

**GENERAL PLUMBING NOTES**

- ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE LATEST VERSION OF THE INTERNATIONAL PLUMBING CODE (IPC) WITH GEORGIA AMENDMENTS AND ALL APPLICABLE LOCAL CODES AND ORDINANCES.
- PLUMBING FIXTURES SHALL BE "HIGH EFFICIENCY" WITH WATER SENSE COMPLIANT FLOW OR FLUSH RATES AS REQUIRED BY GEORGIA AMENDMENTS TO THE IPC.
- EXPOSED FIXTURES: CHROME PLATED BRASS AND COPPER TUBING WITH THREADED PLATED BRASS FITTINGS.
- JOIN PIPES OF DISSIMILAR METALS WITH DIELECTRIC UNIONS OR SIMILAR ISOLATING DEVICES, DO NOT DIRECTLY CONNECT TO PIPES OF DISSIMILAR METALS.
- ROUTE PIPING PARALLEL TO BUILDING STRUCTURE AND MAINTAIN GRADIENT.
- INSTALL PIPING TO MAINTAIN HEADROOM. GROUP PIPING TO CONSERVE SPACE. GROUP PIPING WHENEVER PRACTICAL AT COMMON ELEVATIONS.
- INSTALL PIPING TO ALLOW FOR EXPANSION AND CONTRACTION WITHOUT STRESSING PIPE, JOINTS, OR CONNECTED EQUIPMENT.
- PROVIDE CLEARANCE IN HANGERS AND FROM STRUCTURE AND OTHER EQUIPMENT FOR INSTALLATION OF INSULATION AND ACCESS TO VALVES AND FITTINGS.
- SLEEVE PIPE PASSING THROUGH PARTITIONS, WALLS AND FLOORS.
- INSTALL IDENTIFICATION ON PIPING SYSTEMS OR INSULATION COVERINGS INCLUDING UNDERGROUND PIPING PER PIPE LABELING DETAIL. LABELS SHALL INCLUDE NAME OF FLUID INSIDE PIPE ALONG WITH DIRECTIONAL FLOW ARROWS. ALL GAS PIPING SHALL BE PAINTED YELLOW WITH PIPE MARKERS APPLIED AFTER PAINTING. NON-STEEL GAS PIPING SHALL HAVE LABELS APPLIED NOT EXCEEDING 5 FEET APART.
- PROTECT PIPING SYSTEMS FROM ENTRY OF FOREIGN MATERIALS BY TEMPORARY COVERS, COMPLETING SECTIONS OF THE WORK, AND ISOLATING PARTS OF COMPLETED SYSTEM.
- CONTRACTOR SHALL SECURE AND PAY FOR ALL FEES AND PERMITS REQUIRED TO ACCOMPLISH THE WORK SHOWN.
- BEFORE COMMENCEMENT OF WORK, CONTRACTOR SHALL VERIFY EXACT LOCATIONS, ELEVATIONS, AND CHARACTERISTICS OF UTILITIES AND PIPING AND SHALL NOTIFY ARCHITECT OF ANY DISCREPANCIES. PIPE SLOPES SHOULD BE VERIFIED TO ENSURE PROPER ELEVATIONS ARE OBTAINED AT CONNECTION POINTS.
- EXACT LOCATIONS AND MOUNTING HEIGHTS OF PLUMBING FIXTURES SHALL BE OBTAINED FROM ARCHITECTURAL DRAWINGS.
- CONTRACTOR SHALL MAKE ALL ARRANGEMENTS WITH UTILITY COMPANIES FOR SERVICE AND CONNECTIONS AND SHALL PAY FOR ALL FEES, CHARGES, PERMITS, AND METERS.
- ALL SANITARY DRAINAGE PIPES 2" AND SMALLER SHALL BE SLOPED AT 1/4" PER FOOT MINIMUM, AND ALL SANITARY DRAINAGE PIPES 3" AND LARGER SHALL BE SLOPED AT 1/8" PER FOOT MINIMUM.
- ALL PIPING ABOVE GRADE SHALL BE PROPERLY SUPPORTED FROM THE BUILDING STRUCTURE AND SHALL NOT REST ON CEILING TILES OR BE SUPPORTED FROM CEILING TILES.
- LOCATE ALL SECTIONAL OR MAIN CONTROL VALVES WITHIN 1'-0" OF ACCESS PANELS, CEILING TILES, OR OTHER POINTS OF ACCESS.
- PLUMBING AND FIRE PROTECTION PIPING IS NOT TO BE INSTALLED IN ELECTRICAL ROOMS, CLOSETS, TELEPHONE ROOMS, OR ELEVATOR EQUIPMENT ROOMS EXCEPT PIPING SERVING THAT ROOM.
- WATER PIPING ROUTED ABOVE CEILING AND IN EXTERIOR WALLS SHALL BE ROUTED ON HEATED SIDE (UNDERSIDE) OF CEILING INSULATION AND HEATED SIDE (INSIDE) OF WALL INSULATION.
- TOPS OF ALL FLOOR DRAINS AND FLOOR CLEANOUTS SHALL BE LEVEL WITH FINISHED FLOOR AT INSTALLATION LOCATION TO PREVENT TRIP HAZARDS - FLOORS SHALL SLOPE TO FLOOR DRAINS.
- PRIME ALL FLOOR DRAIN AND INDIRECT DRAIN TRAPS WITH WATER BASED TRAP PRIMERS AS SHOWN ON PLANS. PRO-VENT TRAP GUARDS MAY BE USED IN LIEU OF WATER BASED TRAP PRIMERS WHERE THE AUTHORITY HAVING JURISDICTION ALLOWS.
- ALL VENT AND FLUE OUTLETS SHALL BE 10'-0" MINIMUM FROM ANY FRESH AIR INTAKE.
- DURING THE PROGRESS OF THE PROJECT, MAINTAIN AN ACCURATE RECORD OF ALL CHANGES MADE IN THE PLUMBING SYSTEMS. THE RECORD DRAWING SHALL SHOW CHANGES IN MANUFACTURER (WITH NUMBERS AND TRADE NAMES), MATERIALS, SIZES, LOCATIONS, AND HOOK-UP POINTS. AS-BUILTS SHALL BE GIVEN TO OWNER'S CONSTRUCTION MANAGER AT COMPLETION OF JOB.
- UPON COMPLETION OF THIS JOB, CONTRACTOR SHALL INSPECT ALL EXPOSED PORTIONS OF THE PLUMBING INSTALLATION AND COMPLETELY REMOVE ALL EXPOSED LABELS, SOIL, MARKINGS, AND FOREIGN MATERIAL EXCEPT PRODUCT LABELS AND THOSE REQUIRED BY THESE PLANS.
- CONTRACTOR SHALL COORDINATE ELECTRICAL CHARACTERISTICS AND REQUIREMENTS OF ALL PLUMBING EQUIPMENT WITH THE ELECTRICAL DRAWINGS AND THE ELECTRICAL CONTRACTOR, AND SHALL FURNISH EQUIPMENT WIRED FOR THE VOLTAGES SHOWN THEREIN. PLUMBING CONTRACTOR SHALL WIRE AND START ALL ELECTRICAL PLUMBING EQUIPMENT, ELECTRICAL CONTRACTOR SHALL PROVIDE WIRING, CONDUIT, BREAKERS, AND OTHER APPROPRIATE ELECTRICAL EQUIPMENT.
- ALL PLUMBING EQUIPMENT, PIPING, INSULATION, ETC. INSTALLED IN HVAC PLENUM SPACES SHALL MEET CODE REQUIREMENTS FOR SMOKE AND COMBUSTIBILITY.
- ALL PIPE PENETRATIONS OF FIRE OR SMOKE RATED ASSEMBLIES SHALL BE FIRE STOPPED AS REQUIRED TO RESTORE ASSEMBLY TO ORIGINAL INTEGRITY. FIRE BARRIER PRODUCTS SHALL BE AS MANUFACTURED BY 3M COMPANY, CP25 CAULK, CS195 COMPOSITE PANEL, FS195 WRAP/SHRINK, OR PSS 7900 SERIES SYSTEMS AS RECOMMENDED BY MANUFACTURER FOR PARTICULAR APPLICATIONS, OR EQUIVALENT SYSTEM AS APPROVED BY LOCAL CODE OFFICIALS.
- ALL VENT THRU ROOF PENETRATIONS SHALL BE ROUTED TO TERMINATE AT THE LEAST VISIBLE LOCATION FROM THE ENTRY VIEW.
- CONTRACTOR SHALL PROVIDE ALL NECESSARY PRODUCTS AND MATERIALS FOR A COMPLETE PLUMBING SYSTEM.
- EQUIPMENT AND PIPING LOCATIONS AND ROUTING SHOWN ARE DIAGRAMMATIC AND INTENDED TO SHOW THE INTENT OF THE DESIGN. COORDINATE FINAL LOCATIONS AND PIPE ROUTING WITH ARCHITECTURAL PLANS AND FIELD CONDITIONS.

PLUMBING FIXTURE SCHEDULE						
TAG	FIXTURE	PIPING CONNECTION SIZES				SPECIFICATION
		S.S.	V.	C.W.	H.W.	
HWC-1	WATER CLOSET, HCOP.	3"		1/2"		<ul style="list-style-type: none"> <li>HANDICAPPED WATER CLOSET SHALL BE FLOOR MOUNTED PRESSURE ASSIST TANK TYPE WITH ELONGATED BOWL AND 1.0 GPF PA TANK, HANDLE AWAY FROM WALL. SEAT SHALL BE COMMERCIAL TYPE WITH OPEN FRONT. INCLUDE ALL REQUIRED HARDWARE FOR A COMPLETE INSTALLATION.</li> <li>FIXTURE: KOHLER K-3519</li> <li>SEAT: KOHLER</li> </ul>
WC-1	WATER CLOSET	3"		1/2"		<ul style="list-style-type: none"> <li>STANDARD HEIGHT WATER CLOSET SHALL BE FLOOR MOUNTED TANK TYPE WITH ELONGATED BOWL AND PRESSURE ASSIST 1.0 GPF. SEAT SHALL BE COMMERCIAL TYPE WITH OPEN FRONT. INCLUDE ALL REQUIRED HARDWARE FOR A COMPLETE INSTALLATION.</li> <li>FIXTURE: KOHLER K-3531</li> <li>SEAT: KOHLER K-4731-C</li> </ul>
UR-1	URINAL	2"	2"	3/4"		<ul style="list-style-type: none"> <li>AMERICAN STANDARD A6590001020 0.5 GPM FLUSH VALVE URINAL WITH TOP SPUD.</li> <li>MANUAL FLUSH VALVE FV TS 11.5 R-1 0.5 GPM.</li> <li>FLOOR MOUNTED COMMERCIAL WALL CARRIER.</li> </ul>
S-1	BREAK RM. SINK	2"	2"	1/2"	1/2"	<ul style="list-style-type: none"> <li>FIXTURE: DROP-IN DOUBLE BOWL SELF RIMMING 18 GA. STAINLESS STEEL SINK WITH FAUCET LEDGE AND ADA DEPTH. JUST DL-1933-A-GR</li> <li>FAUCET: DELTA 141 DST</li> <li>TEMPER FAUCET TO 110 DEG F MAXIMUM DELIVERED HOT WATER USING ASSE 1070 CERTIFIED TEMPERATURE LIMITING DEVICE OR SAME FACTORY INSTALLED ON-BOARD WATER HEATER.</li> <li>INCLUDE TRUBRO 103 PIPE COVERS AND OFFSET TAILPIECE.</li> </ul>
JS	SERVICE SINK	3"	2"	1/2"	1/2"	<ul style="list-style-type: none"> <li>FIXTURE: STERN WILLIAMS MTB-3624 MOP SINK WITH 8" HEIGHT SIDE WALLS.</li> <li>INCLUDE T-10-VB SERVICE SINK FAUCET (INCLUDE CHECK VALVES ACCESSIBLE IN SUPPLIES.</li> <li>INCLUDE T-35 HOSE/WALL BRACKET, T-40 MOP HANGER, AND 20 GA STAINLESS STEEL WALL PANEL FOR SPLASH.</li> </ul>
WCO	WALL CLEANOUT	2"				<ul style="list-style-type: none"> <li>J.R. SMITH 4472</li> </ul>
FD	FLOOR DRAIN	2"				<ul style="list-style-type: none"> <li>WATTS FD-100-B, FLOOR DRAIN WITH ROUND HEAVY DUTY 10" STRAINER.</li> </ul>
WH	FROST PROOF WALL HYDRANT			3/4"		<ul style="list-style-type: none"> <li>J.R. SMITH QUARTER HORSE 5509QT-R NON-FREEZE WALL HYDRANT WITH INTEGRAL VACUUM BREAKER AND STAINLESS STEEL BOX.</li> </ul>
LAV-1	WALL MOUNT LAVATORY, PUBLIC (0.5 GPM)	2"	2"	1/2"	1/2"	<ul style="list-style-type: none"> <li>KOHLER K-2035, ADA COMPLIANT, WHITE VITREOUS CHINA WALL MOUNT SINK, REAR CENTER DRAIN WITH OVERFLOW, HOLE DRILLING ON 4" CENTERS, 21-1/4" L-R X 18-1/8" F-B X 7-1/4" DEEP, INCLUDE WALL CARRIER.</li> <li>JAY R. SMITH 2598 PRIME-EZE WATER SAVER TRAP PRIMER (ALT SPEC: KOHLER 8998 P-TRAP WHERE NOT USED AS TRAP PRIMER)</li> <li>DELTA 501 FAUCET, POLISHED CHROME.</li> <li>MCGUIRE 151 BRASS STRAINER.</li> <li>MCGUIRE BV-2165 QUARTER TURN BALL VALVE STOPS AND SUPPLIES.</li> <li>TRUBRO 103 COVERS.</li> <li>PROVIDE ASSE 1070 CONFORMING TEMPERATURE LIMITING VALVE, LOCATE BELOW FIXTURE AND SET MAXIMUM DELIVERED HOT WATER TEMPERATURE TO 110° F MAX.</li> </ul>
LAV-2	DROP-IN LAVATORY, PUBLIC (0.5 GPM)	2"	2"	1/2"	1/2"	<ul style="list-style-type: none"> <li>KOHLER K-2917, ADA COMPLIANT, WHITE VITREOUS CHINA WALL MOUNT SINK.</li> <li>JAY R. SMITH 2598 PRIME-EZE WATER SAVER TRAP PRIMER (ALT SPEC: KOHLER 8998 P-TRAP WHERE NOT USED AS TRAP PRIMER)</li> <li>DELTA 501 FAUCET, POLISHED CHROME.</li> <li>MCGUIRE 151 BRASS STRAINER.</li> <li>MCGUIRE BV-2165 QUARTER TURN BALL VALVE STOPS AND SUPPLIES.</li> <li>TRUBRO 103 COVERS.</li> <li>PROVIDE ASSE 1070 CONFORMING TEMPERATURE LIMITING VALVE, LOCATE BELOW FIXTURE AND SET MAXIMUM DELIVERED HOT WATER TEMPERATURE TO 110° F MAX.</li> </ul>
LAV-3	WALL HUNG SHOP LAVATORY	2"	2"	1/2"	1/2"	<ul style="list-style-type: none"> <li>ADVANCE TABCO, 7-PS-45, ADA COMPLIANT, STAINLESS STEEL WALL MOUNT SINK. INCLUDE WALL MOUNTING BRACKETS AND BACK SPLASH GOOSENECK FAUCET.</li> <li>MCGUIRE BV-2165 QUARTER TURN BALL VALVE STOPS AND SUPPLIES.</li> <li>PROVIDE ASSE 1070 CONFORMING TEMPERATURE LIMITING VALVE, LOCATE BELOW FIXTURE AND SET MAXIMUM DELIVERED HOT WATER TEMPERATURE TO 110° F MAX.</li> </ul>
DF/HDF-1	REFRIGERATED DRINKING FOUNTAIN	2"	2"	1/2"		<ul style="list-style-type: none"> <li>BI-LEVEL ADA AND STANDARD HEIGHT COMPLIANT ELECTRICALLY REFRIGERATED DRINKING FOUNTAIN.</li> <li>FIXTURE: ELKAY EZSTL8C</li> </ul>

ELECTRIC WATER HEATER SCHEDULE								
TAG	BASIS OF DESIGN	STORAGE CAPACITY (GALS.)	ELEMENT KW	100 F RECOVERY (GPH)	HW CONN. (IN.)	CW CONN. (IN.)	PWR	NOTES
EW-1	RHEEM ELD-52	50	4.5 (2)	18	3/4	3/4	SEE DIV. 16	1,2

**NOTES**

- WIRE MULTIPLE ELEMENTS FOR NON-SIMULTANEOUS OPERATION.
- INSTALL ON COMMERCIAL GRADE STAND AND INSTALL CATCH PAN UNDERNEATH WATER HEATER.

CIRCULATING PUMP SCHEDULE								
TAG	BASIS OF DESIGN	FLOW (GPM)	HEAD (FT)	OPER. PWR. (W)	HW CONN. (IN.)	CW CONN. (IN.)	PWR	NOTES
CP-1	B&G VARIO 19-14	2	12	125	3/4	3/4	SEE DIV. 16	1

**NOTES**

- PUMP CONTROLLED BY PROGRAMMABLE 7-DAY A WEEK TIME CLOCK AND IMMERSION AQUASTAT.

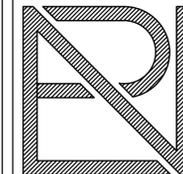
PLUMBING LEGEND		
SYMBOL	DESCRIPTION	ABBREVIATION
—	ABOVE FINISHED CEILING	AFC
—	ABOVE FINISHED FLOOR	AFF
—	BELOW COUNTER	B/C
—	BELOW FINISHED FLOOR	BFF
—	BELOW GRADE	B/G
—	DOMESTIC COLD WATER PIPING	CW
—	DOMESTIC HOT WATER PIPING	HW
—	VENT PIPE	V
—	SANITARY SOIL	SS
—	VENT THROUGH ROOF OR WALL	VTR OR VTW
⊕	FLOOR CLEANOUT	FCO
⊖	FLOOR DRAIN	FD
⊖	FLOOR SINK (INDIRECT DRAIN)	FS
⊖	WALL CLEANOUT	WCO
⊖	CLEANOUT TO GRADE	COTG
⊖	P-TRAP	
⊖	PRESSURE REDUCING VALVE	PRV
⊖	BACKFLOW PREVENTER	BP
⊖	BALL VALVE	
⊖	UNION	
⊖	PRESSURE REDUCING VALVE	
⊖	BLIND FLANGE/CAP	
⊖	PIPING CONNECTION ON TOP	
⊖	PIPING CONNECTION ON BOTTOM	
⊖	ELBOW TURNED DOWN	
⊖	ELBOW TURNED UP	
⊖	THERMOMETER	

PIPING LABEL COLOR GUIDE		
PIPING SYSTEM FLUID	LABEL COLOR	TEXT COLOR
NATURAL GAS	SAFETY YELLOW	WHITE
PROPANE GAS	SAFETY YELLOW	WHITE
COMPRESSED AIR	SAFETY BLUE	WHITE
CHILLED WATER	SAFETY GREEN	WHITE
HEATING HOT WATER	SAFETY GREEN	WHITE
STEAM	SAFETY GREEN	WHITE
DOMESTIC COLD WATER	SAFETY GREEN	WHITE
DOMESTIC HOT WATER	SAFETY GREEN	WHITE
FIRE PROTECTION FLUIDS	SAFETY RED	WHITE

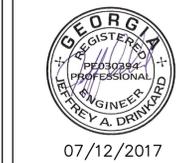
SIZE OF LEGEND LETTERS		
PIPE OR PIPE COVERING OUTER DIAM. (IN.)	LENGTH OF COLOR FIELD (IN.)	SIZE OF LETTERS (IN.)
3/4" TO 1-1/4"	8"	1/2"
1-1/2" TO 2"	8"	3/4"
2-1/2" TO 6"	12"	1-1/4"
8" TO 10"	24"	2-1/2"
OVER 10"	32"	3-1/2"

**NOTES:**

- IF AN EXISTING PIPE LABELING/MARKING SCHEME IS USED IN THE FACILITY, MATCH EXISTING SCHEME IN LIEU OF THESE DIRECTIONS.
- LABEL TEXT SHOULD MATCH FLUIDS IN TABLE, AND SHOULD INCLUDE FLOW ARROWS INDICATING DIRECTION OF FLUID FLOW.
- IF FLUIDS MAY FLOW IN TWO DIRECTIONS, ARROWS SHOULD INDICATE SUCH.
- APPLY LABELS SO THAT THEY ARE EASILY READABLE BY OCCUPANTS OR EMPLOYEES. FOR EASE OF READING, LABELS SHOULD BE APPLIED ON BOTTOM OF PIPES THAT ARE ABOVE OCCUPANT LEVEL, ON TOP OF PIPES THAT ARE BELOW OCCUPANT LEVEL, AND ON SIDE OF PIPES THAT ARE AT OR NEAR OCCUPANT LEVEL.
- FOR PIPES SMALLER THAN 3/4", USE PERMANENTLY ENGRAVED LABELS AFFIXED TO PIPES.
- APPLY LABELS NEAR VALVES, BRANCHES, WHERE A CHANGE IN DIRECTION OCCURS, AT ENTRY AND RE-ENTRY POINTS THRU WALLS, FLOORS, ROOFS, AND ON STRAIGHT SEGMENTS WITH SPACING BETWEEN LABELS THAT ALLOWS FOR EASY IDENTIFICATION.
- PIPING SYSTEMS CONVEYING GASEOUS CONTENTS SHALL HAVE SYSTEM DESIGN PRESSURE INDICATED ON THE LABEL IN ADDITION TO SYSTEM FLUID AND DIRECTIONAL ARROWS.
- NATURAL AND PROPANE GAS LABELS ON NON-STEEL PIPING SHALL BE APPLIED AT INTERVALS NOTE EXCEEDING 5 FEET.
- THESE LABELING GUIDELINES DO NOT APPLY TO MEDICAL GAS AND VACUUM SYSTEMS. FOR THESE TYPES OF SYSTEMS, REFER TO THE LOCAL CODE OFFICIALS' LATEST ACCEPTED VERSION OF NFPA 99.



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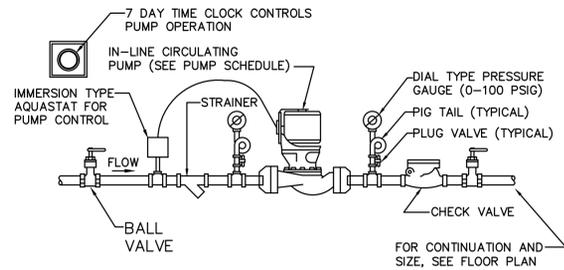
07/12/2017

**FLOYD COUNTY FLOYD RECYCLE CENTER**  
 LAVENDER DRIVE  
 Rome, Georgia 30165

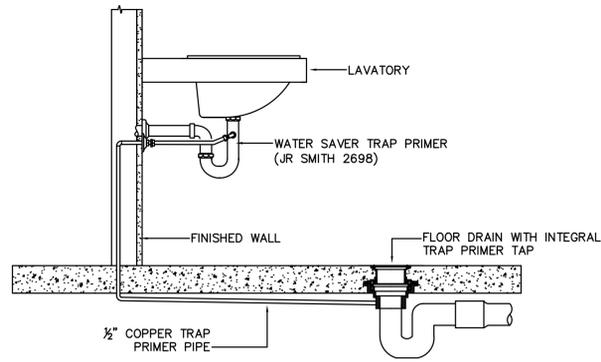
PLUMBING NOTES, LEGEND AND SCHEDULES

PROJECT # 1715  
 DESIGNER: JD  
 DATE: 07/12/2017  
 REV. DATE:

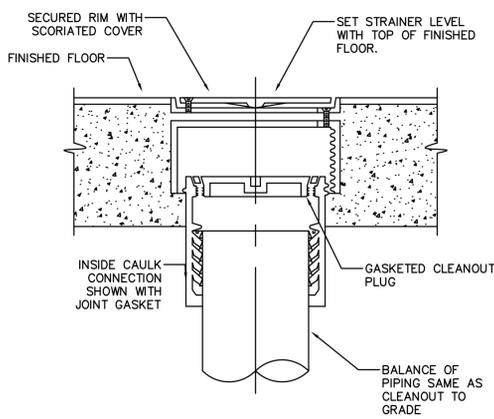
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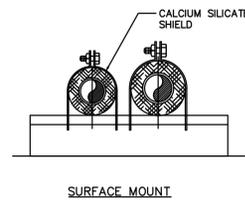
DPE-1 INLINE CIRCULATING PUMP DETAIL



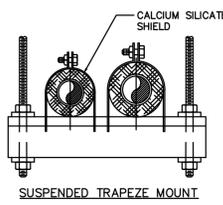
DPP-5 TYP. WATER SAVER TRAP PRIMER DETAIL



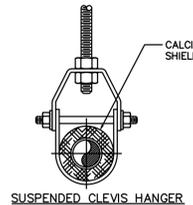
DPP-8 TYP. FLOOR CLEANOUT DETAIL



SURFACE MOUNT



SUSPENDED TRAPEZE MOUNT



SUSPENDED CLEVIS HANGER

NOTES:  
1. SIZE STRUT TO ADEQUATELY SUPPORT LOAD (REFER TO MANUF. CATALOG)  
2. SIZE CALCIUM SILICATE SHIELD TO FIT PIPE AND INSULATION THICKNESS.  
3. SIZE CLAMP TO FIT CALCIUM SILICATE SHIELDS.  
4. BOLT OR WELD STRUT TO STRUCTURE BELOW.

NOTES:  
1. SIZE STRUT TO ADEQUATELY SUPPORT LOAD (REFER TO MANUF. CATALOG)  
2. SIZE CALCIUM SILICATE SHIELD TO FIT PIPE AND INSULATION THICKNESS.  
3. SIZE CLAMP TO FIT CALCIUM SILICATE SHIELDS.  
4. AFFIX TO STRUCTURE ABOVE PER MANUF. RECOMMENDATIONS.

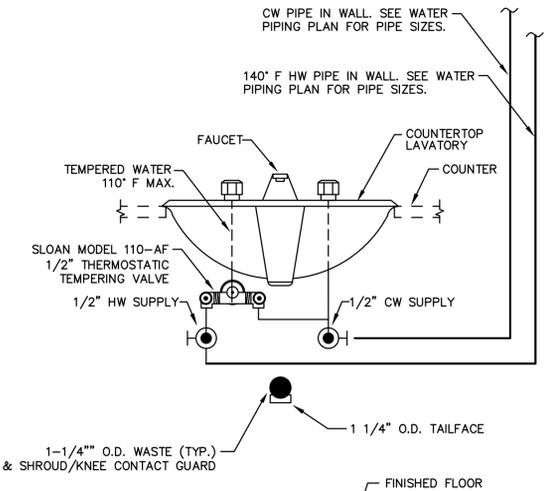
NOTES:  
1. SIZE HANGER TO ADEQUATELY SUPPORT LOAD (REFER TO MANUF. CATALOG)  
2. SIZE CALCIUM SILICATE SHIELD TO FIT PIPE AND INSULATION THICKNESS.  
3. SIZE HANGER TO FIT CALCIUM SILICATE SHIELDS.  
4. AFFIX TO STRUCTURE ABOVE PER MANUF. RECOMMENDATIONS.

HANGER SPACING CHART

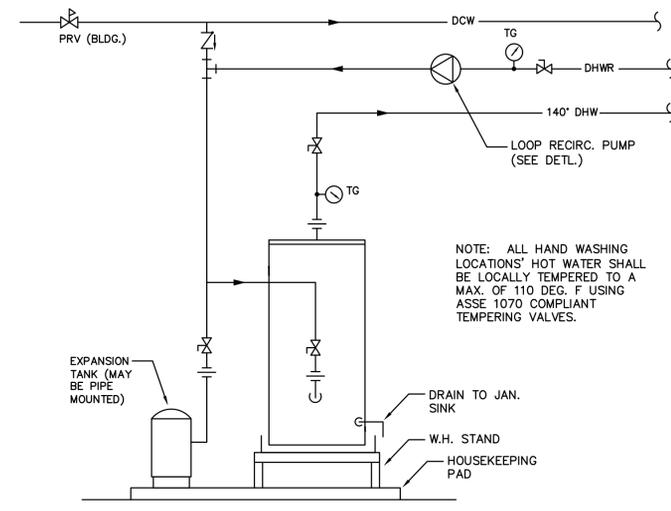
PIPE SIZE	ROD DIAM.	MAX. SPACING
1/2" - 1-1/4"	3/8"	7'
1-1/2"	3/8"	9'
2"	3/8"	10'
2-1/2"	1/2"	11'
3"	1/2"	12'
3-1/2"	1/2"	13'
4"	5/8"	14'
5"	5/8"	16'
6"	3/4"	17'
8"	3/4"	19'
10"	7/8"	22'
12"	7/8"	23'
14"	1"	25'
16"	1"	27'

NOTE: ALL PIPE INSULATION SHALL BE CONTINUOUS THROUGH PIPE CLAMPS, AND SHALL BE PROTECTED BY 3" SHIELD INSIDE CLAMPS.  
NOTE: ALL PIPE INSULATION LOCATED OUTSIDE OF BUILDING SHALL BE PROTECTED BY EMBOSSED METAL JACKETING.

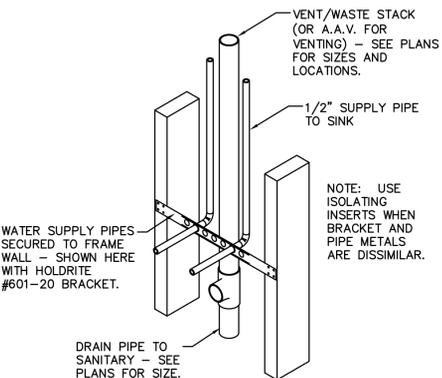
DP-8 TYP. PIPE HANGER DETAILS



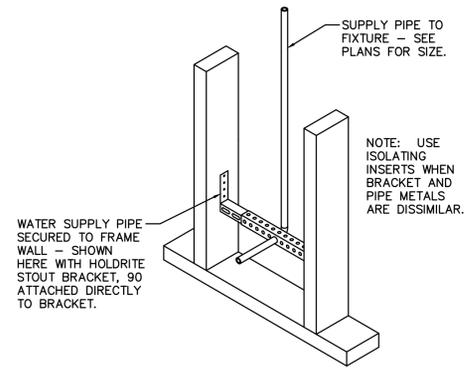
DPP-21A TYP. MIXING VALVE AT FIXTURE DETAIL



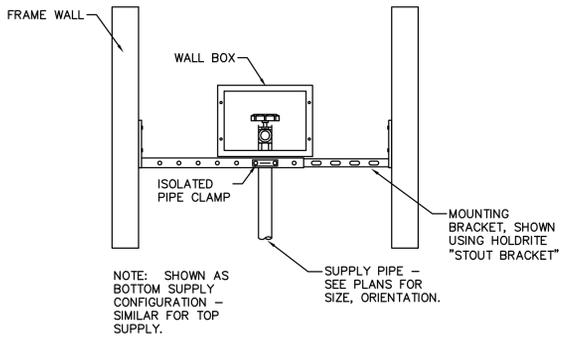
DPE-13 WATER HEATER WITH MIXING VALVE - PIPING DIAGRAM



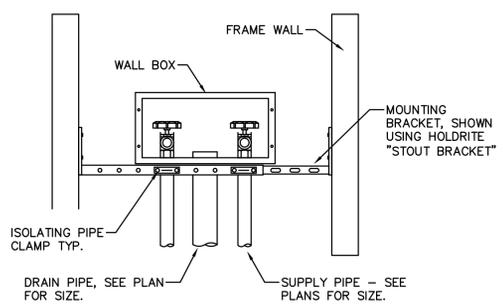
DPP-17 TYP. SINK AND LAV. ROUGH-IN DETAIL



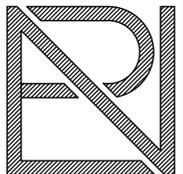
DPP-19 TYP. SINGLE SUPPLY FIXTURE ROUGH-IN DETAIL



DPP-15 TYP. ICE MACHINE SUPPLY WALL BOX DETAIL



DPP-16 TYP. WASHING MACHINE WALL BOX DETAIL



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07/12/2017

FLOYD COUNTY  
FLOYD RECYCLE CENTER  
LAVENDER DRIVE  
Rome, Georgia 30165

PLUMBING DETAILS

PROJECT # 1715  
DESIGNER: JD  
DATE: 07/12/2017  
REV. DATE:





SECTION 15010 – MECHANICAL GENERAL

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

- A. Specification: This specification is intended to cover all portions of this building.
- B. Reference Codes: This installation shall comply with the following codes and regulations, along with all Georgia amendments.
  1. Current Georgia State Minimum Standard Mechanical Code.
  2. Current NFPA No. 90A Installation of Air Conditioning and Ventilation Systems.
  3. Current Georgia State Minimum standard Plumbing Code.
  4. Current Georgia State Minimum Standard Gas Code.
  5. Current NFPA #54 National Fuel Gas Code.
  6. Current Georgia State Minimum Standard Gas Code.
  7. Current NFPA No.70, National Electric Code.
  8. Current Georgia State Minimum Life Safety Code.
  9. Current Georgia State Minimum Standard Fire Prevention Code.
  10. Current Georgia State Energy Code for Buildings

- C. Reference Standards: This installation shall comply with the following standards.
  1. Manufacturers Standardization Society of the Valve and fittings Industry (1815 North Ft. Meyer Drive, Arlington, VA 22209), MSS–SP–58–2002, called MSS–SP–58, MSS–SP–69–2003, called MSS–SP–69.
  2. American Society of Heating and Ventilating and Air Conditioning Engineers Guide, Fundamentals, 2009 Edition.
  3. Sheet Metal and Air Conditioning Contractor National Association (SMACNA) HVAC Duct Construction Standards, Metal & Flexible, 2005 Edition. Fire, Smoke and Radiation Damper Installation Guide for HVAC Systems, 1986 Edition. Seismic Restraint Manual Guidelines for Mechanical Systems, Second Edition.
  4. American Society of Sanitary Engineers (ASSE) Standard, Latest Edition.
  5. North American Insulation Manufacturers Association (NAIMA) Fibrous Glass Duct Construction Standards.

1.2 REGULATIONS

- A. Attention is called to the fact that all work shall be done in accordance with all applicable City, County and State regulations, which regulations shall be considered as minimum requirements, and shall not alter the arrangement and pipe sizes indicated on the plans, except where they conflict.
- B. Contractor is responsible for obtaining all permits and paying all fees required to complete the Work

1.3 DRAWINGS

- A. The work is shown on the project drawings and specifications.

1.4 PROTECTION OF PUBLIC

- A. If the contractor must operate any potentially dangerous devices before all specified safety valves controls and devices are installed, he shall notify the Architect in writing. He shall not operate such devices under these conditions until arrangements for supervision by competent operators have been instituted and Architect's written approval has been issued.

1.5 EXCAVATION, SHORING AND BRACING

- A. Excavate and back-fill for the installation of all underground work.
- B. Provide all shoring and bracing to prevent cave-ins during the construction period.

1.6 SHOP DRAWINGS

- A. Shop drawings shall be submitted for but not limited to the following items:
  1. All Scheduled Equipment
  2. Ductwork & Accessories
  3. Hangers
  4. Piping & Accessories
  5. Supports
  6. Vibration Isolation
  7. Fixtures
  8. Roof Portals
  9. Control System
  10. Duct Systems
  11. Equipment Curbs
  12. Insulation
  13. Filters
  14. Access Panels
  15. Louvers
  16. Refrigerant Pipe Sizes

- B. Provide with the submittal package the proposed Test & Balance Company's credentials as described in Section 15950. Include a letter from the Test & Balance company indicating that they have read Section 15950 and will perform testing and balancing of the mechanical systems as described in that Section.

- C. Provide a complete list of all accessories and options (indicate factory or field installed) for all scheduled mechanical equipment, including air distribution devices. Provide manufacturer generated specifications and ratings sheets for each individual piece of air conditioning and heating equipment. Generic photocopies from manufacturers catalog will not be accepted.

- D. In addition to cut sheets, provide a summary sheet indicating exactly what pipe material joining methods, valves, etc. will be provided in the various piping systems.

- E. The Contractor shall produce ¼" scale CAD-generated ductwork and piping shop drawing for every area of the building. Contractor shall coordinate all new mechanical systems with other Divisions, specifically including piping, lights, the building structure, and ceiling heights. It shall be the Contractor's responsibility to ensure that the mechanical work is coordinated with all other trades. The shop drawings submitted shall reflect this coordination in its entirety, including location of piping 2" and larger, all ductwork (except runouts to diffusers), and all equipment by dimensions to column lines. Bottom of duct and bottom of pipe dimensions shall be taken from finished floor, and shall be recorded on the shop drawings for review. Any interferences or conflicts not resolved during normal shop drawing coordination between trades shall be specifically noted to the Architect for his instructions. Conflicts arising out of work installed (or ductwork already fabricated) without shop drawings or shop drawings that have not been completely coordinated, shall be the Contractor's responsibility and at his expense for any necessary changes.

- F. The Contract Drawings are diagrammatic and indicated generally the size and location of ductwork and equipment. While duct sizes shall not be decreased, it is recognized that job site conditions may require re-routing or re-sizing of ductwork, and the Contractor shall be responsible for this coordination. Ductwork that has to be re-sized and/or re-routed as a result of this coordination effort shall be the Contractor's responsibility and at his expense. Ductwork re-sized shall be equivalent to that shown on the drawings.

- G. Steel fabrication shop drawings shall be coordinated with all Division 15 equipment and roof openings. The resulting coordination shall be confirmed and verification shall be submitted with associated equipment and roof curbs.

- H. Division 15 shall coordinate with structural steel contractors to insure where ductwork is required to be routed within joist space that an alternate to x bracing is installed. Failure to coordinate shall subject the Contractor to full cost incurred to meet the design intent on the contract documents.

1.7 MOTORS, WIRING AND ELECTRICAL EQUIPMENT

- A. All motors required for this work shall be built in accordance with the latest standards of National Electrical Manufacturer's Association, and shall be especially designed for quiet operation. All motors shall be selected for operation within their nameplate amperage. Adjustable bases shall be provided with motors and equipment which have belt drives.

- B. All electrical materials shall comply with requirements of the National Electric Code. All contractors, starters, relays and panels used in this work, which are included in Underwriters Label Service, shall be new and bear the National Board of Fire

Underwriters inspection label. Material not included in Underwriters Label service shall be new and conform to NEMA or other applicable industry standard.

- C. Division 16, ELECTRICAL, provides for the furnishing of conduit and wire from electrical source to electrical use, called "path of power," and for the installation of certain line voltage devices specified in Division 15 which lie in the "path of power," including but not limited to:
  1. Manual switches.
  2. Line voltage thermostats.
  3. Solid state speed controllers.
  4. Operators for operable dampers.
  5. Aquastats for domestic hot water circulating pumps.
  6. Alarms for Flow Switches and Valve Supervisor Switches.

- D. The "path of power" terminates at contactors or control panels of the following listed items of equipment. These control panels contain starters/contactors for the motors or heaters installed on or within the unit and are specified in Division 15. Any wiring past the point of termination described above is Division 15 work.
  1. Packaged Rooftop Units.
  2. Domestic Water Heaters.
  3. Make-up Air Units.
  4. Condensing and/or Heat Pump Units.
  5. Fan Coil Units.
  6. Ductless Split Systems.
  7. Electric Heaters.

- E. Division 16, ELECTRICAL, provides for electrical power to any given item of equipment at the voltage and phase required by the primary use only. If the item of equipment contains devices such as fans, thermostats, motorized dampers or other controls which require other than primary voltage for their proper function, then transformers shall be furnished under Division 15 for that purpose.
- F. Voltage and phase for Division 15 equipment shall be as specified by Division 16. Division 15 Contractor shall submit a list of all mechanical equipment requiring electrical connections to the Contractor prior to release of any equipment, for coordination with the Division 16 contractor. A copy of this list that has been reviewed and approved by the General Contractor shall be submitted to the Architect with the submittal for mechanical equipment. Failure to include this list may result in the rejection of the entire mechanical equipment submittal.

- G. The control power source (point of connection for control power) for major equipment except those single phase fans which are thermostatically controlled and those items listed in C above, are provided at the combination starters.
- H. The automatic control of signal for STOP–START of major equipment is furnished and installed to and from combination starts as part of Division 15.

- I. All other conduit and wire, not in "path of power" described above is included in Division 15.
- J. If any Division's Contractor makes a change by submittal, by delivery, by wiring rearrangement or power requirements, which results in increased costs, the Contractor initiating the change shall bear all cost increases.
- K. All motors that are 1 HP and larger shall be high efficiency motors with nominal and minimum full load efficiencies equal to or greater than those specified by the State Energy Code. Specifications shall be submitted for each motor furnished.

- L. Starters or contractors shall be furnished in Division 15 for each motor.
  1. Magnetic starters shall be NEMA standard sizes adequate for the load served, Size 00, 1, 2, 3, 4. Half sizes and/or quarter sizes are not acceptable.
  2. Overload relays shall be unit constructed, hand reset melting alloy type, and shall be provided for all underground legs.
  3. Units shall have NEMA–1 enclosures, three thermal overloads in three–phase starts, HAND–OFF–AUTO switches as required by the "controls" specification section.
  4. All fractional HP single–phase motors shall have internal thermal overload protection except where starters are scheduled.

- M. Where power wiring to Division 15 equipment is not within the equipment curb, roof curb and boots shall be provided under Division 16. The portal location shall be coordinated with Division 15 equipment power inlet requirements, and located not to block access for equipment servicing.

1.8 ACCESS PANELS

- A. Shall be provided to permit operation of concealed valves, dampers, or equipment. The following table lists types of Bilco access frames and doors. Panels of equivalent construction by Titus, Milcor, Hohmann, and Barnard or Zurn are acceptable.
 

1. Sheetrock	Style G
2. Plaster	Style A
3. Masonry	Style C

- B. Wall:
 

1. Sheetrock	Style G
2. Plaster	Style A
3. Concealed spline	Style D
4. Lay-in tile	None
- D. Fire Rated Wall or Ceiling Style F (U.L. Listed)

- E. Sizes shall be: Small valves – 12" x 12". Multiple valves and dampers – 24" x 24"

- F. Access panels shall be insulated for sound barrier equal to wall in which it is installed.

- G. Acoustical Tile: Coordinate with tile installed to provide a removal tile at access point. Install a colored thumb tack to mark the access panel of above ceiling equipment, control instrument, valves or relay.

1.9 WARRANTY

- A. The Contractor shall operate the air conditioning, heating and ventilating systems and plumbing systems for a period of one week to the satisfaction of the Architect. Thereafter, the Contractor shall guarantee and be responsible for all materials and workmanship (parts and labor) for a period of one (1) year following the date of acceptance by the Architect.
- B. The Contractor shall also provide maintenance for the one (1) year period by providing four (4) periodic inspections at approximately three–month intervals, which shall include the following.
  1. Check all bearing, align and oil or grease.
  2. Check belt tensions and pulley adjustment and adjust as necessary.
  3. Check filters and advise Owner when change is necessary.
  4. Check refrigerant charges and oil levels and replenish as necessary.
  5. Check and re-calibrate controls as necessary.
- C. Any required maintenance for the above shall be performed and materials needed shall be furnished by the Contractor. Not included in the materials to be furnished by the Contractor are fuel, electricity, water and filters. Provide the Owner with four (4) copies of the inspection reports indicating all items checked and adjustment or repairs performed.
- D. Water heaters shall be guaranteed for five years; parts and labor.
- E. All equipment compressors shall be guaranteed for five years; parts and labor.

1.10 CUTTING AND PATCHING

- A. The Contractor shall set sleeves for pipes, ducts and equipment accurately before the concrete walls and floors are poured.
- B. Should the contractor neglect to perform this preliminary work and should cutting and patching be required in order to install the piping, ductwork or equipment, then the expense of the cutting and restoring of surfaces to their original condition shall be borne by the Contractor.

1.11 BASIS OF DESIGN

- A. When brand, trade or manufacturer's names are used for basis of design, they

are used in the interest of brevity to describe the style, type, size, quality or arrangement of articles of equipment and are not intended to limit competition. If articles of equipment by manufacturers other than basis of design are submitted for installation, the Architect shall compare them with specified articles of equipment on basis of qualities mentioned. The size, weight and arrangement of other equipment shall be checked by the Contractor to ascertain that it can be installed, connected, operated, and serviced successfully, and that walking space and service space can be maintained without altering equipment space or enclosures or the work of other trades. Manufacturers not listed as "Acceptable Manufacturers" will not be considered.

- B. If any Division's Contractor makes a change by submittal, by delivery or by wiring rearrangement which results in increased costs, the Contractor initiating the change shall bear all cost increases.

1.12 AS–BUILT DRAWINGS

- A. Per the Georgia State energy Code, the Contractor shall produce and submit to the Architect, "As–Built" drawings, four (4) copies, as described below.
- B. As work progresses, neatly and clearly record on four (4) sets of mechanical plans (in red) all changes and deviations from the contract drawings in size, locations, etc., of all piping, ductwork terminal units and other equipment. Record (in red) final location of piping, ductwork, starts, valves, thermostats, etc., by dimensions to adjacent walls and floors. Make sufficient measurement to accurately locate all equipment. Locate underground lines by dimension from building walls.

1.13 OPERATION AND MAINTENANCE MANUALS

- A. Operation and Maintenance manuals (6 sets) shall be provided to the Owner or the Owners designated representative. Manuals shall be in accordance with the Georgia State Energy Code for Buildings.
  1. Manuals shall include as a minimum the following:
    - a. Final, corrected submittal data with equipment sizes and selected options for each piece of equipment, including Engineer's submittal review comments.
    - b. Current manufacturer's published operation and maintenance manuals for each piece of equipment.
    - c. Name, address and phone number of at least one LOCAL service agency.
    - d. HVAC controls system maintenance and calibration information including wiring diagrams, schematics, and control drawings.
    - e. Complete narrative of how each system is intended to operate, including suggested set–points.
    - f. Copy of the final Test & Balance report.
    - g. Copy of the final As–built drawings.
    - h. Controls certification letter.
    - i. Copy of Engineer's final punch list items, with each item checked off when completed or an explanation of why the item was not completed.

1.14 INTERFACES WITH OTHER WORK

- A. There are many interfaces between the work involved with Division 15 and the work involved with other Sections and Divisions, particularly with Division 16. Contractor shall be aware of the requirements of these other Sections or Divisions and his responsibilities at the interfaces.
- B. No mechanical equipment, piping, or ductwork shall be placed within 42" of switchboards and/or panel boards.
- C. No water piping (domestic, storm, sanitary, etc., except sprinkler piping when required) shall be located above electrical switchboards and/or panel boards. When sprinklers are required, shields must be provided over the panels.

1.15 EQUIPMENT IDENTIFICATION

- A. Equipment identification:
  1. All mechanical equipment shall be labeled with Bakelite nameplates with 2" high white letters on a black background, securely affixed to equipment for outdoor or indoor service.
  2. Equipment identification numbers shall be the same as those scheduled on the design drawings. Identification shall be located where it can be conveniently read, and shall be located in the same relative position on like equipment.
  3. In addition to the above ID tags, all scheduled equipment shall be provided with permanent factory installed engraved nameplate labels listing complete model and serial numbers, unit voltage, motor sizes, etc.
  4. Identify all disconnect switches that are not directly attached to the equipment that they serve, with identical ID tags as specified above for the equipment.

1.16 PIPE IDENTIFICATION

- A. All piping systems shall be identified.
  1. All piping systems within the building except as noted herein shall be identified with clear block letters and number stenciled on the outside surface of the pipe or insulation, indicating the system contents by abbreviated letters and direction of the flow.
  2. This identification marking shall be applied to the pipe systems where pipe enters or leaves a wall or floor, and item of equipment such as pumps, fan coil units and tanks, and at tees. Identification shall be applied no less than 50 feet apart on horizontal pipe; and one identification per floor on vertical pipe.
  3. Letters and numbers shall be high on pipe 2" and smaller.
  4. Letters and numbers shall be 1" high on pipe 3" and larger.
  5. Directional arrows shall be 4" long and "wide.
  6. Letters and numbers shall be black on white pipe or insulation.
  7. Letters and number shall be white on dark pipe or insulation.
  8. Pipe identification symbols shall be the same as shown on the drawings.
  9. Soil, vent and refrigerant piping shall not be identified.

1.17 PERMITS AND INSPECTIONS

- A. The Contractor shall secure and pay for all permits, fees, inspections, and utility connection costs.
- B. BOILER TEST CERTIFICATES: It shall be the Contractor's responsibility to have each boiler, large (greater than 120 gallon capacity) water heater, and pressure vessel inspected by a State of Georgia certified inspector upon installation. Each inspection report shall be submitted to the Georgia Department of Labor, Safety Engineering Section, 1700 Century Circle, Atlanta, Georgia 30345 to the attention of Direction of Engineering, PLUS a copy of each report transmitted to the Architect. ONE additional copy of each report shall be included in EACH of the FOUR Close–Out Manuals.

1.18 EQUIPMENT & MATERIAL PROTECTION

- A. All equipment and material shall be kept clean and free of debris as construction progresses. Closures shall be provided over duct, piping and major equipment openings during storage, erection and prior to connection. Material finishes shall be protected by covers to prevent impingement of corrosive, abrasive and disfiguring foreign matter. Accidental finish damage shall be repaired equivalent to original finish.

1.19 TEST, BALANCE AND REPORT

- A. See Section 15950.

1.20 PROHIBITED MATERIALS

- A. All products, materials or assemblies which contain asbestos or polychlorinated biphenyl (PCB) in any form or in any concentration whatsoever, are expressly forbidden from being used on this project.

1.21 SITE VISIT AND FAMILIARIZATION

- A. Contractors proposing to undertake work under this Division shall visit the site of the work and fully inform themselves of all conditions that effect the work or cost thereof, examine the drawings and specifications as related to the site conditions, and acquaint themselves with the utility companies from whom services will be supplied; verify locations of utility services and determine requirements for connections.
- B. Consideration will not be granted for any alleged misunderstanding of the amount of work to be performed. Tender of proposal shall convey full agreement to all items and conditions specified, indicated on the drawings, and/or required by nature of the site.
- C. Attention is called to the fact that this scope of work includes renovation to an

existed facility and/or an addition to an existing building. When the work is finished, the mechanical systems shall be complete in every respect, and completely integrated with all affected mechanical and control systems.

- D. Existing mechanical systems in the existing facility shall not be interrupted without prior approval of the Owner or Architect.

1.22 DISINFECTION AND TESTING OF WATER SYSTEM

- A. Sanitize plumbing potable water systems after cleaning and pressure tests, with chlorinated potable water solution to 200 ppm chlorine residual after 24–hours minimum, then flushed with fresh potable water until effluent chlorine content does not exceed make–up. Water samples shall be sent to Local Health Department (LHP) for testing. A letter of approval must be obtained from the LHD before the system is put into service.
- B. All domestic water piping shall be disinfected with chlorine before it is placed into operation. The chlorinating material shall be liquid chlorine conforming to Federal Specification BB–C–120 and shall be introduced to the system by experienced operators only. The chlorine solution applied to the piping sections or system shall contain at least fifty (50) parts per million of available chlorine and shall remain in the sections or system for a period of not less than sixteen (16) hours. During the disinfection period all valves shall be opened and closed at least four (4) times. After the disinfection period, the chlorinated water shall be flushed from the system with clear water until the residual chlorine content is not greater than two–tenths parts per million (0.2PPM). Submit certification to the Architect and Owner that the system was disinfected.

END OF SECTION

SECTION 15080 – PLUMBING INSULATION

PART 1 GENERAL

1.1 GENERAL

- A. Section 15010 applies.

PART 2 PRODUCTS

2.1 BASIS OF DESIGN

- A. Manufacturers shown below as Basis of Design
  1. Acceptable Manufacturers for Glass Fiber and Mineral Fiber Insulation Products: CertainTeed, Knaut, Johns Manville, Owens–Corning.

2.2 PIPE INSULATION

- A. Domestic Hot Water Supply and Recirculation
  1. ASTM C547, molded glass fiber pipe insulation.
  2. Thermal Conductivity: 0.23 at 75 degrees F.
  3. Operating Temperature Range: 0 to 850 degrees F.
  4. Vapor Barrier Jacket: ASTM C1136, Type I, factory applied reinforced foil kraft with self–sealing adhesive joints.
  5. Jacket Temperature Limit: minus 20 to 150 degrees F.
  6. Thickness: 1" thickness for 1–1/2" pipe and smaller. 1–1/2" thickness for pipes larger than 1–1/2".
- B. Domestic Cold Water Supply and Condensate Piping
  1. ASTM C547, molded glass fiber pipe insulation.
  2. Thermal Conductivity: 0.23 at 75 degrees F.
  3. Operating Temperature Range: 0 to 850 degrees F.
  4. Vapor Barrier Jacket: ASTM C1136, Type I, factory applied reinforced foil kraft with self–sealing adhesive joints.
  5. Jacket Temperature Limit: minus 20 to 150 degrees F.
  6. Thickness: 1/2" thickness for all pipes.
- C. Pipe Insulation Jacket
  1. ASTM C921, white Kraft paper with glass fiber yarn, bonded to aluminized film.
  2. Water vapor transmission: ASTM E96/E96M; 0.02 perm–inches.

PART 3 EXECUTION

3.1 INSTALLATION – PIPING SYSTEMS

- A. Paint insulation to match ceiling where piping and pipe insulation are exposed to view.
- B. Verify piping and equipment has been tested before applying insulation materials. Verify surfaces are clean and dry, with foreign material removed. Piping Exposed to View in Finished Spaces: Locate insulation and cover seams in least visible locations.
- C. Continue insulation through penetrations of building assemblies or portions of assemblies having fire resistance rating of one hour or less. Provide expanding fire stopping when continuing insulation through assembly. Finish at supports, protrusions, and interruptions.
- D. Hot and Cold Piping Systems:
  1. Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, and expansion joints.
  2. Furnish factory–applied or field–applied standard jackets. Secure with outward clinch expanding staples or pressure sensitive adhesive system on standard factory–applied jacket and butt strips or both.
  3. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
  4. Do not insulate unions and flanges at equipment, but bevel and seal ends of insulation at such locations. For hot piping systems above 140 degrees F, insulate unions and flanges at equipment.
- E. Inserts and Shields:
  1. Piping 1–1/2 inches Diameter and Smaller: Install steel shield between pipe hanger and insulation.
  2. Piping 2 inches Diameter and Larger: Install insert between support shield and piping and under finish jacket.
    - a. Insert Configuration: Minimum 6 inches long, of thickness and contour matching adjoining insulation; may be factory fabricated.
    - b. Insert Material: Compression resistant insulating material suitable for planned temperature range and service.
  3. Piping Supported by Roller Type Pipe Hangers: Install galvanized steel shield between roller and inserts.
    - a. Condensate Piping: Insulate entire piping system and components inside the building space to prevent condensation.
    - b. Pipe exposed in Mechanical Equipment or Finished Spaces: Finish with PVC jacket and fitting covers. Labels on exterior covers should be oriented so as to be easily readable and shall have directional flow arrows.

END OF SECTION



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07/12/2017

**FLOYD COUNTY**  
**FLOYD RECYCLE CENTER**  
 LAVENDER DRIVE  
 Rome, Georgia 30165

PLUMBING SPECIFICATIONS

PROJECT # 1715  
 DESIGNER: JD  
 DATE: 07/12/2017  
 REV. DATE:

P2.1

SECTION 15100 – PIPING AND ACCESSORIES

PART 1 GENERAL

1.1 GENERAL

- A. Section 15010 is applicable.

1.2 PRESSURE

- A. The working pressure of all pipes, fittings, valves, and joints shall be in excess of the maximum system pressure and maximum system temperature at the point of installation.

PART 2 PRODUCTS

2.1 PIPE HANGERS AND SUPPORTS

- A. Conform to ASME B31.9, ASTM F708.
- B. Hangers for Non Insulated Pipe Sizes 1/2 to 1–1/2 inch: Malleable iron or carbon steel, adjustable swivel, split ring.
- C. Hangers for Insulated and Non Insulated Pipe Sizes 1/2 to 30 inches: Carbon steel, adjustable, clevis.
- D. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
- E. Vertical Support: Steel riser clamp.
- F. Wall Support for Pipe Sizes to 3 inches: Cast iron hook.
- G. Wall Support for Pipe Sizes 4 inches and Over: Welded steel bracket and wrought steel clamp.
- H. Copper Pipe Support: Copper–plated, carbon–steel adjustable, ring.
- I. Floor Support for horizontal Pipe Sizes to 4 inches: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
- J. Floor Support for horizontal Pipe Sizes 6 inches and Over: Adjustable cast iron roll and stand, steel screws, and concrete pier or steel support.
- K. Ground support for exterior horizontal Pipe: Adjustable stainless steel roll and stand, and concrete pier support.

2.2 PIPE SLEEVES

- A. Sleeves are defined as holes that are provided to permit the passage of pipe (and insulation) through walls or floors. Soil, waste, vent, and domestic water pipes stubbed through walls and floors for plumbing fixture connections do not require sleeves.
- B. Masonry: Sleeves shall be schedule 40 steel pipe and shall be large enough to accommodate continuous passage of pipe plus insulation through the wall or floor system. Pipe sleeves shall extend 1" on both sides of a wall or floor.
- C. Concrete:
  - 1. Sleeves through concrete walls and floor shall be formed by any device that forms a neat circular hole, of proper size, through the wall or floor system. Acceptable devices are pipe and sheet metal.
  - 2. Structural floor sleeves require extension above the floor surface to prevent water passage down the sleeves, and shall be made of schedule 40 black steel pipe extended 1" above the floor.
- D. Other Sleeves: Where sleeves pass through wood, drywall, plaster partitions, or suspended ceilings, sleeves shall be neatly cut holes sealed with caulk, finished with chrome plated escutcheon where exposed in visible areas.
- E. Sealing of annular space: For sleeves in masonry and concrete walls and elevated floor slabs, non-rated, annular spaces shall be packed with silicone RTV foam. Sleeves in exterior walls shall be sealed with a "Link Seal" assembly or packed with fiberglass and sealed at both ends with weather-resistant, non-hardening caulk. Where escutcheons are not required, the annular space shall be neatly sealed at the sleeve end. Pipes passing through ducts and plenums shall be sealed air tight. Annular spaces that pass through fire resistive or fire rated partitions, or ceilings shall be closed with 3M Fire Barrier Penetration Sealing System.
- F. Unseal holes in floors made for duct or pipe penetrations shall be sealed neatly to match existing wall or floor.
- G. All sleeves shall be sized for full pipe size plus pipe insulation thickness through the entire length of the sleeve.

2.3 ESCUTCHEONS

- A. Escutcheons are annular shaped metal plates installed to cover annular spaces around pipes entering walls, floors, or other partitions. They are installed for decorative purposes in areas where these penetrations are visible. Escutcheons shall be chrome plated steel, fastened to remain secure and in position at all times.
- B. Escutcheons for water closets, plated supply pipes, and shower heads shall be chrome plated brass with setscrew.
- C. Escutcheons are not to be installed on the bell of any soil or drain pipes, on any pipe larger than 4", on insulated pipe if exterior diameter of insulation is larger than 4", or on pipes which do not enter the wall or floor at right angles.

2.4 FLASHING

- A. Flashing shall be sheet lead, 4 lbs. per square foot, and shall extend out from pipe and edge of drain a minimum of 12".
- B. Roof drains, floor drains, area drains, and equipment room drains installed where membrane water-proofing is installed shall be flashed.
- C. Vent stacks and other pipes through roof shall be flashed. Flashing may be caulked into pipe bell if flush with finished roof, or on 3" and larger may employ 4 lb. boot flashing. Vents shall extend a minimum of 12" above finished roof elevation at penetration. Refer to roof pipe portals for piping through roof other than sanitary vents or overflow drains.

2.5 PIPES AND TUBES

- A. Sanitary Sewer (SS), Vent Piping (V)
  - 1. Sanitary Sewer (SS): PVC, schedule 40, with PVC fittings and elastomeric gasket joints. Solvent weld with ASTM D2564 solvent cement.
  - 2. Vent Piping (V) (from a point at least 2" above any trap fixture): PVC, schedule 40, with PVC fittings and elastomeric gasket joints. Solvent weld with ASTM D2564 solvent cement.
- B. Domestic Water Piping, Cold water (CW), Hot water (HW) & Hot water return (HWR)
  - 1. Underground: Type K Copper Tubing ASTM B42, Tempered O61 annealed without fittings.
  - 2. Above ground: Type L copper tubing, ASTM BBB, drawn with wrought copper fittings and grade 95TA solder joints.
  - 3. Exposed fixtures: Chrome plated brass and copper tubing with threaded plated brass fittings.
- C. TPR Drain Piping:
  - 1. PVC, Schedule 40, with PVC fittings and elastomeric gasket joints. Solvent weld with ASTM D2564 solvent cement. Type L copper in exposed areas or HVAC plenums.
- D. Trap Primer piping (TP):
  - 1. Type K Copper Tubing ASTM B42, Tempered O61 annealed without fittings.

2.6 VALVES

- A. For drinking water service, provide valves complying with NSF 61.
- B. Gate Valves:
  - 1. Up to 2 inches: Bronze body, bronze trim, non-rising stem, hand wheel, inside screw, double wedge disc, soldered or threaded.
  - 2. Over 2 inches: Iron body, bronze trim, rising stem, hand wheel, OS&Y, solid wedge, flanged or grooved ends.
- C. Ball Valves:
  - 1. Up to 2 inches: Bronze or stainless steel one piece body, chrome plated brass ball, teflon seats and stuffing box ring, lever handle, solder or threaded ends.
  - 2. Over 2 inches: Cast steel flanged body, chrome plated steel ball, Teflon seat and stuffing box seals and lever handle.

D. Relief Valves:

- 1. Bronze body, Teflon seat, stainless steel stem and springs, automatic, direct pressure actuated capacities ASME certified and labeled.
- E. Plug Valves:
- 1. Up to 2 inches: Bronze body, bronze tapered plug, non-lubricated, Teflon packing, threaded ends; extended neck, 10-position lever handle.
  - 2. Over 2 inches: Cast iron body and plug, pressure lubricated, Teflon packing, flanged ends.
- F. Butterfly Valves:
- 1. Up To 2 inches: Bronze body, stainless steel disc, resilient replaceable seat, threaded ends; extended neck, 10-position lever handle.
  - 2. Over 2 inches: Iron body, chrome plated iron disc, resilient replaceable seat, wafer or lug ends, extended neck, 10 position lever handle.
- G. Swing Check Valves:
- 1. Up to 2 inches: Bronze body and swing disc, solder or threaded ends.
  - 2. Over 2 inches: Iron body, bronze trim, swing disc, renewable disc and seat, flanged ends.
- H. Spring Loaded Check Valves:
- 1. Iron body, bronze trim with threaded, wafer or flanged ends and stainless steel spring with renewable composition disc.
- I. Relief Valves:
- 1. Bronze body, Teflon seat, stainless steel stem and springs, automatic, direct pressure actuated capacities ASME certified and labeled.

2.7 METERS AND GAGES

- A. Thermometers:
  - 1. Scale Range: Temperature ranges for services listed are as follows:
    - a. Domestic Hot Water: 30 to 240 deg F, with 2-degree scale divisions
    - b. Domestic Cold Water: 0 to 100 deg F, with 2-degree scale divisions
  - 2. Liquid–in–Glass Thermometers Description: ASTM E 1.
    - a. Case: Die cast and aluminum finished in baked–epoxy enamel, glass front, spring secured, 9 inches (230 mm) long.
    - b. Adjustable Joint: Finish to match case, 180-degree adjustment in vertical plane, 360-degree adjustment in horizontal plane, with locking device.
    - c. Tube: Red or blue reading, organic–liquid filled with magnifying lens.
- Retain paragraph above or below. Tube type above is recommended.
  - d. Tube: Red or blue reading, mercury filled with magnifying lens.
  - e. Scale: Satin-faced nonreflective aluminum with permanently etched markings.
  - f. Stem: Copper–plated steel, aluminum, or brass for separable socket; of length to suit installation.
- 2. Thermometer Wells: Fitting with protective well for installation in threaded pipe fitting to hold test thermometer.
  - a. Material: Brass, for use in copper piping.
  - b. Material: Stainless steel, for use in steel piping.
  - c. Material: Steel, for use in steel piping.
  - d. Extension–Neck Length: Nominal thickness of 2 inches but not less than thickness of insulation. Omit extension neck for wells for piping not insulated.
  - e. Retain one of three subparagraphs below.
  - f. Insertion Length: To extend to one-third of diameter of pipe.
  - g. Cap: Threaded, with chain permanently fastened to socket.
  - h. Heat–Transfer Fluid: Oil or graphite.

C. Pressure Gages

- 1. Description: ASME B40.1, phosphor–bronze bourdon–tube type with bottom connection; dry type, unless liquid–filled–case type is indicated.
- 2. Cases are also constructed of molded aluminum and phenolic plastic. Lenses are also made of clear acrylic plastic.
- 3. Case: Drawn steel, brass, or aluminum with 4–1/2–inch diameter, glass lens.
- 4. Connector: Brass, NPS 1/4.
- 5. Scale: White–coated aluminum with permanently etched markings.
- 6. Range: 0–100 PSI.

D. Test Plugs

- 1. Description: Nickel–plated, brass–body test plug in NPS 1/2 fitting.
  - 2. Body: Length as required to extend beyond insulation.
  - 3. Pressure Rating: 500 psig minimum.
  - 4. Core Inserts: One or two self–sealing valves, suitable for inserting 1/8–inch OD probe from dial–type thermometer or pressure gage.
  - 5. Test–Plug Cap: Gasketed and threaded cap, with retention chain or strap.
  - 6. Test Kit: Pressure gage and adapter with probe, two bimetal dial thermometers, and carrying case.
- E. Calibrated Flow Balancing Valves
- 1. Furnished with calibrated nameplate and memory stop.
  - 2. Fitted with capped readout fittings.

F. Manufacturers:

- Subject to compliance with requirements, provide products by one of the following:
  - 1. Liquid–in–Glass Thermometers:
    - a. Dresser Industries, Inc.; Instrument Div.; Weksler Instruments Operating Unit.
    - b. Ernst Gage Co.
    - c. Marsh Bellofram.
    - d. Palmer Instruments, Inc.
    - e. Terrice: H. O. Terrice Co.
    - f. Weiss Instruments, Inc.
    - g. Winter's Thermogauges, Inc.
  - 2. Pressure Gages:
    - a. AMETEK, Inc.; U.S. Gauge Div.
    - b. Dresser Industries, Inc.; Instrument Div.; Ashcroft Commercial Sales Operation.
    - c. Dresser Industries, Inc.; Instrument Div.; Weksler Instruments Operating Unit.
    - d. Ernst Gage Co.
    - e. Marsh Bellofram.
    - f. Noshok, Inc.
    - g. Terrice: H. O. Terrice Co.
    - h. Weiss Instruments, Inc.
    - i. WKA Instruments Corp.
    - j. Winter's Thermogauges, Inc.
  - 3. Test Plugs:
    - a. Flow Design, Inc.
    - b. MG Piping Products Co.
    - c. National Meter.
    - d. Peterson Equipment Co., Inc.
    - e. Sisco Manufacturing Co.
    - f. Terrice: H. O. Terrice Co.
    - g. Watts Industries, Inc.; Water Products Div.
  - 4. Calibrated Flow Balancing Valve:
    - a. Taco
    - b. Bell & Gossett
    - c. Macon

2.8 PIPING SPECIALTIES

- A. Flanges, Unions, and Couplings:
  - 1. Pipe Size 2 inches and Under: Malleable iron unions for threaded ferrous piping; bronze unions for copper pipe, soldered joints.
  - 2. Pipe Size Over 2 inches: Forged steel flanges for ferrous piping; bronze flanges for copper piping; preformed neoprene gaskets.
  - 3. Grooved and Shouldered Pipe End Couplings: Malleable iron housing, C–shape elastomer composition sealing gasket, steel bolts, nuts, and washers.
  - 4. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier. Dielectric unions shall be used for joining ferrous and non–ferrous metals to prevent galvanic corrosion.
- B. Strainers:

- 1. Size 2 inches and Under: Threaded brass or iron body for 175 psig working pressure, Y pattern with 1/32 inch stainless steel perforated screen.
  - 2. Size 2–1/2 inch to 4 inch: Flanged iron body for 175 psig working pressure, Y pattern with 3/64 inch stainless steel perforated screen.
- C. Flexible Connectors:
- 1. Corrugated stainless steel hose with single layer of stainless steel exterior braiding, minimum 9 inches long with copper tube ends; for maximum working pressure 300 psig.
- D. Water Hammer Arrestors:
- 1. Install on all fixture branches having quick–closing valves and at the tops of all risers to prevent water hammer. Each water hammer arrestor shall be sized and certified according to the Plumbing and Drainage Institute standard – WH201.

2.9 DRAINAGE FIXTURES

- A. Floor Drain (FD): Floor drain shall be epoxy coated cast iron drain with anchor flange, reversible clamping collar with primary and secondary weep holes, adjustable round nickel bronze strainer and no hub outlet.
  - 1. Basis of design: Watts FD–100–A

2.10 CLEANOUTS (CO)

- A. Cleanouts shall be provided at the base of each stack, and at each change in direction greater than 45 degrees. Cleanouts shall be of the same nominal size as the connected pipe up to and including 4" and not less than 4" in larger pipe.
- B. The distance between cleanouts in horizontal soil and waste lines shall not be greater than 50 feet for pipes up to and including 3", 80 feet for lines 4" and larger.
- C. All cleanouts shall be made with a caulking cast ferrule having a cast brass cleanout screw plug, having a raised nut not less than 1" high, except that cleanouts underground under floor slabs shall be extended through the slabs, flush with the floor line, provided with countersunk caps.
- D. Basis of Design: J.R. Smith, according to the following table.
  - 1. Exposed piping, cast iron: 4470
  - 2. Exterior or unfinished area floors, cast iron: 4031
  - 3. Finished ceramic or quarry tile floors: 4051
  - 4. Vinyl tile floors (recessed top for tile insert): 4151
  - 5. All walls: 4472
  - 6. Carpeted area floors (carpet cleanout markers): 4031–X

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify excavations are to required grade, dry, and not over–excavate.

3.2 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt, on inside and outside piping before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

3.3 INSTALLATION – INSERTS

- A. Install inserts for placement in concrete forms.
- B. Install inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
- C. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
- D. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
- E. Where inserts are omitted, drill through concrete slab from below and provide through–bolt with recessed square steel plate and nut recessed into and grouted flush with slab.

3.4 INSTALLATION – PIPING SYSTEMS

- A. Install dielectric connections wherever joining dissimilar metals.
- B. Label all piping with labels and directional flow arrows per 22 0001.
- C. Install unions downstream of valves and at equipment or apparatus connections.
- D. Route piping parallel to building structure and maintain gradient.
- E. Install piping to maintain headroom. Group piping to conserve space. Group piping whenever practical at common elevations.
- F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- G. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
- H. Sleeve pipe passing through partitions, walls and floors.
- I. Install piping system allowing clearance for installation of insulation and access to valves and fittings.
- J. Install identification on piping systems including underground piping.
- K. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

3.5 INSTALLATION – VALVES

- A. Install valves with stems upright or horizontal, not inverted.
- B. Install ball or butterfly valves for shut–off and to isolate equipment, part of systems, or vertical risers.
- C. Install ball or butterfly valves for throttling, bypass, or manual flow control services.
- D. Provide lug end butterfly valves adjacent to equipment when functioning to isolate equipment.
- E. Install spring loaded check valves on discharge of pumps.
- F. Install plug valves for throttling service. Install non–lubricated plug valves only when shut–off or isolating valves are also installed.
- G. Install 3/4 inch drain ball valves at main shut–off valves, low points of piping, bases of vertical risers, and equipment drains. Pipe to nearest drain.

3.6 INSTALLATION – PIPING SPECIALTIES

- A. Install pressure gages with pulsation dampers. Provide ball valve to isolate each gage. Extend nipples and siphons to allow clearance from insulation.
- B. Install thermometers in piping systems in sockets in short couplings. Enlarge pipes smaller than 2–1/2 inches for installation of thermometer sockets. Allow clearance from insulation.
- C. Install gages and thermometers in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.
- D. Adjust gages and thermometers to final angle, clean windows and lenses, and calibrate to zero.
- E. Provide drain and hose connection with valve on strainer blow down connection.
- F. Test backflow preventers in accordance with ASSE.

3.7 INSTALLATION – PLUMBING SUPPLY PIPING

- A. Install water piping in accordance with ASME B31.9.
- B. Insulate all domestic hot water (and recirculating) pipes and domestic cold water pipes per specs.
- C. Establish elevations of buried piping outside the building to obtain not less than two (2) ft of cover.
- D. Provide support for utility meters in accordance with requirements of utility companies.
- E. Slope water piping and arrange to drain at low points.
- F. Install piping from relief valves, back–flow preventers and drains to nearest drain.

- G. Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to lavatories, sinks, washing machine outlets, and other fixtures and equipment with quick acting valves.
- H. Provide water service complete with approved reduced pressure back–flow preventer and water meter with by–pass valves, pressure reducing valve, and sand strainer.
- I. Install flow controls in water circulating systems as indicated on Drawings.
- J. Disinfecting of Domestic Water Systems:
  - 1. Prior to starting, verify system is complete, flushed and clean.
  - 2. Verify pH of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).
  - 3. Inject disinfectant, free chlorine in liquid, powder and tablet or gas form, throughout system to obtain residual from 50 to 80 mg/L.
  - 4. Bleed water from outlets to obtain distribution and test for disinfectant residual at minimum 15 percent of outlets.
  - 5. Maintain disinfectant in system for 24 hours.
  - 6. When final disinfectant residual tests less than 25 mg/L, repeat treatment.
  - 7. Flush disinfectant from system until residual concentration is equal to incoming water or 1.0 mg/L.
  - 8. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

3.8 INSTALLATION – PLUMBING DRAINAGE PIPING

- A. Install bell and spigot pipe with bell end upstream.
- B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Install with clearance at cleanout for rodding of drainage system.
- C. Encase exterior cleanouts in concrete flush with grade.
- D. Install floor cleanouts at elevation to accommodate finished floor.
- E. Establish elevations of buried piping outside building to provide not less than 2 ft of cover.
- F. Install piping penetrating roofed areas to maintain integrity of roof assembly.
- G. Establish invert elevations, slopes for drainage per plumbing plan notes. Maintain gradients.
- H. Test drainage piping in accordance with local code requirements.

3.9 INSTALLATION – PIPE HANGERS AND SUPPORTS

- A. Support horizontal piping as scheduled.
- B. Install hangers with minimum 1/2 inch space between finished covering and adjacent work.
- C. Place hangers within 12 inches of each horizontal elbow.
- D. Use hangers with 1–1/2 inch minimum vertical adjustment.
- E. Support horizontal cast iron pipe adjacent to each hub, with 5 feet maximum spacing between hangers.
- F. Support vertical piping at every floor. Support vertical cast iron pipe at each floor at hub.
- G. Where piping is installed in parallel and at same elevation, provide multiple pipe or trapeze hangers.
- H. Design hangers for pipe movement without disengagement of supported pipe.
- I. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

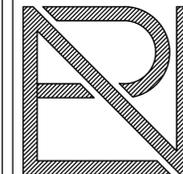
3.10 SERVICE CONNECTIONS

- A. Install sanitary sewer services. Before commencing work check invert elevations required for sewer connections, confirm inverts and verify proper slope for drainage and proper cover to avoid freezing.

3.11 PIPE CLEANING

- A. Flush heating system hot water, and cooling system chilled water piping with clean water. Where temporary construction strainers are installed, remove and install permanent strainer. Remove and clean or replace other strainer screens.

END OF SECTION



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FLOYD COUNTY  
FLOYD RECYCLE CENTER  
LAVENDER DRIVE  
Rome, Georgia 30165

PLUMBING  
SPECIFICATIONS

PROJECT # 1715  
DESIGNER: JD  
DATE: 07/12/2017  
REV. DATE:

P2.2

SECTION 13900 – FIRE SUPPRESSION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes complete fire suppression system including, as required, sprinkler system, fire department connections and fire pump system for sprinkling of the building.
- B. The Work is shown on the project architectural drawings.
- C. The intent of this specification is for the Contractor to determine, based on site visit(s) and the architectural drawings, the labor, materials, equipment, and other items necessary for a complete sprinkling of the building per NFPA 13. This determination includes, but is not limited to, the use of fire pumps, jockey pumps, fire hoses, stand pipes, and other fire suppression equipment for a complete sprinkling of the building. The Fire Suppression Contractor should base his bid on this determination.
- D. The information contained in the specification on fire pumps is intended to be a guide in the selection and installation of such fire pumps. If, based on hydraulic calculations and hydrant testing, a pump is deemed to be necessary, it is the responsibility of the Contractor to coordinate with other applicable trades, e.g. the Division 16 contractor, to provide a complete and functional fire suppression system installation.

1.2 SYSTEM DESCRIPTION

- A. Sprinkler System: Conform to the following criteria:
  - 1. Coverage for entire building.
  - 2. Design system hydraulically to achieve the hazard occupancy requirements set forth in NFPA 13.
- B. Fire Pump (where applicable): Conform to the following criteria:
  - 1. Description: Electric motor driven.
  - 2. Design to NFPA 20.
  - 3. System to achieve performance required by NFPA 13.
- C. The Contractor shall be responsible for coordinating with all other trades.
- D. The Contractor shall be responsible for obtaining all necessary inspections, permits, utility connections, and paying all required fees.
- E. Areas subject to freezing shall be provided with a dry pipe system.

1.3 SUBMITTALS

- A. Shop Drawings: Indicate detailed fire pump and jockey pump layout, pipe layout, supports, components, accessories, sizes, and hydraulic calculations. Drawings to be on a scale of 1/8" = 1'-0" showing all equipment and piping installed under this section. Shop drawings shall be given drawing numbers, which shall be retained through all revisions.
- B. All shop drawings submitted shall be approved by the Fire Marshall before submission to the Architect for approval. Submit sufficient prints for architect to retain three copies.
- C. Product Data: Submit data for pipe materials used, valves, manufacturer's catalog sheet for equipment indicating rough-in size, finish, accessories, pump type, capacity, power requirements, certified pump curves, and NPSH.

1.4 CHARTS AND TAGS

- A. Provide three (3) sets of charts or diagrams showing outline plan of the structures and the essential features of the systems including all piping, equipment, valves, and controls.
- B. All valves, dampers, and controls shall be designated

1.5 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations of sprinkler heads.
- B. Operation and Maintenance Data: Submit description of components of system, servicing requirements, record drawings, inspection data, and parts lists.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with:
  - 1. Sprinkler Systems: NFPA 13.
  - 2. Standpipe and Hose Systems: NFPA 14.
  - 3. Fire Pump System: NFPA 20.
- B. Design fire suppression system under direct supervision of a NICET qualified fire protection system designer experienced in design of this Work and licensed at Project location.

PART 2 PRODUCTS

2.1 PIPE AND TUBE

- A. Steel Pipe: ASTM A135 black welded or seamless, schedule 40 or 10.
  - 1. Steel Fittings: ASME B16.9, wrought steel, butt welded; ASME B16.25, butt weld ends; ASTM A234/A234M, wrought carbon steel and alloy steel; ASME B16.5, steel flanges and fittings; ASME B16.11, forged steel socket welded and threaded.
  - 2. Cast Iron Fittings: ASME B16.1, flanges and fittings; ASME B16.4, threaded fittings.
  - 3. Malleable Iron Fittings: ASME B16.3, threaded type; ASTM A47/A47M.
  - 4. Water service underground pipe to building shall be as per site plans.

2.2 GATE VALVES

- A. Up to and including 2 inches: Bronze body and trim, rising stem, hand wheel, solid wedge or disc, threaded ends.
- B. Over 2 inches: Iron body, bronze trim, rising stem pre-grooved for mounting tamper switch, hand wheel, OS&Y, solid bronze or cast iron wedge, flanged or grooved ends.

2.3 BUTTERFLY VALVES

- A. Bronze body, stainless steel disc, resilient replaceable seat, threaded ends, extended neck, hand wheel and gear drive and integral indicating device, tamper switch.
- B. Iron body, iron or bronze disc, EPDM seat, wafer, lug, or grooved ends, extended neck, hand wheel and gear drive, integral indicating device, tamper switch.

2.4 CHECK VALVES

- A. Up to and including 2 inches: Bronze body and swing disc, rubber seat, threaded ends.
- B. Over 2 inches: Iron body, bronze trim, swing check with rubber disc, renewable disc and seat, flanged ends.

2.5 DRAIN VALVES

- A. Bronze compression stop with hose thread nipple and cap.
- B. Brass ball valve with cap and chain, 3/4 inch hose thread.

2.6 SPRINKLERS

- A. Sprinkler brand: Viking, Tyco.
- B. Suspended Ceiling Type: Semi-recessed pendant type with chrome plated finish and matching escutcheon.
- C. Exposed Area Type: Standard upright type with brass finish.
- D. Guards: Finish to match sprinkler head.

2.7 SPRINKLER PIPING SPECIALTIES

- A. Wet Pipe Sprinkler Alarm Valve: Check type valve with electrically or hydraulically operated alarms, with pressure retard chamber and variable pressure trim.
- B. Dry Pipe Sprinkler Alarm Valve: Check type valve with electrically or hydraulically operated alarms, with accelerator.
- C. Flooding Deluge Valve: Gate type valve, actuated electrically with electrically operated alarms, with alarm testing trim.
- D. Water Motor Alarm: Hydraulically operated impeller type alarm gong, red enameled.
- E. Electric Alarm: Electrically operated red enameled gong with pressure alarm switch.
- F. Water Flow Switch: Vane type switch with two contacts.
- G. Pressure Maintenance Pump: Close coupled motor and pump unit, with open drip proof, permanently lubricated, 115 volt, single phase, 60 Hz, motor.
- H. Air Compressor: Single unit, electric motor driven, ASME rated horizontal receiver tank, air pressure operated, safety valves, check valves, automatic tank drain, muffler-filter, belt guard, controls and 115 volt, single phase, 60 Hz motor.

2.8 STANDPIPE EQUIPMENT

- A. Hose Cabinet: Formed steel construction, prime coated; recessed mounted; 16 gage thick with 12 gage thick door; glazed door style, hinged with positive latch device. Fire rated when installed within fire rated assemblies.
- B. Hose Rack: Steel with polished chrome finish; swivel or stationary type with pins and water stop.
- C. Hose: 100 feet of 1-1/2 inch synthetic hose.
- D. Nozzle: Brass; combination fog-straight stream and adjustable shut-off nozzle.
- E. Hose Station Valves: Angle type, 1-1/2 inch nominal size with ball drip.
- F. Hose Connection Valves: Brass, chrome plated finish, 2-1/2 inch size, thread to match

fire department hardware, threaded dust cap and chain.

2.9 FIRE DEPARTMENT CONNECTION

- A. Type: Post mounted type in vault with brass finish.
- B. Outlets: Two way with thread size to suit fire department hardware; threaded dust cap and chain of matching material and finish.
- C. Drain: 3/4 inch automatic drip.
- D. Label: "Fire Department Connection."
- E. Coordinate with local fire department on connection type before pricing job.

2.10 FIRE PUMP

- A. Pumps
  - 1. Type: UL 448 Centrifugal, direct connected.
  - 2. Casing: Cast iron, split case, single or double suction, rated for 150 psig or 1.25 times working discharge pressure, renewable bronze wearing rings, flanged suction and discharge.
  - 3. Impeller: Bronze, fully enclosed, keyed to shaft.
  - 4. Shaft: High-grade alloy steel with copper, bronze or stainless steel shaft sleeves.
  - 5. Bearings: Grease lubricated ball bearings.
  - 6. Drive: Flexible coupling with coupling guard.
  - 7. Seals: Packing gland with minimum four rings packing.
  - 8. Baseplate: High grade heat-treated cast iron or reinforced steel with integral drain rim.
- B. Accessories:
  - 1. Check valve in discharge pipe.
  - 2. OS&Y gate or butterfly valves on system side of check valve and on supply side of pump.
  - 3. Fire pump bypass fitted with OS&Y gate or butterfly valves and check valve.
  - 4. Relief valve.
  - 5. Pressure gages, suction and discharge.
  - 6. Temperature relief valve.
  - 7. Umbrella cock, automatic air release.
  - 8. Splash shield between pump and motor.
  - 9. Manifold with hose gate valves.
  - 10. Flow metering system for closed loop testing.
- C. Electric Drive: Squirrel cage type in open drip proof NEMA MG 1 enclosure, 208 volt, three phase, 60 Hz.
- D. Electric Motor Controls: Limited service type with reduced voltage starter.
  - 1. Alarm circuit for power failure.
- E. Operating Controls: Hand-off-automatic switch, fire water pressure switch to operate pump drive, fire water pressure switches for alarms, with indicating lights for low fire water pressure and high fire water pressure and contacts for remote circuits to indicate pump operational status and alarm status.

2.11 PRESSURE BOOSTER (JOCKEY) PUMP

- A. Electrically operated, positive-displacement pressure booster pump, pressure switch operated.

2.12 ELECTRICAL CHARACTERISTICS AND COMPONENTS

- A. Per Division 16.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance NFPA 13, NFPA 14, NFPA 20.
- B. Install Work in accordance with Fire Department, Fire Marshall, and local and state Building Inspection's standards.
- C. Ream pipe and tube ends to full inside diameter. Remove burrs and bevel plain end ferrous pipe.
- D. Remove scale and foreign material, inside and outside, before assembly.
- E. Install sleeves where penetrating footings, floors, or walls. Seal pipe and sleeve penetration to maintain fire resistance equivalent to fire separation of footings, floors, or walls.
- F. Install pipe runs to minimize obstruction to other work. Offset around ductwork.
- G. Install piping in concealed spaces above finished ceilings.
- H. Install gate valves for shut-off or isolating service.
- I. Install drain valves at main shut-off valves, low points of piping and apparatus.
- J. Connect system to water source ahead of domestic water connection with double check valve assembly.
- K. Install heads to coordinate with reflected ceiling plan. Center in two directions in ceiling tiles.
- L. Protection:
  - 1. Apply temporary tape or paper cover to sprinkler heads to protect from painting.
  - 2. Protect concealed sprinkler head cover plates from painting.
- M. Install air compressor on vibration isolators.
- N. Install drain piping from tank to nearest floor drain.
- O. Interface sprinkler system with building fire and smoke alarm system.
- P. Locate fire department connection with sufficient clearance from walls, obstructions, or adjacent Siamese connectors to allow full swing of fire department wrench handle.
- Q. Install drain piping from pump bases, pump stuffing boxes, and pump casings to floor sinks or drains. Install air vents on pump cases.
- R. Install long radius elbows on suction side of pump. Do not support piping from pump casing.
- S. Align base mounted pumps. Install on vibration isolators.
- T. On jockey pumps, install shut-off valves, check valve, and relief valves.
- U. Flush entire piping system of foreign matter.
- V. Hydrostatically test entire system. Schedule test to be witnessed by authority having jurisdiction.

END OF SECTION

SECTION 15401 – PLUMBING FIXTURES

PART 1 GENERAL

1.1 GENERAL

- A. Section 15010 is applicable.

PART 2 PRODUCTS

2.1 BASIS OF DESIGN

- A. Fixture and accessory brands and model numbers shown below are intended to establish minimum acceptable quality. Models deemed by the engineer to be of inferior quality as compared to the Basis of Design will not be accepted. Equivalent fixtures and accessories by the manufacturers noted below are acceptable unless noted otherwise.
  - 1. Fixtures: Toto, Kohler, Crane, American Standard
  - 2. Sinks: Just, Moen, Kohler, Advance Tabco, Elkay, Toto
  - 3. Faucets: Toto, Delta, Kohler, Zurn, Symmons, Moen
  - 4. Supplies: Brasscraft, McGuire, Proflo, Franklin Brass
  - 5. Water Closet Seats: Kohler, Toto, American Standard, Proflo, Bemis, Beneke
  - 6. Drinking Fountains: Elkay, Kohler
  - 7. Fixture Carriers: J.R. Smith, Zurn, Josam
  - 8. Floor drains: Watts, J.R. Smith, Josam, Zurn
  - 9. Indirect drains: Watts, J.R. Smith, Josam, Zurn
  - 10. Cleanouts: Watts, J.R. Smith, Josam, Zurn, Wade
  - 11. Hose Bibbs: Woodford, Chicago, T&S Brass
  - 12. Wall Hydrants: Josam, Woodford, Smith

PART 3 PLUMBING FIXTURES:

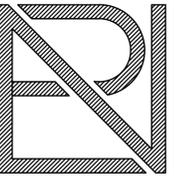
3.1 SEE FIXTURE SCHEDULE

PART 4 EXECUTION

4.1 INSTALLATION

- A. Verify adjacent construction is ready to receive rough-in work of this section. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough in and installation. If discrepancies exist between millwork sizes and fixtures specified, contact Engineer for direction.
- B. All fixtures shall be installed straight, level, and plumb. When three or more of the same fixture are installed adjacent to each other, use equal spacing between fixtures.
- C. All fixtures and equipment shall be installed with all accessories required for a complete and fully functional installation, regardless of whether all equipment and accessories are listed on the plans or in the specifications.
- D. All vitreous china fixtures shall be bright white in color unless otherwise noted. Faucets shall be polished chrome unless otherwise noted. If these colors are unavailable, contact Engineer for approved alternatives.
- E. Install each fixture with chrome plated rigid or flexible supplies with screwdriver stops, reducers, and escutcheons. All water and drain piping exposed to view shall be chrome plated. Piping underneath counters with closing doors need not be chrome plated.
- F. All handicapped fixtures shall be installed according to ADA and local code requirements. All handicapped drains shall be covered.
- G. All floors where floor drains are installed shall slope to drain, minimum 2%. This contractor shall coordinate with the applicable trades to ensure that the proper slope is achieved.
- H. Prime all floor drains. Where accessible, prime drain by water-saver trap primer from adjacent lavatory. Otherwise prime floor drain using water-valve type primer from domestic water supply. In lieu of water-based trap primers, PROVENT trap guards may be used where AHJ allows.
- I. All pressure operated fixtures and equipment shall be furnished with water stops. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.
- J. All hand washing fixtures shall have a delivered water temperature limit of 110 degrees F unless specified otherwise. This may be accomplished with a tempering valve at each device to maintain delivered temperature below 110 F. See plans for location of tempering valves as applicable.

END OF SECTION



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07/12/2017

**FLOYD COUNTY**  
**FLOYD RECYCLE CENTER**  
 LAVENDER DRIVE  
 Rome, Georgia 30165

PLUMBING SPECIFICATIONS

PROJECT # 1715  
 DESIGNER: JD  
 DATE: 07/12/2017  
 REV. DATE:

P2.3

SECTION 15214 - GENERAL SERVICE COMPRESSED AIR SYSTEMS

PART 1 GENERAL

- 1.1 GENERAL
- A. Section 15010 applies.
- 1.2 REFERENCES
- A. American Society of Mechanical Engineers:
- ASME B16.3 - Malleable Iron Threaded Fittings.
  - ASME B31.1 - Power Piping.
  - ASME B31.9 - Building Services Piping.
  - ASME Section VIII - Boiler and Pressure Vessel Code - Pressure Vessels.
  - ASME Section IX - Boiler and Pressure Vessel Code - Welding and Brazing Qualifications.
- B. ASTM International:
- ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- C. American Welding Society:
- AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.
  - AWS D1.1 - Structural Welding Code - Steel.
- D. Manufacturers Standardization Society of the Valve and Fittings Industry:
- MSS SP 58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
  - MSS SP 67 - Butterfly Valves.
  - MSS SP 69 - Pipe Hangers and Supports - Selection and Application.
  - MSS SP 70 - Cast Iron Gate Valves, Flanged and Threaded Ends.
  - MSS SP 71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends.
  - MSS SP 80 - Bronze Gate, Globe, Angle and Check Valves.
  - MSS SP 89 - Pipe Hangers and Supports - Fabrication and Installation Practices.
  - MSS SP 110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.
- 1.3 SUBMITTALS
- A. Shop Drawings: Indicate piping system schematic with electrical and connection requirements general assembly of components, mounting and installation details, and general layout of control and alarm panels.
- B. Product Data:
- Piping: Submit data on pipe materials, fittings, and accessories.
  - Valves: Submit manufacturers catalog information with valve data and ratings for each service.
  - Hangers and Supports: Submit manufacturers catalog information including load capacity.
  - System Components: Submit manufacturers catalog information including capacity, component sizes, rough-in requirements, and service sizes. When applicable, include electrical characteristics and connection requirements.
- C. Product Data: Submit manufacturers catalog literature with capacity, weight, and electrical characteristics and connection requirements.
- D. Manufacturer's Installation Instructions: Submit hoisting and setting requirements, starting procedures.
- E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- 1.4 CLOSEOUT SUBMITTALS
- A. Project Record Documents: Record actual locations of equipment piping, valves, outlets and components on plans and deliver to Owner at the end of the project.
- 1.5 QUALITY ASSURANCE
- A. Perform Work in accordance with ASME B31.9 code for installation of piping systems and ASME Section IX for welding materials and procedures.
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Accept equipment on site in factory fabricated containers with shipping skids and plastic pipe end protectors in place. Inspect for damage.
- B. Protect piping and equipment from weather and construction traffic. Maintain factory packaging and caps in place until installation.
- C. Deliver each length of piping with manufacturer's plugged or capped ends and keep sealed until installation. Deliver fittings, valves, and other components in sealed containers and keep sealed until installation.

PART 2 PRODUCTS

- 2.1 COMPRESSED AIR PIPING
- A. Steel Pipe: ASTM A53/A53M, Schedule 40 black.
- Fittings: ASME B16.3, malleable iron, or ASTM A234/A234M, forged steel welding type.
  - Joints: Threaded for pipe 2 inch and smaller; welded for pipe 2-1/2 inches and larger.
- 2.2 UNIONS AND FLANGES
- A. Unions for Pipe 2 inches and Smaller:
- Ferrous Piping: Class 150, malleable iron, threaded.
- B. Flanges for Pipe 2-1/2 inches and Larger:
- Ferrous Piping: Class 150, forged steel, slip-on flanges.
  - Gaskets: 1/16 inch thick preformed neoprene gaskets.
- 2.3 BALL VALVES
- A. 2 inches and Smaller: MSS SP 110, Class 150, bronze, three piece body, type 316 stainless steel ball, full port, teflon seats, blow-out proof stem, threaded ends with union, lever handle with balancing stops.
- 2.4 GATE VALVES
- A. 2 inches and Smaller: MSS SP 80, Class 150, bronze body, bronze trim, threaded or union bonnet, non-rising stem, hand-wheel, inside screw, solid wedge disc, alloy seat rings, solder or threaded ends.
- B. 2-1/2 inches and Larger: MSS SP 70, Class 125, cast iron body, bronze trim, bolted bonnet, rising or non-rising stem, hand-wheel, outside screw and yoke, solid wedge disc with bronze seat rings, flanged ends. Furnish chain-wheel operators for valves 6 inches and larger mounted over 8 feet above floor.
- 2.5 CHECK VALVES
- A. Horizontal Swing Check Valves:
- 2 inches and Smaller: MSS SP 80, Class 150 bronze body and cap, bronze seat, threaded ends.
  - 2-1/2 inches and Larger: MSS SP 71, Class 125, cast iron body, bolted cap, bronze or cast iron disc, flanged ends.
- 2.6 STRAINERS
- A. 2 inch and Smaller: Y pattern, ASTM B62 bronze body, threaded ends, Class 150, stainless steel perforated screen.
- B. 2-1/2 inch and Larger: Y pattern, ASTM A126 cast iron body, flanged ends, Class 125, stainless steel perforated screen.
- 2.7 PIPE HANGERS AND SUPPORTS
- A. Conform to ASME B31.9.
- B. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron or Carbon steel, adjustable swivel, split ring.
- C. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
- D. Vertical Support: Steel riser clamp.
- 2.8 FLEXIBLE CONNECTORS
- A. 2 inches and Smaller: Corrugated stainless steel hose with single layer of stainless steel exterior braiding, Schedule 40 black steel ends; maximum working pressure 170 threaded or soldered connections.

2.9 RELIEF VALVES

- A. Relief Valves: Bronze body, Teflon seat, stainless steel stem and springs, automatic, direct pressure actuated capacities ASME certified and labeled.

2.10 COMPRESSED AIR OUTLETS

- A. Compressed Air Outlets: Quick Connector: brass, snap on connector with self closing valve. Coordinate size and style with owner.

2.11 AIR RECEIVER

- A. Manufacturers:
- MacMaster-Carr Model 9426K15.
- B. Air Receiver: Horizontal, built to ASME Section VIII regulations for working pressure of 125 psi. Screw inlet and outlet connections.
- C. Fittings: Adjustable pressure regulator, safety valve, pressure gage, drain valve, and automatic float actuated condensate trap.
- D. Tank Finish: Black powder-coated finish
- E. Size for Remote Air Receivers (unless otherwise noted on plans):
- Diameter: 24 inches.
  - Length: 67 inches.
  - Capacity: 120 gallons.
4. Receiver capacities that are delivered as part of the air compressor assembly shall be specified in the air compressor schedule.

2.12 PRESSURE REGULATORS

- A. Pressure Regulators: Diaphragm operated, bronze body, direct acting, spring loaded, manual pressure setting adjustment, rated for 250 psig inlet pressure.

2.13 HOSE CONNECTORS

- A. Hose Connectors: Corrugated stainless steel tubing with stainless steel wire braid covering and ends welded to inner tubing.
- B. Working Pressure: 250 psig minimum.
- C. End Connections:
- 2 inches and Smaller: Threaded steel pipe nipple.
  - 2-1/2 inches and Larger: Class 150 Flanges.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Install di-electric connections when connecting two pipes or fittings of dissimilar metallic materials.

3.2 PREPARATION

- A. Ream pipe and tube ends. Remove burrs.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare piping connections to equipment with flanges or unions.
- D. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

3.3 INSTALLATION - INSERTS

- A. Provide inserts for placement in concrete forms.
- B. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.

3.4 INSTALLATION - HANGERS AND SUPPORTS

- A. Install hangers and supports in accordance with ASME B31.9.
- B. Support horizontal piping as scheduled. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
- C. Place hangers within 12 inches of each horizontal elbow.
- D. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
- E. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.
- F. Where piping is installed in parallel and at same elevation, provide multiple pipe or trapeze hangers.
- G. Provide sheet lead packing between hanger or support and piping.
- H. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
- I. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

3.5 INSTALLATION - ABOVE GROUND PIPING - COMPRESSED AIR SYSTEMS

- A. Install drip connections with valves at low points of piping system.
- B. Install take-off to outlets from top of main, with shut off valve after take off. Slope take-off piping to outlets.
- C. Install compressed air couplings, female quick connectors, and pressure gages where outlets are indicated, coordinate final locations and connector types with owner.
- D. Install tees instead of elbows at changes in direction of piping. Fit open end of tee with plug.
- E. Cut pipe and tubing accurately and install without springing or forcing.
- F. Slope piping in direction of flow.
- G. Install pipe sleeves where pipes and tubing pass through walls, floors, roofs, and partitions.
- H. Install firestopping at fire rated construction perimeters and openings containing penetrating sleeves and piping.
- I. Except where indicated, install manual shut off valves with stem vertical and accessible for operation and maintenance.

3.6 INSTALLATION - EQUIPMENT

- A. Install air valve and drain connection on horizontal casing.
- B. Install shut-off valve on water inlet to after cooler. Pipe drain to floor drain.
- C. Install condensate drain piping to nearest floor drain.
- D. Install bypass with valves around air dryer. Use factory insulated inlet and outlet connections.
- E. Provide bypass with valves, around receivers.

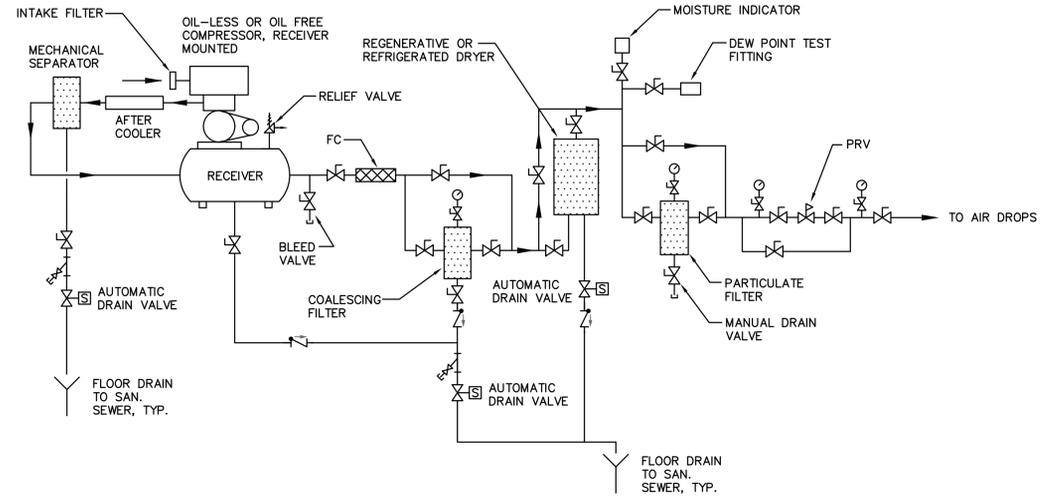
3.7 FIELD QUALITY CONTROL

- A. Compressed Air Piping Leak Test: Prior to initial operation, clean and test compressed air piping.
- B. Verify for atmospheric pressure in piping systems, other than system under test.
- C. Test system with dry compressed air or dry nitrogen with test pressure in piping system at 50 psi.

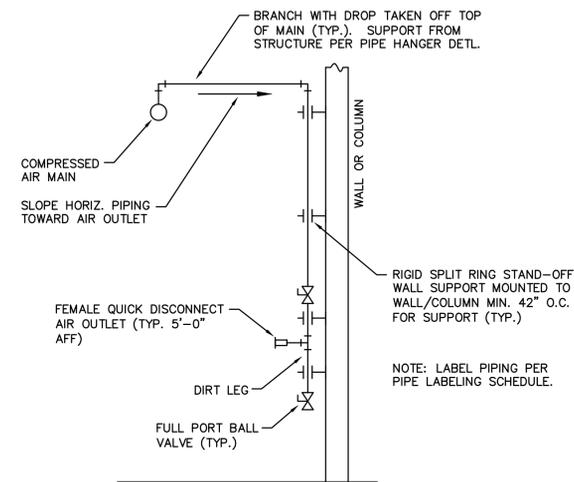
3.8 CLEANING

- A. Blow systems clear of free moisture and foreign matter.

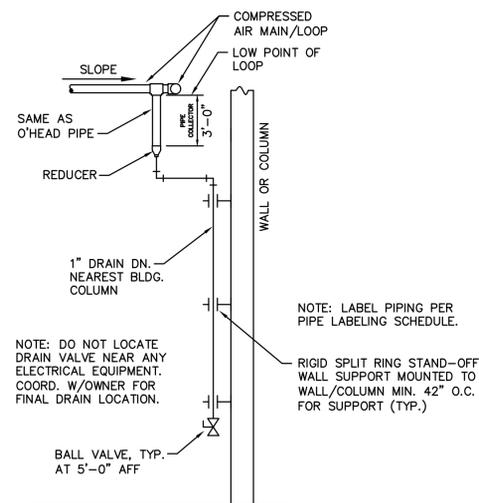
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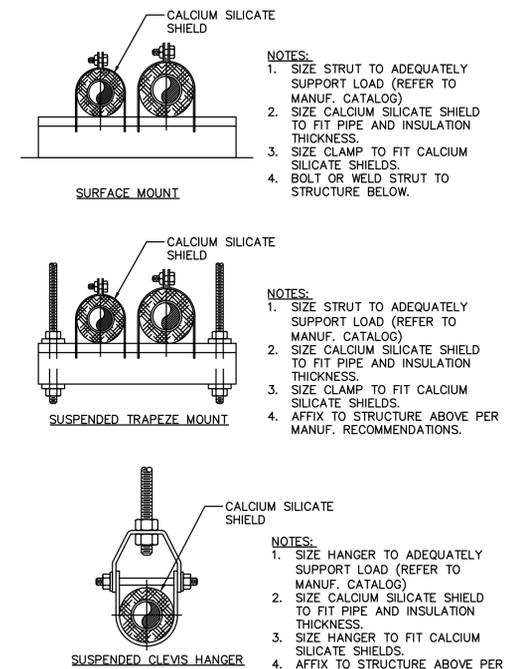
DPP-28 TYP. AIR COMPRESSOR SYSTEM DETAIL



DPP-28A TYP. COMPRESSED AIR/GAS DROP DETAIL



DPP-28C TYP. AIR PIPING DRIP LEG DETAIL



PIPE SIZE	ROD DIAM.	MAX. SPACING
1/2" - 1-1/4"	3/8"	7'
1-1/2"	3/8"	9'
2"	3/8"	10'
2-1/2"	1/2"	11'
3"	1/2"	12'
3-1/2"	1/2"	13'
4"	5/8"	14'
5"	5/8"	16'
6"	3/4"	17'

NOTE: ALL PIPE INSULATION SHALL BE CONTINUOUS THROUGH PIPE CLAMPS, AND SHALL BE PROTECTED BY 3" SHIELD INSIDE CLAMPS.

NOTE: ALL PIPE INSULATION LOCATED OUTSIDE OF BUILDING SHALL BE PROTECTED BY EMBOSSED METAL JACKETING.

DP-8 TYP. PIPE HANGER DETAILS



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PLUMBING  
SPECIFICATIONS &  
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