


1 WINDOW TYPES
1/4" = 1'-0"


ALL WINDOW DIMENSIONS SHALL BE SITE VERIFIED PRIOR TO FABRICATION



INTEGRATED ARCHITECTURE
www.integratedarc.com
P.O. Box 7808 Edmond, OK 73078 (405) 255-4243
CIVIL ENGINEERING

STRUCTURAL ENGINEERING
360 Engineering Group, PLLC
www.360enggroup.com
1201 East 3rd Street
Tulsa, OK 74120
918.518.1124
Certificate of Authorization: OK #5996 | EXP 6.30.2022

MFP ENGINEERING



PR SS AL ENGINEERING CONSULTANTS, P.A.
10 W. W. RIVIERE, SUITE 100, OKLAHOMA CITY, OK 73107
405-755-8111 www.com C.O.A. 1045 PEELS EXPRES. JUNE 30, 2021

SWADLEY'S FOGGY BOTTOM KITCHEN

ROBBERS CAVE STATE PARK

CLIENT
STATE OF OKLAHOMA / SWADLEY'S

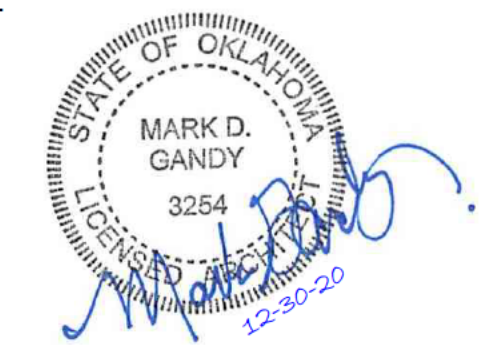
PROJECT # 20011

ISSUED BY CT DRAWN BY / CHECKED BY MG

REVISIONS

No.	Description	Date

SEAL



SHEET NAME
WINDOW TYPES

SHEET NUMBER
A502

G. All gate and globe valves shall be designed for repacking under pressure when fully opened, and shall be equipped with packing suitable for the intended service. When the valve is fully opened, the back seat shall protect the packing and the stem threads from the fluid. All gate and globe valves shall have a gland follower. The pressure-temperature rating of valves shall be not less than the design criteria applicable to all components of the system.

H. Bronze valves with the basic saturated steam rating of 125 psi or 150 psi shall have pressure containing parts of a material having at least the physical properties of ASTM Specification B-62. Metallic seated bronze globe, angle, check and gate valves with a basic steam rating of 200 or 300 psi shall have pressure containing parts of material conforming to ASTM Specification B-61, for temperatures to 550°F.

I. Pressure containing parts of iron body valves shall be of material conforming to ASTM Specification A-126 Grade B. If the wedge in OS&Y gate valves is fastened to the stem by threads, it shall be secured by a nickel alloy or monel pin.

J. Face-to-face and end-to-end dimensions of iron body valves shall conform to ANSI B16.10. Design, workmanship, materials, and testing shall conform to MSS-SP-70 and MSS-SP-71 (Manufacturers Standardization Society of the Valve and Fitting Industry).

K. Stems of bronze and Iron Bodied Bronze Mounted valves shall be of ASTM-B-198 Class 13C (cast silicon brass), ASTM B-371, Alloy A (rolled silicon brass), or other material equally resistant to dezincification.

L. Grooved end valves shall be of the same manufacturer as the adjoining couplings. Bodies shall be ductile iron conforming to ASTM Specification A-536.

M. All pressure casing shall be free of any impregnating materials.

N. Gate valves shall be of the solid wedge type, designed and manufactured in such a way that seating surfaces are prevented from contacting until near the point of closure. Valves two inches and smaller shall be rising stem with threaded, solder, socket, or flanged end to suit service. Valves 2 1/2" and larger shall be flanged, and unless otherwise specified all shall be OS&Y.

O. Globe valves two inches and smaller shall be threaded, flanged, solder end or socket end, to suit service. Globe valves 2 1/2 inches and larger shall be flanged, unless otherwise specified. Where composition discs are used, the disc shall be suitable for the intended service. For steam throttling service, composition disc valves shall be fitted with throttling nut. Metal seated globe valves shall have hardened stainless steel disc and seat ring.

P. By-pass valves shall be globe type, and these two inches and smaller at pressure reducing stations, shall be 500 Brinell plug disc and seat ring type, or stellite. Those 2 1/2 inches through 4 inches shall be hardened stainless steel plug disc globe valves.

Q. Unless a composition disc is specified, swing check valves two inches and smaller shall be bronze, regrinding, with seating angle 40 to 45 degrees. A stop plug is required as a renewable stop for the hanger, unless otherwise specified. Disc and hanger shall be separate parts, and the disc shall be free to rotate. Hanger pins shall be supported on both ends by removable side plugs.

R. Lift check valves two inches and smaller shall be bronze or forged steel, to suit the service.

S. Check valves 2 1/2 inches and larger shall be flanged, swing type, or grooved ends with spring assisted disc for vertical or horizontal installation, unless otherwise specified.

T. Butterfly valves shall conform to MSS-SP-67. Liners and discs shall be suitable for the intended service.

U. Butterfly valves shall be grooved end or lug type suitable for dead end service. Body constructed of cast or ductile iron - heavy duty stem bushing to absorb operator side thrust - aluminum bronze disc - 300 series stainless steel stem - EPDM seat (pressure responsive in sizes through NPS 12) - operators with ten position lever lock for sizes 2 1/2" thru 4" - wormgear with handwheel for sizes above 4" - valve pressure rated for 150 psig at 230°F with EPDM seat / seals.

V. Each valve is to be given shell and seat tests by the manufacturer and will carry a permanently affixed indication that tests have been successfully completed.

W. Ball valves two inches and smaller shall have a forged brass body with screwed pipe ends for steel pipe and sweat ends for copper pipe. Body shall be two piece for valve assembly access to allow performance of all maintenance operations. One piece hard chrome plated brass ball or stainless steel ball with full port flow, self-aligning and free floating between two Viton seats (300 psi) to provide positive seal in either direction. Stem shall be brass or stainless steel and extended 1 1/4" above the valve to clear insulation and to receive molded packing brass packing nut and handle nut. Handle shall be constructed of zinc plated steel with partial plastic coating. Valve shall be rated for 150 psig at 180°F.

X. Insofar as possible, all valves of the same type shall be of the same manufacturer. Before purchasing any valve, contractor shall submit for approval the name of the manufacturer, the figure number which he proposes to furnish, and engineering data on each figure number, if not using those specified. The intent of this requirement is to obtain the most suitable valve for each service. Nonstandard valves will not be considered.

1.5 JOINTS

A. Provide joints of type indicated in each piping system.

B. Full and clean cut.

C. Ream to the full inside diameter of the pipe with all burrs removed.

D. Sweat joints in copper tubing - with 95-5 solder.

E. Thread pipe in accordance with ANSI B2.1; cut threads full and clean using sharp dies. Ream threaded ends to remove burrs and restore full inside diameter. Apply pipe joint compound, or pipe joint tape (Teflon) where recommended by pipe/fitting manufacturer, on male threads at each joint and tighten joint to leave not more than 3 threads exposed.

F. Braze copper tube-and-fitting joints where indicated, in accordance with ANSI B31.

G. Solder copper tube-and-fitting joints where indicated, in accordance with recognized industry practice. Cut tube ends squarely, ream to full inside diameter, and clean outside of tube ends and inside of fittings. Apply solder flux to joint areas of both tubes and fittings. Insert tube full depth into fitting, and solder in manner which will draw solder full depth and circumference of joint. Wipe excess solder from joint before it hardens.

H. Grooved ends shall comply with (or similar to) AWWA C606. Install in accordance with the manufacturer's published instructions. The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service. Gaskets shall be molded and produced by the grooved coupling manufacturer. Grooved coupling manufacturer's factory trained field representative shall provide on-site training for contractor's field personnel in the proper use of grooving tools, application of groove, and installation of grooved piping products. Factory trained representative shall periodically visit the jobsite to ensure best practices in grooved product installation are being followed. Contractor shall remove and replace any improperly installed products.

I. Use dielectric nipples on HVAC and domestic water lines where steel and copper pipe are joined.

J. Use brass ferrules on plumbing systems where dissimilar metals are joined.

1.6 UNIONS

A. Unions 2" and Smaller (150 WSP - 200 WOG): Standard Weight brass to iron seat malleable iron body with screwed ends - Walworth #7712 or #7762 - equivalent Crane or Stockham.

B. Unions 2 1/2" and Larger: (125 PSI WSP) Standard cast iron body with flanged ends - Walworth #1137 or #1537 - equivalent Crane or Stockham.

C. Unions of fittings for servicing and disconnect are not required in installations using grooved joint couplings.

D. Install wherever necessary for repair, replacement, or service of the equipment or system.

1.7 STRAINERS

A. Provide basket or "Y" type strainers with iron bodies of same size as pipe line, removable screen inserts of not less than 22 gauge brass, perforated for a total net free area opening equal to four times the pipe area.

2" and smaller Crane #988 1/2 - equivalent Walworth, Stockham, Paget, or Victaulic.

2 1/2" and larger Crane #989 1/2 - equivalent Walworth, Stockham, Paget, or Victaulic.

B. Use brass bodied strainers on copper pipe.

1.8 SLEEVES AND COVER PLATES

A. Install for all pipes passing through floors, walls, or partitions. Size sleeves large enough to allow for free movement of the pipes with expansion.

B. Floor sleeves: 20 gauge galvanized sheet metal flanged at the bottom and attached to the forms before concrete is poured (straighten sleeve after floor is poured).

C. Sleeves for insulated pipe passing through walls or partitions: 24 gauge galvanized sheet metal with plaster bead set flush with the wall finish.

D. Sleeves for uncovered pipe passing through walls or partitions: Galvanized steel pipe sleeves, extending outside of the wall finish as required to attach the cover plates.

E. Sleeves for basement walls or floors: Provide "Link-Seal" as manufactured by Thunderline Corp. or silicone pressure sealants as manufactured by General Electric or Dow Chemical Co., field applied under the direction of the local Manufacturer's Representative.

F. Provide chrome plated brass cover plates attached to the sleeves independent of the pipe on all pipes which pass through floors, walls, ceilings, and partitions in finished rooms. Beaton Corbin Co. Style 2-BC for copper tube and 13-BC for standard pipe.

G. Manufacturer: Subject to compliance with requirements, provide pipe escutcheons of one of the following:
Chicago Specialty Mfg. Co.
Producers Specialty & Mfg. Corp.
Sanitary-Dash Mfg. Co.

H. Provide pipe escutcheons as specified herein with inside diameter closely fitting pipe outside diameter, or outside of pipe insulation where pipe is insulated. Select outside diameter of escutcheon to completely cover pipe penetration hole in floors, walls, or ceilings; and pipe sleeve extension, if any. Furnish pipe escutcheons with nickel or chrome finish for occupied areas, escutcheons not required for unoccupied areas.

I. Pipe Escutcheons for Moist Areas: For waterproof floors, and areas where water and condensation can be expected to accumulate, provide cast brass or sheet brass escutcheons, solid or split or split hinged.

J. Pipe Escutcheons for Dry Areas: Provide sheet steel escutcheons, solid or split hinged.

K. Install pipe escutcheons on each pipe penetration thru floors, walls, partitions, and ceilings where penetration is exposed to view; and on exterior of building. Secure escutcheon to pipe or insulation so escutcheon covers penetration hole, and is flush with adjoining surface.

1.9 PRESSURE GAGES

A. Manufacturers: Ashcroft - Flo Fab - Miljoco - Palmer Wahl - Tel-Tru - Terrice - Watts - Weiss - Winters.

B. Capacity: Anticipated pressure to be 50% of full scale unless otherwise indicated on the plans.

C. Features: Phosphor bronze bourdon tube - 4 1/2" diameter dial of white laminated phenol with black figures and graduation lines - nylon movement in rotary gear design - adjustable micrometer type pointer readily accessible from front of gage - black enameled cast - glass face window - tightly constructed to be dust and moisture resistant - accuracy within 1/2 of 1% of scale range.

D. Accessories: Pressure snubber utilizing porous metal filter to damper pulsations - syphon loop (steam duty only) - 1/4" brass T handle cock.

1.11 THERMOMETERS

A. Manufacturers: Ashcroft - Miljoco - Palmer Wahl - Tel-Tru - Terrice - Weiss - Winters

B. Capacity: Full range of anticipated temperatures or as indicated on plans.

C. Features: Industrial glass thermometer - full 9" scale opening - metal scale with etched, scribed, or inlaid lines and figures vividly contrasting with

background material - red reading mercury tube - heavy rattle proof glass cover to make unit dust and moisture resistant - non-corrosive steel bulb chamber - threaded connection - swivel and lock nut.

D. Accessories: Separable socket on all liquid or vapor sensing thermometers - union connection on all air sensing thermometers.

1.12 EQUIPMENT SUPPORTS

A. Provide each piece of equipment or apparatus suspended from ceilings or mounted above floor level with suitable structural support, platform or carrier in accordance with best recognized practice. All such supporting or mounting means shall be furnished by respective contractor who shall arrange for their inclusion and attachment to building structure, unless otherwise indicated on plans or herein specified. Contractors shall exercise extreme care that structural members of building are not overloaded by such equipment. In all cases details of such hangers, platforms, and supports, together with total weights of mounted equipment shall be approved by Architect-Engineer.

1.13 MOTORS

A. Polyphase motors: NEMA MG 1, Design B medium induction motor, premium efficient, with 1.15 service factor. Multispeed motors shall have a separate winding for each speed. Bearings shall be regreassable, shielded, antifriction ball bearings suitable for radial and thrust loading. Class B temperature rise with class F insulation.

B. Polyphase motors with additional requirements: With motors used with reduced voltage and multispeed controllers, match wiring connection requirements for controller with required motor leads. Motors used with variable frequency controllers shall have copper magnet wire windings, premium efficient motors shall be Class B temperature rise with Class F insulation, and inverter duty motors shall be Class F temperature rise with Class H insulation. All motors 10 HP and larger, driven by a variable frequency PWM drive shall include a factory installed maintenance free, circumferential, conductive micro fiber or carbon brush shaft grounding ring to discharge shaft currents to ground. The conductive microfibers shall redirect shaft currents and provide a reliable, very low impedance path from shaft to motor frame by-passing motor bearings entirely. For vertical turbine pump motors, the upper shaft shall be provided with a coating to isolate the shaft from the bearings and the shaft grounding ring shall be installed within the motor casing. This information shall be provided with the shop drawing submittal for verification of method of installation and to ensure they are to be supplied. Comply with NEMA MG 1 for thermally protected motors.

C. Single phase motors: Motors larger than 1/20 HP shall be permanent-split capacitor, split phase, or capacitor start. Multispeed motors shall be variable torque, permanent-split capacitor type. Bearings shall be prelubricated, antifriction ball bearings or sleeve bearings. Motors 1/20 HP and smaller shall be shaded pole type. All motors shall have internal automatic thermal protection calibrated to insulation temperature rating.

1.14 MOTOR STARTERS

A. Unless specifically noted otherwise on the mechanical plans, or in the specifications, all motor starters shall be furnished and installed by the Electrical Contractor. Refer to the Electrical Specifications for Motor Starter requirements.

1.15 V-BELT DRIVES

A. Capacity of V-Belt Drives at rated RPM shall be not less than 150 percent of motor nameplate horsepower rating.

B. V-Belt Drive combinations shall be limited to A, B, C, and fractional horsepower belts. 3V, 5V, and 8V belts and sheaves shall not be used.

C. Drives requiring single belt application shall be of the adjustable pitch type. Multiple belt drives shall be of the non-adjustable type. All fixed pitch sheaves, including single groove fan sheaves, shall be of the bushed type. Fixed bore sheaves will not be acceptable for non-adjustable pitch sheaves.

ACCESS DOORS

A. Where valves, traps, dampers, devices or equipment of any kind is subject to service and maintenance are installed in inaccessible concealed spaces, access doors shall be furnished by the Mechanical Contractor and installed by the General Contractor. Doors shall be 12" x 12" for handhole and 24" x 24" for manhole where required.

B. Doors shall be:
(1) Milcor Style "K" in plastered wall or ceiling.
(2) Milcor Style "M" in masonry wall.
(a) Doors in unfinished walls to have a rustproof prime coat finish.
(b) Doors in tile finished walls shall be all stainless steel with satin finish.
(3) Milcor Style "DW" in drywall construction.
(4) Fire rated doors - Milcor style as described above for various types of construction except with U.L. 1 1/2 hr. "B" label.

C. Equivalent doors as manufactured by Wade or Miami-Carey approved.

1.17 DRIP PANS

A. Provide drip pans fabricated from corrosion-resistant sheet metal with watertight joints, and with edges turned up 2-1/2". Reinforce top, either by structural angles or by rolling top over 1/4" steel rod. Provide hole, gasket, and flange at low point for watertight joint and 1" drain line connection.

B. Locate drip pans under piping passing within 3' horizontality of electrical equipment, and elsewhere as indicated. Hang from structure with rods and building attachments, weld rods to sides of drip pan. Brace to prevent sagging or swaying. Connect 1" drain line to drain connection, and run to nearest plumbing drain or elsewhere as indicated.

SECTION 200700 - INSULATION

1.1 INSULATION AND PIPE COVERING

A. Manufacturers: Johns Manville - Owens Corning - CertainTeed - Knauf.

B. Features: All completed insulation of pipe and fittings shall have the following Underwriters Laboratories Fire Hazard Classification:
Flame spread not to exceed - 25.
Fuel contributed not to exceed - 50.
Smoke developed not to exceed - 50.

C. Four (4 lb.) density glass fiber insulation used for all pipe covering in this section shall have a maximum "K" factor of .23 at 75° F. mean temperature.

D. Prepare all exposed insulated covering for painting. Apply insulation over clean dry surface. Butt all longitudinal joints tightly together. Insulate domestic hot and domestic cold water and condensate drains in their entirety. Rain leaders need not be insulated below grade.

E. Insulate domestic hot water supply and domestic hot water recirculating line up through 2" with 1" thick glass fiber pipe insulation. Insulate piping 2'-1/2" and larger with 1-1/2" thick insulation. Insulate domestic cold water, interior rain leaders and downspouts with 1" thick glass fiber pipe insulation. Insulate heating and chilled water supply and return piping through 3" with 1" thick glass fiber pipe insulation and 4" or larger with 1-1/2" thick insulation. All pipe insulation to be covered with factory applied flame retardant vapor barrier jacket. Manville Micro-Lok 850 fiberglass AP-T Plus jacket or equal.

1. Interior concealed fittings and pipe hangers shall be insulated with flexible glass fiber to a thickness equal to the adjoining pipe insulation. Finish by spiral wrapping with white vinyl and apply a brush coat of vapor barrier mastick. Childers CP-30 or equal.

2. Interior exposed fittings shall be insulated with PVC fitting covers installed over flexible glass fiber inserts to a thickness equal to the adjoining pipe insulation. Manville Zeston or equal. Vapor seal all joints with Childers CP-30 or equal.

F. In finished rooms or areas where insulated pipes are subject to abuse, additionally finish with .032 embossed aluminum jacketing or 30 mil PVC jacketing for a distance of not less than 9 ft. up from finished floor or to finished ceiling level.

G. Provide high density inserts at hanger locations between the pipe and pipe shield for pipe sizes 4" and larger. Maintain a continuous vapor barrier through the hangers and match the jacketing of adjoining pipe insulation.

H. Outdoor Piping (exposed to weather): Use the same insulation for interior exposed pipes carrying the same product and add: a jacket of .032 embossed aluminum with factory applies vapor barrier. Finish fittings with Foster Sealfas G-P-M 35-00 reinforced with Foster Mastik-a-Fab.

I. Insulate refrigerant suction lines with 1" thick and condensate drain lines with 1/2" thick Armstrong AP Armaflex, applied in strict accordance with manufacturer's instruction. Finish all exposed piping with two coats of white Armstrong Armaflex finish. Manville Aerotube or Owens-Corning O.C. flexible tubing approved equal.

1.2 EQUIPMENT

A. Insulate roof drain sumps, with Armstrong Armaflex II sheet insulation 1/2" thick. Apply in accordance with manufacturers recommendations.

B. Prepare all exposed insulated covering for painting. Apply insulation over clean dry surface. Butt all longitudinal joints tightly together.

1.3 DUCT LINER (INTERNAL)

A. Manufacturers: Johns Manville - Owens Corning - CertainTeed - Knauf.

B. Insulate internally low velocity rectangular supply air ducts with 1/2" thick and rectangular return air ducts with 1/2" thick Type I liner per ASTM C 1071. Ductwork routed in unconditioned building spaces shall have 1-1/2" thick liner. The liner shall have a NRC not less than 0.45 as tested per ASTM C423, with a minimum density of 2 pounds per Cu. ft. and a maximum "K" factor of 0.26 at 75°F mean temperature. The liner air stream surface coating shall contain an EPA registered, anti-microbial agent.

C. Apply with coated side to air stream in cut to fit pieces fastened to interiors of duct with adhesive. Coat all exposed edges with adhesive.

D. Adhere liner to interior sides of duct with minimum 50% coverage of fire retardant adhesive.

E. Use mechanical fastening of Graham Welded pins, or Stick-Klips on maximum 16" centers at top sections when width exceeds 12" and on sides when height exceeds 24".

F. Apply a brush width of Foster's Fire Retardant Coating over all joints, visible cut edges, and leading edges of insulation to prevent fiber erosion.

G. DUCT SIZES ON DRAWINGS ARE FOR DIMENSIONS INSIDE OF LINING AND SHEET METAL SIZE SHALL BE INCREASED ACCORDINGLY. Adhesives shall be approved and listed by Underwriters Laboratory and shall bear the U. L. Label.

H. Manufacturers shall print density and thickness on face of duct liner.

I. Duct liner shall have an Underwriters Laboratories fire hazard rating with a flame spread not to exceed 25 and fuel contributed and smoke developed ratings not to exceed 50.

J. All ductwork exposed to weather to be insulated internally with 2" glass fiber liner with the same properties and applied in the same manner as liner in interior ductwork. Duct sizes on drawings are for dimensions inside of lining therefore sheet sizes shall be increased accordingly.

1.4 DUCT INSULATION (EXTERNAL)

A. Manufacturers: Johns Manville - CertainTeed - Owens Corning - Knauf.

B. Insulate externally all concealed round ducts and rectangular outdoor air ducts with .75 pound minimum density fiberglass ductwrap with a Foil-scrim Kraft vapor barrier applied with outward-clinching staples. The insulation is to have a minimum installed R-value of 4.2 for 1-1/2" thick insulation and 5.6 for

2" thick insulation when compressed 25%. Duct wrap thickness shall be 1-1/2" for supply and return ductwork located with-in the conditioned building space. Thickness shall be 2" for supply and return ductwork located with-in unconditioned building space and for all outdoor air ductwork.

C. Insulate externally all exposed rectangular outdoor air duct with 1-1/2" thick, 3 pound density board insulation with FAK facing and a maximum "K" Factor of 0.24 at 75°F mean temperature. Apply over Insul-Anchors and secure with self-locking washers. Tape all joints and washers with 3" wide FSK tape to match the facing of the insulation.

D. The duct insulation shall have Underwriters Laboratories flame spread rating not to exceed 25 - fuel contributed rating not to exceed 50 - smoke developed rating not to exceed 50.

E. Insulation shall be continuous through partitions, coils, etc. Insulate fire damper sleeves to partitions.

F. Insulate kitchen grease ductwork with two layers of 1-1/2" thick "firemaster" or equal inorganic blanket encapsulated with scrim reinforced foil. Wrap duct with insulation per UL listing. Overlap seams by 3" and attach insulation using steel banding or by welded pins and clips.

G. Ductwork located exterior to the building shall have 1" duct liner insulation and 2" external rigid glass board insulation with vapor retarder jacket. Cover with membrane duct jacket and aluminum jacket. Caulk all seams.

SECTION 210500 – FIRE PROTECTION

1.1 GENERAL REQUIREMENTS

A. Scope of the Work: The work shall include, but is not necessarily limited to the Sprinkler Systems and any appurtenances common to the systems, generally consisting of pipe, fittings, valves, hangers, covering, painting, cleaning, testing and such other work as is necessary and specified or shown on the drawings. All areas are to be classed "ordinary hazard" unless otherwise noted. Work shall be done by Licensed Sprinkler Contractor.

B. Shop Drawings: This Contractor shall submit complete sprinkler system working plans showing sprinkler head locations, all piping locations and sizes, valves, alarms, fire department connections etc., as set forth in National Fire Code 13. Shop drawings shall be sealed by a Licensed Fire Protection Engineer in the State that the project is located. Shop drawings shall be submitted to the City Code Enforcement Authority and the Local Fire Department. After review by the Local Code Enforcement Authority, the Contractor will make any changes and/or additions to the plan and system which the City Code Enforcement Authority or Fire Department deem necessary. Submit final approved plans to Owners Representative.

C. Piping systems shall be hydraulically designed per NFPA-13. Calculations for hydraulic designed system shall be submitted with shop drawings.

D. Regulations and Permits: All work under this section of the specifications shall comply with all laws, ordinances, rules and regulations of the local authorities having jurisdiction and fire protection layout according to NFPA, Pamphlet #13 and the associated Factory Mutual's approval and shall be subject to the inspection and approval of the authorities having jurisdiction not withstanding anything in this specification to the contrary. The Contractor for the work, under this Division of the specifications, shall obtain and pay for all permits required to initiate and complete the work under this contract.

E. Approval: The sprinkler system shop drawings shall be approved by the Local Fire Department and the insuring agency, or as required by the insuring agency before work shall begin on any part of the systems.

F. Fire Protection Equipment Guarantee: All equipment and components furnished under this specification shall be guaranteed for a period of one (1) year from the date of acceptance. Failures of any part of the guaranteed equipment during the guarantee period shall be promptly replaced with new parts by and at the expense of the Contractor.

1.2 SYSTEM DESCRIPTION

A. Wet Pipe System with automatic sprinklers attached to piping system containing water and connected to water supply so that water discharges immediately from sprinklers when they are opened by fire. A wet pipe system shall be utilized at all areas, unless noted otherwise.

1.3 PIPE APPLICATIONS

A. Wet pipe sprinkler system piping 2" and smaller shall be one of the following:
1. Standard weight ASTM A53/A53M, Type E, Grade B black steel pipe with threaded ends, gray iron threaded fittings, and threaded joints.
2. Standard weight ASTM A53/A53M, Type E, Grade B black steel pipe with plain ends, steel welded fittings, and welded joints.
3. Thinwall ASTM A135 Schedule 10 black steel pipe with plain ends, welded fittings, and welded joints.

B. Wet pipe sprinkler system piping 2-1/2" and larger shall be one of the following:
1. Standard weight ASTM A53/A53M, Type E, Grade B black steel pipe with cut or roll grooved ends, uncoated grooved end fittings for steel piping, grooved end pipe couplings for steel piping, and grooved joints.
a. In applicable sizes, fittings shall be short pattern with flow equal to standard pattern fittings.
b. Couplings:
1) Rigid Type: Housings cast with offsetting, angle-pattern, bolt pads to provide system rigidity and support and hanging in accordance with NFPA-13.
2) Flexible Type: For use in locations where vibration attenuation and stress relief are required.
2. Standard weight ASTM A53/A53M, Type E, Grade B black steel pipe with plain ends, steel welded fittings, and welded joints.
3. Thinwall ASTM A135 Schedule 10 black steel pipe with roll grooved ends, uncoated grooved end fittings for steel piping, grooved end pipe couplings for steel piping, and grooved joints.
4. Thinwall ASTM A135 Schedule 10 black steel pipe with plain ends, welded fittings, and welded joints.

C. Schedule 80 CPVC pipe and fittings, and solvent welded joints, maybe be used for light hazard and residential occupancies. CPVC pipe shall be ASTM F 442/F 442M and UL 1821, SDR 13.5, for 175 psig rated pressure. Include "Listed" and "CPVC Sprinkler Fitting" markings.

1.4 AUTOMATIC SPRINKLERS AND COMPONENTS

A. Sprinklers should be installed in accordance with the latest published standards of the National Fire Protection Association, Factory Mutual, Fire Offices' Committee, governmental agencies, or similar organizations and to meet local codes and ordinances.

B. Sprinkler Heads: Type and style as indicated or required by the application. Unless otherwise indicated, provide heads with nominal 1/2 inch discharge orifice, for "Ordinary" temperature range. 165 deg. F temperature rating.

1. Rough brass upright, pendant, or pendant sidewall type heads shall be used in exposed areas without finished ceilings.

2. White painted type heads and white coverplate shall be used in all gyp board ceilings and soffits, plaster ceilings, and lay-in acoustical tile ceilings.

3. Sprinkler heads shall be located in straight line pattern parallel and/or perpendicular to walls of room. Provide additional heads over and above the required quantities for symmetrical installation with regard to lights, structural and aesthetic elements. Particular attention shall be exercised with regard to head locations in all gyp board soffits, ceilings and aesthetic elements. Where lay-in ceiling tile occurs, sprinkler heads shall be located in the exact center of the tile.

4. Furnish wall-mounted steel cabinet with hinged cover, and with space for minimum of six spare sprinklers plus sprinkler wrench. Include number of sprinklers required by NFPA 13 and sprinkler wrench. Include sprinklers and wrench for each type of sprinkler used on Project.

5. In lieu of rigid pipe offsets or return bends for sprinkler drops, flexible stainless steel sprinkler kits may be used to locate sprinklers as required by final finished ceiling tiles and walls. The drop system shall consist of a braided type 304 stainless steel flexible tube, zinc plated steel Male threaded nipple or groove style coupling for connection to branch-line piping, and a zinc plated steel reducer with a female thread for connection to the sprinkler head.

C. Alarm Devices: Vane type waterflow detector, rated to 250 psig and designed for horizontal or vertical installation - supervisory switches - electric alarm bell.

D. Fire Department Connection: Wall Type or Sidewalk Siamese Connection per Drawings - polished cast brass, angle body, two way, siamese connection. Connection sizes shall be 4 inch outlet and two 2-1/2 inch female inlets, having threads, conforming to Local Fire Department. Each inlet shall have a clapper valve, and plug and chain.
1. At the low point near each fire department connection, install a 90-degree elbow with drain connection to allow for localized system drainage to prevent freezing.

E. Backflow Preventer: Double check detector assembly or other AHJ-approved device shall be located where the water enters the building.

F. Air Compressor: Provide air compressor with ASME tank to maintain charge and dry pipe pressurization. Provide air maintenance device for dry pipe system. Provide flexible connection on all piping connected to air compressor. Compressor shall have automatic start/stop from pressure switch, and shall have relief valve, belt guard, and integral air filter. Provide refrigerated air dryer for each air compressor.

SECTION 220400 - PLUMBING

1.1 WATER SERVICE

A. Install underground service pipe from main to building wall in accordance with requirements of the Water Department, including required cut off valves and service box.

B. Install underground with a minimum coverage of 3'-6". Verify frost line depth with project location.

C. Connect through building wall or floor in pipe sleeve 1" larger than pipe and link seal or silicone pressure sealant.

D. Service piping 3" and smaller: Type K copper pipe, or plastic PE pipe with molded or heat fusion fittings per local code and water department requirements.

E. Service piping 4" to 6": Ductile iron water pipe with mechanical joints, or PVC AWWA Class 150 pipe with fabricated or molded fittings and gasketed joints per local code and water department requirements.

1.2 DOMESTIC WATER PIPING

A. Pitch all piping to low points and provide with a valved drain connection.

B. Pitch hot water piping to vent at high points or top fixture connections and provide an air vent valve connected to a drain at high point not vented by a fixture.

C. Provide air compression chambers equal to 12 pipe diameters, 18" minimum, on all water supply connections to fixtures and equipment.

D. Domestic hot, cold and recirculated water pipe: Below grade use Type "K" hard drawn copper tube with wrought fittings. Above grade use Type "L" hard drawn copper tube with wrought fittings. Below concrete floors within the building use soft annealed Type "K" copper tubing with wrought fittings.

E. Test under 130 psi hydrostatic pressure.

F. Contractor's option to utilize PEX tube and fittings. PEX tube and fittings shall meet the material requirements of this specification and shall be approved for use in potable domestic water systems for underground or aboveground use.

1.3 CLEANING AND TREATING DOMESTIC WATER SYSTEM

A. Sterilize domestic hot and cold water systems to meet State Board of Health requirements. Prior to treatment flush the system of all dirt and foreign matter, then fill with water treated with 50 ppm of chlorine. Open all valves and faucets several times during the flushing and treatment filling processes. Leave treated water in the systems for 24 hours. Test the chlorine content at the end of this period and if exceeding 10 ppm, flush the system; if less than 10 ppm, repeat the sterilization process. After sterilization, flush the systems with clean water until the chlorine content is no greater than 0.1 ppm. After sterilization, obtain State Board of Health approval on samples of water taken from the systems or repeat the sterilization process until approval is obtained.

INTEGRATED ARCHITECTURE
www.integratedarc.com
P.O. Box 7808 Edmond, OK 73078 (405) 255-4243

STRUCTURAL ENGINEERING

MEP ENGINEERING

PEC
PROFESSIONAL ENGINEERING CONSULTANTS, P.A.
1021 S. WESTERN AVE., SUITE 100, OKLAHOMA CITY, OK 73107
405-735-9539 www.pecf.com C.O.# 32416 REG. EXP. DATE: JUNE 30, 2021

CLIENT
FOGGY BOTTOM

PROJECT #
20011

ISSUED BY: MPM DRAWN BY / CHECKED BY: TJS

No.	Description	Date

SEAL 11/20/2020

ISSUED FOR:
PERMIT DRAWINGS

SHEET NAME
MECHANICAL SPECIFICATIONS

SHEET NUMBER
M003

SWADLEYS FOGGY BOTTOM KITCHEN

ROBBERS CAVE STATE PARK

- B. In addition to sterilization testing, samples shall be collected at the city supply and at all tap locations for testing of lead content to ensure compliance with EPA regulations for:
- A. Maximum contaminant level or 5 ppb for drinking water for water supplied by the distributor.
 - A. Maximum average 10 ppb lead concentration at the user's tap.

1.4 SOIL AND WASTE PIPING

- A. Grade all waste piping less than 4" in diameter at a uniform fall of not less than 1/4" per foot. Grade piping 4" diameter and greater 1/8" per foot with approval of Administrative Authority.
- B. Install cleanouts at the base of all vertical stacks, changes in direction, where necessary for easy cleaning, and as indicated on the plans.
- C. Size cleanouts the full size of the pipe.
- D. Branch connections and changes in direction made with 45 degree "Y" fittings or long sweep ells, except only that sanitary tees or short sweep ells may be used on vertical stacks and closed connections.
- E. Provide means for expansion in vertical stacks to roof.
- F. Extend vent stacks full size through the roof.
- G. Install vent connections on all fixtures, traps, and equipment connected to the soil and waste system and extend vertical not less than 3'-6" above the floor line before connecting to any horizontal run.
- H. Conceal vent lines within the building and extend one foot above roof line.
- I. Use standard cast iron soil pipe and fittings with No-Hub joints for waste pipe within the building, and TY-Seal joints under the building, and to a point 5'-0" outside the building.
- J. Use Schedule 40 PVC/ABS-DWV plastic pipe with solvent welded fittings for waste pipe within the building and to a point 5'-0" outside the building.
- K. Test soil, waste, and vent piping systems with 10 ft. water column.

1.5 SEWER PIPING

- A. Extend from a point 5'-0" outside building to main sewer.
- B. Provide cleanouts at each change in direction of over 45 degrees and not over 100'-0" apart.
- C. Cleanouts shall be 4" cast iron with a brass screw plug set 6" below finished grade and furnished with a cast iron meter box cover.
- D. Install pipe on firm, solid earth for entire length.
- E. Lay pipe in a straight line with grade uniformly at not less than 12-1/2" per 100'.
- F. Close open ends of pipe with stopper when pipe laying is not in progress.
- G. Use Schedule 40 ABS-PVC/DWV pipe with solvent welded DWV drainage fittings.

1.6 VENT PIPING

- A. Use cast iron pipe with no-hub joints.
- B. Schedule 40 PVC/ABS-DWV plastic pipe with solvent welded fittings will be allowed only in ducted return applications. Plastic pipe is not allowed in return air plenums.

1.7 FLASHING

- A. Flash plumbing vents through roof with sheet lead extending 12" in all directions from the pipe and a piece of lead soil pipe extending from the roof line up to 2" above the top of, and turned down 1" inside, the vent pipe.
- B. Use sheet lead weighing 4 pounds per square foot.
- C. If roofing is single ply, flash plumbing vents as required by Roofing Manufacturer.

1.8 TRAPS

- A. Provide traps required, including traps not furnished in combination with the fixtures and equipment.
- B. Separately trap all fixtures with waste connections with a water sealed trap placed as close to the fixture as possible.
- C. Provide deep seal traps at floor drains, condensate drain boxes, and where shown on the plans.
- D. All exposed traps in finished areas shall be of chromium plated cast brass.

1.9 CLEANOUTS

- A. Manufacturers: Wade - Zurn - Josam - J. R. Smith - MIFAB.
- B. For the purpose of identification only, one manufacturer's numbers shall be used throughout the cleanout schedule. Accessible cleanouts shall be installed as required to clean all horizontal waste lines at no greater than 100 ft. intervals. Plumbing Superintendent on the job shall mark in Red on Blue Line Drawings desired locations and install only following approval of these locations by the Architects Inspector.
- C. Cleanouts on Floors:
 1. Finished Floor Cleanout - Wade W-6000 Adjustable cleanout with nickel bronze scoriated top and removable threaded bronze or ABS plug. Ty-Seal outlet.
 2. Concrete Floors (Light Duty) - Wade W-6000-Z Adjustable cleanout with Cast iron scoriated top, removable threaded bronze or ABS plug and Ty-Seal outlet.
 3. Concrete Floors (Heavy Duty) - Wade W-6000-Z-X Adjustable cleanout with heavy ductile iron grate, scoriated top, and removable threaded bronze or ABS plug, Ty-Seal outlet.
 4. Vinyl or Asphalt Tile Floor - Wade W-6000-TS Adjustable cleanout with square, nickel bronze top, recessed for tile, with removable threaded bronze or ABS plug, Ty-Seal outlet.
 5. Cleanout in Carpet - Wade W-6000-CM Adjustable cleanout with satin bronze top with carpet marker and removable threaded bronze or ABS plug and Ty-Seal outlet.
 6. Terrazzo Finished Floors - Wade W-6000-U Adjustable cleanout with nickel bronze top, recessed for terrazzo and removable threaded bronze or ABS plug and Ty-Seal outlet.
 7. Ceramic or Quarry Tile Floor - Wade W-6000-S Adjustable cleanout with square, nickel bronze top, with removable threaded bronze or ABS plug, Ty-Seal outlet.
 8. Wall Cleanouts - Wade W-8480-R bronze plug with round stainless steel access cover and screw.
- D. Accessories: Clamping collar (where water seepage is possible through hydrostatic pressure).

1.10 DRAINS

- A. Manufacturers: Wade - Zurn - Josam - J. R. Smith - MIFAB.
- B. For the purpose of identification only, one manufacturer's numbers shall be used throughout the drain schedule.
- C. Floor Drains:
 1. General Floor Drain - Wade W-1100 Cl floor drain with seepage flange, and round nickel bronze strainer. 2" outlet with 5" strainer - 3" outlet with 6" strainer - 4" outlet with 8" strainer.
 2. To Accept Drip - Wade W-1100-EF4 Cl floor drain w/seepage flange, adj. round 7" NB strainer and 4" NB funnel.
 3. Heavy Duty Drain - Wade W-1210 Cl heavy duty floor drain with medium sump, seepage flange, and heavy duty 12" diameter cast iron grate.
 4. Linoleum, Asphalt Tile Floors - Wade W-1100-F Cl floor drain w/seepage flange and round nickel bronze raised lip adjustable strainer.
 5. Quarry, Ceramic, Terrazzo Tile Floors - Wade W-1100-G Cl floor drain w/seepage flange and square nickel bronze strainer. 2" and 3" outlets to have 5" square strainer - 4" outlets to have 6" square strainer.
 6. "AD" Area Drains - Wade W-2370-8 Square, 12" diameter cast iron hopper drain with heavy cast iron grate and secondary strainer.
 7. "FS" Floor Sinks - Wade W-9140 Cl floor sink with 12" x 12" x 8" body, acid resisting ARE interior, aluminum sediment bucket, and square nickel brass secured grate.
- D. Accessories: Cast iron soil-P-trap, deep seal. Backwater valves on all drains installed below grade as required.

1.11 GAS SERVICE

- A. Provide underground gas service as shown on the Site Plan, terminating as directed at property line.
- B. Meter and regulator will be installed by the Gas Company, but this Contractor shall rough-in piping as directed and install cut off valves as required.
- C. Underground piping Republic X-Tru-Coat plastic coated steel pipe with welded joints wrapped with X-Tru-Tape in conformance with manufacturer's instructions.
- D. Underground piping shall be PE-2406 plastic gas piping with heat fusion or compression fittings with built-in stiffeners and conforming to ASTM-D2513-73 or D2517-73. Install per manufacturer's instructions. Bury with #18 copper tracer wire per code.
- E. The Gas Company will provide the insulating connection on the outlet side of the meter for the service line. The Mechanical Contractor shall bring piping above grade, valve, and enter building. Use a flanged plug valve with an insulating flange gasket and plastic sleeves for the bolts of the flanged joints.

1.12 GAS PIPING

- A. Standard black steel piping with welded fittings for piping 2 1/2" and larger. Standard threaded fittings for 2" and smaller.
- B. Test under 30 psi. air pressure.
- C. Install gas cock external to the building, on each gas line entering the building and at each piece of equipment served.
- D. Gas Cocks 2 Inch and Smaller: 150 psi WOG, bronze body, straightaway pattern, square head, threaded ends.
- E. Gas Cocks 2-1/2 Inch and Larger: MS SP-78; 175 psi, lubricated plug type, semi-steel body, single gland, wrench operated, flanged ends.
- F. Install a dirt leg and union for a rigid connection to each gas appliance unless noted otherwise on drawings.

1.13 GAS PRESSURE REGULATORS

- A. ANSI Z21.18 or ANSI Z21.18a, single stage, steel jacketed, corrosion-resistant pressure regulators. Include atmospheric vent, elevation compensator, with threaded ends for 2" and smaller and flanged ends for 2 1/2" and larger. Regulator pressure ratings, inlet and outlet pressures, and flow volume in standard cubic feet per hour are as indicated.

1.14 ELECTRIC DOMESTIC TANK WATER HEATER

- A. Manufacturers: A.O. Smith - Lochinvar - Rheem - State
- B. Capacity: As scheduled on the plans.
- C. Features: Tank listed by Underwriters Laboratories - glass lining permanently bonded to heavy steel tank - 3 year warranty on tanks from 20 gallon to

120 gallon storage - tank constructed and guaranteed to 150 psi. working pressure - immersion type heating elements - magnesium anode rod - factory insulated - ASME construction on units above 58 KW or over 120 gallon storage - steel jacket with enameled finish - adjustable thermostat.

- D. Pressure/temperature relief valve with ASME label, extend tell-tale line from relief valve to the nearest floor drain.
- E. Domestic water expansion tank: Amtrol, Bell and Gossett, A.O. Smith, State, Taco, or equal. Steel, pressure rated tank constructed with welded joints and factory-installed butyl-rubber diaphragm. Include air precharge to minimum system operating pressure at tank.

BACKFLOW PREVENTERS

- A. Manufacturer: Febco - Ames Co. - Conbraco Industries - Watts - Zurn
- B. Provide double check valve assembly or reduced pressure zone (RPZ) backflow preventers as indicated on drawings consisting of assembly including shutoff valves on inlet and outlet. RPZ assemblies shall also contain a strainer on inlet. Backflow preventers shall include test cocks. RPZ assemblies contain a pressure-differential relief valve located between 2 positive seating check valves. Construct in accordance with ASSE Standard 1013 as applicable.
- C. Install where shown on plans and where required by Local Plumbing Code. Locate in same room as equipment being protected. Provide funnel for RPZ valves and pipe relief outlet to nearest floor drain or building exterior.
- D. Install a thermal expansion tank in the supply line between the backflow preventer and the water heater if backflow preventer is located on water service.

1.16 WATER HAMMER ARRESTERS

- A. Manufacturer: PPP Inc. - Smith (Jay R.) Mfg. Co. - Tyler Pipe - Zurn Industries, Inc. - Sioux Chief Mfg. Co. - Watts Drainage Products
- B. Provide piston type, copper tube casing, tested and certified in accordance with PDI Standard WH-201. Install in upright position. PDI Sizes A through F.

1.17 CONDENSATE DRAIN PIPING (COOLING COIL DRIP)

- A. Type M copper pipe with sweat drainage fittings, galvanized steel pipe with screwed drainage fittings or Schedule 40 PVC/ABS-DWV plastic pipe with solvent welded fittings.
- B. Pitch all horizontal lines to drain at a minimum fall of 1" per 10 feet of run.
- C. Provide air trap at each equipment connection.

SECTION 224000 - PLUMBING FIXTURES AND TRIM

1.1 PLUMBING FIXTURES - GENERAL

- A. All fixtures shall be furnished complete with trim. All exposed trim shall be chrome plated brass. China fixtures shall be of the best grade vitreous ware without pit holes or blemishes and the outlines shall be generally true. The Architect reserves the right to reject any pieces which, in his opinion are faulty.
- B. All fixtures shall be set true and level with solid backing behind lavatory supports. Nipples through the wall to the fixture connection shall be brass and all necessary supports for the fixtures shall be installed before the wall is finished. All fixtures fitting against walls shall have ground backs. All fixtures shall be cleaned before setting, and the installation shall be left ready for use.
- C. All fixtures indicated to be installed for handicap accessibility to be installed per ADA Guidelines. Insulate hot water and drain piping at accessible sinks with pre-manufactured insulating covers.
- D. Fixtures indicated on the plans by a "P" number must be set and all plumbing connections required for its function installed.

1.2 PLUMBING FIXTURE SCHEDULE

- A. China Fixture Manufacturers: American Standard - Toto - Kohler - Eljer - Zurn - Sloan.
- B. Faucet Manufacturers: Delta - Kohler - Chicago Faucets - American Standard - Zurn - Sloan.
- C. Carrier Manufacturers: Zurn - Josam - Wade - J. R. Smith. Specific carriers shall be submitted for approval with fixture shop drawings.
- D. Water Closet Seat Manufacturers: Church - Olsonite - Beneke.
- E. Flush Valve Manufacturers: Sloan - Zurn - Toto.
- F. Service Stops: All lavatories, sinks, and tank type closets unless otherwise specified shall be provided with chrome plated loose key quarter-turn stops and flexible risers.

SECTION 230593 - AIR TEST AND BALANCE

1.1 SCOPE

- A. The Mechanical Contractor shall procure the services of a pre-approved Independent Air Balancing Agency to test air moving equipment and air distribution and exhaust systems and to supervise the balance and adjustment of these systems. The mechanical contractor shall provide workmen of the proper trade to make adjustments to the systems as determined by the Engineer. The Contractor shall provide access as required, including any necessary scaffolding, and shall cooperate with testing laboratory personnel. All instruments used in this work shall be accurately calibrated and maintained in good working order. If requested the tests shall be conducted in the presence of the Mechanical Engineer responsible for the project and/or his representative. Air balance and testing shall not begin until the system has been completed and is in full working order. The Contractor shall put all heating, ventilating, and air conditioning systems and equipment into full operation 24 hours prior to the onset of testing and balancing and shall continue the operation of same during each working day until the completion of all test and balance work. The Contractor shall award the test and balance contract upon receipt of his contract to proceed with the air conditioning installation, to allow the Air Balance and Testing Engineer to schedule his work in cooperation with other trades involved and comply with completion date. Upon completion of the air conditioning system installation, the Air Balance and Testing Engineer shall perform the following tests, supervise adjustments and system modifications, and compile the test data as required for evaluation and approval.
- B. In addition to procuring the services of an air balancing engineer as hereinafter specified the mechanical contractor shall:
 1. Clean air filters, ductwork, coils, fans, etc. in the air system to remove all construction dust and debris.
 2. Start, lubricate and balance all fans. Change and/or adjust drive pulleys on fans to give required capacity.
 3. Supply and install all balancing dampers as required for final balancing as determined by the balancing engineer.
 4. Furnish workmen familiar with this project and of the proper trade to assist the balancing engineer in the air and water balancing. Also make available subject to request by the balancing engineer trained servicemen of the control and equipment suppliers to assist as needed during the testing of their portion of the project.
 5. Furnish plans, operating manuals, and shop drawings of all equipment installed for use by the Air and Water Balancing Agency.
 6. Have all systems in full operation a minimum of 24 hours before Balancing Engineer arrives on job.

1.2 AIR SYSTEM TEST AND BALANCE PROCEDURE

- A. Procedure:
 1. Bring all fans to design RPM.
 2. Bring air volume in each air handling system to the design air volume using pitot tube transverse method.
 3. Test and record fan motor data.
 4. Bring air diffusers and registers to design CFM.
 5. Make recommendations for system modifications and adjustments required to facilitate proper system balancing as determined by preceding test.
 6. Retest and readjust all system segments affected by system modifications.

1.3 DATA FILE

- A. Prepare complete data file on all equipment and devices tested indicating name plate data, design requirements and final operating conditions. Submit six (6) copies of the final balance report to be distributed as follows:
 - Mechanical Contractor - 1 copy
 - Architect - 1 copy
 - Engineering - 1 copy
- B. Remaining three (3) copies to be included in the operation and maintenance manuals presented to the Owner.

1.4 INSTRUCTION

- A. At the completion of the balancing, review the operating and maintenance brochures as supplied by the Mechanical Contractor supplement these instructions as determined through balancing experience. Meet with owners personnel to review proper operating procedures.
- B. Warranty that the system is set in accordance with values as established by the plans and specifications.

SECTION 230800 - AIR DISTRIBUTION

1.1 SHEET METAL DUCT WORK CONSTRUCTION - LOW PRESSURE

- A. The work under this heading includes all sheet metal work as required to complete supply and exhaust systems including ducts, housings, ventilating hoods, exhaust hoods, louvers, dampers, grilles, diffusers, registers, access doors, access panels, etc.
- B. Duct material shall be galvanized steel unless noted otherwise on the drawings.
- C. Make ductwork and installation in conformance with the applicable local Mechanical Code and Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) HVAC Duct Construction Standards (Latest Edition) amended as follows:
 1. Minimum Duct Class 2" S.P., Seal Class B.
 2. Seal all transverse joints, fittings, connections, and seams with Hardcast DT tape and FTA adhesive, Hardcast AFG-1402 "Foil-Grip" applied per manufacturers instructions, or brushed-on liquid based joint and seam sealant.
 3. Make all branch connections with 45° entry clinch collar.
 4. Round branch duct take-offs shall be high efficiency takeoffs (HETO), made with 45° entry clinched collar and rectangular to round transition. If damper is provided with HETO, it shall meet the requirements of the manual balance damper section below.
- D. Use square type elbows with turning vanes for changes in direction and fittings for branch ducts. Radius elbows may also be used for duct changes in direction, refer to drawings.
- E. Offset ducts to clear pipes and obstructions.
- F. Patch all duct holes air tight after installation.
- G. All round ductwork shall be a minimum of 26 gauge sheet metal or heavier as required by SMACNA and the Mechanical Code.

1.2 FLEXIBLE CONNECTIONS

- A. Duct connections to fans and where noted elsewhere on plans, shall be sound and vibration isolation flexible connections made with fire resistant, water proof heavy glass fabric with double coating of neoprene as manufactured by Ventfabrics, Inc., Ductmate Industries, Inc., Duro Dyme, Inc., or Ward Industries, Inc. Connections shall be not less than 4" long, shall have suitable metal collar frame at each end and shall be made with at least one inch slack in material to prevent transmission of vibration.

1.3 FLEXIBLE DUCTS

- A. Flexible ducts - Thermaflex Type MKE or equivalent by Flexmaster USA, McGill Airflow, or Ward Industries, meeting amended code standards of NFPA and NEFU Pamphlet 90A with U.L. Fire rating of not over 25 flame spread and a developed smoke rating of not over 50. U.L. Standard 181 Class 1 woven and coated fiberglass supported by helically wound spring steel wire. 1" fibrous glass insulation. Aluminumized vapor barrier film. Pressure rating of 10 inch wg positive and 2 inch wg negative. A maximum of six feet of flexible duct may be used for each connection to supply diffusers only, only above accessible ceilings.
- B. Accessories: Strap clamps with stainless steel band and cadmium plated hex screw to tighten band with worm-gear action.
- C. Installation: Duct connections to collars shall be made in accordance with the duct manufacturer's recommendations.

1.4 GRILLES, REGISTERS, AND DIFFUSERS

- A. Manufacturers: Carnes - Titus - Air Guide - Krueger - Price - Nailor.
- B. Capacity: As indicated on drawings.
- C. Accessories: As scheduled on the drawings for finish, opposed blade dampers, borders, directional vanes, etc.

1.5 MANUAL VOLUME DAMPERS (UNDER 1500 FPM)

- A. Manufacturers: Air Balance Inc. - Cesco - Ruskin - Carnes - Nailor - Greenheck - Pottorff - Metalaire - American Warming and Ventilating - Flexmaster USA - McGill Airflow.
- B. Features: 20 gauge min. galvanized steel blades - 20 gauge min. galvanized steel frame with blade stops - noncorrosive bearings (Oilite or Nylon) - rectangular dampers to have blade linkage concealed in frame - full width 3/8" minimum square cadmium plated steel axle shaft extending through frame - manual locking quadrant bracketed 1-1/2" minimum from frame to allow for insulation.
- C. Single blade dampers may be used for duct sizes of 12" high x 36" wide and less. Sizes greater than 12" high or 36" wide shall be multiple opposed blade dampers.

1.6 LOUVERS

- A. Manufacturers: Ruskin ELM6375DX or equal as manufactured by Louvers and Dampers - Industrial Louvers - Greenheck - Nailor - Pottorff - American Warming or approved equal.
- B. Extruded aluminum construction with flattened 3/4" aluminum bird screen. Combustion air louvers shall have 1/4" mesh aluminum screen. Drainable blade construction with integral downspouts and caulking slots.
- C. Kynar finish - color to be selected by the Architect.
- D. Set in openings, caulk and connect the ductwork where applicable.

1.7 EXHAUST FANS

- A. Manufacturers: PennBarry - Cook - Greenheck - Acme - Twin City - Carnes.
- B. Capacity: As scheduled on the drawings.
- C. Features: All fans bear seal of ratings certified by A.M.C.A. - adjustable sheave belt drive or variable speed direct drive as scheduled on plans - factory roof curbs shall be galvanized steel with 1-1/2" thick fiberglass insulation and wood nailer, sized to suit fan base and sloped as necessary for roof - utility set fans shall have epoxy coated finish unless noted otherwise on plans.
- D. Accessories: As scheduled on drawings. Roof curb, vent cap, rotary belt tensioner, variable speed control, vibration isolation hangers, birdscreen, disconnect switch, backdraft damper as applicable.

1.9 HIGH EFFICIENCY FURNACE AND AIR COOLED CONDENSING UNIT

- A. Manufacturers: Lennox - Trane - Carrier - York - Rheem.
- B. Capacity: As scheduled on plans.
- C. Furnace Features: Direct vent condensing type (combustion air intake and venting with Schedule 40 PVC or CPVC pipe) - painted steel cabinet with factory insulation - factory balanced, resilient mounted, multi-speed direct drive blower - gas burner - gas valve with 100% safety main shut-off valve, pressure regulator, safety with flame sensor, limit control, transformer, and ignition/fan timer control board - electric pilot ignition with hot surface igniter or electric spark ignition - aluminumized steel or stainless steel primary heat exchanger with stainless steel secondary heat exchanger - combustion air inducer fan - solid state furnace control board integrating ignition, heat, cooling, and fan speeds.
- D. DX Cooling Coil Features: Comply with ARI 210/240 - painted steel cabinet to match furnace, with access panel and flanges for mounting at furnace cabinet - copper tubes mechanically expanded into aluminum fins - drain pan.
- E. Condensing Unit Features: Galvanized steel cabinet with baked enamel finish and removable panels - Scroll type compressor(s) with overload protection on vibration isolators - single stage, digital scroll, variable speed, or multiple stage compressor as scheduled - condenser coil with seamless copper tubing with aluminum fins - propeller condenser fan(s) with aluminum or galvanized steel blades, statically and dynamically balanced, direct driven with permanently lubricated bearings - crankcase heater - cycle protector - high pressure switch - low ambient controller to allow unit operation down to 40 deg. F - low pressure switch - thermostatic mixing valve - time delay relay - R410a Refrigerant.
- F. Accessories: Extra set of throw away air filters to install after final acceptance - separate filter rack required on all side or bottom return installations - PVC or CPVC combustion air intake and vent piping through outside wall or roof, sized and installed per manufacturer requirements - concentric vent termination kit.
- G. Controls: Provide 7-day programmable thermostat with fan on/auto and heat/auto/cool switches for automatic heating and cooling operation. Program thermostat for continuous fan operation during occupied periods. Thermostat shall be capable of operating multiple heating and/or cooling stages as scheduled. Where two furnaces are "twinning" together, include a factory twinning kit.
- H. Refrigerant Piping: Contractor to provide Type "L" hard drawn pre-dehydrated and sealed copper pipe equal to "ACR". Fittings to be forged or wrought copper sweat with "SIL-FOS" or equivalent silver bearing solder. Use long radius ells except for traps. Test system at 300 PSI with Nitrogen. Support piping with "Hydratorb", "Cush-A-Clamp" or equal vibration absorbing clamps. Equipment supplier to size piping for the indicated installation, and provide all required refrigerant specialties. Contractor's option to utilize pre-charged and insulated line sets.

1.9 ELECTRIC UNIT HEATERS

- A. Manufacturers: Markel - Berko - Reznor
- B. Capacity: As scheduled on plans.
- C. Features: Wall or ceiling mounted, heavy duty, forced air electric unit heater - recessed in wall or surface mounted as scheduled - tamper resistant front enclosure - cabinet with baked enamel finish - permanently lubricated totally enclosed motor - corrosion resistant electric resistance heating coil with nickel-chromium heating wire embedded in magnesium oxide refractory and sealed in metallic sheath - thermal overload - UL listed - integral tamper resistant or wall-mounted thermostat as scheduled - integral disconnect - wall box for recessed units.

SECTION 230923 - TEMPERATURE CONTROL SYSTEMS

1.1 SYSTEM SUMMARY

- A. The intent of this specification is to provide control strategies for expanding the existing BAS system, and utilizing the same software license agreement for the applications. All equipment as listed on the mechanical drawings/control drawings shown to be controlled by the BAS system shall adhere to this specification. Temperature controls shall be xxx by xxx, to match existing.

1.2 QUALITY ASSURANCE



- A. The Building Automation System (BAS) herein specified shall be fully integrated and installed as a complete package by the Temperature Controls Contractor. The system must be fully compatible with the current system installed at the facility. The system shall include all wiring, electrical conduit, installation supervision, calibration, adjustments, and checkout necessary for a complete and fully operational system.

1.3 MATERIALS AND EQUIPMENT

- A. General: Provide temperature control products in sizes and capacities indicated consisting of valves, dampers, thermostats, clocks, sensors, controllers, and other components as required for complete installation. Except as otherwise indicated, provide manufacturer's standard materials and components as published in their product information, designed and constructed as recommended by manufacturer, and as required for application indicated.
- B. Control Valves: Provide selection as determined by manufacturer for installation requirements and pressure class, based on maximum pressure and temperature in piping system. Provide valve size in accordance with scheduled or specified maximum pressure drop across control valve. Equip control valves with electric actuators, with proper shutoff rating for each individual application.
- C. Thermostats: Thermostats shall be a similar style to existing installed in the facility.
- D. Building Automation System: The BAS shall be capable of integrating multiple building functions including equipment supervision and control, alarm management, energy management, and historical data collection and archiving.
- E. Control Wiring:
 1. Provide and install all low-voltage wiring required for temperature control systems under this section excluding power feeder wiring.
 2. E.C. shall provide and install conduit for all control wiring.
 3. All wiring and installation shall be in accordance with the Electrical Specifications.

1.4 CLOSEOUT PROCEDURES

- A. Owner's Instructions: Provide services of manufacturer's technical representative to instruct Owner's personnel in operation and maintenance of control systems.

22	 INTEGRATED ARCHITECTURE www.integratedarc.com P.O. Box 7808 Edmond, OK 73078 (405) 255-4243 CIVIL ENGINEERING		
21			
20			
19			
18	STRUCTURAL ENGINEERING		
17	 MEP ENGINEERING PROFESSIONAL ENGINEERING CONSULTANTS, P.A. 1921 S. WESTERN AVE., SUITE 100, OKLAHOMA CITY, OK 73107 405-735-9339 www.pec1.com C.O.A. 194-PEL-EXP-PPES, JUNE 30, 2021		
16	SWADLEYS FOGGY BOTTOM KITCHEN ROBBERS CAVE STATE PARK		
15			
14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4			
3			
2			
1	SHEET NUMBER		

