

PLUMBING LEGEND

ALL SYMBOLS INDICATED MAY NOT APPEAR ON THESE CONTRACT DRAWINGS

— — — — —	DOMESTIC COLD WATER SUPPLY		AUTOFLOW CONTROL VALVE
— — — — —	DOMESTIC HOT WATER SUPPLY		FLOW METER
— — — — —	DOMESTIC HOT WATER RECIRCULATING		CIRCUIT SENSOR
— SAN —	SANITARY WASTE		MANUAL AIR VENT
— — — — —	SANITARY WASTE VENT		AUTOMATIC AIR VENT
— SW —	SOFTENED WATER		PRESSURE GAUGE WITH GAUGE COCK
— ST —	STORM DRAIN		SIPHON
— G —	GAS, NATURAL PROPANE		PRESSURE/TEMPERATURE TEST PORT
— FP —	SPRINKLER PIPING		HOSE END DRAIN
— ACID —	PVDF ACID WASTE PIPING		STRAINER
— A —	COMPRESSED AIR		STRAINER WITH BLOW DOWN
	PITCH DOWN IN DIRECTION OF ARROW		THERMOMETER
	DIRECTION OF FLOW		SILL COCK
	PIPE TURNING DOWN		HOSE BIBB
	PIPE TURNING UP		WALL HYDRANT
	RISER UP OR DOWN		FLOOR DRAIN
	TEE AND ELBOW UP		ENTERING WATER TEMPERATURE
	TEE AND ELBOW DOWN		ROOF DRAIN
	TEE UP		FLOOR CLEANOUT
	UNION		HORIZONTAL CLEANOUT ON MAIN
	FLANGE		WALL CLEANOUT
	PIPE CAP		P-TRAP
	PIPE CONCENTRIC REDUCER/INCREASER		PUMP
	PIPE ECCENTRIC REDUCER/INCREASER		VENT THRU ROOF
	BUTTERFLY VALVE		WATER HAMMER ARRESTOR, P.D.I. SIZE INDICATED
	BALL VALVE		TRAP PRIMER WITH BALL VALVE
	GATE VALVE		PRESSURE SWITCH
	PLUG VALVE		FLOW SWITCH
	GLOBE VALVE		HOSE STATION
	NEEDLE VALVE		CONNECTION POINT
	GAS COCK		DEMOLITION POINT
	PRESSURE REDUCING VALVE		CONSTRUCTION NOTE
	PRESSURE RELIEF/SAFETY VALVE		DEMOLITION NOTE
	TWO WAY CONTROL VALVE		ROOM NUMBER
	THREE WAY CONTROL VALVE		RISER NO. SANITARY (WASTE) RISER
	SOLENOID VALVE		RISER NO. WATER RISER
	FLEX CONNECTOR		FLOW RATE IN GPM U.N.O.
	SWING GATE CHECK VALVE		INDICATES PIPING INSTALLED IN BEAM SPACE
	SPRING CHECK VALVE		
	BACKFLOW PREVENTER		
	CIRCUIT SETTER		

GENERAL BID NOTE

- EXISTING PLUMBING IS BASED ON ORIGINAL CONSTRUCTION DRAWINGS AND MAY NOT REFLECT CURRENT PLUMBING/FIXTURES LAYOUT. CONTRACTOR SHALL FIELD VERIFY ACTUAL CONDITIONS PRIOR TO PRICING AND BEFORE PROCEEDING WITH WORK. NOTIFY ENGINEER IN THE EVENT THAT EXISTING PLUMBING SHOWN TO REMAIN IS SIGNIFICANTLY DIFFERENT FROM EXISTING CONDITIONS.
- CONTRACTORS SHALL BE RESPONSIBLE FOR MATCHING EXISTING BUILDING SYSTEMS WHERE REQUIRED BY DEMOLITION AND NEW WORK. ITEMS INCLUDING BUT NOT LIMITED TO: WALL TYPES, INSULATION, GLASS, CONCRETE, REBAR, ETC. SHALL MATCH EXISTING DESIGN CONDITIONS WHEN REPLACED OR REPAIRED.

PLUMBING SUBMITTAL NOTES

- GENERAL: THE CONTRACTOR SHALL SUBMIT INFORMATION TO THE OWNER DEMONSTRATING COMPLIANCE OF PRODUCTS AND INSTALLATION OF DRAWINGS AND SPECIFICATIONS. THIS INFORMATION SHALL INCLUDE BUT NOT BE LIMITED TO: CATALOG DATA, PERFORMANCE DATA, FAN CURVES, PUMP CURVES, ELECTRICAL REQUIREMENTS INCLUDING OVER CURRENT PROTECTION DATA, PRODUCT DIMENSIONS, SPECIAL INSTALLATION REQUIREMENTS AND RECOMMENDED CLEARANCES.
- RESUBMISSION: CONTRACTOR SHALL CHANGE OR CORRECT SUBMITTALS AS REQUIRED BY THE OWNER AND RESUBMIT UNTIL APPROVED. THE CONTRACTOR SHALL ALSO INDICATE ANY CHANGES WHICH HAVE BEEN MADE OTHER THAN THOSE REQUESTED BY THE OWNER OR ENGINEER.

PLUMBING ABBREVIATIONS

ALL ABBREVIATIONS INDICATED MAY NOT APPEAR ON THESE CONTRACT DRAWINGS

⊙	AT	KW	KILOWATTS
A	AMPERE	LC	LIGHTING CONTACTOR
A/C	AIR CONDITIONING	LWT	LEAVING WATER TEMPERATURE
ABV	ABOVE	MACH	MACHINE
AFC	ABOVE FINISHED CEILING	MAX.	MAXIMUM
AFF	ABOVE FINISHED FLOOR	MC	MECHANICAL CONTRACTOR
AFG	ABOVE FINISHED GRADE	MFR	MANUFACTURER
AL	ALUMINUM	MIN	MINIMUM
ALT	ALTERNATE	NC	NORMALLY CLOSED
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE	NIC	NOT IN CONTRACT
APPROX	APPROXIMATE	NO	NORMALLY OPEN
AVG	AVERAGE	NOM.	NOMINAL
ARF	ABOVE RAISED FLOOR	NPS	NOMINAL PIPE SIZE
BAS	BUILDING AUTOMATION SYSTEM	NTS	NOT TO SCALE
BEL	BELOW	OEM	ORIGINAL EQUIPMENT MANUFACTURER
BFF	BELOW FINISHED FLOOR	ORD	OVERFLOW ROOF DRAIN
BFC	BELOW FINISHED CEILING	P-1	PUMP
BKBD	BACKBOARD	PC	PUMPED CONDENSATE
BLDG	BUILDING	PD	PRESSURE DROP
BOM	BILL OF MATERIALS	P.D.I.	PLUMBING AND DRAINAGE INSTITUTE
BRF	BELOW RAISED FLOOR	PRV	PRESSURE REDUCING VALVE
CLG	CEILING	PSI	POUNDS PER SQUARE INCH
CO	CLEANOUT	RD	ROOF DRAIN
DEMO	DEMOLITION	RL	RAIN LEADER
DHWRP-1	DOMESTIC HOT WATER RECIRCULATING PUMP	REFRIG	REFRIGERATOR
DIA	DIAMETER	REQ	REQUIRED
DIAG	DIAGRAM	SS	STAINLESS STEEL
DN	DOWN	SAN	SANITARY WASTE
DWG	DRAWING	SC	SILL COCK
DWRP-1	DOMESTIC WATER RECIRCULATING PUMP	SF	SQUARE FEET
ELEV	ELEVATION OR ELEVATOR	SPEC	SPECIFICATION
EQUIP	EQUIPMENT	STD	STORM DRAIN
ER	EXISTING RELOCATED	TD	TRENCH DRAIN
ETR	EXISTING TO REMAIN	TEMP	TEMPERATURE
EW	ELECTRIC WATER COOLER	TOF	TOP OF FOOTER
EW	ELECTRIC WATER HEATER	TRANSF	TRANSFER
EWT	ENTERING WATER TEMPERATURE	TYP	TYPICAL
EX	EXISTING	UC	UNDERCOUNTER
FBO	FURNISHED BY OTHERS	UL	UNDERWRITERS LABORATORY
FC	FLEXIBLE CONNECTION	U.N.O.	UNLESS NOTED OTHERWISE
FD	FLOOR DRAIN	V	VALVE
FDC	FIRE DEPARTMENT CONNECTION	VERT	VERTICAL
FFE	FINISH FLOOR ELEVATION	VFD	VARIABLE FREQUENCY DRIVE
FL	FLANGES	VTR	VENT TO ROOF
FLEX	FLEXIBLE	W/	WITH
FLR	FLOOR	W/O	WITHOUT
GC	GENERAL CONTRACTOR	WCO	WALL CLEANOUT
GPH	GALLONS PER HOUR	WF	WATER FILTER
GPM	GALLONS PER MINUTE	WFMD	WATER FLOW MEASURING DEVICE
GWB	GYPSUM WALL BOARD	WH	WALL HYDRANT
GWH	GAS WATER HEATER	WHA	WATER HAMMER ARRESTOR
HB	HOSE BIBB	WP	WEATHER PROOF
HORZ	HORIZONTAL	WTR	WATER
HP	HOT WATER PUMP	WWM	WELDED WIRE MESH
HT	HEIGHT		
HVAC	HEATING, VENTILATING, AND AIR CONDITIONING		
I.E.	INVERT ELEVATION		

PLUMBING GENERAL NOTES

- ALL WORK SHALL CONFORM TO THE REGULATIONS OF APPLICABLE FEDERAL, STATE, LOCAL LAWS, ORDINANCES AND CODES. PLUMBING WORK SHALL BE IN ACCORDANCE WITH THE LATEST ADOPTED EDITION OF THE INTERNATIONAL PLUMBING CODE AND ANY APPROVED SUPPLEMENTS TO THAT CODE.
- THE DRAWINGS ILLUSTRATE GENERAL SCOPE AND ARRANGEMENT OF PLUMBING SYSTEMS. THEY SHALL BE FOLLOWED AS CLOSELY AS ACTUAL CONDITIONS ALLOW. PLUMBING CONTRACTOR SHALL PROVIDE FITTINGS AND OFFSETS IN PIPING TO AVOID FIELD INTERFERENCES.
- ELECTRICAL DATA ILLUSTRATED IS THAT PUBLISHED BY THE MANUFACTURER.
- NOT ALL SPECIFICATIONS WILL BE APPLICABLE TO THIS PROJECT. USE SPECIFICATION SECTIONS AND SUB-SECTIONS AS THEY APPLY TO THE PLUMBING SYSTEMS BEING INSTALLED.
- INSTALL ALL EQUIPMENT MATERIAL AND ACCESSORY DEVICES PER MANUFACTURERS INSTRUCTIONS UNLESS OTHERWISE DIRECTED BY THE OWNER/ENGINEER. ENSURE MAINTENANCE ACCESS IS PROVIDED.
- COORDINATE ALL PLUMBING UTILITIES SHUT DOWNS WITH THE OWNER. ANY SHUT DOWNS NECESSARY TO ACHIEVE THE OBJECTIVE OF THIS DESIGN SHALL BE COMPLETED DURING "OFF HOURS" AND SHALL COMPLY WITH THE OWNER'S UTILITY SHUT DOWN POLICIES.
- CONTRACTOR IS RESPONSIBLE FOR ALL CUTTING, PATCHING AND DEMOLITION PER THEIR MEANS-AND-METHODS AS NECESSARY TO PROVIDE THE DESIGN INDICATED.
- VERIFY LOCATION OF ALL EXISTING UTILITIES BEFORE LAYING OUT AND MAKING CONNECTIONS. REPORT ANY INCONSISTENCIES TO THE OWNER/ENGINEER BEFORE COMMENCING WORK. CONTRACTORS SHALL BE RESPONSIBLE FOR ANY ERROR RESULTING FROM FAILURE TO EXERCISE THESE PRECAUTIONS.
- UNLESS SPECIFICALLY PROVIDED OTHERWISE, ALL MATERIALS AND EQUIPMENT FURNISHED FOR PERMANENT INSTALLATION SHALL CONFORM TO ALL APPLICABLE STANDARDS AND BE NEW, CURRENT DESIGN, UNUSED AND UNDEMANAGED.
- THE CONTRACTOR SHALL VERIFY IN THE FIELD EXACT SIZES AND LOCATION OF ALL EXISTING PLUMBING PIPING PRIOR TO INSTALLATION OF ANY NEW PLUMBING WORK. NEW PLUMBING WORK SHALL BE COORDINATED WITH EXISTING CONDITIONS TO ASSURE PROPER INSTALLATION.
- ANY PIPING WHICH MUST REMAIN AS PART OF AN ACTIVE SYSTEM AND IS IN CONFLICT WITH THE NEW LAYOUT SHALL BE RELOCATED AT NO COST TO THE OWNER.
- EXCEPT WHERE OTHERWISE INDICATED ON THE DRAWINGS, PIPING IS SHOWN ON THE FLOOR WHERE IT ACTUALLY OCCURS IN THE BUILDING.
- PIPING SHALL TYPICALLY BE RUN ABOVE THE CEILINGS AND CONCEALED WITHIN WALLS, EXCEPT FOR UNDER SLAB DRAINAGE OR IN DESIGNATED MECHANICAL ROOMS.
- ALL SANITARY AND STORM PIPING 3" AND LARGER SHALL BE INSTALLED AT 1/8" PER FOOT SLOPE UNLESS OTHERWISE NOTED. SANITARY PIPING 2-1/2" OR SMALLER SHALL BE INSTALLED AT 1/4" PER FOOT SLOPE UNLESS OTHERWISE NOTED.
- ALL DOMESTIC WATER SYSTEMS, WHERE NEW OR RELOCATED AND PLACED BACK IN SERVICE, SHALL BE DISINFECTED PRIOR TO UTILIZATION PER SECTION 610 OF THE INTERNATIONAL PLUMBING CODE. PREPARE TEST SAMPLES AND SUBMIT TO A TESTING LABORATORY. PRESENT OWNER AND ENGINEER WITH TEST RESULTS.
- ALL PIPING SHALL BE PRESSURE TESTED AT THE WORKING PRESSURE INDICATED FOR A PERIOD OF 24 HOURS. STOP-LEAK COMPOUNDS WILL NOT BE ALLOWED.
- ALL PIPE PENETRATIONS THROUGH FLOORS OR FIRE RATED WALLS SHALL BE PROVIDED WITH SLEEVES, FIRE SAFING MATERIAL AND CAULKING TO MATCH THE FIRE RATING OF THE RESPECTIVE FLOORS OR WALLS. REFER TO ARCHITECTURAL DRAWINGS FOR APPROPRIATE WALL RATINGS.
- THE CONTRACTOR SHALL MAKE ALL EQUIPMENT AND FIXTURE FINAL CONNECTIONS FOR BOTH CONTRACTOR AND OWNER PROVIDED FIXTURES. PROVIDE THE NECESSARY ADAPTERS, FITTINGS, VALVES, DEVICES, ETC. FOR A COMPLETE OPERABLE SYSTEM. THE CONTRACTOR SHALL REFER TO THE ARCHITECTURAL DOCUMENTS FOR ADDITIONAL INFORMATION AND SHALL COORDINATE EXACT LOCATIONS OF ALL FIXTURES WITH ARCHITECTURAL DRAWINGS.
- NO SANITARY, SOIL OR WASTE PIPE SHALL EXTEND MORE THAN 2'-0" TO A DEAD END. CLEANOUTS SHALL BE PROVIDED AS REQUIRED BY THE LOCAL AUTHORITY.
- ALL PIPING SHALL BE SUPPORTED FROM STRUCTURE WITH UL LISTED HANGERS AND SUPPORTS SUITABLE FOR THE INTENDED INSTALLATION. DESIGN, SELECTION, SPACING AND APPLICATION OF HANGERS AND SUPPORTS SHALL COMPLY WITH ANSI B31.1 AND MSS SP-69.
- FIXTURES SHALL BE PROTECTED DURING CONSTRUCTION FROM DIRT AND PHYSICAL DAMAGE. DIRTY FIXTURES SHALL BE CLEANED AND DAMAGED PARTS OF FIXTURES SHALL BE REPLACED.
- INSTALL FLOOR DRAINS A MINIMUM OF 1/8" LOWER THAN THE FINISHED FLOOR. TAPER CONCRETE TO THE DRAIN.
- DURING CONSTRUCTION, AN ACCURATE RECORD OF ALL DEVIATIONS BETWEEN WORK SHOWN ON THE DRAWINGS AND THAT WHICH IS ACTUALLY INSTALLED SHALL BE MAINTAINED. THESE DEVIATIONS SHALL BE NOTED NEATLY AND ACCURATELY IN RED INK ON A SET OF PLUMBING PRINTS. WHEN ALL REVISIONS HAVE BEEN SHOWN ON THESE PRINTS TO INDICATE THE WORK AS ACTUALLY INSTALLED, THE PRINTS SHALL BE DELIVERED TO THE OWNER IN TRIPPLICATE.
- INSTALL PIPING IN MECHANICAL AND UTILITY SPACES AS HIGH AS POSSIBLE. PROVIDE ADEQUATE CLEARANCE FOR REMOVAL AND SERVICING OF ALL EQUIPMENT INCLUDING MAJOR EQUIPMENT.
- CONTRACTOR SHALL IDENTIFY AND COORDINATE WITH THE OWNER ALL WORK AREAS REQUIRING CONSTRUCTION EFFORTS DURING HOSPITAL "OFF" HOURS. "OFF" HOUR WORK SHALL BE INCLUDED IN THE CONTRACTOR BID/SCOPE OF WORK.
- CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL ISOLATION VALVES NECESSARY TO COMPLETE THE DESIGN INDICATED.
- ALL DOMESTIC WATER PIPING, VALVES AND DEVICES SHALL BE COMPLIANT WITH THE 2011 REDUCTION OF LEAD IN DRINKING WATER ACT. THIS INCLUDES ALL PIPING FOR DISTRIBUTION OR CONNECTION TO FIXTURES OR EQUIPMENT. THE CONTRACTOR SHALL COORDINATE EXEMPTIONS OF ANY NON-POTABLE USES (EX. SHOWER VALVES, BACKFLOW PREVENTERS FOR MECHANICAL SYSTEM MAKEUP WATER) WITH THE AHJ AND OBTAIN APPROVAL BEFORE ORDERING MATERIALS OR INSTALLING COMPONENTS.

MEP DESIGN SUMMARY

PROJECT INFORMATION	PROJECT NAME: FARMERS MARKET RESTROOM RENOVATION
ADDRESS: 345 SOUTH MAIN STREET HARRISONBURG, VA. 22801	OFFICE AND PUBLIC RESTROOMS
OWNER: CITY OF HARRISONBURG	ADAM WRIGHT
OWNER CONTACT: 540-560-9455	10895-3
PHONE: 540-560-9455	
VE PROJ. NO.:	
APPLICABLE CODES	BUILDING CODE: VIRGINIA REHABILITATION CODE: 2012
MECHANICAL CODE: VIRGINIA MECHANICAL CODE: 2012	PLUMBING CODE: VIRGINIA PLUMBING CODE: 2012
ELECTRICAL CODE: NFPA 70, 2011 NATIONAL ELECTRICAL CODE	ACCESSIBILITY CODE: ICC/ANSI A117.1 2009 STANDARDS ON ACCESSIBLE AND USABLE BUILDING AND FACILITIES
GAS CODE: VIRGINIA FUEL GAS CODE: 2012	
PROJECT TEAM	PROJECT MANAGER: PHIL GENTRY
PROJECT TEAM:	JOHN SOLDANO — HVAC ENGINEER MATT SHOCKEY — PLUMBING ENGINEER KEVIN KLUNE — ELECTRICAL ENGINEER TED ENOSAKI — STRUCTURAL ENGINEER TIM HOUSDEN — ELECTRICAL DESIGNER

DRAWING LIST

P0.01	PLUMBING LEGENDS, ABBREVIATIONS, AND NOTES
P0.02	PLUMBING SPECIFICATIONS
P0.03	PLUMBING SPECIFICATIONS
P0.04	PLUMBING SPECIFICATIONS
P0.05	PLUMBING SCHEDULES
P1.01	PLUMBING BELOW GRADE PLANS
P2.01	PLUMBING PLANS
P5.01	PLUMBING DETAILS
P5.02	PLUMBING DETAILS

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CONSTRUCTION DOCUMENTS

REVISIONS:

DATE:	05-17-2016
PROJECT NO:	10895-3
EXP./CLIENT NO:	N/A
SCALE:	N/A

PLUMBING LEGENDS, ABBREVIATIONS, AND NOTES

SHEET NO.: **P0.01**

(NOT ALL SPECIFICATIONS APPLY TO THIS PROJECT)
SECTION 220500 - COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL
1.1 SUMMARY
A. ALL SECTIONS OF THIS SPECIFICATION ARE NOT REQUIRED FOR THIS PROJECT. COORDINATE SECTIONS AND NEED AS REQUIRED BY SYSTEMS AND LOCATION INSTALLED.
B. THIS SECTION INCLUDES THE FOLLOWING:
1. PIPING MATERIALS AND INSTALLATION INSTRUCTIONS COMMON TO MOST PIPING SYSTEMS.
2. DIELECTRIC FITTINGS.
3. MECHANICAL SLEEVE SEALS.
4. SLEEVES.
5. ESCUTCHEONS.
6. GROUT.
7. PLUMBING DEMOLITION.
8. EQUIPMENT INSTALLATION REQUIREMENTS COMMON TO EQUIPMENT SECTIONS.
9. CONCRETE BASES.
10. SUPPORTS AND ANCHORAGES.
1.2 DEFINITIONS
A. FINISHED SPACES: SPACES OTHER THAN PLUMBING AND ELECTRICAL EQUIPMENT ROOMS, FURRED SPACES, PIPE CHASES, UNHEATED SPACES IMMEDIATELY BELOW ROOF, SPACES ABOVE CEILING, UNEXCAVATED SPACES, CRAWLSPACES, AND TUNNELS.
B. EXPOSED, INTERIOR INSTALLATIONS: EXPOSED TO VIEW INDOORS. EXAMPLES INCLUDE FINISHED OCCUPIED SPACES AND PLUMBING EQUIPMENT ROOMS.
C. EXPOSED, EXTERIOR INSTALLATIONS: EXPOSED TO VIEW OUTDOORS OR SUBJECT TO OUTDOOR AMBIENT TEMPERATURES AND WEATHER CONDITIONS. EXAMPLES INCLUDE ROOFTOP LOCATIONS.
D. CONCEALED, INTERIOR INSTALLATIONS: CONCEALED FROM VIEW AND PROTECTED FROM PHYSICAL CONTACT BY BUILDING OCCUPANTS. EXAMPLES INCLUDE ABOVE CEILING AND IN CHASES.
E. CONCEALED, EXTERIOR INSTALLATIONS: CONCEALED FROM VIEW AND PROTECTED FROM WEATHER CONDITIONS AND PHYSICAL CONTACT BY BUILDING OCCUPANTS BUT SUBJECT TO OUTDOOR AMBIENT TEMPERATURES. EXAMPLES INCLUDE INSTALLATIONS WITHIN UNHEATED SHELTERS.
1.3 QUALITY ASSURANCE
A. STEEL SUPPORT WELDING: QUALITY PROCESSES AND OPERATORS ACCORDING TO AWS D1.1, "STRUCTURAL WELDING CODE--STEEL."
B. ELECTRICAL CHARACTERISTICS FOR PLUMBING EQUIPMENT: EQUIPMENT OF HIGHER ELECTRICAL CHARACTERISTICS MAY BE FURNISHED PROVIDED SUCH PROPOSED EQUIPMENT IS APPROVED IN WRITING AND CONNECTING ELECTRICAL SERVICES, CIRCUIT BREAKERS, AND CONDUIT SIZES ARE APPROPRIATELY MODIFIED. IF MINIMUM ENERGY RATINGS OR EFFICIENCIES ARE SPECIFIED, EQUIPMENT SHALL COMPLY WITH REQUIREMENTS.
PART 2 - PRODUCTS
2.1 PIPE, TUBE, AND FITTINGS
A. PIPE THREADS: ASME B1.20.1 FOR FACTORY-THREADED PIPE AND PIPE FITTINGS.
2.2 JOINING MATERIALS
A. REFER TO INDIVIDUAL PIPING SECTIONS FOR SPECIAL JOINING MATERIALS NOT LISTED BELOW.
B. PIPE-FLANGE GASKET MATERIALS: ASME B16.21, NONMETALLIC, FLAT, ASBESTOS-FREE, 1/8-INCH MAXIMUM THICKNESS UNLESS THICKNESS OR SPECIFIC MATERIAL IS INDICATED.
C. PLASTIC, PIPE-FLANGE GASKET, BOLTS, AND NUTS: TYPE AND MATERIAL RECOMMENDED BY PIPING SYSTEM MANUFACTURER, UNLESS OTHERWISE INDICATED.
D. SOLDER FILLER METALS: ASTM B 32, LEAD-FREE ALLOYS. INCLUDE WATER-FLUSHABLE FLUX ACCORDING TO ASTM B 813.
E. BRAZING FILLER METALS: AWS A5.8, BCPJ SERIES OR BAG1, UNLESS OTHERWISE INDICATED.
F. WELDING FILLER METALS: COMPLY WITH AWS D10.12.
1. SOLVENT CEMENTS FOR JOINING PLASTIC PIPING:
2. ABS PIPING: ASTM D 2235.
3. CPVC PIPING: ASTM F 493.
4. PVC PIPING: ASTM D 2564. INCLUDE PRIMER ACCORDING TO ASTM F 656.
5. PVC TO ABS PIPING TRANSITION: ASTM D 3138.
2.3 DIELECTRIC FITTINGS
A. DESCRIPTION: COMBINATION FITTING OF COPPER ALLOY AND FERROUS MATERIALS WITH THREADED, SOLDER-JOINT, PLAIN, OR WELD-NECK END CONNECTIONS THAT MATCH PIPING SYSTEM MATERIALS.
B. INSULATING MATERIAL: SUITABLE FOR SYSTEM FLUID, PRESSURE, AND TEMPERATURE.
C. DIELECTRIC UNIONS: FACTORY-FABRICATED, UNION ASSEMBLY, FOR 250-PSIG MINIMUM WORKING PRESSURE AT 180 DEG F.
D. DIELECTRIC FLANGES: FACTORY-FABRICATED, COMPANION-FLANGE ASSEMBLY, FOR 150- OR 300-PSIG MINIMUM WORKING PRESSURE AS REQUIRED TO SUIT SYSTEM PRESSURES.
E. DIELECTRIC COUPLINGS: GALVANIZED-STEEL COUPLING WITH INERT AND NONCORROSIVE, THERMOPLASTIC LINING; THREADED ENDS; AND 300-PSIG MINIMUM WORKING PRESSURE AT 225°F.
F. DIELECTRIC NIPPLES: ELECTROPLATED STEEL NIPPLE WITH INERT AND NONCORROSIVE, THERMOPLASTIC LINING; PLAIN, THREADED, OR GROOVED ENDS; AND 300-PSIG MINIMUM WORKING PRESSURE AT 225°F.
2.4 MECHANICAL SLEEVE SEALS
A. SEALING ELEMENT: SEALING ELEMENT UNIT, DESIGNED FOR FIELD ASSEMBLY, TO FILL ANNULAR SPACE BETWEEN PIPE AND SLEEVE.
B. SEALING ELEMENTS: EPDM INTERLOCKING LINKS SHAPED TO FIT SURFACE OF PIPE. INCLUDE TYPE AND NUMBER REQUIRED FOR PIPE MATERIAL AND SIZE OF PIPE.
C. PRESSURE PLATES: STAINLESS STEEL. INCLUDE TWO FOR EACH SEALING ELEMENT.
D. CONNECTING BOLTS AND NUTS: STAINLESS STEEL OF LENGTH REQUIRED TO SECURE PRESSURE PLATES TO SEALING ELEMENTS. INCLUDE ONE FOR EACH SEALING ELEMENT.
2.5 SLEEVES
A. GALVANIZED-STEEL SHEET: 0.0239-INCH MINIMUM THICKNESS; ROUND TUBE CLOSED WITH WELDED LONGITUDINAL JOINT.
B. STEEL PIPE: ASTM A 53, TYPE E, GRADE B, SCHEDULE 40, GALVANIZED, PLAIN ENDS.
C. CAST IRON: CAST OR FABRICATED "WALL PIPE" EQUIVALENT TO DUCTILE-IRON PRESSURE PIPE, WITH PLAIN ENDS AND INTEGRAL WATERSTOP, UNLESS OTHERWISE INDICATED.
D. STACK SLEEVE FITTINGS: MANUFACTURED, CAST-IRON SLEEVE WITH INTEGRAL CLAMPING FLANGE. INCLUDE CLAMPING RING AND BOLTS AND NUTS FOR MEMBRANE FLASHING.
1. UNDERDECK CLAMP: CLAMPING RING WITH SET SCREWS.
E. MOLDED PVC: PERMANENT, WITH NAILING FLANGE FOR ATTACHING TO WOODEN FORMS.
F. PVC PIPE: ASTM D 1785, SCHEDULE 40.
G. MOLDED PE: REUSABLE, PE, TAPERED-CUP SHAPED, AND SMOOTH-OUTER SURFACE WITH NAILING FLANGE FOR ATTACHING TO WOODEN FORMS.
2.6 ESCUTCHEONS
A. DESCRIPTION: MANUFACTURED WALL AND CEILING ESCUTCHEONS AND FLOOR PLATES, WITH AN ID TO CLOSELY FIT AROUND PIPE, TUBE, AND INSULATION OF UNHEATED PIPING AND AN OD THAT COMPLETELY COVERS OPENING.
B. ONE-PIECE, DEEP-PATTERN TYPE: DEEP-DRAWN, BOX-SHAPED BRASS WITH POLISHED CHROME-PLATED FINISH.
C. ONE-PIECE, CAST-BRASS TYPE: WITH SET SCREW.
1. FINISH: POLISHED CHROME-PLATED.
D. SPLIT-CASTING, CAST-BRASS TYPE, WITH CONCEALED HINGE AND SET SCREW.
2. FINISH: POLISHED CHROME-PLATED.
2.7 GROUT
A. DESCRIPTION: ASTM C 1107, GRADE B, NONSHRINK AND NONMETALLIC, DRY HYDRAULIC-CEMENT GROUT.
1. CHARACTERISTICS: POST-HARDENING, VOLUME-ADJUSTING, NONSTAINING, NONCORROSIVE, NONSEGREGATING, AND RECOMMENDED FOR INTERIOR AND EXTERIOR APPLICATIONS.
2. DESIGN MIX: 5000-PSI, 28-DAY COMPRESSIVE STRENGTH.
3. PACKAGING: PREMIXED AND FACTORY PACKAGED.
PART 3 - EXECUTION
3.1 PLUMBING DEMOLITION
A. DISCONNECT, DEMOLISH, AND REMOVE PLUMBING SYSTEMS, EQUIPMENT, AND COMPONENTS INDICATED TO BE REMOVED.
1. PIPING TO BE REMOVED: REMOVE PORTION OF PIPING INDICATED TO BE REMOVED AND CAP OR PLUG REMAINING PIPING WITH SAME OR COMPATIBLE PIPING MATERIAL.
2. PIPING TO BE ABANDONED IN PLACE: DRAIN PIPING AND CAP OR PLUG PIPING WITH SAME OR COMPATIBLE PIPING MATERIAL.
3. EQUIPMENT TO BE REMOVED: DISCONNECT AND CAP SERVICES AND REMOVE EQUIPMENT.
4. EQUIPMENT TO BE REMOVED AND REINSTALLED: DISCONNECT AND CAP SERVICES AND REMOVE, CLEAN, AND STORE EQUIPMENT; WHEN APPROPRIATE, REINSTALL, RECONNECT, AND MAKE EQUIPMENT OPERATIONAL.
5. EQUIPMENT TO BE REMOVED AND SALVAGED: DISCONNECT AND CAP SERVICES AND REMOVE EQUIPMENT AND DELIVER TO OWNER.
B. IF PIPE, INSULATION, OR EQUIPMENT TO REMAIN IS DAMAGED IN APPEARANCE OR IS UNSERVICEABLE, REMOVE DAMAGED OR UNSERVICEABLE PORTIONS AND REPLACE WITH NEW PRODUCTS OF EQUAL CAPACITY AND QUALITY.
3.2 PIPING SYSTEMS - COMMON REQUIREMENTS
A. INSTALL PIPING ACCORDING TO THE REQUIREMENTS STATED HEREIN AND ANY APPLICABLE RECOGNIZED STANDARDS.
B. DRAWING PLANS, SCHEMATICS, AND DIAGRAMS INDICATE GENERAL LOCATION AND ARRANGEMENT OF PIPING SYSTEMS. INDICATED LOCATIONS AND ARRANGEMENTS WERE USED TO SIZE PIPE AND CALCULATE FRICTION LOSS, EXPANSION, PUMP SIZING, AND OTHER DESIGN CONSIDERATIONS.
C. INSTALL PIPING AS INDICATED UNLESS DEVIATIONS TO LAYOUT ARE APPROVED ON COORDINATION DRAWINGS.
D. INSTALL PIPING IN CONCEALED LOCATIONS, UNLESS OTHERWISE INDICATED AND EXCEPT IN EQUIPMENT ROOMS AND SERVICE AREAS.
E. INSTALL PIPING INDICATED TO BE EXPOSED AND PIPING IN EQUIPMENT ROOMS AND SERVICE AREAS AT RIGHT ANGLES OR PARALLEL TO BUILDING WALLS. DIAGONAL RUNS ARE PROHIBITED UNLESS SPECIFICALLY INDICATED OTHERWISE.
F. INSTALL PIPING ABOVE ACCESSIBLE CEILING TO ALLOW SUFFICIENT SPACE FOR CEILING PANEL REMOVAL.
G. INSTALL PIPING TO PERMIT VALVE SERVICING.
H. INSTALL PIPING AT INDICATED SLOPES.
I. INSTALL PIPING FREE OF SAGS AND BENDS.
J. INSTALL FITTINGS FOR CHANGES IN DIRECTION AND BRANCH CONNECTIONS.
K. INSTALL PIPING TO ALLOW APPLICATION OF INSULATION.
L. SELECT SYSTEM COMPONENTS WITH PRESSURE RATING EQUAL TO OR GREATER THAN SYSTEM OPERATING PRESSURE.
M. INSTALL ESCUTCHEONS FOR PENETRATIONS OF WALLS, CEILING, AND FLOORS.
N. INSTALL SLEEVES FOR PIPES PASSING THROUGH CONCRETE AND MASONRY WALLS, GYPSUM-BOARD PARTITIONS, AND CONCRETE FLOOR AND ROOF SLABS.
O. ABOVEGROUND, EXTERIOR-WALL PIPE PENETRATIONS: SEAL PENETRATIONS USING SLEEVES AND MECHANICAL SLEEVE SEALS. SELECT SLEEVE SIZE TO ALLOW FOR 1-INCH ANNULAR CLEAR SPACE BETWEEN PIPE AND SLEEVE FOR INSTALLING MECHANICAL SLEEVE SEALS.
1. INSTALL STEEL PIPE FOR SLEEVES SMALLER THAN 6 INCHES IN DIAMETER.
2. INSTALL CAST-IRON "WALL PIPES" FOR SLEEVES 6 INCHES AND LARGER IN DIAMETER.
3. MECHANICAL SLEEVE SEAL INSTALLATION: SELECT TYPE AND NUMBER OF SEALING ELEMENTS REQUIRED FOR PIPE MATERIAL AND SIZE. POSITION PIPE IN CENTER OF SLEEVE. ASSEMBLE MECHANICAL SLEEVE SEALS AND INSTALL IN ANNULAR SPACE BETWEEN PIPE AND TIGHTEN BOLTS AGAINST PRESSURE PLATES THAT CAUSE SEALING ELEMENTS TO EXPAND AND MAKE WATERTIGHT SEAL.
P. UNDERGROUND, EXTERIOR-WALL PIPE PENETRATIONS: INSTALL CAST-IRON "WALL PIPES" FOR SLEEVES. SEAL PIPE PENETRATIONS USING MECHANICAL SLEEVE SEALS. SELECT SLEEVE SIZE TO ALLOW FOR 1-INCH ANNULAR CLEAR SPACE BETWEEN PIPE AND SLEEVE FOR INSTALLING MECHANICAL SLEEVE SEALS.
1. MECHANICAL SLEEVE SEAL INSTALLATION: SELECT TYPE AND NUMBER OF SEALING ELEMENTS REQUIRED FOR PIPE MATERIAL AND SIZE. POSITION PIPE IN CENTER OF SLEEVE. ASSEMBLE MECHANICAL SLEEVE SEALS AND INSTALL IN ANNULAR SPACE BETWEEN PIPE AND TIGHTEN BOLTS AGAINST PRESSURE PLATES THAT CAUSE SEALING ELEMENTS TO EXPAND AND MAKE WATERTIGHT SEAL.
Q. FIRE-BARRIER PENETRATIONS: MAINTAIN INDICATED FIRE RATING OF WALLS, PARTITIONS, CEILING, AND FLOORS AT PIPE PENETRATIONS. SEAL PIPE PENETRATIONS WITH FIRESTOP MATERIALS. REFER TO DIVISION 07 SECTION "PENETRATION FIRESTOPPING" FOR MATERIALS.
R. VERIFY FINAL EQUIPMENT LOCATIONS FOR ROUGH-IN. REFER TO EQUIPMENT SPECIFICATIONS IN OTHER SECTIONS OF THESE SPECIFICATIONS FOR ROUGH-IN REQUIREMENTS.
3.3 PIPING JOINT CONSTRUCTION
A. JOIN PIPE AND FITTINGS ACCORDING TO THE FOLLOWING REQUIREMENTS AND DIVISION 22 SECTIONS SPECIFYING PIPING SYSTEMS.
B. BEAM ENDS OF PIPES AND TUBES AND REMOVE BURRS. BEVEL PLAIN ENDS OF STEEL PIPE.
C. REMOVE SCALE, SLAG, DIRT, AND DEBRIS FROM INSIDE AND OUTSIDE OF PIPE AND FITTINGS BEFORE ASSEMBLY.

D. SOLDERED JOINTS: APPLY ASTM B 813, WATER-FLUSHABLE FLUX, UNLESS OTHERWISE INDICATED, TO TUBE END. CONSTRUCT JOINTS ACCORDING TO ASTM B 828 OR ODA'S "COPPER TUBE HANDBOOK," USING LEAD-FREE SOLDER ALLOY COMPLYING WITH ASTM B 32.
E. BRAZED JOINTS: CONSTRUCT JOINTS ACCORDING TO AWS'S "BRAZING HANDBOOK," "PIPE AND TUBE" CHAPTER, USING COPPER-PHOSPHORUS BRAZING FILLER METAL COMPLYING WITH AWS A5.8.
F. THREADED JOINTS: THREAD PIPE WITH TAPERED PIPE THREADS ACCORDING TO ASME B1.20.1. CUT THREADS FULL AND CLEAN USING SHARP REAM THREADED PIPE ENDS TO REMOVE BURRS AND RESTORE FULL ID. JOIN PIPE FITTINGS AND VALVES AS FOLLOWS:
1. APPLY APPROPRIATE TAPE OR THREAD COMPOUND TO EXTERNAL PIPE THREADS UNLESS DRY SEAL THREADING IS SPECIFIED.
2. DAMAGED THREADS: DO NOT USE PIPE OR PIPE FITTINGS WITH THREADS THAT ARE CORRODED OR DAMAGED. DO NOT USE PIPE SECTIONS THAT HAVE CRACKED OR OPEN WELDS.
G. WELDED JOINTS: CONSTRUCT JOINTS ACCORDING TO AWS D10.12, USING QUALIFIED PROCESSES AND WELDING OPERATORS ACCORDING TO PART 1 "QUALITY ASSURANCE" ARTICLE.
H. FLANGED JOINTS: SELECT APPROPRIATE GASKET MATERIAL, SIZE, TYPE, AND THICKNESS FOR SERVICE APPLICATION. INSTALL GASKET CONCENTRICALLY POSITIONED. USE SUITABLE LUBRICANTS ON BOLT THREADS.
I. PLASTIC PIPING SOLVENT-CEMENT JOINTS: CLEAN AND DRY JOINING SURFACES. JOIN PIPE AND FITTINGS ACCORDING TO THE FOLLOWING:
1. COMPLY WITH ASTM F 402, FOR SAFE-HANDLING PRACTICE OF CLEANERS, PRIMERS, AND SOLVENT CEMENTS.
2. ABS PIPING: JOIN ACCORDING TO ASTM D 2235 AND ASTM D 2661 APPENDICES.
3. CPVC PIPING: JOIN ACCORDING TO ASTM D 2846/D 2846M APPENDIX.
4. PVC PIPING: JOIN ACCORDING TO SCHEDULE NUMBER ASTM D 1785, PVC PIPE AND PVC SOCKET FITTINGS ACCORDING TO ASTM D 2672. JOIN OTHER THAN SCHEDULE-NUMBER PVC PIPE AND SOCKET FITTINGS ACCORDING TO ASTM D 2855.
5. PVC NONPRESSURE PIPING: JOIN ACCORDING TO ASTM D 2855.
6. PVC TO ABS NONPRESSURE TRANSITION FITTINGS: JOIN ACCORDING TO ASTM D 3138 APPENDIX.
J. PLASTIC PRESSURE PIPING GASKETED JOINTS: JOIN ACCORDING TO ASTM D 3139.
K. PLASTIC NONPRESSURE PIPING GASKETED JOINTS: JOIN ACCORDING TO ASTM D 3212.
L. PE PIPING HEAT-FUSION JOINTS: CLEAN AND DRY JOINING SURFACES BY WIPING WITH CLEAN CLOTH OR PAPER TOWELS. JOIN ACCORDING TO ASTM D 2857.
1. PLAIN-END PIPE AND FITTINGS: USE BUTT FUSION.
2. PLAIN-END PIPE AND SOCKET FITTINGS: USE SOCKET FUSION.
M. FIBERGLASS BONDED JOINTS: PREPARE PIPE ENDS AND FITTINGS, APPLY ADHESIVE, AND JOIN ACCORDING TO PIPE MANUFACTURER'S WRITTEN INSTRUCTIONS.
3.4 PIPING CONNECTIONS
A. MAKE CONNECTIONS ACCORDING TO THE FOLLOWING, UNLESS OTHERWISE INDICATED:
1. INSTALL UNIONS, IN PIPING NPS 2 AND SMALLER, ADJACENT TO EACH VALVE AND AT FINAL CONNECTION TO EACH PIECE OF EQUIPMENT.
2. INSTALL FLANGES, IN PIPING NPS 2-1/2 AND LARGER, ADJACENT TO FLANGED VALVES AND AT FINAL CONNECTION TO EACH PIECE OF EQUIPMENT.
3. DRY PIPING SYSTEMS: INSTALL DIELECTRIC UNIONS AND FLANGES TO CONNECT PIPING MATERIALS OF DISSIMILAR METALS.
4. WET PIPING SYSTEMS: INSTALL DIELECTRIC COUPLING AND NIPPLE FITTINGS TO CONNECT PIPING MATERIALS OF DISSIMILAR METALS.
3.5 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS
A. INSTALL EQUIPMENT TO ALLOW MAXIMUM POSSIBLE HEADROOM UNLESS SPECIFIC MOUNTING HEIGHTS ARE NOT INDICATED.
B. INSTALL EQUIPMENT LEVEL AND PLUMB, PARALLEL AND PERPENDICULAR TO OTHER BUILDING SYSTEMS AND COMPONENTS IN EXPOSED INTERIOR SPACES, UNLESS OTHERWISE INDICATED.
C. INSTALL PLUMBING EQUIPMENT TO FACILITATE SERVICE, MAINTENANCE, AND REPAIR OR REPLACEMENT OF COMPONENTS. CONNECT EQUIPMENT FOR EASE OF DISCONNECTING, WITH MINIMUM INTERFERENCE TO OTHER INSTALLATIONS. EXTEND GREASE FITTINGS TO ACCESSIBLE LOCATIONS.
D. INSTALL EQUIPMENT TO ALLOW RIGHT OF WAY FOR PIPING INSTALLED AT REQUIRED SLOPE.
3.6 CONCRETE BASES
A. CONCRETE BASES: ANCHOR EQUIPMENT TO CONCRETE BASE ACCORDING TO EQUIPMENT MANUFACTURER'S WRITTEN INSTRUCTIONS AND ACCORDING TO SEISMIC CODES AT PROJECT.
1. CONSTRUCT CONCRETE BASES OF DIMENSIONS INDICATED, BUT NOT LESS THAN 4 INCHES LARGER IN BOTH DIRECTIONS THAN SUPPORTED UNIT.
2. INSTALL DOWEL RODS TO CONNECT CONCRETE BASE TO CONCRETE FLOOR. UNLESS OTHERWISE INDICATED, INSTALL DOWEL RODS ON 18-INCH CENTERS AROUND THE FULL PERIMETER OF THE BASE.
3. INSTALL EPOXY-COATED ANCHOR BOLTS FOR SUPPORTED EQUIPMENT THAT EXTEND THROUGH CONCRETE BASE, AND ANCHOR INTO STRUCTURAL CONCRETE FLOOR.
4. PLACE AND SECURE ANCHORAGE DEVICES. USE SUPPORTED EQUIPMENT MANUFACTURER'S SETTING DRAWINGS, TEMPLATES, DIAGRAMS, AND INSTRUCTIONS, AND DIRECTIONS FURNISHED WITH ITEMS TO BE EMBEDDED.
5. INSTALL ANCHOR BOLTS TO ELEVATIONS REQUIRED FOR PROPER ATTACHMENT TO SUPPORTED EQUIPMENT.
6. INSTALL ANCHOR BOLTS ACCORDING TO ANCHOR-BOLT MANUFACTURER'S WRITTEN INSTRUCTIONS.
7. USE 3000-PSI, 28-DAY COMPRESSIVE-STRENGTH CONCRETE AND REINFORCEMENT.
3.7 ERECTION OF METAL SUPPORTS AND ANCHORAGES
A. CUT, FIT, AND PLACE MISCELLANEOUS METAL SUPPORTS ACCURATELY IN LOCATION, ALIGNMENT, AND ELEVATION TO SUPPORT AND ANCHOR PLUMBING MATERIALS AND EQUIPMENT.
B. FIELD WELDING: COMPLY WITH AWS D11.
3.8 ERECTION OF WOOD SUPPORTS AND ANCHORAGES
A. CUT, FIT, AND PLACE WOOD GROUNDS, WALLERS, BLOCKING, AND ANCHORAGES TO SUPPORT, AND ANCHOR PLUMBING MATERIALS AND EQUIPMENT.
B. SELECT FASTENER SIZES THAT WILL NOT PENETRATE MEMBERS IF OPPOSITE SIDE WILL BE EXPOSED TO VIEW OR WILL RECEIVE FINISH MATERIALS. TIGHTEN CONNECTIONS BETWEEN MEMBERS. INSTALL FASTENERS WITHOUT SPLITTING WOOD MEMBERS.
C. ATTACH TO SUBSTRATES AS REQUIRED TO SUPPORT APPLIED LOADS.
3.9 GROUTING
A. MIX AND INSTALL GROUT FOR PLUMBING EQUIPMENT BASE BEARING SURFACES, PUMP AND OTHER EQUIPMENT BASE PLATES, AND ANCHORS.
B. CLEAN SURFACES AND DIRECTIONS TO BE CONTACT WITH GROUT.
C. PROVIDE FORMS AS REQUIRED FOR PLACEMENT OF GROUT.
D. AVOID AIR ENTRAPMENT DURING PLACEMENT OF GROUT.
E. PLACE GROUT COMPLETELY FILLING EQUIPMENT BASES.
F. PLACE GROUT ON CONCRETE BASES AND PROVIDE SMOOTH BEARING SURFACE FOR EQUIPMENT.
G. PLACE GROUT AROUND ANCHORS.
H. CURE PLACED GROUT.
SECTION 220529 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT
PART 1 - GENERAL
1.1 SUMMARY
A. ALL SECTIONS OF THIS SPECIFICATION ARE NOT REQUIRED FOR THIS PROJECT. COORDINATE SECTIONS AND NEED AS REQUIRED BY SYSTEMS AND LOCATION INSTALLED.
B. THIS SECTION INCLUDES THE FOLLOWING:
1. STEEL PIPE HANGERS AND SUPPORTS.
2. TRAPEZE PIPE HANGERS.
3. METAL FRAMING SYSTEMS.
4. THERMAL-HANGER SHIELD INSERTS.
5. FASTENER SYSTEMS.
6. EQUIPMENT SUPPORTS.
1.2 DEFINITIONS
A. TERMINOLOGY: AS DEFINED IN MSS SP-90, "GUIDELINES ON TERMINOLOGY FOR PIPE HANGERS AND SUPPORTS."
1.3 PERFORMANCE REQUIREMENTS
A. DESIGN SUPPORTS FOR MULTIPLE PIPES CAPABLE OF SUPPORTING COMBINED WEIGHT OF SUPPORTED SYSTEMS, SYSTEM CONTENTS, AND TEST WATER.
B. DESIGN EQUIPMENT SUPPORTS CAPABLE OF SUPPORTING COMBINED OPERATING WEIGHT OF SUPPORTED EQUIPMENT AND CONNECTED SYSTEMS AND COMPONENTS.
PART 2 - PRODUCTS
2.1 MANUFACTURERS
A. IN OTHER PART 2 ARTICLES WHERE TITLES BELOW INTRODUCE LISTS, THE FOLLOWING REQUIREMENTS APPLY TO PRODUCT SELECTION:
1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE MANUFACTURERS SPECIFIED.
2.2 STEEL PIPE HANGERS AND SUPPORTS
A. DESCRIPTION: MSS SP-58, TYPES 1 THROUGH 58, FACTORY-FABRICATED COMPONENTS. REFER TO PART 3 "HANGER AND SUPPORT APPLICATIONS" ARTICLE FOR WHERE TO USE SPECIFIC HANGER AND SUPPORT TYPES.
B. MANUFACTURERS:
1. B-LINE SYSTEMS, INC.; A DIVISION OF COOPER INDUSTRIES.
2. EMPIRE INDUSTRIES, INC.
3. ERICO/MICHIGAN HANGER CO.
4. GLOBE PIPE HANGER PRODUCTS, INC.
5. GRINNELL CORP.
6. NATIONAL PIPE HANGER CORPORATION.
7. PHD MANUFACTURING, INC.
8. PHS INDUSTRIES, INC.
9. PIPING TECHNOLOGY & PRODUCTS, INC.
C. GALVANIZED, METALLIC COATINGS: PREGALVANIZED OR HOT DIPPED.
D. NONMETALLIC COATINGS: PLASTIC COATING, JACKET, OR LINER.
E. PADDED HANGERS: HANGER WITH FIBERGLASS OR OTHER PIPE INSULATION PAD OR CUSHION FOR SUPPORT OF BEARING SURFACE OF PIPING.
2.3 TRAPEZE PIPE HANGERS
A. DESCRIPTION: MSS SP-69, TYPE 59, SHOP- OR FIELD-FABRICATED PIPE-SUPPORT ASSEMBLY MADE FROM STRUCTURAL-STEEL SHAPES WITH MSS SP-58 HANGER RODS, NUTS, SADDLES, AND U-BOLTS.
2.4 METAL FRAMING SYSTEMS
A. DESCRIPTION: MFMA-3, SHOP- OR FIELD-FABRICATED PIPE-SUPPORT ASSEMBLY MADE OF STEEL CHANNELS AND OTHER COMPONENTS.
B. MANUFACTURERS:
1. B-LINE SYSTEMS, INC.; A DIVISION OF COOPER INDUSTRIES.
2. ERICO/MICHIGAN HANGER CO.; ERISTRUT DIV.
3. OS METALS CORP.
4. POWER-STRUT DIV.; TYCO INTERNATIONAL, LTD.
5. THOMAS & BETTS CORPORATION.
6. UNISTRUT CORP.; TYCO INTERNATIONAL, LTD.
C. COATINGS: MANUFACTURER'S STANDARD FINISH, UNLESS BARE METAL SURFACES ARE INDICATED.
D. NONMETALLIC COATINGS: PLASTIC COATING, JACKET, OR LINER.
2.5 THERMAL-HANGER SHIELD INSERTS
A. DESCRIPTION: 100-PSIG- MINIMUM, COMPRESSIVE-STRENGTH INSULATION INSERT ENCASED IN SHEET METAL SHIELD.
B. MANUFACTURERS:
1. CARPENTER & PATERSON, INC.
2. ERICO/MICHIGAN HANGER CO.
3. PHS INDUSTRIES, INC.
4. PIPE SHIELDS, INC.
5. RILCO MANUFACTURING COMPANY, INC.
6. VALUE ENGINEERED PRODUCTS, INC.
C. INSULATION-INSERT MATERIAL FOR COLD PIPING: WATER-REPELLENT TREATED, ASTM C 533, TYPE I CALCIUM SILICATE WITH VAPOR BARRIER.

D. INSULATION-INSERT MATERIAL FOR HOT PIPING: WATER-REPELLENT TREATED, ASTM C 533, TYPE I CALCIUM SILICATE.
E. OR TRAPEZE OR CLAMPED SYSTEMS: INSERT AND SHIELD SHALL COVER ENTIRE CIRCUMFERENCE OF PIPE.
F. FOR CLEVIS OR BAND HANGERS: INSERT AND SHIELD SHALL COVER LOWER 180 DEGREES OF PIPE.
G. LENGTH: EXTEND 2 INCHES BEYOND SHEET METAL SHELD FOR PIPING OPERATING BELOW AMBIENT AIR TEMPERATURE.
2.6 FASTENER SYSTEMS
A. POWDER-ACTUATED FASTENERS: THREADED-STEEL STUD, FOR USE IN HARDENED PORTLAND CEMENT CONCRETE WITH PULL-OUT, TENSION, AND SHEAR CAPACITIES APPROPRIATE FOR SUPPORTED LOADS AND BUILDING MATERIALS WHERE USED.
1. MANUFACTURERS:
a. HILTI, INC.
b. ITW RAMSEY/RED HEAD.
c. MASTERSET FASTENING SYSTEMS, INC.
d. MKT FASTENING, LLC.
e. POWERS FASTENERS.
B. MECHANICAL-EXPANSION FASTENERS: INSERT-WEDGE-TYPE ZINC-COATED STEEL, FOR USE IN HARDENED PORTLAND CEMENT CONCRETE WITH PULL-OUT, TENSION, AND SHEAR CAPACITIES APPROPRIATE FOR SUPPORTED LOADS AND BUILDING MATERIALS WHERE USED.
1. MANUFACTURERS:
a. B-LINE SYSTEMS, INC.; A DIVISION OF COOPER INDUSTRIES.
b. EMPIRE INDUSTRIES, INC.
c. HILTI, INC.
d. ITW RAMSEY/RED HEAD.
e. MKT FASTENING, LLC.
f. POWERS FASTENERS.
2.7 EQUIPMENT SUPPORTS
DESCRIPTION: WELDED, SHOP- OR FIELD-FABRICATED EQUIPMENT SUPPORT MADE FROM STRUCTURAL-STEEL SHAPES.
2.8 MISCELLANEOUS MATERIALS
A. STRUCTURAL STEEL: ASTM A 36/A 36M, STEEL PLATES, SHAPES, AND BARS; BLACK AND GALVANIZED.
B. GROUT: ASTM C 1107, FACTORY-MIXED AND -PACKAGED, DRY, HYDRAULIC-CEMENT, NONSHRINK AND NONMETALLIC GROUT; SUITABLE FOR INTERIOR AND EXTERIOR APPLICATIONS.
1. PROPERTIES: NONSTAINING, NONCORROSIVE, AND NONSEGREGATING.
2. DESIGN MIX: 5000-PSI, 28-DAY COMPRESSIVE STRENGTH.
PART 3 - EXECUTION
3.1 HANGER AND SUPPORT APPLICATIONS
A. STEEL PIPE HANGER INSTALLATION: COMPLY WITH MSS SP-58 AND MSS SP-59. INSTALL HANGERS, SUPPORTS, CLAMPS, AND ATTACHMENTS AS REQUIRED TO PROPERLY SUPPORT PIPING FROM BUILDING STRUCTURE.
B. TRAPEZE PIPE HANGER INSTALLATION: COMPLY WITH MSS SP-69 AND MSS SP-69. ARRANGE FOR GROUPING OF PARALLEL RUNS OF HORIZONTAL PIPING AND SUPPORT TOGETHER ON FIELD-FABRICATED TRAPEZE PIPE HANGERS.
C. PIPES OF VARIOUS SIZES: SUPPORT TOGETHER AND SPACE TRAPEZES FOR SMALLEST PIPE SIZE OR INSTALL INTERMEDIATE SUPPORTS.
D. THERMAL-HANGER SHIELD INSERTS: INSTALL IN PIPE HANGER OR SHIELD FOR INSULATED PIPING.
E. FASTENER SYSTEM INSTALLATION:
1. INSTALL MECHANICAL-EXPANSION ANCHORS IN CONCRETE AFTER CONCRETE IS PLACED AND COMPLETELY CURED. INSTALL FASTENERS ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.
F. INSTALL HANGERS AND SUPPORTS COMPLETE WITH NECESSARY INSERTS, BOLTS, RODS, NUTS, WASHERS, AND OTHER ACCESSORIES.
G. EQUIPMENT SUPPORT INSTALLATION: FABRICATE FROM WELDED-STRUCTURAL-STEEL SHAPES.
H. INSTALL HANGERS AND SUPPORTS TO ALLOW CONTROLLED THERMAL AND SEISMIC MOVEMENT OF PIPING SYSTEMS, TO PERMIT FREEDOM OF MOVEMENT BETWEEN PIPE (ANCHORS), AND TO FACILITATE ACTION OF EXPANSION JOINTS, EXPANSION LOOPS, EXPANSION BENDS, AND SIMILAR UNITS.
I. INSTALL LATERAL BRACING WITH PIPE HANGERS AND SUPPORTS TO PREVENT SWAYING.
J. INSTALL BUILDING ATTACHMENTS TO STRUCTURAL STEEL. INSTALL ADDITIONAL ATTACHMENTS AT CONCENTRATED LOADS, INCLUDING VALVES, FLANGES, AND STRAINERS. NPS 2-1/2 AND LARGER AND AT CHANGES IN DIRECTION OF INSTALL CONCRETE INSERTS BEFORE CONCRETE IS PLACED; FASTEN INSERTS TO FORMS AND INSTALL REINFORCING BARS THROUGH OPENINGS AT TOP OF INSERTS.
K. LOAD DISTRIBUTION: INSTALL HANGERS AND SUPPORTS SO PIPING LIVE AND DEAD LOADS AND STRESSES FROM MOVEMENT WILL NOT BE TRANSMITTED TO CONNECTED EQUIPMENT.
L. PIPE SLOPES: INSTALL HANGERS AND SUPPORTS TO PROVIDE INDICATED PIPE SLOPES AND SO MAXIMUM PIPE DEFLECTIONS ALLOWED BY ASME B31.9 (FOR BUILDING SERVICES PIPING) ARE NOT EXCEEDED.
M. INSULATED PIPING: COMPLY WITH THE FOLLOWING:
1. ATTACH CLAMPS AND SPACERS TO PIPING.
a. PIPING OPERATING ABOVE AMBIENT AIR TEMPERATURE: CLAMP MAY PROJECT THROUGH INSULATION.
b. PIPING OPERATING BELOW AMBIENT AIR TEMPERATURE: USE THERMAL-HANGER SHIELD INSERT WITH CLAMP SIZED TO MATCH OD OF INSERT.
c. DO NOT EXCEED PIPE STRESS LIMITS ACCORDING TO ASME B31.9 FOR BUILDING SERVICES PIPING.
2. INSTALL MSS SP-58, TYPE 39, PROTECTION SADDLES IF INSULATION WITHOUT VAPOR BARRIER IS INDICATED. FILL INTERIOR VOIDS WITH INSULATION THAT MATCHES ADJOINING INSULATION.
3. INSTALL MSS SP-58, TYPE 40, PROTECTIVE SHIELDS ON COLD PIPING WITH VAPOR BARRIER. SHIELDS SHALL SPAN AN ARC OF 180 DEGREES.
4. SHIELD DIMENSIONS FOR PIPE: NOT LESS THAN THE FOLLOWING:
a. NPS 1/4 TO NPS 3-1/2: 12 INCHES LONG AND 0.048 INCH THICK.
b. NPS 4: 12 INCHES LONG AND 0.06 INCH THICK.
c. NPS 5 AND NPS 6: 18 INCHES LONG AND 0.06 INCH THICK.
d. NPS 8 TO NPS 14: 24 INCHES LONG AND 0.075 INCH THICK.
e. NPS 16 TO NPS 24: 24 INCHES LONG AND 0.105 INCH THICK.
5. PIPES NPS 8 AND LARGER: INCLUDE WOOD INSERTS.
6. INSULATE MATERIAL LENGTH AT LEAST AS LONG AS PROTECTIVE SHIELD.
THERMAL-HANGER SHIELDS: INSTALL WITH INSULATION SAME THICKNESS AS PIPING INSULATION.
3.2 HANGER AND SUPPORT INSTALLATION
A. STEEL PIPE HANGER INSTALLATION: COMPLY WITH MSS SP-58 AND MSS SP-59. INSTALL HANGERS, SUPPORTS, CLAMPS, AND ATTACHMENTS AS REQUIRED TO PROPERLY SUPPORT PIPING FROM BUILDING STRUCTURE.
B. TRAPEZE PIPE HANGER INSTALLATION: COMPLY WITH MSS SP-69 AND MSS SP-69. ARRANGE FOR GROUPING OF PARALLEL RUNS OF HORIZONTAL PIPING AND SUPPORT TOGETHER ON FIELD-FABRICATED TRAPEZE PIPE HANGERS.
C. PIPES OF VARIOUS SIZES: SUPPORT TOGETHER AND SPACE TRAPEZES FOR SMALLEST PIPE SIZE OR INSTALL INTERMEDIATE SUPPORTS.
D. THERMAL-HANGER SHIELD INSERTS: INSTALL IN PIPE HANGER OR SHIELD FOR INSULATED PIPING.
E. FASTENER SYSTEM INSTALLATION:
1. INSTALL MECHANICAL-EXPANSION ANCHORS IN CONCRETE AFTER CONCRETE IS PLACED AND COMPLETELY CURED. INSTALL FASTENERS ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.
F. INSTALL HANGERS AND SUPPORTS COMPLETE WITH NECESSARY INSERTS, BOLTS, RODS, NUTS, WASHERS, AND OTHER ACCESSORIES.
G. EQUIPMENT SUPPORT INSTALLATION: FABRICATE FROM WELDED-STRUCTURAL-STEEL SHAPES.
H. INSTALL HANGERS AND SUPPORTS TO ALLOW CONTROLLED THERMAL AND SEISMIC MOVEMENT OF PIPING SYSTEMS, TO PERMIT FREEDOM OF MOVEMENT BETWEEN PIPE (ANCHORS), AND TO FACILITATE ACTION OF EXPANSION JOINTS, EXPANSION LOOPS, EXPANSION BENDS, AND SIMILAR UNITS.
I. INSTALL LATERAL BRACING WITH PIPE HANGERS AND SUPPORTS TO PREVENT SWAYING.
J. INSTALL BUILDING ATTACHMENTS TO STRUCTURAL STEEL. INSTALL ADDITIONAL ATTACHMENTS AT CONCENTRATED LOADS, INCLUDING VALVES, FLANGES, AND STRAINERS. NPS 2-1/2 AND LARGER AND AT CHANGES IN DIRECTION OF INSTALL CONCRETE INSERTS BEFORE CONCRETE IS PLACED; FASTEN INSERTS TO FORMS AND INSTALL REINFORCING BARS THROUGH OPENINGS AT TOP OF INSERTS.
K. LOAD DISTRIBUTION: INSTALL HANGERS AND SUPPORTS SO PIPING LIVE AND DEAD LOADS AND STRESSES FROM MOVEMENT WILL NOT BE TRANSMITTED TO CONNECTED EQUIPMENT.
L. PIPE SLOPES: INSTALL HANGERS AND SUPPORTS TO PROVIDE INDICATED PIPE SLOPES AND SO MAXIMUM PIPE DEFLECTIONS ALLOWED BY ASME B31.9 (FOR BUILDING SERVICES PIPING) ARE NOT EXCEEDED.
M. INSULATED PIPING: COMPLY WITH THE FOLLOWING:
1. ATTACH CLAMPS AND SPACERS TO PIPING.
a. PIPING OPERATING ABOVE AMBIENT AIR TEMPERATURE: CLAMP MAY PROJECT THROUGH INSULATION.
b. PIPING OPERATING BELOW AMBIENT AIR TEMPERATURE: USE THERMAL-HANGER SHIELD INSERT WITH CLAMP SIZED TO MATCH OD OF INSERT.
c. DO NOT EXCEED PIPE STRESS LIMITS ACCORDING TO ASME B31.9 FOR BUILDING SERVICES PIPING.
2. INSTALL MSS SP-58, TYPE 39, PROTECTION SADDLES IF INSULATION WITHOUT VAPOR BARRIER IS INDICATED. FILL INTERIOR VOIDS WITH INSULATION THAT MATCHES ADJOINING INSULATION.
3. INSTALL MSS SP-58, TYPE 40, PROTECTIVE SHIELDS ON COLD PIPING WITH VAPOR BARRIER. SHIELDS SHALL SPAN AN ARC OF 180 DEGREES.
4. SHIELD DIMENSIONS FOR PIPE: NOT LESS THAN THE FOLLOWING:
a. NPS 1/4 TO NPS 3-1/2: 12 INCHES LONG AND 0.048 INCH THICK.
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c. NPS 5 AND NPS 6: 18 INCHES LONG AND 0.06 INCH THICK.
d. NPS 8 TO NPS 14: 24 INCHES LONG AND 0.075 INCH THICK.
e. NPS 16 TO NPS 24: 24 INCHES LONG AND 0.105 INCH THICK.
5. PIPES NPS 8 AND LARGER: INCLUDE WOOD INSERTS.
6. INSULATE MATERIAL LENGTH AT LEAST AS LONG AS PROTECTIVE SHIELD.
THERMAL-HANGER SHIELDS: INSTALL WITH INSULATION SAME THICKNESS AS PIPING INSULATION.
3.3 EQUIPMENT SUPPORTS
A. FABRICATE STRUCTURAL-STEEL STANDS TO SUSPEND EQUIPMENT FROM STRUCTURE OVERHEAD OR TO SUPPORT EQUIPMENT ABOVE FLOOR.
B. GROUTING: PLACE GROUT UNDER SUPPORTS FOR EQUIPMENT AND MAKE SMOOTH BEARING SURFACE.
C. PROVIDE LATERAL BRACING TO PREVENT SWAYING, FOR EQUIPMENT SUPPORTS.
3.4 METAL FABRICATIONS
A. CUT, DRILL, AND FIT MISCELLANEOUS METAL FABRICATIONS FOR TRAPEZE PIPE HANGERS AND EQUIPMENT SUPPORTS.
B. FIT EXPLODED CONNECTIONS TOGETHER TO FORM HAIRLINE JOINTS. FIELD WELD CONNECTIONS THAT CANNOT BE SHOP WELDED BECAUSE OF SHIPPING SIZE LIMITATIONS.
C. FIELD WELDING: COMPLY WITH AWS D11.1 PROCEDURES FOR SHIELDED METAL ARC WELDING, APPEARANCE AND QUALITY OF WELDS, AND METHODS USED IN CORRECTING WELDING WORK, AND WITH THE FOLLOWING:
1. USE MATERIALS AND METHODS THAT MINIMIZE DISTORTION AND DEVELOP STRENGTH AND CORROSION RESISTANCE OF BASE METALS.
2. OBTAIN FUSION WITHOUT UNDERCUT OR OVERLAP.
3. REMOVE WELDING FLUX IMMEDIATELY.
4. FINISH WELDS AT EXPOSED CONNECTIONS SO NO ROUGHNESS SHOWS AFTER FINISHING AND CONTOURS OF WELDED SURFACES MATCH ADJACENT CONTOURS.
3.5 ADJUSTING
A. HANGER ADJUSTMENTS: ADJUST HANGERS TO DISTRIBUTE LOADS EQUALLY ON ATTACHMENTS AND TO ACHIEVE INDICATED SLOPE OF PIPE.

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CONSTRUCTION DOCUMENTS

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D. 3.6 PAINTING A. TOUCH UP: CLEAN FIELD WELDS AND ABRADED AREAS OF SHOP PAINT. PAINT EXPOSED AREAS IMMEDIATELY AFTER ERECTING HANGERS AND SUPPORTS. USE SAME MATERIALS AS USED FOR SHOP PAINTING. COMPLY WITH SSPC-PA 1 REQUIREMENTS FOR TOUCHING UP FIELD-PAINTED SURFACES. 1. APPLY PAINT BY BRUSH OR SPRAY TO PROVIDE MINIMUM DRY FILM THICKNESS OF 2.0 MILS. B. GALVANIZED SURFACES: CLEAN WELDS, BOLTED CONNECTIONS, AND ABRADED AREAS AND APPLY GALVANIZING-REPAIR PAINT TO COMPLY WITH ASTM A 780.

SECTION 220700 - PLUMBING INSULATION (SEE SCHEDULE FOR COORDINATION WITH THIS PROJECT)

PART 1 - GENERAL

1.1 SUMMARY A. SECTION INCLUDES: 1. INSULATION MATERIALS: a. FLEXIBLE ELASTOMERIC. b. MINERAL FIBER. c. POLYOLEFIN. 2. INSULATING CEMENTS. 3. ADHESIVES. 4. MASTICS. 5. SEALANTS. 6. FACTORY-APPLIED JACKETS. 7. FIELD-APPLIED FABRIC-REINFORCING MESH. 8. FIELD-APPLIED JACKETS. 9. TAPES. 10. SECUREMENTS. 11. CORNER ANGLES.

1.2 SUBMITTALS A. PRELIM DATA: FOR EACH TYPE OF PRODUCT INDICATED. B. SHOP DRAWINGS: 1. DETAIL APPLICATION OF PROTECTIVE SHIELDS, SADDLES, AND INSERTS AT HANGERS FOR EACH TYPE OF INSULATION AND HANGER. 2. DETAIL ATTACHMENT AND COVERING OF HEAT TRACING INSULATION. 3. DETAIL INSULATION APPLICATION AT PIPE EXPANSION JOINTS FOR EACH TYPE OF INSULATION. 4. DETAIL INSULATION APPLICATION AT ELBOWS, FITTINGS, FLANGES, VALVES, AND SPECIALTIES FOR EACH TYPE OF INSULATION. 5. DETAIL REMOVABLE INSULATION AT PIPING SPECIALTIES, EQUIPMENT CONNECTIONS, AND ACCESS PANELS. 6. DETAIL APPLICATION OF FIELD-APPLIED JACKETS. 7. DETAIL APPLICATION AT LINKAGES OF CONTROL DEVICES. 8. DETAIL FIELD APPLICATION FOR EACH EQUIPMENT TYPE. C. FIELD QUALITY-CONTROL REPORTS.

1.3 QUALITY ASSURANCE A. FIRE-TEST-RESPONSE CHARACTERISTICS: INSULATION AND RELATED MATERIALS SHALL HAVE FIRE-TEST-RESPONSE CHARACTERISTICS INDICATED, AS DETERMINED BY TESTING IDENTICAL PRODUCTS PER ASTM E 84, BY A TESTING AND INSPECTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION. FACTORY LABEL INSULATION AND JACKET MATERIALS AND ADHESIVE, MASTIC, TAPES, AND CEMENT MATERIAL CONTAINERS, WITH APPROPRIATE MARKINGS OF APPLICABLE TESTING AND INSPECTING AGENCY. 1. INSULATION INSTALLED INDOORS: FLAME-SPREAD INDEX OF 75 OR LESS, AND SMOKE-DEVELOPED INDEX OF 50 OR LESS. 2. INSULATION INSTALLED OUTDOORS: FLAME-SPREAD INDEX OF 25 OR LESS, AND SMOKE-DEVELOPED INDEX OF 150 OR LESS.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS A. COMPLY WITH SCHEDULED REQUIREMENTS ILLUSTRATED ON THE DRAWINGS FOR WHERE INSULATING MATERIALS SHALL BE APPLIED. B. PRODUCTS SHALL NOT CONTAIN ASBESTOS, LEAD, MERCURY, OR MERCURY COMPOUNDS. C. PRODUCTS THAT COME IN CONTACT WITH STAINLESS STEEL SHALL HAVE A LEACHABLE CHLORIDE CONTENT OF LESS THAN 50 PPM WHEN TESTED ACCORDING TO ASTM C 871. D. INSULATION MATERIALS FOR USE ON AUSTENITIC STAINLESS STEEL SHALL BE QUALIFIED AS ACCEPTABLE ACCORDING TO ASTM C 795. E. FOAM INSULATION MATERIALS SHALL NOT USE CFC OR HCFC BLEWING AGENTS IN THE MANUFACTURING PROCESS. F. FLEXIBLE ELASTOMERIC: CLOSED-CELL, SPONGE-OR EXPANDED-RUBBER MATERIALS. COMPLY WITH ASTM C 534, TYPE I FOR TUBULAR MATERIALS AND TYPE II FOR SHEET MATERIALS. 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING: a. AEROFLEX USA INC.; AEROCEL. b. ARMACELL LLC; AP ARMAFLEX. c. RBX CORPORATION; INSUL-SHEET 1800 AND INSUL-TUBE 180. G. HIGH-TEMPERATURE, MINERAL-FIBER BLANKET INSULATION: MINERAL OR GLASS FIBERS BONDED WITH A THERMOSETTING RESIN. COMPLY WITH ASTM C 553, TYPE V, WITHOUT FACTORY-APPLIED JACKET. 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING: a. JOHNS MANVILLE; HTB 23 SPIN-GLAS. b. OWENS CORNING; HIGH TEMPERATURE FLEXIBLE BATT INSULATIONS. H. HIGH-TEMPERATURE, MINERAL-FIBER BOARD INSULATION: MINERAL OR GLASS FIBERS BONDED WITH A THERMOSETTING RESIN. COMPLY WITH ASTM C 612, TYPE III, WITHOUT FACTORY-APPLIED JACKET. 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING: a. JOHNS MANVILLE; 1000 SERIES SPIN-GLAS. b. OWENS CORNING; HIGH TEMPERATURE INDUSTRIAL BOARD INSULATIONS. c. ROCK WOOL MANUFACTURING COMPANY; DELTA BOARD. I. MINERAL-FIBER, PREFORMED PIPE INSULATION: 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING: a. JOHNS MANVILLE; MICRO-LOK. b. KNAUF INSULATION; 1000 PIPE INSULATION. c. OWENS CORNING; FIBERGLAS PIPE INSULATION. 2. TYPE I, 850 DEG F MATERIALS: MINERAL OR GLASS FIBERS BONDED WITH A THERMOSETTING RESIN. COMPLY WITH ASTM C 547, TYPE I, GRADE A, WITH FACTORY-APPLIED ASJ-SSL. FACTORY-APPLIED JACKET REQUIREMENTS ARE SPECIFIED IN "FACTORY-APPLIED JACKETS" ARTICLE. J. MINERAL-FIBER, PIPE AND TANK INSULATION: MINERAL OR GLASS FIBERS BONDED WITH A THERMOSETTING RESIN. SEMIRIGID BOARD MATERIAL WITH FACTORY-APPLIED ASJ COMPLYING WITH ASTM C 1393, TYPE II OR TYPE IIIA CATEGORY 2, OR WITH PROPERTIES SIMILAR TO ASTM C 612, TYPE IB. NOMINAL DENSITY IS 2.5 LB/CU. FT. OR MORE. THERMAL CONDUCTIVITY (K-VALUE) AT 100 DEG F IS 0.29 BTU X IN./H. X SQ. FT. X DEG F OR LESS. FACTORY-APPLIED JACKET REQUIREMENTS ARE SPECIFIED IN "FACTORY-APPLIED JACKETS" ARTICLE. 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING: a. CERTANTEED CORP.; CRIMPWRAP. b. JOHNS MANVILLE; MICROFLEX. c. KNAUF INSULATION; PIPE AND TANK INSULATION. d. OWENS CORNING; FIBERGLAS PIPE AND TANK INSULATION. K. POLYOLEFIN: UNICELLULAR, POLYETHYLENE THERMAL PLASTIC INSULATION. COMPLY WITH ASTM C 534 OR ASTM C 1427, TYPE I, GRADE 1 FOR TUBULAR MATERIALS AND TYPE II, GRADE 1 FOR SHEET MATERIALS. 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING: a. ARMACELL LLC; TUBOLIT. b. NOMACO INC.; IMCOLOCK, IMCOSHEET, NOMALOCK, AND NOMAPLY. c. RBX CORPORATION; THERMA-CELL.

2.2 INSULATING CEMENTS A. MINERAL-FIBER, HYDRAULIC-SETTING INSULATING AND FINISHING CEMENT: COMPLY WITH ASTM C 449/C 449M. 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING: a. INSULCO, DIVISION OF MFS, INC.; SMOOTHKOTE. b. INSULATION MFG. CO., INC.; PK NO. 127, AND QUIK-COTE. c. ROCK WOOL MANUFACTURING COMPANY; DELTA ONE SHOT.

2.3 ADHESIVES A. MATERIALS SHALL BE COMPATIBLE WITH INSULATION MATERIALS, JACKETS, AND SUBSTRATES AND FOR BONDING INSULATION TO ITSELF AND TO SURFACES TO BE INSULATED, UNLESS OTHERWISE INDICATED. 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING: a. CHILDERS PRODUCTS, DIVISION OF ITW; CP-96. b. FOSTER PRODUCTS CORPORATION, H. B. FULLER COMPANY; 81-33. B. FLEXIBLE ELASTOMERIC AND POLYOLEFIN ADHESIVE: COMPLY WITH MIL-A-24179A, TYPE II, CLASS I. 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING: a. AEROFLEX USA INC.; AEROSOL-B. ARMACELL LLC; 520 ADHESIVE. c. FOSTER PRODUCTS CORPORATION, H. B. FULLER COMPANY. d. FOSTER PRODUCTS CORPORATION; RUBATEX CONTACT ADHESIVE. C. MINERAL-FIBER ADHESIVE: COMPLY WITH MIL-A-3316C, CLASS 2, GRADE A. 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING: a. CHILDERS PRODUCTS, DIVISION OF ITW; CP-82. b. FOSTER PRODUCTS CORPORATION, H. B. FULLER COMPANY; 85-20. c. ITW TACC, DIVISION OF ILLINOIS TOOL WORKS; S-90/80. D. ASJ ADHESIVE, AND FSK AND PVDC JACKET ADHESIVE: COMPLY WITH MIL-A-3316C, CLASS 2, GRADE A FOR BONDING INSULATION JACKET LAP SEAMS AND HANGERS. 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING: a. CHILDERS PRODUCTS, DIVISION OF ITW; CP-82. b. FOSTER PRODUCTS CORPORATION, H. B. FULLER COMPANY; 85-20. E. PVC JACKET ADHESIVE: COMPATIBLE WITH PVC. 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING: a. DOW CHEMICAL COMPANY (THE); 739; DOW SILICONE. b. JOHNS-MANVILLE; ZESTON PERMA-WELD, CEEL-TITE SOLVENT WELDING ADHESIVE. c. SPEEDLINE CORPORATION; SPEEDLINE VINYL ADHESIVE.

2.4 MASTICS MATERIALS SHALL BE COMPATIBLE WITH INSULATION MATERIALS, JACKETS, AND SUBSTRATES; COMPLY WITH MIL-C-19565C, TYPE II. B. VAPOR-BARRIER MASTIC: WATER BASED; SUITABLE FOR INDOOR AND OUTDOOR USE ON BELOW AMBIENT SERVICES. 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING: a. CHILDERS PRODUCTS, DIVISION OF ITW; CP-35. b. FOSTER PRODUCTS CORPORATION, H. B. FULLER COMPANY; 30-90. c. MARATHON INDUSTRIES, INC.; 590. 2. WATER-VAPOR PERMEANCE: ASTM E 96, PROCEDURE B, 0.013 PERM AT 43-MIL DRY FILM THICKNESS. 3. SERVICE TEMPERATURE RANGE: MINUS 20 TO PLUS 180 DEG F. 4. SOLIDS CONTENT: ASTM D 1644, 59 PERCENT BY VOLUME AND 71 PERCENT BY WEIGHT. 5. COLOR: WHITE.

2.5 SEALANTS A. JOINT SEALANTS: 1. JOINT SEALANTS FOR POLYSTYRENE PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING: a. CHILDERS PRODUCTS, DIVISION OF ITW; CP-70. b. FOSTER PRODUCTS CORPORATION, H. B. FULLER COMPANY; 30-45/30-46. c. MARATHON INDUSTRIES, INC.; 405. 2. MATERIALS SHALL BE COMPATIBLE WITH INSULATION MATERIALS, JACKETS, AND SUBSTRATES.

PERMANENTLY FLEXIBLE, ELASTOMERIC SEALANT. 1. SERVICE TEMPERATURE RANGE: MINUS 100 TO PLUS 300 DEG F. 2. COLOR: WHITE OR GRAY. B. FSK AND METAL JACKET FLASHING SEALANTS: 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING: a. CHILDERS PRODUCTS, DIVISION OF ITW; CP-76-B. b. FOSTER PRODUCTS CORPORATION, H. B. FULLER COMPANY; 95-44. c. MARATHON INDUSTRIES, INC.; 405. 2. MATERIALS SHALL BE COMPATIBLE WITH INSULATION MATERIALS, JACKETS, AND SUBSTRATES. 3. FIRE- AND WATER-RESISTANT, FLEXIBLE, ELASTOMERIC SEALANT. 4. SERVICE TEMPERATURE RANGE: MINUS 40 TO PLUS 250 DEG F. 5. COLOR: ALUMINUM. C. ASJ FLASHING SEALANTS, AND VINYL, PVDC, AND PVC JACKET FLASHING SEALANTS: 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING: a. CHILDERS PRODUCTS, DIVISION OF ITW; CP-76. 1. MATERIALS SHALL BE COMPATIBLE WITH INSULATION MATERIALS, JACKETS, AND SUBSTRATES. 2. FIRE- AND WATER-RESISTANT, FLEXIBLE, ELASTOMERIC SEALANT. 3. SERVICE TEMPERATURE RANGE: MINUS 40 TO PLUS 250 DEG F. 4. COLOR: WHITE.

2.6 FACTORY-APPLIED JACKETS A. INSULATION SYSTEM SCHEDULES INDICATE FACTORY-APPLIED JACKETS ON VARIOUS APPLICATIONS. WHEN FACTORY-APPLIED JACKETS ARE INDICATED, COMPLY WITH THE FOLLOWING: 1. ASJ: WHITE, KRAFT-PAPER, FIBERGLASS-REINFORCED SCRIM WITH ALUMINUM-FOIL BACKING; COMPLYING WITH ASTM C 1136, TYPE I. 2. ASJ-SSL: ASJ WITH SELF-SEALING, PRESSURE-SENSITIVE, ACRYLIC-BASED ADHESIVE COVERED BY A REMOVABLE PROTECTIVE STRIP; COMPLYING WITH ASTM C 1136, TYPE I. 3. FSK JACKET: ALUMINUM-FOIL, FIBERGLASS-REINFORCED SCRIM WITH KRAFT-PAPER BACKING; COMPLYING WITH ASTM C 1136, TYPE II.

2.7 FIELD-APPLIED FABRIC-REINFORCING MESH A. WOVEN POLYESTER FABRIC: APPROXIMATELY 1 OZ./SQ. YD. WITH A THREAD COUNT OF 10 STRANDS BY 10 STRANDS/SQ. INCH, IN A LENO WEAVE, FOR EQUIPMENT AND PIPE. 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING: a. FOSTER PRODUCTS CORPORATION, H. B. FULLER COMPANY; MAST-A-FAB. b. VIMASCO CORPORATION; ELASTAFAB 894.

2.8 FIELD-APPLIED JACKETS A. FIELD-APPLIED JACKETS SHALL COMPLY WITH ASTM C 921, TYPE I, UNLESS OTHERWISE INDICATED. B. PVC JACKET: HIGH-IMPACT-RESISTANT, UV-RESISTANT PVC COMPLYING WITH ASTM D 1784, CLASS 16354-C; THICKNESS AS SCHEDULED; ROLL STOCK READY FOR SHOP OR FIELD CUTTING AND FORMING. THICKNESS IS INDICATED IN FIELD-APPLIED JACKET SCHEDULES. 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING: a. JOHNS MANVILLE; ZESTON. b. PLASTICS, INC.; FG SERIES. c. PROTO PVC CORPORATION; LOSMOKE. d. SPEEDLINE CORPORATION; SMOCKSAFE. 2. ADHESIVE: AS RECOMMENDED BY JACKET MATERIAL MANUFACTURER. 3. COLOR: WHITE. 4. FACTORY-FABRICATED FITTING COVERS TO MATCH JACKET IF AVAILABLE; OTHERWISE, FIELD FABRICATE. a. 45- AND 90-DEGREE, SHORT- AND LONG-RADIUS ELBOWS, TEES, VALVES, FLANGES, UNIONS, REDUCERS, END CAPS, SOIL-PIPE HUBS, TRAPS, MECHANICAL JOINTS, AND P-TRAP AND SUPPLY COVERS FOR LAVATORIES. 5. FACTORY-FABRICATED TANK HEADS AND TANK SIDE PANELS. C. ALUMINUM JACKET: COMPLY WITH ASTM B 209, ALLOY 3003, 3005, 3105 OR 5005, TEMPER H-14. 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING: a. CHILDERS PRODUCTS, DIVISION OF ITW; METAL JACKETING SYSTEMS. b. PABCO METALS CORPORATION; SUREFIT. c. RPR PRODUCTS, INC.; INSUL-MATE. 2. SHEET AND ROLL STOCK READY FOR SHOP OR FIELD SIZING OR FACTORY CUT AND ROLLED TO SIZE. 3. FINISH AND THICKNESS ARE INDICATED IN FIELD-APPLIED JACKET SCHEDULES. 4. MOISTURE BARRIER FOR INDOOR APPLICATIONS: 1-MIL THICK, HEAT-BONDED POLYETHYLENE AND KRAFT PAPER. 5. MOISTURE BARRIER FOR OUTDOOR APPLICATIONS: 2.5-MIL THICK POLYSURFOLIN. 6. FACTORY-FABRICATED FITTING COVERS: a. SAME MATERIAL, FINISH, AND THICKNESS AS JACKET. b. PREFORMED 2-PIECE OR GORE, 45- AND 90-DEGREE, SHORT- AND LONG-RADIUS ELBOWS. c. TEE COVERS. d. FLANGE AND UNION COVERS. e. END CAPS. f. BEVELED COLLARS. g. VALVE COVERS. h. FIELD FABRICATE FITTING COVERS ONLY IF FACTORY-FABRICATED FITTING COVERS ARE NOT AVAILABLE.

2.9 TAPES A. ASJ TAPE: WHITE VAPOR-RETARDER TAPE MATCHING FACTORY-APPLIED JACKET WITH ACRYLIC ADHESIVE, COMPLYING WITH ASTM C 1136. 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING: a. AVERY DENNISON CORPORATION, SPECIALTY TAPES DIVISION; FASSON 0835. b. COMPAQ CORP.; 104 AND 105. c. IDEAL TAPE CO., INC., AN AMERICAN BILTRITE COMPANY; 428 AWF ASJ. d. VENTURE TAPE; 1540 CW PLUS, 1542 CW PLUS, AND 1542 CW PLUS/SQ. 2. WIDTH: 3 INCHES. 3. THICKNESS: 11.5 MILS. 4. ADHESION: 90 OUNCES FORCE/INCH IN WIDTH. 5. ELONGATION: 2 PERCENT. 6. TENSILE STRENGTH: 40 LBF/INCH IN WIDTH. 7. ASJ TAPE DISKS AND SQUARES: PRECUT DISKS OR SQUARES OF ASJ TAPE. B. FSK TAPE: POLYURETHANE VAPOR-RETARDER TAPE MATCHING FACTORY-APPLIED JACKET WITH ACRYLIC ADHESIVE; COMPLYING WITH ASTM C1136. 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING: a. AVERY DENNISON CORPORATION, SPECIALTY TAPES DIVISION; FASSON 0827. b. COMPAQ CORP.; 110 AND 111. c. IDEAL TAPE CO., INC., AN AMERICAN BILTRITE COMPANY; 491 AWF FSK. d. VENTURE TAPE; 1525 CW, 1528 CW, AND 1528 CW/SQ. 2. WIDTH: 3 INCHES. 3. THICKNESS: 6 MILS. 4. ADHESION: 90 OUNCES FORCE/INCH IN WIDTH. 5. ELONGATION: 2 PERCENT. 6. TENSILE STRENGTH: 40 LBF/INCH IN WIDTH. 7. FSK TAPE DISKS AND SQUARES: PRECUT DISKS OR SQUARES OF FSK TAPE. C. PVC TAPE: WHITE VAPOR-RETARDER TAPE MATCHING FIELD-APPLIED PVC JACKET WITH ACRYLIC ADHESIVE. SUITABLE FOR INDOOR AND OUTDOOR APPLICATIONS. 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING: a. AVERY DENNISON CORPORATION, SPECIALTY TAPES DIVISION; FASSON 0555. b. COMPAQ CORP.; 130. c. IDEAL TAPE CO., INC., AN AMERICAN BILTRITE COMPANY; 370 WHITE PVC TAPE. d. VENTURE TAPE; 1506 CW NS. 2. WIDTH: 2 INCHES. 3. THICKNESS: 6 MILS. 4. ADHESION: 100 OUNCES FORCE/INCH IN WIDTH. 5. ELONGATION: 500 PERCENT. 6. TENSILE STRENGTH: 18 LBF/INCH IN WIDTH. D. ALUMINUM-FOIL TAPE: VAPOR-RETARDER TAPE WITH ACRYLIC ADHESIVE. 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING: a. AVERY DENNISON CORPORATION, SPECIALTY TAPES DIVISION; FASSON 0800. b. COMPAQ CORP.; 120. c. IDEAL TAPE CO., INC., AN AMERICAN BILTRITE COMPANY; 488 AWF. d. VENTURE TAPE; 3520 CW. 2. WIDTH: 2 INCHES. 3. THICKNESS: 3.7 MILS. 4. ADHESION: 100 OUNCES FORCE/INCH IN WIDTH. 5. ELONGATION: 5 PERCENT. 6. TENSILE STRENGTH: 34 LBF/INCH IN WIDTH.

2.10 SECUREMENTS A. ALUMINUM BANDS: ASTM B 209, ALLOY 3003, 3005, 3105, OR 5005; TEMPER H-14, 0.020 INCH THICK, 3/4 INCH WIDE WITH WING OR CLOSED SEAL. 1. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING: a. CHILDERS PRODUCTS; BANDS. b. PABCO METALS CORPORATION; BANDS. c. RPR PRODUCTS, INC.; BANDS. B. INSULATION PINS AND HANGERS 1. METAL, ADHESIVELY ATTACHED, PERFORATED-BASE INSULATION HANGERS: BASEPLATE WELDED TO PROJECTING SPINDLE THAT IS CAPABLE OF HOLDING INSULATION, OF THICKNESS INDICATED, SECURELY IN POSITION INDICATED WHEN SELF-LOCKING WASHER IS IN COMPLY WITH THE FOLLOWING REQUIREMENTS: a. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING: * AGM INDUSTRIES, INC.; TACTOO INSUL-HANGERS, SERIES I. * GEMCO; PERFORATED BASE. * MIDWEST FASTENERS, INC.; SPINDLE. b. BASEPLATE: PERFORATED, GALVANIZED CARBON-STEEL SHEET, 0.030 INCH THICK BY 2 INCHES SQUARE. c. SPINDLE: STAINLESS STEEL, FULLY ANNEALED, 0.106-INCH DIAMETER SHANK, LENGTH TO SUIT DEPTH OF INSULATION INDICATED. d. ADHESIVE: RECOMMENDED BY HANGER MANUFACTURER. PRODUCT WITH DEMONSTRATED CAPABILITY TO BOND INSULATION HANGER SECURELY TO SUBSTRATES INDICATED WITHOUT DAMAGING INSULATION, HANGERS, AND SUBSTRATES. 2. NONMETAL, ADHESIVELY ATTACHED, PERFORATED-BASE INSULATION HANGERS: BASEPLATE FASTENED TO PROJECTING SPINDLE THAT IS CAPABLE OF HOLDING INSULATION, OF THICKNESS INDICATED, SECURELY IN POSITION INDICATED WHEN SELF-LOCKING WASHER IS IN COMPLY WITH THE FOLLOWING REQUIREMENTS: a. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING: * GEMCO; NYLON HANGERS. * MIDWEST FASTENERS, INC.; NYLON INSULATION HANGERS. b. BASEPLATE: PERFORATED, NYLON SHEET, 0.030 INCH THICK BY 1-1/2 INCHES IN DIAMETER. c. SPINDLE: NYLON, 0.106-INCH DIAMETER SHANK, LENGTH TO SUIT DEPTH OF INSULATION INDICATED, UP TO 2-1/2 INCHES. d. ADHESIVE: RECOMMENDED BY HANGER MANUFACTURER. PRODUCT WITH DEMONSTRATED CAPABILITY TO BOND INSULATION HANGER SECURELY TO SUBSTRATES INDICATED WITHOUT DAMAGING INSULATION, HANGERS, AND SUBSTRATES. 3. INSULATION-RETAINING WASHERS: SELF-LOCKING WASHERS FORMED FROM 0.016-INCH THICK, STAINLESS-STEEL SHEET, WITH BEVELED EDGE SIZED AS REQUIRED TO HOLD INSULATION SECURELY IN PLACE BUT NOT LESS THAN 1-1/2 INCHES IN DIAMETER. a. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING: * AGM INDUSTRIES, INC.; RC-150. * GEMCO; R-150. * MIDWEST FASTENERS, INC.; WA-150. b. NELSON STUD WELDING; SPEED CLIPS. c. PROTECT ENDS WITH CARPED SELF-LOCKING WASHERS INCORPORATING A SPRING STEEL INSERT TO ENSURE PERMANENT RETENTION OF CAP IN EXPOSED LOCATIONS.

C. STAPLES: OUTWARD-CLINCHING INSULATION STAPLES, NOMINAL 3/4-INCH WIDE, STAINLESS STEEL OR MONEL. D. WIRE: 0.062-INCH SOFT-ANNEALED, STAINLESS STEEL. 1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: a. C & F WITH CHILDERS PRODUCTS. c. RPR PRODUCTS, INC. 2.11 CORNER ANGLES A. PVC CORNER ANGLES: 30 MILS THICK, MINIMUM 1 BY 1 INCH, PVC ACCORDING TO ASTM D 1784, CLASS 16354-C. WHITE OR COLOR-CODED TO MATCH ADJACENT SURFACE. B. ALUMINUM CORNER ANGLES: 0.040 INCH THICK, MINIMUM 1 BY 1 INCH, ALUMINUM ACCORDING TO ASTM B 209, ALLOY 3003, 3005, 3105 OR 5005; TEMPER H-14.

PART 3 - EXECUTION

3.1 PREPARATION A. SURFACE PREPARATION: CLEAN AND DRY SURFACES TO RECEIVE INSULATION. REMOVE MATERIALS THAT WILL ADVERSELY AFFECT INSULATION INSTALLATION. B. COORDINATE INSULATION INSTALLATION WITH THE TRADE INSTALLING HEAT TRACING. COMPLY WITH REQUIREMENTS FOR HEAT TRACING THAT APPLY TO INSULATION. C. MIX INSULATING CEMENTS WITH CLEAN POTABLE WATER; IF INSULATING CEMENTS ARE TO BE IN CONTACT WITH STAINLESS-STEEL SURFACES, USE DEMINERALIZED WATER.

3.2 GENERAL INSTALLATION REQUIREMENTS A. INSTALL INSULATION MATERIALS, ACCESSORIES, AND FINISHES WITH SMOOTH, STRAIGHT, AND EVEN SURFACES; FREE OF VOIDS THROUGHOUT THE LENGTH OF EQUIPMENT AND PIPING INCLUDING FITTINGS, VALVES, AND SPECIALTIES. B. INSTALL INSULATION MATERIALS, FORMS, VAPOR BARRIERS OR RETARDERS, JACKETS, AND THICKNESSES REQUIRED FOR EACH ITEM OF EQUIPMENT AND PIPE SYSTEM AS SPECIFIED IN INSULATION SYSTEM SCHEDULES. C. INSTALL ACCESSORIES COMPATIBLE WITH INSULATION MATERIALS AND SUITABLE FOR THE SERVICE. INSTALL ACCESSORIES THAT DO NOT CORRODE, SOFTEN, OR OTHERWISE ATTACK INSULATION OR JACKET EITHER WET OR DRY STATE. D. INSTALL INSULATION WITH LONGITUDINAL SEAMS AT TOP AND BOTTOM OF HORIZONTAL RUNS. E. INSTALL MULTIPLE LAYERS OF INSULATION WITH LONGITUDINAL AND END SEAMS STAGGERED. F. DO NOT WELD BRACKETS, CLIPS, OR OTHER ATTACHMENT DEVICES TO PIPING, FITTINGS, AND SPECIALTIES. G. KEEP INSULATION MATERIALS DRY DURING APPLICATION AND FINISHING. H. INSTALL INSULATION WITH TIGHT LONGITUDINAL SEAMS AND END JOINTS. BOND SEAMS AND JOINTS WITH ADHESIVE RECOMMENDED BY INSULATION MATERIAL MANUFACTURER. I. INSTALL INSULATED JOINTS WITH 3-INCH-WIDE STRIPS, OF SAME MATERIAL AS INSULATION JACKET. SECURE STRIPS WITH WHERE VAPOR BARRIER IS INDICATED, SEAL JOINTS, SEAMS, AND PENETRATIONS IN INSULATION AT HANGERS, SUPPORTS, ANCHORS, AND OTHER PROJECTIONS WITH VAPOR-BARRIER MASTIC. J. INSTALL INSULATION CONTINUOUSLY THROUGH HANGERS AND AROUND ANCHOR ATTACHMENTS. 1. INSTALL INSULATION APPLICATION WHERE VAPOR BARRIERS ARE INDICATED, EXTEND INSULATION ON ANCHOR LESS FROM POINT OF ATTACHMENT TO SUPPORTED ITEM TO POINT OF ATTACHMENT TO STRUCTURE. TAPER AND SEAL ENDS AT ATTACHMENT TO STRUCTURE WITH VAPOR-BARRIER MASTIC. 3. INSTALL INSERT MATERIALS AS INSTALL INSULATION TO TIGHTLY JOIN THE INSERT. SEAL INSULATION TO INSULATION INSERTS WITH ADHESIVE OR SEALING COMPOUND RECOMMENDED BY INSULATION MATERIAL MANUFACTURER. 4. COVER INSERTS WITH JACKET MATERIAL MATCHING ADJACENT PIPE INSULATION. INSTALL SHIELDS OVER JACKET, ARRANGED TO PROTECT JACKET FROM RUBBING OR PUNCTURE BY HANGER, SUPPORT, AND SHIELD. K. APPLY ADHESIVES, MASTICS, AND SEALANTS AT MANUFACTURER'S RECOMMENDED COVERAGE RATE AND WET AND DRY FILM THICKNESSES. L. INSTALL INSULATION WITH FACTORY-APPLIED JACKETS AS FOLLOWS: 1. DRAW JACKET TIGHT AND SMOOTH. 2. COVER CIRCUMFERENTIAL JOINTS WITH 3-INCH-WIDE STRIPS, OF SAME MATERIAL AS INSULATION JACKET. SECURE STRIPS WITH ADHESIVE AND OUTWARD CLINCHING STAPLES ALONG BOTH EDGES OF STRIP, SPACED 4 INCHES O.C. 3. OVERLAP JACKET LONGITUDINAL SEAMS AT LEAST 1-1/2 INCHES. INSTALL INSULATION WITH LONGITUDINAL SEAMS AT BOTTOM OF PIPE. CLEAN AND DRY SURFACE TO RECEIVE SELF-SEALING LAP. STAPLE LAPS WITH OUTWARD CLINCHING STAPLES ALONG EDGE AT 4 INCHES O.C. (WHERE STAPLES ARE USED). A. FOR BELOW AMBIENT SERVICES, APPLY VAPOR-BARRIER MASTIC OVER STAPLES. 4. COVER JOINTS AND SEAMS WITH TAPE AS RECOMMENDED BY INSULATION MATERIAL MANUFACTURER TO MAINTAIN VAPOR SEAL. 5. WHERE VAPOR BARRIERS ARE INDICATED, APPLY VAPOR-BARRIER MASTIC ON SEAMS AND JOINTS AND AT ENDS ADJACENT TO PIPE FLANGES AND FITTINGS. M. CUT INSULATION IN A MANNER TO AVOID COMPRESSING INSULATION MORE THAN 75 PERCENT OF ITS NOMINAL THICKNESS. N. FINISH INSTALLATION WITH SYSTEMS AT OPERATING CONDITIONS. REPAIR JOINT SEPARATIONS AND CRACKING DUE TO THERMAL MOVEMENT. O. REPAIR DAMAGED INSULATION FACINGS BY APPLYING SAME FACING MATERIAL OVER DAMAGED AREAS. EXTEND PATCHES AT LEAST 4 INCHES BEYOND DAMAGED AREAS. ADHERE, STAPLE, AND SEAL PATCHES SIMILAR TO BUTT JOINTS. P. FOR ABOVE AMBIENT SERVICES, DO NOT INSTALL INSULATION TO THE FOLLOWING: 1. VIBRATION-CONTROL DEVICES. 2. TESTING AGENCY LABELS AND STAMPS. 3. NAMEPLATES AND DATA PLATES. 4. MANHOLES. 5. HANDHOLES. 6. CLEANOUTS.

3.3 PENETRATIONS

A. INSULATION INSTALLATION AT ROOF PENETRATIONS: INSTALL INSULATION CONTINUOUSLY THROUGH ROOF PENETRATIONS. 1. SEAL PENETRATIONS WITH FLASHING SEALANT. 2. FOR APPLICATIONS REQUIRING ONLY INDOOR INSULATION, TERMINATE INSULATION ABOVE ROOF SURFACE AND SEAL WITH JOINT SEALANT. FOR APPLICATIONS REQUIRING INDOOR AND OUTDOOR INSULATION, INSTALL INSULATION FOR OUTDOOR APPLICATIONS TIGHTLY JOINED TO INDOOR INSULATION ENDS. SEAL JOINT WITH JOINT SEALANT. 3. EXTEND JACKET OF OUTDOOR INSULATION OUTSIDE ROOF FLASHING AT LEAST 2 INCHES BELOW TOP OF ROOF FLASHING. B. INSULATION INSTALLATION AT ABOVEGROUND EXTERIOR WALL PENETRATIONS: INSTALL INSULATION CONTINUOUSLY THROUGH WALL PENETRATIONS. 1. SEAL PENETRATIONS WITH FLASHING SEALANT. 2. FOR APPLICATIONS REQUIRING ONLY INDOOR INSULATION, TERMINATE INSULATION INSIDE WALL SURFACE AND SEAL WITH JOINT SEALANT. FOR APPLICATIONS REQUIRING INDOOR AND OUTDOOR INSULATION, INSTALL INSULATION FOR OUTDOOR APPLICATIONS TIGHTLY JOINED TO INDOOR INSULATION ENDS. SEAL JOINT WITH JOINT SEALANT. 3. EXTEND JACKET OF OUTDOOR INSULATION OUTSIDE WALL FLASHING AND OVERLAP WALL FLASHING AT LEAST 2 INCHES. 4. SEAL JACKET TO WALL FLASHING WITH FLASHING SEALANT. C. INSULATION INSTALLATION AT INTERIOR WALL AND PARTITION PENETRATIONS (THAT ARE NOT FIRE RATED): INSTALL INSULATION CONTINUOUSLY THROUGH WALLS AND PARTITIONS. D. INSULATION INSTALLATION AT FIRE-RATED WALL AND PARTITION PENETRATIONS: INSTALL INSULATION CONTINUOUSLY THROUGH PENETRATIONS OF FIRE-RATED WALLS AND PARTITIONS. E. INSULATION INSTALLATION AT FLOOR PENETRATIONS: 1. PIPE: INSTALL INSULATION CONTINUOUSLY THROUGH FLOOR PENETRATIONS. 2. SEAL PENETRATIONS THROUGH FIRE-RATED ASSEMBLIES.

3.4 EQUIPMENT, TANK, AND VESSEL INSULATION INSTALLATION

A. MINERAL FIBER, PIPE AND TANK INSULATION INSTALLATION FOR TANKS AND VESSELS: SECURE INSULATION WITH ADHESIVE AND ANCHOR PINS AND SPEED WASHERS. 1. APPLY ADHESIVES ACCORDING TO MANUFACTURER'S RECOMMENDED COVERAGE RATES PER UNIT AREA, FOR 100 PERCENT COVERAGE OF TANK AND VESSEL SURFACES. 2. GROOVE AND SCORE INSULATION MATERIALS TO FIT AS CLOSELY AS POSSIBLE TO EQUIPMENT, INCLUDING CONTOURS. BEVEL INSULATION EDGES FOR CYLINDRICAL SURFACES FOR TIGHT JOINTS. STAGGER END JOINTS. 3. PROTECT EXPOSED CORNERS WITH SECURED CORNER ANGLES. 4. INSTALL ADHESIVELY ATTACHED OR SELF-STICKING INSULATION HANGERS AND SPEED WASHERS ON SIDES OF TANKS AND VESSELS AS FOLLOWS: a. DO NOT WELD ANCHOR PINS TO ASME-LABELED PRESSURE VESSELS. b. SELECT INSULATION HANGERS AND ADHESIVE THAT ARE COMPATIBLE WITH SERVICE TEMPERATURE AND WITH SUBSTRATE. c. ON TANKS AND VESSELS, MAXIMUM ANCHOR-PIN SPACING IS 3 INCHES FROM INSULATION END JOINTS, AND 16 INCHES O.C. IN BOTH DIRECTIONS. d. DO NOT OVERCOMPRESS INSULATION DURING INSTALLATION. e. CUT AND MITER INSULATION SEGMENTS TO FIT CURVED SIDES AND DOWED HEADS OF TANKS AND VESSELS. f. IMPALE INSULATION OVER ANCHOR PINS AND ATTACH SPEED WASHERS. g. CUT EXCESS PORTION OF PINS EXTENDING BEYOND SPEED WASHERS OR BEND PARALLEL WITH INSULATION SURFACE. COVER EXPOSED PINS AND WASHERS WITH TAPE MATCHING INSULATION FACING. 5. SECURE EACH LAYER OF INSULATION WITH STAINLESS-STEEL OR ALUMINUM BANDS. SELECT BAND MATERIAL COMPATIBLE WITH INSULATION MATERIALS. 6. WHERE INSULATION HANGERS ON EQUIPMENT AND VESSELS ARE NOT PERMITTED OR PRACTICAL AND WHERE INSULATION SUPPORT RINGS ARE NOT PROVIDED, INSTALL A GRID NETWORK FOR SECURING INSULATION. STRETCH PRESTRESSED AIRCRAFT CABLE AROUND THE DIAMETER OF VESSEL AND MAKE TIGHT WITH CLAMPS, TURNBUCKLES, OR BREATHER SPRINGS. PLACE ONE CIRCUMFERENTIAL GRIDLE AROUND EQUIPMENT APPROXIMATELY 6 INCHES FROM EACH END. INSTALL WIRE OR CABLE TENSILE STRENGTH OF TWO CIRCUMFERENTIAL GRIDLES 12 INCHES O.C. INSTALL A WIRE RING AROUND EACH END AND AROUND OUTER PERIPHERY OF CENTER OPENINGS, AND STRETCH PRESTRESSED AIRCRAFT CABLE RADIALLY FROM THE WIRE RING TO NEAREST CIRCUMFERENTIAL GRIDLE. INSTALL ADDITIONAL CIRCUMFERENTIAL GRIDLES ALONG THE BODY OF EQUIPMENT OR TANK AT A MINIMUM SPACING OF 48 INCHES O.C. USE THIS NETWORK FOR SECURING INSULATION WITH THE WIRE OR BANDS. 7. STAGGER JOINTS BETWEEN INSULATION LAYERS AT LEAST 3 INCHES. 8. INSTALL INSULATION IN REMOVABLE ACCESS DOORS, MANHOLES, HANDHOLES, AND OTHER ELEMENTS THAT REQUIRE FREQUENT REMOVAL FOR SERVICE AND INSPECTION. 9. BEVEL AND SEAL INSULATION ENDS AROUND MANHOLES, HANDHOLES, ASME STAMPS, AND NAMEPLATES. 10. FOR EQUIPMENT WITH SURFACE TEMPERATURES BELOW AMBIENT, APPLY MASTIC TO OPEN ENDS, JOINTS, SEAMS, BREAKS, AND PUNCTURES IN INSULATION. A. FLEXIBLE ELASTOMERIC THERMAL INSULATION INSTALLATION FOR TANKS AND VESSELS: INSTALL INSULATION OVER ENTIRE SURFACE OF TANKS AND VESSELS. 1. APPLY 100 PERCENT COVERAGE OF ADHESIVE TO SURFACE WITH MANUFACTURER'S RECOMMENDED ADHESIVE. 2. SEAL LONGITUDINAL SEAMS AND END JOINTS.

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**CONSTRUCTION
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SHEET NO.:
P0.04

3.5 GENERAL PIPE INSULATION INSTALLATION
A. REQUIREMENTS IN THIS ARTICLE GENERALLY APPLY TO ALL INSULATION MATERIALS EXCEPT WHERE MORE SPECIFIC REQUIREMENTS ARE SPECIFIED IN VARIOUS PIPE INSULATION MATERIAL INSTALLATION ARTICLES.
B. INSULATION INSTALLATION ON FITTINGS, VALVES, STRAINERS, FLANGES, AND UNIONS:
1. INSTALL INSULATION OVER FITTINGS, VALVES, STRAINERS, FLANGES, AND OTHER SPECIALTIES WITH CONTINUOUS THERMAL AND VAPOR-RETARDER INTEGRITY, UNLESS OTHERWISE INDICATED.
2. INSULATE PIPE ELBOWS USING PREFORMED FITTING INSULATION OR MITERED FITTINGS MADE FROM SAME MATERIAL AND DENSITY AS ADJACENT PIPE INSULATION. EACH PIECE SHALL BE BUTTED TIGHTLY AGAINST ADJOINING PIECE AND BONDED WITH ADHESIVE. FILL JOINTS, SEAMS, VOIDS, AND IRREGULAR SURFACES WITH INSULATING CEMENT FINISHED TO A SMOOTH, HARD, AND UNIFORM CONTOUR THAT IS UNIFORM WITH ADJOINING PIPE INSULATION.
3. INSULATE TEE FITTINGS WITH PREFORMED FITTING INSULATION OR SECTIONAL PIPE INSULATION OF SAME MATERIAL AND THICKNESS AS USED FOR ADJACENT PIPE. CUT SECTIONAL PIPE INSULATION TO FIT. BUTT EACH SECTION CLOSELY TO THE NEXT AND HOLD IN PLACE WITH TIE WIRE. BOND PIECES WITH ADHESIVE.
4. INSULATE VALVES USING PREFORMED FITTING INSULATION OR SECTIONAL PIPE INSULATION OF SAME MATERIAL, DENSITY, AND THICKNESS AS USED FOR ADJACENT PIPE OVERLAP ADJOINING PIPE INSULATION BY NOT LESS THAN TWO TIMES THE THICKNESS OF PIPE INSULATION, OR ONE PIPE DIAMETER, WHICHEVER IS THICKER. FOR VALVES, INSULATE UP TO AND INCLUDING THE BONNETS, VALVE STUFFING-BOX STUDS, BOLTS, AND NUTS. FILL JOINTS, SEAMS, AND IRREGULAR SURFACES WITH INSULATING CEMENT.
5. INSULATE STRAINERS USING PREFORMED FITTING INSULATION OR SECTIONAL PIPE INSULATION OF SAME MATERIAL, DENSITY, AND THICKNESS AS USED FOR ADJACENT PIPE. OVERLAP ADJOINING PIPE INSULATION BY NOT LESS THAN TWO TIMES THE THICKNESS OF PIPE INSULATION, OR ONE PIPE DIAMETER, WHICHEVER IS THICKER. FILL JOINTS, SEAMS, AND IRREGULAR SURFACES WITH INSULATING CEMENT.
6. INSULATE STRAINERS SO STRAINER BASKET FLANGE OR PLUG CAN BE EASILY REMOVED AND REPLACED WITHOUT DAMAGING THE INSULATION AND JACKET. PROVIDE A REMOVABLE REUSABLE INSULATION COVER. FOR BELOW AMBIENT SERVICES, PROVIDE A DESIGN THAT MAINTAINS VAPOR BARRIER.
7. INSULATE FLANGES AND UNIONS USING A SECTION OF OVERSIZED PREFORMED PIPE INSULATION. OVERLAP ADJOINING PIPE INSULATION BY NOT LESS THAN TWO TIMES THE THICKNESS OF PIPE INSULATION, OR ONE PIPE DIAMETER, WHICHEVER IS THICKER.
8. COVER SEGMENTED INSULATED SURFACES WITH A LAYER OF FINISHING CEMENT AND COAT WITH A MASTIC. INSTALL VAPOR BARRIER MASTIC FOR BELOW AMBIENT SERVICES AND A BREATHER MASTIC FOR ABOVE AMBIENT SERVICES. REINFORCE THE MASTIC WITH FABRIC-REINFORCING MESH. TROWEL THE MASTIC TO A SMOOTH AND WELL-SHAPED CONTOUR.
9. FOR SERVICES NOT SPECIFIED TO RECEIVE A FIELD-APPLIED JACKET EXCEPT FOR FLEXIBLE ELASTOMERIC AND POLYOLEFIN, INSTALL FITTED PVC COVER OVER ELBOWS, TEES, STRAINERS, VALVES, FLANGES, AND UNIONS. TERMINATE ENDS WITH PVC ENDCAPS. TAPE CAPS. PVC COVERS TO ADJOINING INSULATION FACING USING PVC TAPE.
C. STENCIL OR LABEL THE OUTSIDE INSULATION JACKET OF EACH UNION WITH THE WORD "UNION." MATCH SIZE AND COLOR OF PIPE LABELS.
D. INSULATE INSTRUMENT CONNECTIONS FOR THERMOMETERS, PRESSURE GAGES, PRESSURE TEMPERATURE TAPS, TEST CONNECTIONS, FLOW METERS, SENSORS, SWITCHES, AND TRANSMITTERS ON INSULATED PIPES, VESSELS, AND EQUIPMENT. SHAPE INSULATION AT THESE CONNECTIONS BY TAPERING IT TO AND AROUND THE CONNECTION WITH INSULATING CEMENT AND FINISH WITH FINISHING CEMENT, MASTIC, AND FLASHING SEALANT.
E. INSTALL REMOVABLE INSULATION COVERS AT LOCATIONS INDICATED. INSTALLATION SHALL CONFORM TO THE FOLLOWING:
1. MAKE REMOVABLE FLANGE AND UNION INSULATION FROM SECTIONAL PIPE INSULATION OF SAME THICKNESS AS THAT ON ADJOINING PIPE. INSTALL SAME INSULATION JACKET AS ADJOINING PIPE INSULATION.
2. WHEN FLANGE AND UNION COVERS ARE MADE FROM SECTIONAL PIPE INSULATION, EXTEND INSULATION FROM FLANGES OR UNION LONG AT LEAST TWO TIMES THE INSULATION THICKNESS OVER ADJACENT PIPE INSULATION ON EACH SIDE OF FLANGE OR UNION. SECURE FLANGE COVER IN PLACE WITH STAINLESS-STEEL OR ALUMINUM BANDS. SELECT BAND MATERIAL COMPATIBLE WITH INSULATION AND JACKET.
3. CONSTRUCT REMOVABLE VALVE INSULATION COVERS IN SAME MANNER AS FOR FLANGES EXCEPT DIVIDE THE TWO-PART SECTION ON THE VERTICAL CENTER LINE OF VALVE BODY.
4. WHEN COVERS ARE MADE FROM BLOCK INSULATION, MAKE TWO HALVES, EACH CONSISTING OF MITERED BLOCKS WIRED TO STAINLESS-STEEL FABRIC. SECURE THIS WIRE FRAME, WITH ITS ATTACHED INSULATION, TO FLANGES WITH TIE WIRE. EXTEND INSULATION AT LEAST 2 INCHES OVER ADJACENT PIPE INSULATION ON EACH SIDE OF VALVE. FILL SPACE BETWEEN FLANGE OR UNION COVER AND PIPE INSULATION WITH INSULATING CEMENT. FINISH COVER ASSEMBLY WITH INSULATING CEMENT APPLIED IN TWO COATS. AFTER FIRST COAT IS DRY, APPLY AND TROWEL SECOND COAT TO SMOOTH FINISH.
5. UNLESS A PVC JACKET IS INDICATED IN FIELD-APPLIED JACKET SCHEDULES, FINISH EXPOSED SURFACES WITH A METAL JACKET.

3.6 FLEXIBLE ELASTOMERIC INSULATION INSTALLATION
A. SEAL LONGITUDINAL SEAMS AND END JOINTS WITH MANUFACTURER'S RECOMMENDED ADHESIVE TO ELIMINATE OPENINGS IN INSULATION THAT ALLOW PASSAGE OF AIR TO SURFACE BEING INSULATED.
B. INSULATION INSTALLATION ON PIPE FLANGES:
1. INSTALL PIPE INSULATION TO OUTER DIAMETER OF PIPE FLANGE.
2. MAKE WIDTH OF INSULATION SECTION SAME AS OVERALL WIDTH OF FLANGE AND BOLTS, PLUS TWICE THE THICKNESS OF PIPE INSULATION.
3. FILL VOIDS BETWEEN INNER CIRCUMFERENCE OF FLANGE INSULATION AND OUTER CIRCUMFERENCE OF ADJACENT STRAIGHT PIPE SEGMENTS WITH CUT SECTIONS OF SHEET INSULATION OF SAME THICKNESS AS PIPE INSULATION.
4. SECURE INSULATION TO FLANGES AND SEAL SEAMS WITH MANUFACTURER'S RECOMMENDED ADHESIVE TO ELIMINATE OPENINGS IN INSULATION THAT ALLOW PASSAGE OF AIR TO SURFACE BEING INSULATED.
C. INSULATION INSTALLATION ON PIPE FITTINGS AND ELBOWS:
1. INSTALL MITERED SECTIONS OF PIPE INSULATION.
2. SECURE INSULATION MATERIALS AND SEAL SEAMS WITH MANUFACTURER'S RECOMMENDED ADHESIVE TO ELIMINATE OPENINGS IN INSULATION THAT ALLOW PASSAGE OF AIR TO SURFACE BEING INSULATED.
D. INSULATION INSTALLATION ON VALVES AND PIPE SPECIALTIES:
1. INSTALL PREFORMED VALVE COVERS MANUFACTURED OF SAME MATERIAL AS PIPE INSULATION WHEN AVAILABLE.
2. WHEN PREFORMED VALVE COVERS ARE NOT AVAILABLE, INSTALL CUT SECTIONS OF PIPE AND SHEET INSULATION TO VALVE BODY. ARRANGE INSULATION TO PERMIT ACCESS TO PACKING AND TO ALLOW VALVE OPERATION WITHOUT DISTURBING INSULATION.
3. INSTALL INSULATION TO FLANGES AS SPECIFIED FOR FLANGE INSULATION APPLICATION.
4. SECURE INSULATION TO VALVES AND SPECIALTIES AND SEAL SEAMS WITH MANUFACTURER'S RECOMMENDED ADHESIVE TO ELIMINATE OPENINGS IN INSULATION THAT ALLOW PASSAGE OF AIR TO SURFACE BEING INSULATED.

3.7 MINERAL-FIBER INSULATION INSTALLATION
A. INSULATION INSTALLATION ON STRAIGHT PIPES AND TUBES:
1. SECURE EACH LAYER OF PREFORMED PIPE INSULATION TO PIPE WITH WIRE OR BANDS AND TIGHTEN BANDS WITHOUT DEFORMING INSULATION MATERIALS.
2. WHERE VAPOR BARRIERS ARE INDICATED, SEAL LONGITUDINAL SEAMS, END JOINTS, AND PROTRUSIONS WITH VAPOR-BARRIER MASTIC AND JOINT SEALANT.
3. FOR INSULATION WITH FACTORY-APPLIED JACKETS ON ABOVE AMBIENT SURFACES, SECURE LAPS WITH OUTWARD CLINCHED STAPLES AT 6 INCHES O.C.
4. FOR INSULATION WITH FACTORY-APPLIED JACKETS ON BELOW AMBIENT SURFACES, DO NOT STAPLE LONGITUDINAL TABS BUT SECURE TABS WITH ADDITIONAL ADHESIVE AS RECOMMENDED BY INSULATION MATERIAL MANUFACTURER AND SEAL WITH VAPOR BARRIER MASTIC AND FLASHING SEALANT.
B. INSULATION INSTALLATION ON PIPE FLANGES:
1. INSTALL PREFORMED PIPE INSULATION TO OUTER DIAMETER OF PIPE FLANGE.
2. MAKE WIDTH OF INSULATION SECTION SAME AS OVERALL WIDTH OF FLANGE AND BOLTS, PLUS TWICE THE THICKNESS OF PIPE INSULATION.
3. FILL VOIDS BETWEEN INNER CIRCUMFERENCE OF FLANGE INSULATION AND OUTER CIRCUMFERENCE OF ADJACENT STRAIGHT PIPE SEGMENTS WITH MINERAL-FIBER BLANKET INSULATION.
4. INSTALL JACKET MATERIAL WITH MANUFACTURER'S RECOMMENDED ADHESIVE, OVERLAP SEAMS AT LEAST 1 INCH, AND SEAL JOINTS WITH FLASHING SEALANT.
C. INSULATION INSTALLATION ON PIPE FITTINGS AND ELBOWS:
1. INSTALL PREFORMED SECTIONS OF SAME MATERIAL AS STRAIGHT SEGMENTS OF PIPE INSULATION WHEN AVAILABLE.
2. WHEN PREFORMED INSULATION ELBOWS AND FITTINGS ARE NOT AVAILABLE, INSTALL MITERED SECTIONS OF PIPE INSULATION TO A THICKNESS EQUAL TO ADJOINING PIPE INSULATION. SECURE INSULATION MATERIALS WITH WIRE OR BANDS.
D. INSULATION INSTALLATION ON VALVES AND PIPE SPECIALTIES:
1. INSTALL PREFORMED SECTIONS OF SAME MATERIAL AS STRAIGHT SEGMENTS OF PIPE INSULATION WHEN AVAILABLE.
2. WHEN PREFORMED SECTIONS ARE NOT AVAILABLE, INSTALL MITERED SECTIONS OF PIPE INSULATION TO VALVE BODY.
3. ARRANGE INSULATION TO PERMIT ACCESS TO PACKING AND TO ALLOW VALVE OPERATION WITHOUT DISTURBING INSULATION.
4. INSTALL INSULATION TO FLANGES AS SPECIFIED FOR FLANGE INSULATION APPLICATION.

3.8 POLYOLEFIN INSULATION INSTALLATION
A. INSULATION INSTALLATION ON STRAIGHT PIPES AND TUBES:
1. SEAL SPLIT-TUBE LONGITUDINAL SEAMS AND END JOINTS WITH MANUFACTURER'S RECOMMENDED ADHESIVE TO ELIMINATE OPENINGS IN INSULATION THAT ALLOW PASSAGE OF AIR TO SURFACE BEING INSULATED.
B. INSULATION INSTALLATION ON PIPE FLANGES:
1. INSTALL PIPE INSULATION TO OUTER DIAMETER OF PIPE FLANGE.
2. MAKE WIDTH OF INSULATION SECTION SAME AS OVERALL WIDTH OF FLANGE AND BOLTS, PLUS TWICE THE THICKNESS OF PIPE INSULATION.
3. FILL VOIDS BETWEEN INNER CIRCUMFERENCE OF FLANGE INSULATION AND OUTER CIRCUMFERENCE OF ADJACENT STRAIGHT PIPE SEGMENTS WITH CUT SECTIONS OF POLYOLEFIN SHEET INSULATION OF SAME THICKNESS AS PIPE INSULATION.
4. SECURE INSULATION TO FLANGES AND SEAL SEAMS WITH MANUFACTURER'S RECOMMENDED ADHESIVE TO ELIMINATE OPENINGS IN INSULATION THAT ALLOW PASSAGE OF AIR TO SURFACE BEING INSULATED.
C. INSULATION INSTALLATION ON PIPE FITTINGS AND ELBOWS:
1. INSTALL MITERED SECTIONS OF POLYOLEFIN PIPE INSULATION.
2. SECURE INSULATION MATERIALS AND SEAL SEAMS WITH MANUFACTURER'S RECOMMENDED ADHESIVE TO ELIMINATE OPENINGS IN INSULATION THAT ALLOW PASSAGE OF AIR TO SURFACE BEING INSULATED.
D. INSULATION INSTALLATION ON VALVES AND PIPE SPECIALTIES:
1. INSTALL CUT SECTIONS OF POLYOLEFIN PIPE AND SHEET INSULATION TO VALVE BODY.
2. ARRANGE INSULATION TO PERMIT ACCESS TO PACKING AND TO ALLOW VALVE OPERATION WITHOUT DISTURBING INSULATION.
3. INSTALL INSULATION TO FLANGES AS SPECIFIED FOR FLANGE INSULATION APPLICATION.
4. SECURE INSULATION TO VALVES AND SPECIALTIES, AND SEAL SEAMS WITH MANUFACTURER'S RECOMMENDED ADHESIVE TO ELIMINATE OPENINGS IN INSULATION THAT ALLOW PASSAGE OF AIR TO SURFACE BEING INSULATED.

3.9 FIELD-APPLIED JACKET INSTALLATION
A. WHERE FSK JACKETS ARE INDICATED, INSTALL AS FOLLOWS:
1. DRAW JACKET MATERIAL SMOOTH AND TIGHT.
2. INSTALL LAP OR JOINT STRIPS WITH SAME MATERIAL AS JACKET.
3. SECURE JACKET TO INSULATION WITH MANUFACTURER'S RECOMMENDED ADHESIVE.
4. INSTALL JACKET WITH 1-1/2-INCH LAPS AT LONGITUDINAL SEAMS AND 3-INCH- WIDE JOINT STRIPS AT END JOINTS.
5. SEAL OPENINGS, PUNCTURES, AND BREAKS IN VAPOR-RETARDER JACKETS AND EXPOSED INSULATION WITH VAPOR-BARRIER MASTIC.
B. WHERE PVC JACKETS ARE INDICATED, INSTALL WITH 1-INCH OVERLAP AT LONGITUDINAL SEAMS AND END JOINTS; FOR HORIZONTAL APPLICATIONS, INSTALL WITH LONGITUDINAL SEAMS ALONG TOP AND BOTTOM OF TANKS AND VESSELS. SEAL WITH MANUFACTURER'S RECOMMENDED ADHESIVE.
1. APPLY TWO CONTINUOUS BEADS OF ADHESIVE TO SEAMS AND JOINTS, ONE BEAD UNDER LAP AND THE FINISH BEAD ALONG SEAM AND JOINT EDGE.
C. WHERE METAL JACKETS ARE INDICATED, INSTALL WITH 2-INCH OVERLAP AT LONGITUDINAL SEAMS AND END JOINTS. OVERLAP LONGITUDINAL SEAMS ARRANGED TO SHED WATER. SEAL END JOINTS WITH WEATHERPROOF SEALANT RECOMMENDED BY INSULATION MANUFACTURER. SECURE JACKET WITH STAINLESS-STEEL BANDS 12 INCHES O.C. AND AT END JOINTS.

3.10 PIPING INSULATION SCHEDULE - GENERAL
A. FOLLOW SCHEDULES ILLUSTRATED ON THE DRAWINGS FOR THICKNESS, MATERIAL AND FINISH NEEDS.
B. ITEMS NOT INSULATED: UNLESS OTHERWISE INDICATED, DO NOT INSTALL INSULATION ON THE FOLLOWING:
1. DRAINAGE PIPING LOCATED IN CRAWL SPACES.
2. UNDERGROUND PIPING.
3. CHROME-PLATED PIPES AND FITTINGS UNLESS THERE IS A POTENTIAL FOR PERSONNEL INJURY.

CONSTRUCTION DOCUMENTS FOR FARMERS MARKET RESTROOM RENOVATION, HARRISONBURG, VIRGINIA. THESE DRAWINGS MAY NOT BE REPRODUCED IN ANY FORM WITHOUT THE WRITTEN CONSENT FROM VALLEY ENGINEERING, P.L.C.

PLUMBING EQUIPMENT SCHEDULE

MARK	FIXTURES				TRIM			ACCESSORIES					SUPPLY SIZE		WASTE SIZE	NOTES	RIM HEIGHT	FLUSH VALVE HEIGHT	BUBBLER HEIGHT			
	DESCRIPTION	ADA	MANUF.	FIXTURE MODEL NO.	FLUSH VALVE MODEL NUMBER	MANUF.	TRIM NO.	MODEL NO.	SEATS	SUPPLIES	STRAINER	TRAP	CONTINUOUS WASTE	INSULATION KIT						MANUF.	CW	HW
P-1	WATER CLOSET	ADA	AM. STANDARD	2386.012	-	-	-	9400CT	2166LK	-	-	-	-	-	CHURCH/McGUIRE	1/2"	-	3"	1, 2, 3	16-1/2"	-	-
P-2	WATER CLOSET	-	AM. STANDARD	2383.012	-	-	-	9400CT	2166LK	-	-	-	-	-	CHURCH/McGUIRE	1/2"	-	3"	2, 3	15"	-	-
P-3	URINAL	ADA	AM. STANDARD	6590.001	(ROYAL) 186-0.5	SLOAN	-	-	-	-	-	-	-	-	-	1"	-	2"	3, 4	15-1/4"	44-3/4"	-
P-4	LAVATORY	ADA	AM. STANDARD	0476.028	-	DELTA	22C151	-	2165LK	155WC	8902	-	PW2000WC	McGUIRE	1/2"	1/2"	2"	2, 3	34"	-	-	
P-5	WATER COOLER	ADA	ELKAY	EZ3TLBWSLK	-	-	-	-	-	-	8912	-	-	-	-	1/2"	-	2"	3	-	-	32-7/8" 38-3/8"
P-6	MOP SINK	-	STERN WILLIAMS	SB-902	-	T&S BRASS	B-0657	-	-	-	-	-	-	-	-	3/4"	3/4"	3"	5, 6	12"	-	-

NOTES:
 1. HANDICAPPED, FLOOR MOUNTED TOILET.
 2. ALL SUPPLIES AND WASTE ASSEMBLIES SHALL BE CHROME PLATED.
 3. USE WHITE SILICONE CAULK TO SEAL AROUND THE PERIMETER OF ALL PLUMBING FIXTURES WHERE THE FIXTURE MAKES CONTACT WITH THE BUILDING STRUCTURE.
 4. PROVIDE JAY R. SMITH FIXTURE SUPPORT AS REQUIRED TO MATCH FIXTURE.
 5. PROVIDE WITH STAINLESS STEEL WALL GUARD, HOSE AND BRACKET, AND 3 POSITION MOP HANGER. SEE DETAIL FOR CLARIFICATION.
 6. WHEN FAUCETS BY ALTERNATE MANUFACTURERS ARE PROVIDED, CERAMIC CHECK VALVES MUST BE PROVIDED TO PREVENT DCW/DHW CROSSOVER.

PLUMBING PIPING APPLICATION CHART

LINE	SYSTEM	PIPE SIZE	PRESSURE RANGE	MATERIAL	ASTM STANDARD	MANUF. PROCESS	WEIGHT	JOINT	PRESSURE RATING (PSIG)	FITTING APPLICATION		
										MATERIAL	CLASS	JOINT
1	DOMESTIC HOT AND COLD WATER PIPING	ALL SIZES ABOVE GROUND	-	PEX (HDPE)	ASTM F876/F877	EXTRUDED	-	LEAD FREE PEX	100	LEAD FREE PEX	-	LEAD FREE PEX
2	DOMESTIC HOT AND COLD WATER PIPING	NPS 4" AND SMALLER	-	WROUGHT COPPER	B 88	DRAWN	TYPE L	95-5 SOLDER	350	WROUGHT COPPER	-	95-5 SOLDER
3	DOMESTIC COLD WATER PIPING (UNDERGROUND)	NPS 2" AND SMALLER	-	WROUGHT COPPER	B 88	DRAWN	TYPE K	BRAZED	350	WROUGHT COPPER	-	BRAZED
4	SANITARY PIPING	ALL SIZES BELOW GROUND	-	PVC DWV	ASTM D-2665	EXTRUDED	SCHEDULE 40	SOLVENT CEMENT	-	PVC DWV	-	SOLVENT CEMENT
5	SANITARY AND VENT PIPING	ALL SIZES ABOVE GROUND	-	NO HUB CAST IRON	ASTM A 74 CISPI 301	CAST	SERVICE WEIGHT	COMPRESSION COUPLINGS	-	NO HUB CAST IRON	-	COMPRESSION COUPLINGS

NOTE:
 1. REFER TO SPECIFICATIONS FOR MARKING REQUIREMENTS. ADHESIVE LABELS ARE NOT ACCEPTABLE.
 2. USE PEX PIPING IN JOISTS ONLY.

PIPE INSULATION SCHEDULE

SERVICE	INSULATION TYPE	FINISH / JACKET		MAINS					RUNOUTS
		INDOOR	OUTDOOR	1-1/4" AND LESS	1 1/2" TO 2"	2 1/2" TO 4"	5" TO 6"	8"	UP TO 1"
DOMESTIC COLD WATER	FLEXIBLE ELASTOMERIC	-	-	0.5"	-	-	-	-	0.5"
DOMESTIC HOT WATER	FLEXIBLE ELASTOMERIC	-	-	1"	-	-	-	-	0.5"

NOTE:
 1. PROTECT INDIRECT HUNG PIPING WITH GALVANIZED INSULATION PROTECTION SHIELDS.
 2. ALL PIPING SHALL HAVE INSULATION CONTINUOUS THROUGH HANGERS.
 3. PROVIDE CONTINUOUS VAPOR BARRIER ON ALL DOMESTIC HOT AND COLD WATER PIPING.
 4. TIGHTEN ALL HANGER NUTS AFTER INSTALLATION OF INSULATION THROUGH HANGERS.
 5. RUNOUTS INDICATE PIPING TO INDIVIDUAL UNITS, NOT EXCEEDING 12 FEET IN LENGTH.

PLUMBING VALVE APPLICATION CHART

LINE	SYSTEM	PIPE SIZE	TYPE	MODEL	MANUF.
1	INLET AND OUTLET OF WATER HEATERS	2" AND BELOW	FULL PORT, BALL VALVE	S-585-66-LF	NIBCO
2	DOMESTIC HOT AND COLD WATER PIPING	1/2" TO 2"	CHECK VALVES (VERTICAL)	S-480-Y-LF	NIBCO
3	DOMESTIC HOT AND COLD WATER PIPING	1/2" TO 2"	CHECK VALVES (HORIZONTAL)	S-413-Y-LF	NIBCO

NOTE:
 1. CONTRACTOR SHALL PROVIDE ALL ISOLATION VALVES TO ACHIEVE THE DESIGN INTENT.
 2. PROVIDE STAINLESS STEEL BALL AND STEM, PER NOTED OPTIONS ABOVE.
 3. PROVIDE EXTENDED HANDLES FOR ALL INSULATED PIPING SYSTEMS TO ACCOMMODATE VALVE OPERATION WITHOUT DAMAGING INSULATION. SEE INSULATION SCHEDULE FOR COORDINATION.
 4. VALVES WHICH ARE NOT LEAD FREE CERTIFIED MAY ONLY BE USED FOR INDIVIDUAL NON-CONSUMPTION EQUIPMENT CONNECTIONS WITH APPROVAL IN ADVANCE FROM THE AHJ.
 5. PROVIDE EXTENDED VALVE HANDLES ON VALVES MOUNTED IN INSULATED PIPING. LENGTH OF EXTENDED HANDLES SHALL SUIT INSULATION THICKNESS.

HYDRANT SCHEDULE

MARK	MANUFACTURER	MODEL NUMBER	SIZE	NOTES
HB-1	JAY R. SMITH	5670-H	3/4"	1, 2

NOTES:
 1. PROVIDE WITH HOSE VACUUM BREAKER.
 2. INSTALL BACKFLOW PREVENTER ON SUPPLY PIPING. SEE PLANS FOR COORDINATION.

FLOOR DRAIN SCHEDULE

MARK	MANUFACTURER	MODEL NUMBER	SIZE	NOTES
FD-1	JAY R. SMITH	2005LXH-A05NB-P050	NOTE 3	1, 2, 4

NOTES:
 1. SPEEDI-SET CONNECTION, TOILETS, SMALL MECHANICAL ROOMS.
 2. USE DEEP SEAL TRAPS ON ALL FLOOR DRAINS.
 3. MATCH PIPE SIZE SHOWN ON PLANS.
 4. PROVIDE TRAP PRIMERS FOR ALL FLOOR DRAINS UNLESS SPECIFICALLY NOTED OTHERWISE.

MIXING VALVE SCHEDULE

MARK	MANUFACTURER	MODEL NUMBER	RATING	FLOW (GPM)	CONNECTION SIZE INLET / OUTLET	PRESSURE LOSS AT RATED FLOW	NOTES
MV-1	WATTS	LF1170-US-M2	ASSE 1017	0.5-5 GPM	3/4" / 3/4"	< 5 PSIG	2
MV-2	WATTS	LFMMV-US-M1	ASSE 1070	0.5-2.5 GPM	3/8" / 3/8"	< 5 PSIG	1, 3

NOTES:
 1. THE DESIGN INTENT FOR MV-2 IS TO PROVIDE TEMPERED WATER (109F MAX) AT EACH FIXTURE, USING THE 120F DHW SUPPLY.
 2. THE DESIGN INTENT FOR MV-1 IS TO PROVIDE 120F WATER FOR DISTRIBUTION.
 3. THE LISTED VALVE IS TRIPLE LISTED FOR ASSE 1017 (MASTER MIXER), ASSE 1016 (SHOWERS AND TUBS) AND ASSE 1070 (POINT OF USE) STANDARDS, WHEN A SEPARATE VALVE IS SUPPLIED FOR EACH RATING.

INSTANTANEOUS WATER HEATER SCHEDULE

MARK	MANUFACTURER	MODEL NUMBER	CAPACITY (GALLONS)	GPM RECOVERY 41°F RISE	AMPS	VOLT/PH/HZ	NOTES
EWH-1	EEMAX	EX180T2 ML	0	3	50 A/PHASE	208/3/60	1, 2, 3, 4, 5

NOTES:
 1. ADJUST OUTPUT TO 120°F.
 2. TURN ON GPM = 0.3.
 3. REPLACEABLE ELEMENT CARTRIDGE, NICKEL CHROME MATERIAL.
 4. 1/2" NPT FITTINGS.
 5. INSTALL UPRIGHT WITH CONNECTIONS ON THE BOTTOM.

BACKFLOW PREVENTER SCHEDULE

MARK	USE	MANUFACTURER / MODEL NUMBER	ASSE RATING	SIZE	NOTES
BFP-1	MAIN WATER ENTRANCE	WATTS / LF909	1013	NOTE 1	1, 2, 3

NOTES:
 1. MATCH PIPE SIZE SHOWN ON PLANS.
 2. SEE MANUFACTURERS INSTALLATION INSTRUCTIONS FOR COORDINATION.
 3. ALL BACKFLOW PREVENTERS SERVING POTABLE WATER SYSTEMS SHALL MEET LEAD FREE REQUIREMENTS. COORDINATE EXCEPTIONS (EX. MECHANICAL EQUIPMENT MAKEUP) WITH AHJ PRIOR TO INSTALLATION.

TRAP PRIMER SCHEDULE

MARK	MANUFACTURER	MODEL NUMBER	SIZE	NOTES
TP-1	PRECISION PLUMBING PRODUCTS	P2-500	1/2" NPT	1, 2

NOTES:
 1. INSTALL TP-1'S WHEREVER TRAP PRIMERS ARE NOTED, UNLESS ANOTHER TRAP PRIMER IS SPECIFICALLY NOTED. INSTALL DU-U ADAPTERS WHERE REQUIRED TO CONNECT ADDITIONAL LINES.
 2. CONNECT OFF TOP OF SUPPLY PIPING TO PREVENT DEBRIS BUILD UP, AS SHOWN ON DETAILS.

CLEANOUT SCHEDULE

MARK	MANUFACTURER	MODEL NUMBER	SIZE	NOTES
CO-1	JAY R. SMITH	4031LXH-NB	NOTE 2	1

NOTES:
 1. FINISHED AREAS, SPEEDI-SET, SEE DRAWINGS FOR SIZE.
 2. MATCH PIPE SIZE SHOWN ON PLANS.

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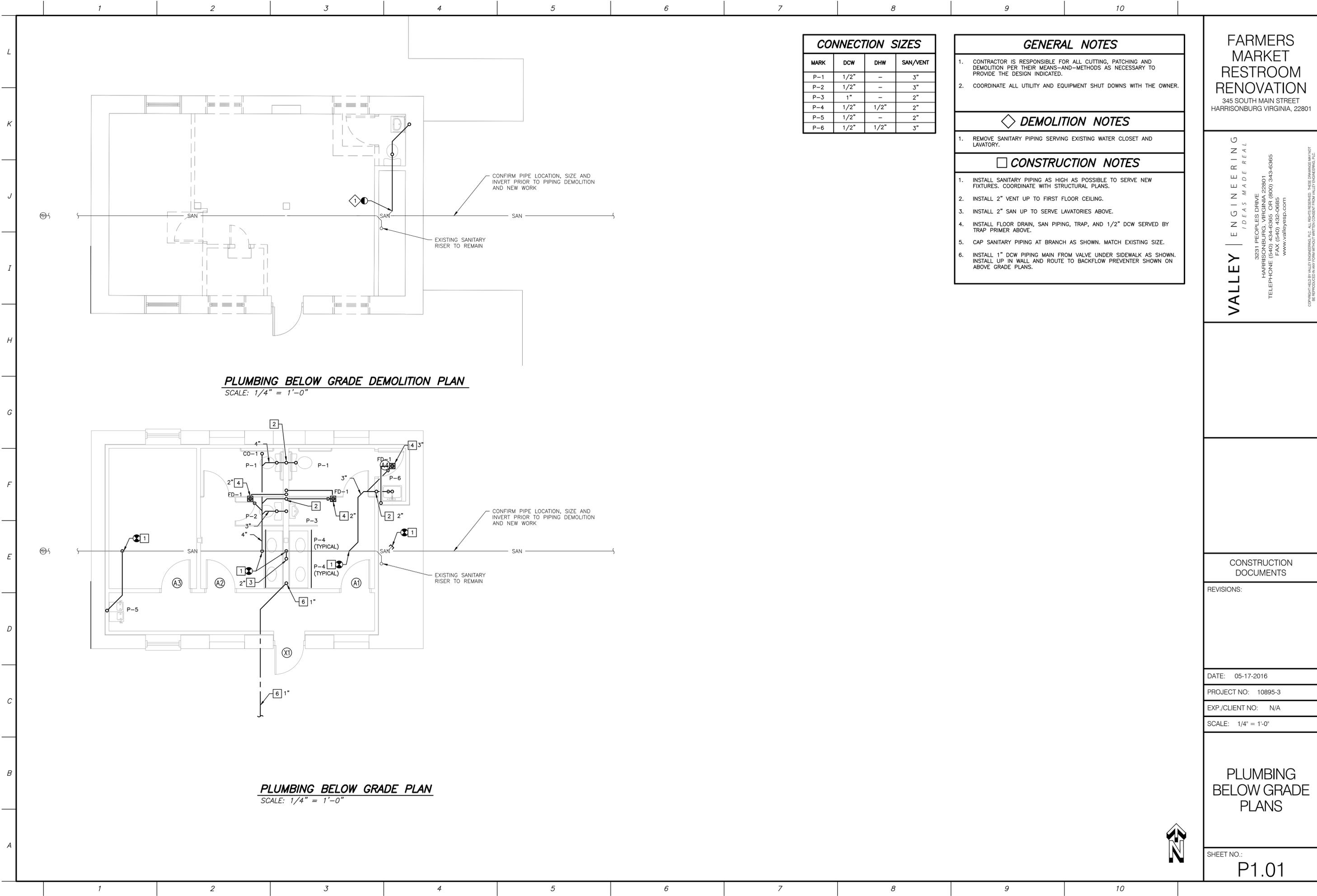
PROJECT NO: 10895-3

EXP./CLIENT NO: N/A

SCALE: N/A

PLUMBING SCHEDULES

SHEET NO.:
P0.05



CONNECTION SIZES			
MARK	DCW	DHW	SAN/VENT
P-1	1/2"	-	3"
P-2	1/2"	-	3"
P-3	1"	-	2"
P-4	1/2"	1/2"	2"
P-5	1/2"	-	2"
P-6	1/2"	1/2"	3"

- GENERAL NOTES**
- CONTRACTOR IS RESPONSIBLE FOR ALL CUTTING, PATCHING AND DEMOLITION PER THEIR MEANS-AND-METHODS AS NECESSARY TO PROVIDE THE DESIGN INDICATED.
 - COORDINATE ALL UTILITY AND EQUIPMENT SHUT DOWNS WITH THE OWNER.
- DEMOLITION NOTES**
- REMOVE SANITARY PIPING SERVING EXISTING WATER CLOSET AND LAVATORY.
- CONSTRUCTION NOTES**
- INSTALL SANITARY PIPING AS HIGH AS POSSIBLE TO SERVE NEW FIXTURES. COORDINATE WITH STRUCTURAL PLANS.
 - INSTALL 2" VENT UP TO FIRST FLOOR CEILING.
 - INSTALL 2" SAN UP TO SERVE LAVATORIES ABOVE.
 - INSTALL FLOOR DRAIN, SAN PIPING, TRAP, AND 1/2" DCW SERVED BY TRAP PRIMER ABOVE.
 - CAP SANITARY PIPING AT BRANCH AS SHOWN. MATCH EXISTING SIZE.
 - INSTALL 1" DCW PIPING MAIN FROM VALVE UNDER SIDEWALK AS SHOWN. INSTALL UP IN WALL AND ROUTE TO BACKFLOW PREVENTER SHOWN ON ABOVE GRADE PLANS.

PLUMBING BELOW GRADE DEMOLITION PLAN
SCALE: 1/4" = 1'-0"

PLUMBING BELOW GRADE PLAN
SCALE: 1/4" = 1'-0"

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PLUMBING BELOW GRADE PLANS

SHEET NO.: **P1.01**



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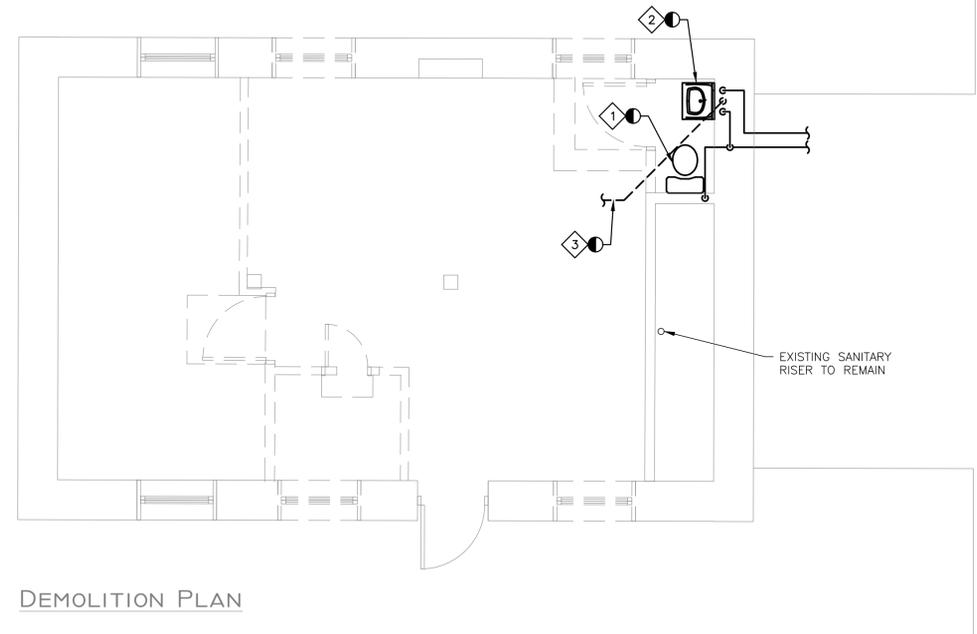
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 PROJECT NO: 10895-3
 EXP./CLIENT NO: N/A
 SCALE: 1/4" = 1'-0"

PLUMBING PLANS

SHEET NO.:
P2.01

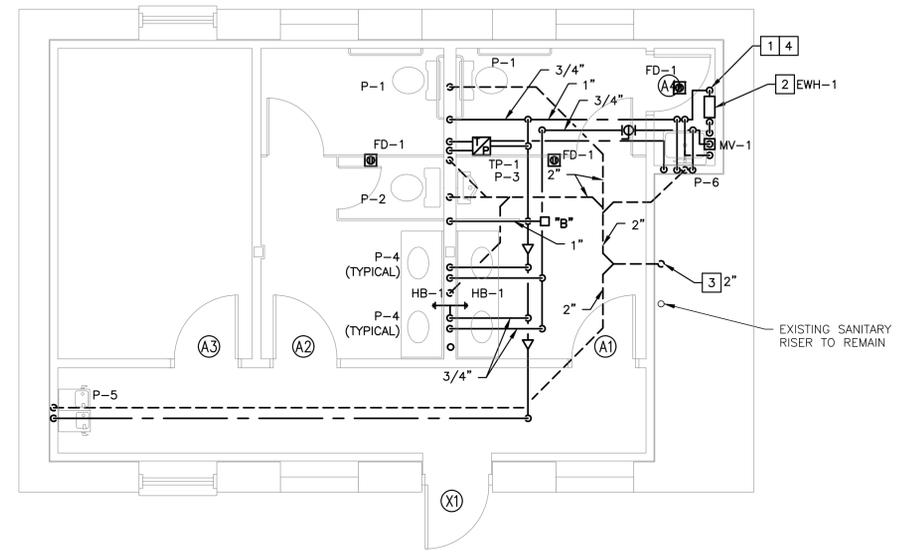
CONNECTION SIZES			
MARK	DCW	DHW	SAN/VENT
P-1	1/2"	-	3"
P-2	1/2"	-	3"
P-3	1"	-	2"
P-4	1/2"	1/2"	2"
P-5	1/2"	-	2"
P-6	1/2"	1/2"	3"

- GENERAL NOTES**
- CONTRACTOR IS RESPONSIBLE FOR ALL CUTTING, PATCHING AND DEMOLITION PER THEIR MEANS-AND-METHODS AS NECESSARY TO PROVIDE THE DESIGN INDICATED.
 - COORDINATE ALL UTILITY AND EQUIPMENT SHUT DOWNS WITH THE OWNER.
- DEMOLITION NOTES**
- REMOVE WATER CLOSET AND ASSOCIATED PIPING BACK TO BRANCH. VALVE AND CAP DCW AT BRANCH.
 - REMOVE LAVATORY, SUPPORT, DCW, DHW, SANITARY, AND VENT PIPING COMPLETE. CAP AND VALVE DCW AND DHW AT BRANCH.
 - REMOVE VENT PIPING SERVING EXISTING FIXTURES COMPLETE.
- CONSTRUCTION NOTES**
- INSTALL 1" DCW BRANCH UP FROM NEW CONNECTION. INSTALL BFP-1 IN VERTICAL.
 - INSTALL EWH-1 MOUNTED ON WALL. INSTALL MV-1 AND COORDINATE WITH DETAIL AND MANUFACTURER'S INSTALLATION REQUIREMENTS FOR WATER HEATER INSTALLATION. INSTALL ALL PIPING AS HIGH AS POSSIBLE TO AVOID INTERFERENCE WITH DOOR AND MOP SINK.
 - INSTALL 2" VENT PIPING ROUTED TO EXISTING CHIMNEY AND TERMINATE ON ROOF VIA BEST ROUTE AVAILABLE.
 - INSTALL TEE, BALL VALVE, AND THREADED PIPE CAP. THE DESIGN INTENT IS TO PROVIDE A POINT OF PRESSURIZATION SUCH THAT THE PIPING SERVING RESTROOMS SHALL BE DRAINED DURING COLD WEATHER MONTHS.



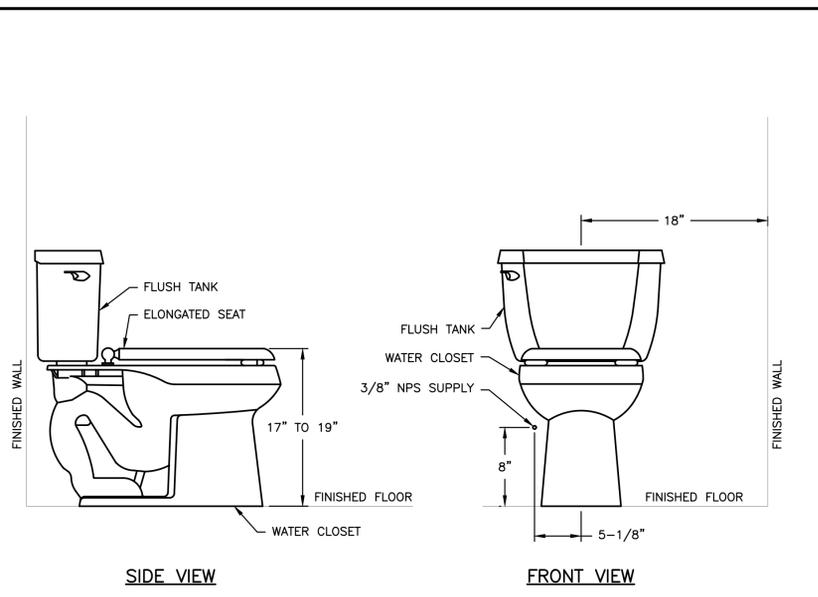
DEMOLITION PLAN

PLUMBING DEMOLITION PLAN
 SCALE: 1/4" = 1'-0"



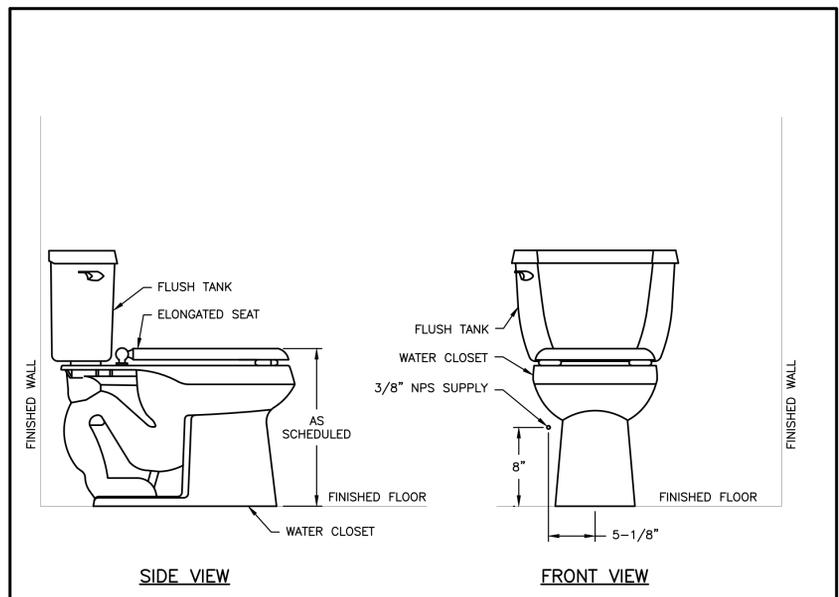
PLUMBING PLAN
 SCALE: 1/4" = 1'-0"





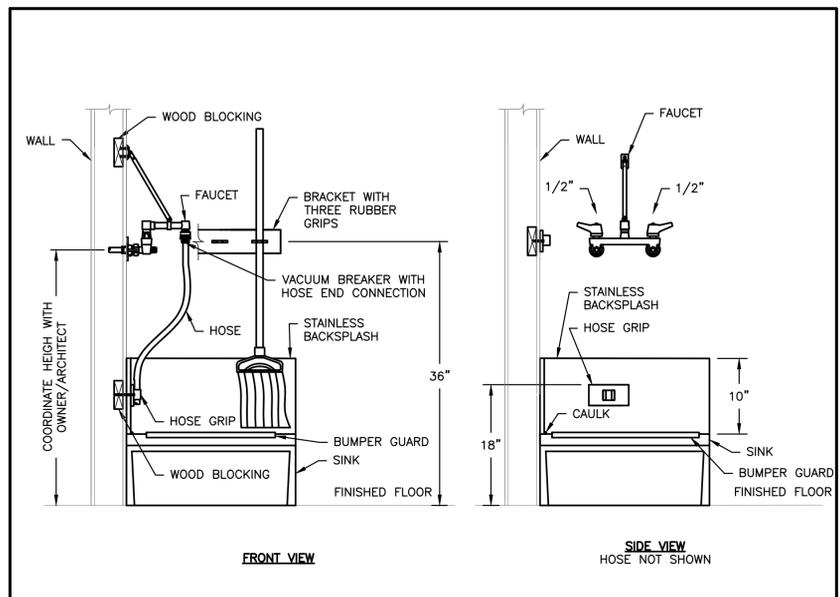
ADA WATER CLOSET

NOT TO SCALE



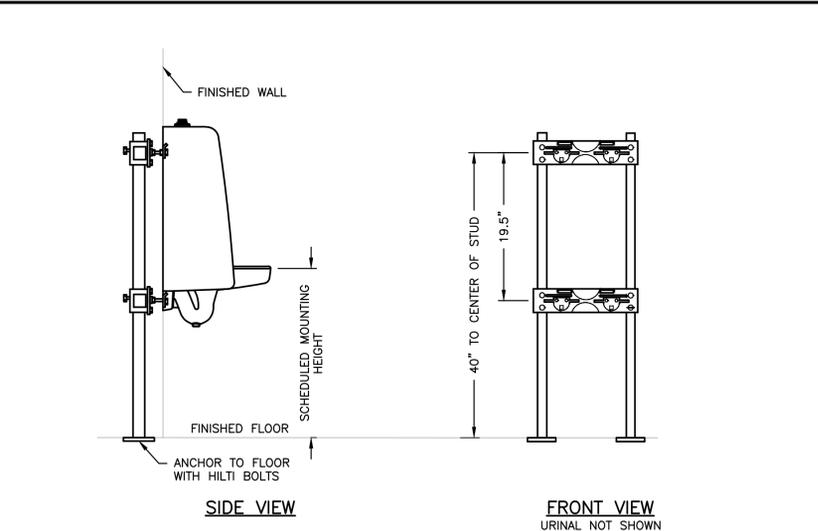
WATER CLOSET

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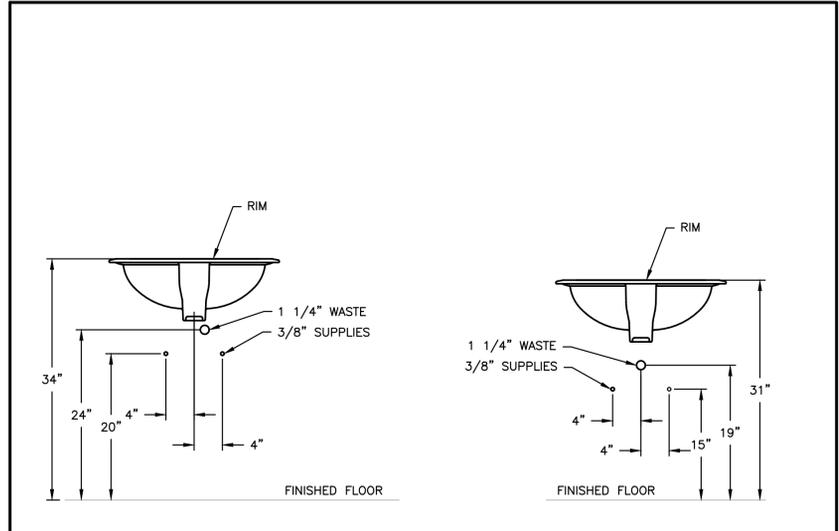
MOP SINK DETAIL

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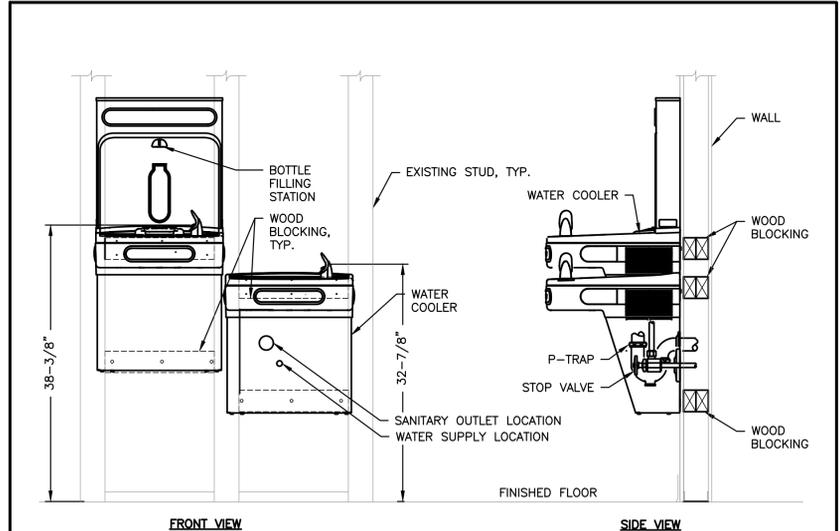
URINAL SUPPORT

NOT TO SCALE



LAVATORY ROUGH-IN

NOT TO SCALE



ADA WATER COOLER INSTALLATION DETAIL

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CONTRACTOR SHALL VERIFY DIMENSIONS FROM ROUGH IN DATA SHEETS AND SCHEDULED MOUNTING HEIGHTS. THESE DRAWINGS MAY NOT BE REPRODUCED IN ANY FORM WITHOUT WRITTEN CONSENT FROM VALLEY ENGINEERING, P.L.C.

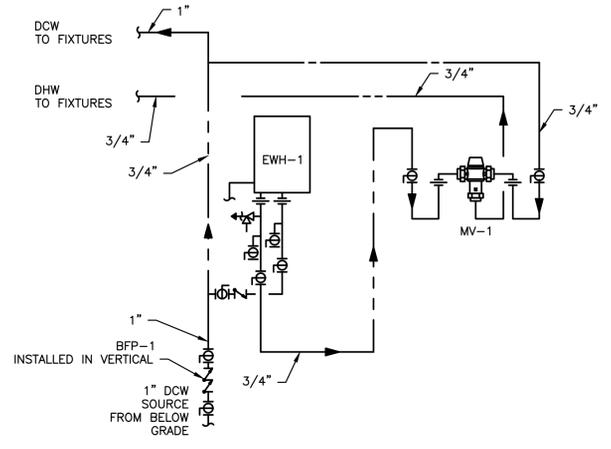
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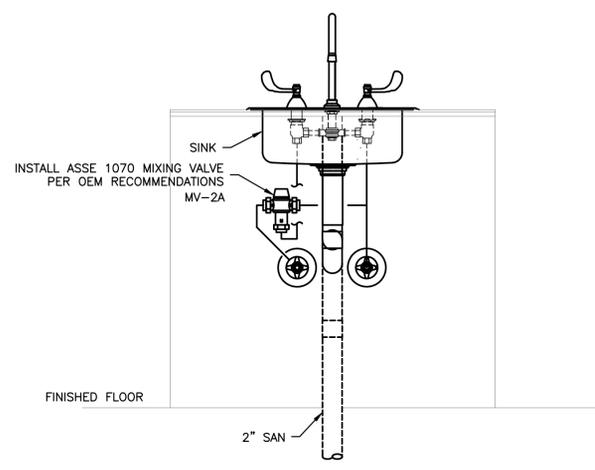
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 SCALE: N/A

PLUMBING DETAILS

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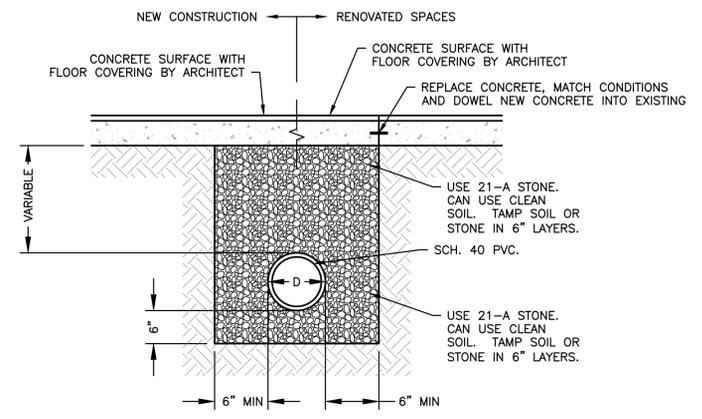


WATER HEATER / BACKFLOW PREVENTER DETAIL
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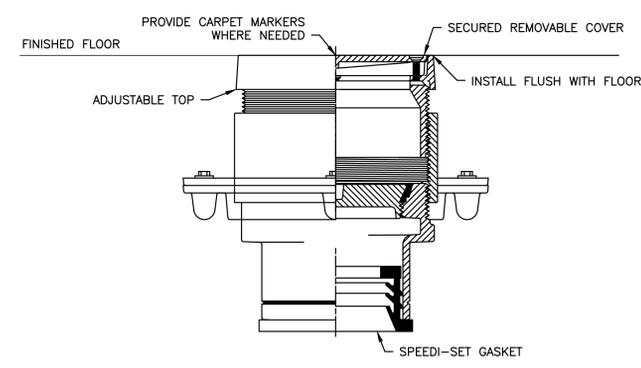


NOTE: INSTALLATION SHOWN IS SIMILAR FOR LAVATORIES AND OTHER FIXTURES.

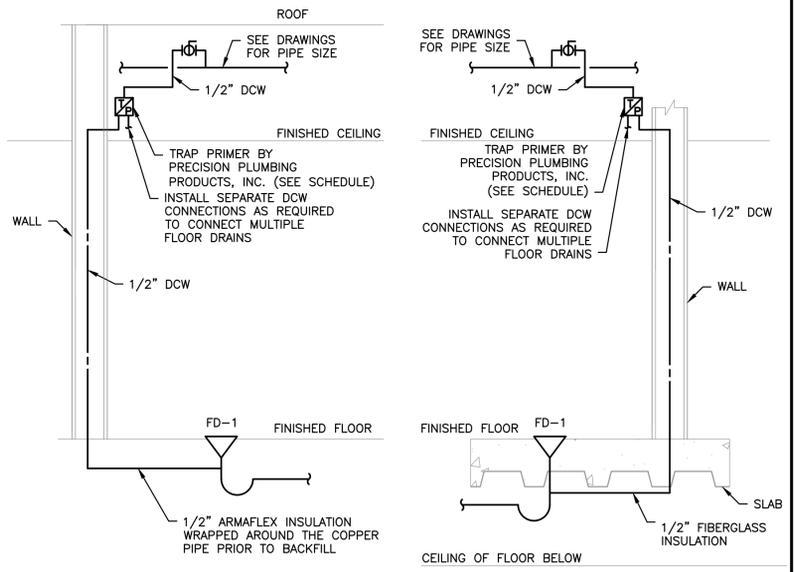
ASSE 1070 MIXING VALVE INSTALLATION DETAIL
NOT TO SCALE



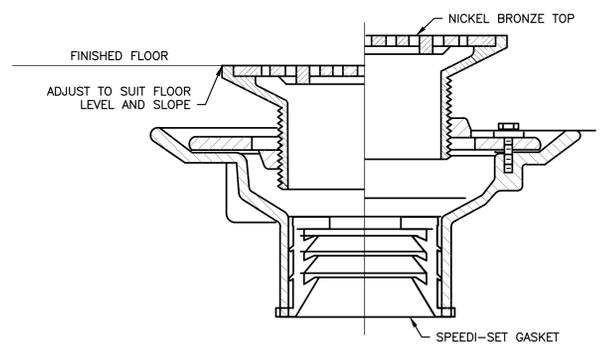
INSIDE PIPE BEDDING DETAIL
NOT TO SCALE



CO-1 SEE SCHEDULE FOR DETAILS
NOT TO SCALE



TRAP PRIMER CONNECTION DETAIL
NOT TO SCALE



FD-1 SEE SCHEDULE FOR DETAILS
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PLUMBING DETAILS

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