warranty Provide an installer's 5 year roof weather tightness warranty.

Provide a manufacturer's 25 year warranty that the roof panels will remain free from perforation due to corrosion. . MATERIALS A. Metal building system shall be fabricated according to MBMA, AISC and governing

Roof Panels: 26 GA, "PBR" panels. Install as per manufactures specifications. Kynar 500 finish with 20 Year Warranty - Color as selected by Owner from all standard paint C. Wall Panels: Reverse "R" panels, 26 GA, 12" width, Color as selected by Owner from all

standard paint finishes. Soffit Panels: To match wall panels E. Wall and Roof Insulation: Note Insulation system to be certified to meet the minimum requirements of IECC 2015. Walls: Minimum R13 insulation value fiberglass roll insulation with laminated WMP-VR-R Plus.

with laminated WMP-VR-R Plus. Standard banded system to hold insulation in place. F. Building eave height - see Building Sections and Elevations. Metal building manufacturer shall supply all required trim to complete the proposed H. Metal building manufacturer to provide all required closure strips and sealant to seal buildings according to industry standards.

Roof 8" purlins: R-30 Insulation Value unfaced fiberglass over purlins with fiberglass roll insulation

Rigid frames & miscellaneous structural components shop built, shop primed built up J. Fasteners: All exposed fasteners to be shop painted to match adjacent materials. All exterior screws to have "Long Life" head and washer assembly. K. Accessories: Flashings, gutters, closers, fillers, metal expansion joints, ridge covers, fascias and other accessories formed of the same material and finish as the siding. 20

Framed Openings: All framed openings to be engineered and fabricated by the metal ouilding manufacturer M. Doors and door frames: Provide exterior metal doors from building manufacturers standard selection. Prefinished standard color. Provide panic hardware with exterior lever, closer, threshold and weather stripping.

N. Windows and Window frames: Provide exterior windows from building manufacturers standard selection. Prefinished standard color. Provide weather stripping for a complete MANUFACTURERS

A. Metal Building Manufacturer must be a member of Metal Building Manufacturing Association and have been in continuous business for at least ten (10) years. Manufacturer shall be Alliance Building System or approved substitute. DESIGN LOADS

 A. Refer to applicable code Collateral loads: 10 psf (including sprinkler)

vear paint finish warranty

Allowable Deflection Length/240 for both frames and secondary structural elements for buildings with exterior cladding of brick, plaster or EIFS. B. Building Frame Drift (Height = Eave Height): Horizontal Deflection of H/240. Pre Engineered Roof Structure shall provide lateral support for the top of exterior and interior FABRICATION

 A. Panels: All panels to be Factory formed B. Trim and Flashing: Components shall be factory formed where possible in 12'-0" standard lengths. Anchorage: Installer to coordinate with Manufacturer for proper anchoring methods to ensure compliance with specifications.

INSTALLATION A. Install all metal building components in strict accordance with the manufacturer's

END OF SECTION 13122 SECTION 15010 - GENERAL PROVISIONS - MECHANICAL

SCOPE A. The mechanical portion of this project includes all labor, materials, equipment, etc., required to provide the complete mechanical work to fulfill the intent of the Contract

B. All work shall be in compliance with the currently enforced edition of the applicable state, national, and local ordinance and building codes. No additional compensation shall be granted for work which must be changed as a result of the work not originally complying with the codes and standards, etc. C. Install fire sealants as required to achieve the assembly fire rating specified. See Section

07900 for materials. SUBMITTALS A. Submittals shall be provided for all equipment, fixtures and other items indicated. Product data shall be from published manufacturer's data. Submittal shall not contain data that is not relevant to the equipment being submitted. The data shall be highlighted by arrows, underlining, etc. Broad, general data, is not acceptable. Data shall be

presented at one time, in a neatly bound and organized manner. At the completion of the Project, a set of marked-up drawings, including DIMENSIONS and location of all underground piping shall be provided to the Owner. OPERATING AND MAINTENANCE MANUALS AND INSTRUCTIONS A. Operating and Maintenance Data includes printed information, such as manufacturer's installation instructions, manufacturer=s service manuals, manufacturer=s lubrication charts, standard wiring diagrams, and a parts list including the price of each item.

GUARANTEE & WARRANTY A. The contractor shall fully guarantee the installation against defects in materials and workmanship which may occur under normal usage for a period of one year (1) after owner=s acceptance. Defects shall be promptly remedied at no cost to the owner. This

guarantee is in addition to, and not a limit to, any other guarantees or warranties. END OF SECTION 15010

SECTION 15400 - PLUMBING SECTION INCLUDES

A. General Conditions under Architectural Section are not repeated here but apply. B. Visit site and become familiar with existing conditions. Inspect all plans and specifications covering all work in its entirety. Consider all conditions affecting work. Perform all work necessary, incidental to produce a complete operating system. CODES AND PERMITS

A. Comply with all applicable national, state and local codes. B. Comply with minimum requirements of codes or exceed minimum when specified or Pay for all lawful fees required by legal authorities and utility companies.

The Plumbing Contractor shall provide all design services as required to communicate

their proposed systems and meet current relevant design standards, laws and codes.

Secure all certificates of inspection/occupancy required.

The Contractor shall submit design criteria used to size the piping. The Plumbing Contractor shall provide schematic drawings depicting any information which may be required to evaluate the design and operation of the system once it is installed. SUBMITTALS AND INSTRUCTIONS A. The Plumbing contractor, upon receipt of contract, shall submit copies of equipment list and catalog data within fifteen (15) days to Architect for approval prior to the beginning of installation. Submittal shall be complete with all items listed and in tabulated form in

B. Contractor shall provide a schematic layout of all piping including size, material, height above the floor and any other pertinent information. COOPERATION Coordinate with all trades and contractors in performing the work and storing material. B. Following general building construction, set all pipe sleeves, inserts, etc.; provide

openings for chases and ducts as construction progresses. Provide services to equipment furnished by others for convenient connection. Mechanical/Electrical work have the following priority sequence: Soil, Waste, Vent Piping

Ductwork Water Piping

the extent of the test of each system.

flanged, Nibco #F-619 or equal.

repair, or replacement

Electrical Wiring Verify that mechanical equipment fits into space allotted. Mechanical Contractor is responsible for changes necessitated by substitute's equipment, even though approved Drawings are diagrammatic and show general arrangement and extent of work. Exact location and arrangement to be determined after equipment is selected and work progresses. Drawings will not be scaled for outlets or equipment locations. Locations determined by reference to dimensioned plans or shop drawings. UTILITIES

Utility locations are a guide only. Verify location of existing utilities to determine extent of Contact utility company, determine extent of their requirements, including bid, any lawful fees, and any compensation for connection to building, premises, projects, etc., including temporary services APPROVAL OF MATERIALS & EQUIPMENT Materials shall conform to the requirements of the contract documents and shall be new

and of best quality and grade. Before purchasing materials of equipment, submit to Designer for approval a complete list of materials and equipment together with the manufacturer's catalog data and ratings. Provide operating instructions for equipment. Instruct operating personnel in operation of equipment. TEST CERTIFICATE Perform all tests outlined herein. Piping shall be thoroughly tested for leaks and

approved before being covered or concealed. Local rules and regulations shall govern

EQUIPMENT CONNECTIONS Provide plumbing connections to all items furnished and all items furnished by other subcontractors or by Owner. Connections to match device connected. Furnish all accessories or appurtenances as necessary to complete connection not furnished with equipment. Exposed piping and fittings in finished areas shall be chromium plated. MATERIALS

A. PLUMBING FIXTURES: Furnish and install plumbing fixtures as specified and scheduled on plans. Install fixtures in accordance with manufacturer's directions. VALVES AND COCKS: Provide isolation valves and unions on all equipment so that equipment may be removed or replaced without draining the system. Gate Valves - Sizes 2" and smaller - Nibco Series 113 all bronze 20# W.O.G. threaded, or sweat joint. Sizes 2 1/2" and larger - iron body, bronze trim 125#

2. Ball Valves - Sizes 2" and smaller - Nibco Series #580 threaded or sweat 300# W.O.G. all bronze body, end entry, Teflon seals. 3. Check Valves - Sizes 2" and smaller - all bronze, 200# - Nibco T-413, screwed bronze. Sizes 2 1/2" and larger shall be Nibco #F-918W, iron body, 1254#flanged or Mission lift check, flanged. 4. Gas Cocks - Size 2" and smaller - all iron, 125# screwed, Healy #900. Sizes 2 1/2"

and larger - semi-steel, lubricated, flanged, 175#, Nordstrom #143. Fixture angle stop valves chrome plate quarter turn, Brass Craft G2 series. MISCELLANEOUS Strainers - 2" and smaller - Crane #988 1/2; 2 1/2" and larger - Crane #989 1/2. Valve Boxes - Utilize valve boxes when valves are located below grade or floor slabs. Boxes, cast iron type, with covers properly marked. Furnish key or valve operated

extension and turn over to Owner before completion of job where required. GENERAL PIPE REQUIREMENTS Install piping systems complete with necessary and incidental appurtenances, fittings, valves, hangers, etc., as required for a complete installation. Provide unions or flanges at all connections to equipment to facilitate maintenance,

Provide anti-galvanic fittings at junctions of dissimilar metals. Plug or cap all open pipe during construction. Install piping as required to meet code. Contractor is not at liberty to depart significantly from the layout shown without approval. Submit shop drawings for changes. Install pipe hangers over "outside" pipe insulation. Provide sheet metal saddle to protect insulation. Provide expansion loops where required or necessary.

Provide long radius elbows and bends. Carefully align piping which penetrates floor slabs on grade and are cast in concrete. Provide personnel to monitor concrete pour to prevent displacement of vertical risers. Do not bend or deflect piping in connections or couplings. PIPING MATERIALS AND METHODS

Piping material as follows: 1. Drain and Relief Lines - Type L, hard drawn, copper tubing, ASTM-B88, with wrought copper sweat fittings, solder joint 2. Domestic Hot and Cold Water Lines - Above grade, Type L, hard drawn, copper tubing below grade, Type K, soft-drawn copper tubing installed without splicing. All splicing made above grade. Penetrations through concrete slab installed use colored plastic sleeve through the concrete. Use wrought copper sweat fittings with approved solder. Prior to placing the water system into service, flush, sanitize

in accordance with State Department of Public Health Regulations. Furnish certificate to compliance. PEX can be used if allowed by Code. 3. Sanitary Soil, Waste and Vents - Below slabs and above floor shall be schedule 40 PVC-DVW pipe with solvent joint socket drainage pattern fittings. 4. Outside Sewer Lines - Use J-M Ring-Tite PVC gravity pipe and fittings, ASTM D3034-SDR35 5. Pipe Support - Bedding and backfill below grade and pipe supports above grade

shall be in strict accordance with the manufacturer's recommendations for PVC pipe and fittings. 6. Fire Rated Penetrations - PVC piping penetrating rated fire walls and/or floors shall have fire stops of a type for the same rating of the wall or floor. HANGERS, SUPPORTS, PIPE SLEEVES AND PIPE ANCHORS

Run visible piping parallel or perpendicular to the horizontal/vertical planes of the Support copper/steel piping from hangers spaced as follows: 3/4" Pipe or Smaller 6'-0"

1 1/4" Pipe and Larger 10'-0" Individual hangers - adjustable, swivel, split ring type, Grinnel No. 101 or 104, copper plated for copper lines, devices. Provide proper pipe support, suspensions. Consult manufacturer's literature regarding correct method, location of supports.

Two or more parallel pipes support on trapeze hangers. Coordinate with electrical contractor. Combine trapeze supports where possible. Coordinate with trades. Group exposed piping, conduit passing through space. Generally, suspend electrical conduits below other piping. Integrate work of all trades to avoid a proliferation of independent suspension systems for individual pipes or conduits resulting in unsightly appearance, unnecessary extra hangers, and reducing the utility of

Provide sleeves on pipe penetrations through concrete slab, not on grade, masonry walls, roofs. Construct sleeves from tubing and terminate flush with wall on both sides of surface penetrated. Clear insulation through sleeves. Galvanized sleeves where subject H. Generally, support hangers from structural steel, masonry and formed or poured concrete. Do not install hanger supports on pre-case concrete, metal decks, steel

bracing, bridging, piping or conduit. Roof supported piping shall be supported with Mapa pipe supports spaced at 6' o.c. PIPING TEST Water Lines - Hydrostatically test at 50 psi for a period of not less than 24 hours. Attach gauges so that pressure can be monitored throughout entire period Sanitary, Storm and Vent Piping - Fill system with water up to the top of vertical section

at least 10 feet above the floor or grade and allow to stand for at least four (4) hours. Level will be monitored to determine if there are any leaks. PIPE INSULATION All domestic water piping above ceilings, in equipment and exterior rooms, and in walls shall be insulated with 1/2" thick preformed sectional pipe insulation with a vapor proof white Kraft paper jacket with sealing strip. Use premolded Zeston plastic covers on exposed fittings. All insulation to be installed in accordance with the manufacturer's

instructions. OPERATIONS, MAINTENANCE AND PARTS MANUALS Furnish Owner with two (2) sets of operation, maintenance and parts manuals on equipment upon completion of the job.

On completion of the work, this Contractor shall provide the Owner a written guarantee on the entire work against all equipment or faulty workmanship for a period of one (1) year after date of acceptance, including agreement to provide free maintenance over this END OF SECTION 15400

SECTION 15500 - HEATING, VENTILATION & AIR CONDITIONING SECTION INCLUDES Air Conditioning Unit/Electric Heat: Minimum SEER = 17. Exhaust Fans Grills and Diffusers

Temperature Controls

Ductwork

Air Filters Install fire sealants as required to achieve the assembly fire rating specified. See Section 07900 for materials. CODES, PERMITS AND ORDINANCES All work shall be executed in accordance with all local or state codes and regulations,

applicable to the particular class of work. The contractor shall hold a valid Texas Air Conditioning Contractors License. The contractor shall pay all applicable service charges, fees, permits, royalties, taxes and other similar costs. The Air Conditioning Contractor shall provide all design services as required to communicate their proposed systems and meet current relevant design standards, laws

and codes. The Contractor shall submit design criteria used to size the equipment. 1.3 SUBMITTALS A. The Air Conditioning shall provide schematic drawings depicting unit locations, unit designation, duct sizes, supply and return duct layout, thermostat and control locations designed grille capacity and any other information which may be required to evaluate the design or to commission and balance the system once it is operational. Testing, Adjusting and Balancing (TAB) shall be the responsibility of the mechanical

subcontractor. All TAB work shall be provided by the subcontractor specifically licensed and certified to do such work. Submit the TAB report to the Architect for review.

A. Air Conditioning Units Split Ducted Air conditioning shall be electric heat and electric air as manufactured by Lennox, Trane, Carrier or American Standard or approved equal. Units are to have a minimum SEER of 17. Minimum acceptable system is an American Standard, Gold Series 2 stage

compressor, 4 ton cooling capacity with 15 KW electric heat. Thermostat: Honeywell 2 stage compatible, 7 day programmable, or equal. 3. Build supply and return ductwork to connect the AC units to the plenums. a Insure that all connections and penetrations are water and air tight Connect electricity and extend 1" diameter schedule 40 PVC condensate

piping to the roof drains. B. Exhaust Fans 1. Exhaust fans are to be provided and installed by the mechanical contractor and ducted to the exterior. Exhaust Fans are ceiling mounted and controlled by wall mounted switch. These exhaust fans shall be ducted to wall caps. All wall vents and caps are to be galvanized prefinished steel and have dampers.

 C. Grills and Diffusers 1. All grills and diffusers shall be white electroplated painted galvanized steel with adiustable vanes. Temperature Controls

1. Single Zone: Furnish and install Honeywell Wi-Fi programmable Thermostat RTH6580WF1001. Install in a locking acrylic box with one key cut for all the boxes installed. Thermostats shall be mounted at 48" AFF unless otherwise noted. 2. Multi-Zone: Thermostats and controls as required by the zoning controls, WiFi 3. The contractor shall furnish and install all contactors, transformers and relays required to provide a complete and working system. All control wiring shall be color coded using a minimum of 18 gage wire.

 Ductwork - all ducts shall be galvanized steel, externally insulated. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses and duct construction methods, unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discoloration and other imperfections. a. The maximum diameter of round "Snap-Lock" duct is 14" diameter. Any duct over this size shall be rectangular. Seal all joints with Pro-Seal as manufactured by DUCTMATE.

2. Galvanized Sheet Steel: Lock-forming quality; complying with ASTM A 653/A 653M and having G90 coating designation; ducts shall have mill-phosphatized finish for surfaces exposed to view. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts. 4. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36" or less;

3/8-inch minimum diameter for lengths longer than 36 inches.

jurisdiction and marked for the intended use

lines shall be galvanized steel externally insulate All ductwork shall have a minimum R-Value of 8.0. F. Air Filters 1. Provide MERVII pleated media MERV (11) eleven. Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having

5. Flex duct may be used in the last 8'-0" only to tie into an individual grill. All truck

1. Insulate refrigerant lines with 1" thick "AP Armaflex" on all line sizes. Use one-piece, slip-on piping and seal butt joints to manufacturer's specifications Paint exposed outdoor lines with a thick coat of white vinyl. 2. The Air Conditioning Contractor is to extend condensate piping to the nearest sanitary sewer inlet or roof drain. Minimum piping is 3/4" PVC. FANS (EXHAUST):

A. Acceptable manufacturers are NuTone, Dayton, Cook, Penn, Acme, Broan, Greenheck or Jenn-Air. All fans shall meet or exceed the performance requirements listed, and shall be approved by the manufacturer for the type of service required. Direct drive exhaust fans shall also be equipped with speed controllers, and backdraft dampers. Where fan capacity is not indicated the contractor shall size the fan to provide 50 cfm of exhaust for each plumbing fixture in the room being served. INSTALLATION

Install in accordance with manufacturer's recommendations, SMACNA, ASHRAE and ACCA standards. Support from structure. All refrigerants handled by certified technicians. WARRANTY A. Unless otherwise noted above, all parts, equipment and workmanship shall be

guaranteed for a period of one (1) year from the date of substantial completion. The compressor shall carry an additional four (4) years PARTS ONLY warranty. Condensing unit and air handling unit parts shall carry an additional four (4) years PARTS ONLY END OF SECTION 15500 SECTION 16050 - BASIC ELECTRICAL MATERIALS AND METHODS

SECTION INCLUDES: Install all electrical systems described in the plans and specifications. These systems may include: Electrical Service and Distribution

Telephone System Television System Alarm and Detection Systems Intercommunication Systems

Construction Lighting - Electrician shall provide temporary construction lighting with a minimum of 5 foot candles and at least one lamp per room or space. At the completion of the project all lights and wiring shall be removed by the electrical contractor Install fire sealants as required to achieve the assembly fire rating specified. See Section 07900 for materials.

GENERAL Codes, Standards, and Permits: All work shall be in strict accordance with all applicable laws and codes, including but not limited to the following.

National Electric Code Occupational Safety and Health Administration National Fire Protection Association Underwriters Laboratories Applicable State Codes

Local City Electrical Code, latest edition National Electrical Manufacturers Association B. Utilities: Utilities locations are guide only. Verify locations with utilities to determine extent of work required. The Electrical Contractor shall provide all design services as required to communicate their proposed systems and meet current relevant design standards, laws and codes. The Contractor shall submit design criteria used to size the panels. The Electrical Contractor shall provide schematic drawings depicting panel boards, wiring diagrams, panel board schedules and any other information which may be required to evaluate the

design. The equipment manufacturer shall be required to perform the necessary coordination to insure compliance with all requirements Labor: Work performed by skilled electricians with experience in jobs of equal magnitude and nature. Remove or replace all unsightly or improper work. Substitution of Products: Contractor shall be responsible for all additional costs required by substitution of products other than those specified in the plans and specifications.

A. 1. Rigid Galvanized Steel Conduits - Hot-dip galvanized produced to ANSI C80.1 latest edition. Permitted in damp or wet locations, outdoors above grade, all elbows of PVC conduit, three inches and larger. 2. Electrical Metallic Tubing (EMT) - Mild steel, electrically welded, galvanized and produced to ANSI 80.3. Permitted in non-exposed areas, all dry locations.

3. Flexible Metallic Conduit - Used to extend dry connection to motors, unit heaters,

light fixtures, and other permanently installed equipment. Liquid tight shall be

utilized for all outdoor and wet locations 4. Rigid Heavy Wall Schedule 40 PVC Conduit - Meeting ANSI/ASTM F512-79 as manufactured by Carlon or equal. Conduit joined with fitting by solvent welding or other method recommended by manufacturer. Ground conductor shall be run in PVC conduits sized according to National Electrical Code. May be used in underground area only. B. Fittings: Fittings shall be concrete tight except in wet locations where they shall be

rain-tight. Compression or set screw may be used on EMT conduit. Indention type fittings may not be used or accepted. Insulating throat connections shall be used at all panel or enclosure terminations. C. Wires and Cables: 1. Conductors of size #10 and smaller shall be type THHN/THWN insulated copper,

insulated for a voltage of at least 600 volts. No conductors smaller than #12 shall be permitted except for thermostat wiring or communication wire. All home runs greater than 100 feet shall be a minimum of size #10. Conductors of size #8 and larger shall be type THW or THHN/THWN, stranded copper with an insulation value of at least 600 volts.

Boxes: Outlet boxes shall be steel, electro-magnetized, sherardized and of proper dimension to suit the location and equipment. Knock-out closers shall be utilized to close unused openings. Boxes to be manufactured by Race, Bowers, Appleton, or equal. F. Wiring Devices 1. Hubbell wiring devices are specified, equal devices by Sierra, G.E., Arrow-Hart, P

D. Pulling Cable: Provide a nylon pull cord equal to Greenlee #431 two-ply poly-pull-line,

tensile strength of 240 lbs. in all empty conduits for later use.

& S, and Leviton may be used.

as shown on panel schedules.

2. Hubbell Toggle Switches - #RS115W (15A, single pole), #RS315W (15A, three-way), #CSB120W (20A, single pole), #CSB320W (20A three-way) white Duplex Receptacles - #RR15W2 (15A), #BR15WHI, white finish. GFCI Receptacles - #GF15WL (15A). GFCI Weatherproof Covers - Vertical - RW51040, Horizontal - RW51020.

Device Plates - Stainless steel on all exposed boxes. White smooth phenolic on others. Plates shall be number of gang as required for location. Floor outlets are to have circular brass cover plates Photocell Tork Time 2100 in a NEMA 3-box or equal. G. Lighting Fixtures and Lamps: Furnish and install complete with lamps the lighting fixtures shown on schedule. Manufacturer's directions shall be utilized for installation of fixtures. Refer to manufacturer's recommendations for pole foundations H. Lamps: Lamps shall be type and size as indicated by manufacturer's literature. Approved manufacturers: G.E., Sylvania, Phillips, or Westinghouse

Distribution and Lighting Panels: Distribution panels - circuit breaker type suitable for

service application. Multi-pole breakers shall be common trip. Approved manufacturers

are Square "D" or Architect approved equal. Lighting panels shall be circuit breaker type

J. Disconnects: Furnish fusible and non-fusible disconnect as shown on plans. Disconnects to be general duty type with UL label and horsepower rating. Quick-make/quick-break mechanism, cover interlock, pad lock provision, NEMA 1 for indoor installation: NEMA 3 for outdoor installation. K. Exhaust Fans: Provide wiring and switch only for the vent. The HVAC contractor will

provide the exhaust vent and duct. A. Raceways: Utilize unions and connectors at equipment connections. Install vibration, noise isolation devices for connection to rotating or vibrating equipment. Exposed

conduits to run parallel or perpendicular to planes of building construction. Where concealed, take direct route between points. All conduits run into vaults shall be off-set according to banking equipment drawings

B. Hangers, Supports, Sleeves, Anchors: Support conduit by hangers on maximum spacing as follows:

3/4" conduit or less 1" conduit

1 1/4" conduit 10'-0" C. Splicing and Connecting: Use "pigtail" splices only on #10 and smaller conductors. Utilize crimp type caps or "Scotchlok" connectors. Make gutter taps with split type crimping sleeve applied with hydraulic compression tool. D. Wire Color Code: Wiring system shall be color-coded throughout in accordance with

E. Wiring Installation: Use approved pulling compound when installing conductors in raceways. Pull wire from pay-out reels or reels provided with wire. F. Outlet Boxes: Utilize four-inch (4") square boxes for switches, receptacles, small pull boxes in wall construction. Sectional switch boxes may be used when only one (1) conduit entry into box not larger than 1/2".

G. Switches: Switch boxes shall be installed on the strike side of door whether indicated on the plans or not. All heights to meet ADA requirements. See Schedule. H. Ground Connections: Use thermite welding process such as Burndy "Thermoweld" or "Cadweld" for connections below grade. Thermoweld or Crimp lugs suitable above I. Lighting Fixtures: Provide appropriate mounting frames for fixtures to match installation

Provide plaster rings where appropriate. Verify ceiling finish with General Contractor to insure proper frame will be supplied. Electrician shall install all light fixtures into their final location including cutting and installing fixtures in ceiling tile provided by others. J. Guarantee: Contractor(s) will guarantee the installation to be free of defects in material and workmanship for a period of one (1) year following the date of written acceptance of the project. Where warranties exceed one (1) year, by specific reference to other parts of these specifications, or where particular equipment is specified which normally carries longer warranties, then these warranties shall apply instead. END OF SECTION 16050

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