

Adam Steen, Director

January 19, 2024

To: All Potential Respondents

From: Construction Procurement

Subject: RFQ919900-02 IMHI Reynolds Building Water Main Replacement

Request for Quote

The State of Iowa is conducting a Request for Quote for a contractor for water main replacement for Reynolds Building at Independence Mental Health Institute (IMHI), Independence, Iowa 50644. See Exhibit B for additional detail.

All work must be done on-site at Independence Mental Health Institute (IMHI), Independence, Iowa 50644. All personnel must pass a background check. Information required for the background check includes full name, birthdate, state driver's license # or State id#, and social security number.

The work shall be substantially completed no later than May 15, 2024.

The Project is located at Independence Mental Health Institute (IMHI), Independence, Iowa 50644.

Please email your quote using the Exhibit A pricing form to construction.procurement@iowa.gov prior to February 8, 2024 at 2:00 (CT).

A pre-quote meeting will be held January 30, 2024 @ 11:00 AM.

All questions regarding this solicitation must be received by email by 2:00 PM (CT) on February 1, 2024.

Contract Terms and Conditions

This procurement will result in a Consensus 802 Agreement. By submitting a quote, respondent agrees to the contract terms and conditions available at:

https://das.iowa.gov/sites/default/files/procurement/pdf/ConsensusDoc802.pdf

Respondent must provide a one-year warranty from the date of completion.

Respondent must provide Performance and Payment Bonds in accordance with Section 10.8 of Consensus 802 Agreement.

See sample Certificate of Insurance attached as Exhibit D for required limits, additional insured requirements, and waiver of subrogation.

Exhibit A Pricing Form

IMHI Reynolds Building Water Main Replacement Independence Mental Health Institute (IMHI), Independence, Iowa 50644 Request for Quote RFQ919900-02

Due Friday, February 8, 2024, at 2:00 PM (CT)

Please submit this completed form with your Quote to: Attention: Michael Bradbury Iowa Department of Administrative Services - Central Procurement <u>construction.procurement@iowa.gov</u>

This form is to be completed in ink or typewritten. Only pricing on this form or an exact copy of this form will be accepted. Pricing Form shall be signed by an officer of the firm with authority to bind Respondent to Contract.

Respondent acknowledges receipt of the following Addenda (if issued) which are part of the RFQ documents:

Addendum No. _____Date_____

Addendum No._____ Date _____

Freight Terms: FOB Destination, Freight Pre-Paid

The State reserves the right to reject any or all quotes without penalty and to waive minor deficiencies and informalities if, in the judgement of the State, it's best interests will be served.

Respondents must submit pricing for all scope of work items indicated per the attached Exhibit B. The State reserves the right to evaluate pricing. The State intends to make one Award for this project.

BP 001 - IMHI Reynolds Building Water Main Replacement (Substantial Completion Date May 15, 2024):

Quote: Total \$_____

*Please note all pricing is to be delivered price. That is why we are stating FOB Destination, Freight Pre-Paid. *

Signature	
Name (Print)	
Title	
Company	
Address	
City, St., Zip	
Phone #	Fax #
E-mail	

Exhibit B Scope of Work

IMHI Reynolds Building Water Main Replacement Independence Mental Health Institute (IMHI), Independence, Iowa 50644 Request for Quote RFQ919900-02

Due Friday, February 8, 2024, at 2:00 PM (CT)

IMHI Reynolds Building Water Main Replacement:

BID PACKAGE INSTRUCTIONS

- A. **BP 001** Reynolds Water Main: Trade Contractor shall include all of the following, but not limited to, as part of the contract (Substantial Completion May 15, 2024):
 - 1. All construction associated with the construction of Reynolds Water Main Project.
 - 2. Drawing numbers G1, G2, C1, M1. M2, M3, M4, M5, M6, X1, X2 & X3
 - 3. Technical Specifications 02 41 00, 03 30 53, 22 00 00 and 22 07 19.

DHS IMHI REYNOLDS BUILDING WATER MAIN PROJECT **INDEPENDENCE**, IOWA

GENERAL NOTES

- 1. REFER TO SPECIFICATIONS FOR ALLOWABLE SERVICE DISRUPTION TIMES AND OWNER NOTIFICATION REQUIREMENTS PRIOR TO SERVICE DISRUPTIONS.
- 2. ALL BURIED UTILITY LOCATIONS ARE APPROXIMATE AND SHALL BE FIELD LOCATED PRIOR TO EXCAVATION. SEWER, NATURAL GAS, TELECOM, AND OTHER HOUSE SERVICE LINES ARE NOT SHOWN ON PLANS. THERE MAY BE OTHER EXISTING UTILITY LINES, STRUCTURES, AND SERVICE CONNECTIONS NOT KNOWN AND NOT SHOWN ON THE DRAWINGS.
- 3. CONTRACTOR SHALL PROTECT ALL EXISTING UTILITIES, DRIVES, STREETS AND OTHER ITEMS TO REMAIN, INCLUDING ANY NOT SPECIFICALLY SHOWN IN THE DRAWINGS. DAMAGE TO EXISTING UTILITIES, DRIVES, STREETS AND OTHER ITEMS SHALL BE REPAIRED BY THE CONTRACTOR AT HIS EXPENSE.
- 4. CONTRACTOR SHALL NOTIFY THE OWNER IMMEDIATELY OF ANY CONFLICTS BETWEEN THE DRAWINGS AND EXISTING FEATURES.
- 5. CONTRACTOR SHALL NOTIFY THE OWNER IMMEDIATELY OF UNEXPECTED SUB-SURFACE CONDITIONS. DISCONTINUE WORK IN AREA UNTIL NOTIFIED BY OWNER TO RESUME WORK.
- 6. CONTRACTOR IS RESPONSIBLE FOR PROVIDING CONSTRUCTION LAYOUT FOR ALL GRADES AND FEATURES.

LOCATION MAP



SHEET NUMBER	TITLE	REVISION NUMBER
G1	COVER SHEET	0
G2	PHASING PLAN AND QUANTITIES	0
C1	OVERVIEW MAP	0
M1	KITCHEN PLAN VIEW	0
M2	TUNNEL PLAN VIEW	0
M3	ENLARGED PLANS	0
M4	SECTIONS	0
M5	SECTIONS	0
M6	SECTIONS	0
X1	REYNOLDS BUILDING PHOTOS	0
X2	REYNOLDS BUILDING PHOTOS	0
X3	REYNOLDS BUILDING PHOTOS	0

IOWA ONE CALL UTILITY CONTACTS

ALLIANT ENERGY Contact Name : Alliant Energy Field Engineer Contact Phone: 8002554268 Contact Email: locate_IPL@alliantenergy.com

MEDIACOM Contact Name : Brian Kadner Contact Phone: 8455449656 Contact Email: bkadner@mediacomcc.com

CENTURYLINK Contact Name : SADIE HULL Contact Phone: 9185470147 Contact Email: sadie.hull@lumen.com

FARMERS MUTUAL TELEPHONE Contact Name : Eric Hoger Contact Phone: 3198271151 Contact Email: locates@jtt.net



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DRAWING INDEX

INDEPENDENCE LIGHT AND POWER Contact Name : Joel Reed Contact Phone: 3193320100 Contact Email: jreed@indytel.com

MIDAMER-ELEC Contact Name : Jordyn Weber Contact Phone: 3192914728 Contact Email: jlweber@midamerican.com

MIDAMER-GAS Contact Name : Jordyn Weber Contact Phone: 3192914728 Contact Email: jlweber@midamerican.com

MENTAL HEALTH INSTITUTE Contact Name : Mental Health Institute Contact Phone: 3193342583 Contact Email: GCOLEMA@DHS.STATE.IA.US



by certify that this engineering document was prepared by me
der my direct personal supervision and that I am a duly licensed
sional Engineer under the laws of the State of Iowa.

Bradley W. Roeth

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Date My license renewal date is December 31, 2024

Sheets covered by this seal: ALL DRAWINGS

DHS IMHI REYNOLDS BUILDING WATER MAIN PROJECT INDEPENDENCE, IOWA	IOWA DEPARTMENT OF ADMINSTRATIVE SERVICES HOOVER STATE BUILDING 1305 EAST WALNUT DES MOINES, IA	DESIGNED BY: BWR DWN BY: CKD BY: XXX BWMTTED BY: BUR	DATE: SOLICITATION NO.: CONTRACT NO.: 127.01	ШЦ				WATERSMITH	
 COVER SHEET	WATERSMITH ENGINEERING 1029 HERSHEY AVE MUSCATINE, IA 52761	PLOT SCALE: ISSUE DATE: XX-XX-XX SIZE: ANSI B	: FILE NUMBER:	0 MARK	FOR BIDS DESCRIPTION	1/18/24 DATE	BWR APPR	ENGINEERING	

PROJECT QUANTITIES

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PHASING PLAN

THE FOLLOWING IS A SUGGESTED PHASING PLAN. CONTRACTOR IS REQUIRED TO DEVELOP A CONSTRUCTION SEQUENCE THAT MAINTAINS CUSTOMER SERVICE THROUGHOUT PROJECT WITHIN ALLOWABLE SERVICE DISRUPTIONS. ALLOWABLE SERVICE DISRUPTION IS 4 HRS. CONTRACTOR SHALL COORDINATE PROPOSED PHASING PLAN WITH OWNER AND PROVIDE MINIMUM 48 HOUR NOTICE PRIOR TO PLANNED OUTAGES.

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1. INSTALL 6" X 4" TEE AND 4" WATER MAIN BELOW FLOOR TO VALVE IN WARD A.

2. INSTALL 8" X 4" TAPPING SLEEVE AND VALVE IN PIPE ROOM.

3. INSTALL 4" WATER MAIN FROM PIPE ROOM TO WARD A.

4. DISINFECT, FLUSH, AND TEST WATER MAIN.

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5. INSTALL 6" X 2" TAPPING SADDLE IN TUNNEL.

6. INSTALL 2" WATER SERVICE IN KITCHEN AREA.

7. DISINFECT, FLUSH, AND TEST WATER SERVICE.

8. CONNECT 2" SERVICE IN KITCHEN AREA. CLOSE 6" VALVE IN TUNNEL AREA.

9. REMOVE 6" TEE AT EAST END OF TUNNEL. INSTALL 6" MAIN AND VALVE.

FOR USE AS REFERENCE ONLY. THESE QUANTITIES ARE ESTIMATES ONLY. PROJE ITEMS REQUIRED BY SPECIFICATIONS OR DRAWINGS BUT NOT LISTED ARE CONSI ITEMS LISTED. CONTRACTOR TO VERIFY QUANTITIES.

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			ADMIN BUILDING (KITCHEN AREA) / TUNNEL- WATER MAIN REPLACEMENT
BID ITEM	QTY	UNIT	DESCRIPTION
			KITCHEN AREA
1	1	EA	TAPPING SADDLE, 6" X 2", CORP STOP AND TAPPING 6" MAIN, INCLUDES HAND DIGGING TO EXPOSE MAIN
2	47	LF	WATER SERVICE, COPPER, 2", IN TUNNEL AREA, INCLUDES PIPE SUPPORTS AND HANGERS
3	3	EA	90 ELBOW, COPPER, 2", IN TUNNEL AREA
4	3	EA	CORE DRILL, 4", LENGTH VARIES, MASONRY WALLS, CONCRETE FLOOR, INCLUDES SLEEVES
5	1	LS	REMOVE 2" WATER SERVICE PIPE, IN DINING ROOM, INCLUDES PATCHING FLOOR PENETRATION
6	1	LS	REMOVE AND REPLACE CEILING FOR WATER SERVICE AND PIPE SUPPORT INSTALLATION
7	1	EA	CONNECT TO EXISTING SERVICE, 2", IN DINING ROOM
8	54	LF	WATER SERVICE, COPPER, 2", INSULATED, IN KITCHEN AREA, INCLUDES FITTINGS REQUIRED FOR FIELD ROUT
9	1	EA	BALL VALVE, BRONZE BODY, 2"
10	1	EA	TEE, COPPER, 2"X 1", INSULATED, IN KITCHEN AREA, INCLUDES THREADED PLUG FOR TESTING
11	1	LS	DISINFECTION, FLUSHING AND TESTING
			EAST END TEE REMOVAL
12	1	LS	REMOVE EXISTING 6" TEE AND WATER MAIN, PARTIALLY BURIED, INCLUDES DEWATERING AND HAND DIGGI
13	2	EA	RESTRAINED COUPLING, 6", VERIFY SIZE AND TYPE NEEDED FOR CAST IRON MAIN
14	1	EA	GATE VALVE, RESTRAINED MJ, 6"
15	10	LF	WATER MAIN, DI, 6"
			TUNNEL WATER MAIN INSTALLATION
16	1	EA	TAPPING SLEEVE AND VALVE, 8"X4", IN PIPE ROOM
17	1	EA	CUT-IN TEE, 6"X4", BURIED, IN WARD A, INCLUDES THRUST BLOCK
18	1	EA	GATE VALVE, FLANGED, 4"
19	2	EA	90 ELBOW, FLANGED, DI, 4", INCLUDES PIPE SUPPORTS
20	1	EA	90 ELBOW, MJ, DI, 4", BURIED, INCLUDES THRUST BLOCK
21	14	EA	90 ELBOW, 4", ASTM D2467, SCH.80
22	1	EA	TEE, FLANGED, DI, 4", INCLUDES BLIND FLANGE ON SIDE TAPPED FOR TESTING
23	16	LF	WATER MAIN, FLANGED OR RESTRAINED MJ, DI, 4", INCLUDES PIPE SUPPORTS
24	254	LF	WATER MAIN, PVC, 4", ASTM D1785, SCH. 80, INCLUDES PIPE SUPPORTS AND HANGERS
25	2	EA	CORE DRILL, 8", LENGTH VARIES, MASONRY WALL, INCLUDES SLEEVES AND LINK SEAL
26	45	SF	REMOVE AND REPLACE CONCRETE FLOOR, INCLUDES CRUSHED ROCK BACKFILL, IN WARD A
27	1	LS	DISINFECTION, FLUSHING AND TESTING
28	1	LS	REMOVE PIPE AND CONDUITS, TUNNEL 3
	I		1

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IDERED	INCIDENTAL TO	

OR FIELD ROUTING PIPE, SUPPORTS AND HANGERS

ND HAND DIGGING

	DATE:		POLIDITATION NO		CONTRACT NO .:	127.01
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SHEET IDENTIFICATION G2

ENGINEERING



















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Photo 1- Enlarged Plan 3-M3, Looking North At 6-inch Valve



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Photo 2- Enlarged Plan 3-M3, Looking West At 6-inch Valve



Photo 4- Drawing M1- Room 18B, Looking West



Photo 5- Drawing M1- Dining Room, Looking West







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Photo 7- Enlarged Plan 4- M3, Looking West At 6-inch Tee

Reynolds Building Photos

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Photo 8- Pipe Room- Section 2- M4, Looking At 8-inch Pipe



Photo 10- Tunnel 1- Section 1- M5, Looking West Toward Pipe Room



Photo 11- Tunnel , Looking North







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Photo 13- Tunnel 3- Section 3- M5, Looking East



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Photo 14- Tunnel 3- Section1- M6, Looking East At Side Tunnel Entrance



Photo 16- Tunnel 3- Section 2- M6, Looking East At End Of Tunnel



Photo 17- Ward A- Section 4- M6, Looking West At Wall



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Photo 18- Ward A- Section 5- M6, Looking West At Interior Wall



DHS IMHI Reynolds Building Water Main Replacement Project Independence, Iowa

Technical Specifications

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- 03 30 53 Miscellaneous Cast-In-Place Concrete
- 22 00 00 Plumbing, General Purpose
- 22 07 19 Plumbing Piping Insulation



I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

1/18/2024 Date

(signature)
Bradley W. Roeth
License number 16536
My license renewal date is December 31, 2024
Pages or sheets covered by this seal: Technical Specifications

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SECTION 02 41 00 DEMOLITION

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SECTION 02 41 00

DEMOLITION 08/22

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ASSP A10.6

(2006) Safety & Health Program Requirements for Demolition Operations -American National Standard for Construction and Demolition Operations

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1	-1	(2014)	Safety		Safety	and	Health
		Requir	ements N	lanı	Jal		

1.2.1.1 Demolition

Demolition is the process of tearing apart and removing any feature of a facility together with any related handling and disposal operations.

1.2.3 General Requirements

Do not begin demolition or deconstruction until authorization is received from the Contracting Officer. Remove rubbish and debris from the project site; do not allow accumulations [inside or outside the building[s]]. [The work includes [demolition,] salvage of identified items and materials, and removal of resulting rubbish and debris. Remove rubbish and debris from Government property daily, unless otherwise directed. Store materials that cannot be removed daily in areas specified by the Contracting Officer.] In the interest of occupational safety and health, perform the work in accordance with EM 385-1-1, Section 23, Demolition, and other applicable Sections.

1.3 ITEMS TO REMAIN IN PLACE

Protect existing vegetation, structures, equipment, utilities, and improvements. Coordinate the work of this section with all other work indicated. Construct and maintain shoring, bracing, and supports as required. Ensure that structural elements are not overloaded. Increase structural supports or add new supports as may be required as a result of any cutting, removal, deconstruction, or demolition work performed under this contract. Do not overload [structural elements]. Provide new supports and reinforcement for existing construction weakened by demolition, deconstruction, or removal work. Repairs, reinforcement, or structural replacement require approval by the Contracting Officer prior to performing such work.

1.3.1 Existing Construction Limits and Protection

Do not disturb existing construction beyond the extent indicated or necessary for installation of new construction. Provide temporary shoring and bracing for support of building components to prevent settlement or other movement. Provide protective measures to control accumulation and migration of dust and dirt in all work areas. Remove dust, dirt, and debris from work areas daily.

1.3.4 Utility Service

Maintain existing utilities indicated to stay in service and protect against damage during demolition and deconstruction operations.

1.3.5 Facilities

Protect electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities. Floors, roofs, walls, columns, pilasters, and other structural components that are designed and constructed to stand without lateral support or shoring, and are determined to be in stable condition, must remain standing without additional bracing, shoring, or lateral support until demolished or deconstructed, unless directed otherwise by the Contracting Officer. Ensure that no elements determined to be unstable are left unsupported and place and secure bracing, shoring, or lateral supports as may be required as a result of any cutting, removal, deconstruction, or demolition work performed under this contract.

1.4 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted.

1.5 AVAILABILITY OF WORK AREAS

Areas in which the work is to be accomplished will be available at contract award.

1.7.2 Dust and Debris Control

Prevent the spread of dust and debris to occupied portions of the building and avoid the creation of a nuisance [or hazard] in the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution.

1.10 RELOCATIONS

Perform the removal and reinstallation of relocated items as indicated with workmen skilled in the trades involved. Repair or replace items to be relocated which are damaged by the Contractor with new undamaged items as approved by the Contracting Officer.

1.11 EXISTING CONDITIONS

Before beginning any demolition or deconstruction work, survey the site and examine the drawings and specifications to determine the extent of the work. Record existing conditions in the presence of the Contracting Officer showing the condition of structures and other facilities adjacent to areas of alteration or removal. Photographs or electronic images with a minimum resolution of 3072×2304 pixels, capable of a print resolution of 300 dpi, will be acceptable as a record of existing conditions. Include in the record the elevation of the top of foundation walls, finish floor elevations, possible conflicting electrical conduits, plumbing lines, alarms systems, the location and extent of existing cracks and other damage and description of surface conditions that exist prior to starting work. It is the Contractor's responsibility to verify and document all required outages which will be required during the course of work, and to note these outages on the record document. Submit survey results to the Contracting Officer [or the Contracting Officer's Representative].

PART 3 EXECUTION

3.1.2.1 General Requirements

Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by the Contracting Officer. Do not interrupt existing utilities serving facilities occupied and used by the Government except when approved in writing and then only after temporary utility services have been approved and provided. Do not begin demolition or deconstruction work until all utility disconnections have been made. Shut off and cap utilities for future use, as indicated.

3.1.2.2 Disconnecting Existing Utilities

Remove existing utilities, as indicated and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by the Contracting Officer. When utility lines are encountered but are not indicated on the drawings, notify the Contracting Officer prior to further work in that area.

3.1.6 Masonry

Sawcut and remove masonry so as to prevent damage to surfaces to remain

and to facilitate the installation of new work. Provide square, straight edges and corners where existing masonry adjoins new work and other locations.

3.1.7 Concrete

Saw concrete along straight lines to a depth of a minimum 2 inch. Make each cut in walls perpendicular to the face and in alignment with the cut in the opposite face. Break out the remainder of the concrete provided that the broken area is concealed in the finished work, and the remaining concrete is sound. At locations where the broken face cannot be concealed, grind smooth or saw cut entirely through the concrete. Sawcuts in existing concrete pads must be at the nearest existing expansion joint or weakened plane joint and at full depth.]

3.1.8 Structural Steel

Dismantle structural steel at field connections and in a manner that will prevent bending or damage. Salvage for recycle structural steel, steel joists, girders, angles, plates, columns and shapes. Do not use flame-cutting torches.

3.1.9 Miscellaneous Metal

Salvage shop-fabricated items such as access doors and frames, steel gratings, metal ladders, wire mesh partitions, metal railings, metal windows and similar items as whole units. Salvage light-gage and coldformed metal framing, such as steel studs, steel trusses, metal gutters, roofing and siding, metal toilet partitions, toilet accessories and similar items. [Scrap metal is the Contractor's property.] Recycle scrap metal as part of demolition and deconstruction operations. Provide separate containers to collect scrap metal and transport to a scrap metal collection or recycling facility, in accordance with the Waste Management Plan.

3.1.14 Patching

Where removals leave holes and damaged surfaces exposed in the finished work, patch and repair these holes and damaged surfaces to match adjacent finished surfaces, using on-site materials when available. Where new work is to be applied to existing surfaces, perform removals and patching in a manner to produce surfaces suitable for receiving new work. Make finished surfaces of patched area flush with the adjacent existing surface and match the existing adjacent surface as closely as possible to texture and finish. Provide patching as specified and indicated, and include the following:

a. Concrete and Masonry: Completely fill holes and depressions, [caused by previous physical damage or] left as a result of removals in existing masonry walls to remain, with an approved masonry patching material, applied in accordance with the manufacturer's printed instructions.

3.1.18 Mechanical Equipment and Fixtures

3.1.18.2 Piping

Disconnect piping at unions, flanges and valves, and fittings as required to reduce the pipe into straight lengths for practical storage. Store salvaged piping according to size and type. If the piping that remains can become pressurized due to upstream valve failure, attach end caps, blind flanges, or other types of plugs or fittings with a pressure gage and bleed valve to the open end of the pipe to ensure positive leak control. Carefully dismantle piping that previously contained gas, gasoline, oil, or other dangerous fluids, with precautions taken to prevent injury to persons and property. Store piping outdoors until all fumes and residues are removed. Box prefabricated supports, hangers, plates, valves, and specialty items according to size and type. Wrap sprinkler heads individually in plastic bags before boxing. Classify piping not designated for salvage, or not reusable, as scrap metal.

3.1.18.3 Ducts

Classify removed duct work as scrap metal.

3.1.18.4 Fixtures, Motors and Machines

Remove and salvage fixtures, motors and machines associated with plumbing, heating, air conditioning, refrigeration, and other mechanical system installations. Salvage, box and store auxiliary units and accessories with the main motor and machines. Tag salvaged items for identification, storage, and protection from damage. Classify [non-porcelain]broken, damaged, or otherwise unserviceable units and not caused to be broken, damaged, or otherwise unserviceable as debris to be disposed of by the Contractor. [Salvage and crush porcelain plumbing fixtures unsuitable for reuse.]

3.1.19 Electrical Equipment and Fixtures

Salvage motors, motor controllers, and operating and control equipment that are attached to the driven equipment. Salvage wiring systems and components. Box loose items and tag for identification. Disconnect primary, secondary, control, communication, and signal circuits at the point of attachment to their distribution system.

3.1.19.1 Fixtures

Remove and salvage electrical fixtures. Salvage unprotected glassware from the fixture and salvage separately. Salvage incandescent, mercuryvapor, and fluorescent lamps and fluorescent ballasts manufactured prior to 1978, boxed and tagged for identification, and protected from breakage.

3.1.19.2 Electrical Devices

Remove and salvage switches, switchgear, transformers, conductors including wire and nonmetallic sheathed and flexible armored cable, regulators, meters, instruments, plates, circuit breakers, panelboards, outlet boxes, and similar items. Box and tag these items for identification according to type and size.

3.1.19.3 Wiring Ducts or Troughs

Remove and salvage wiring ducts or troughs. Dismantle plug-in ducts and wiring troughs into unit lengths. Remove plug-in or disconnecting devices from the busway and store separately.

3.1.19.4 Conduit and Miscellaneous Items

Salvage conduit except where embedded in concrete or masonry. Consider corroded, bent, or damaged conduit as scrap metal. Sort straight and undamaged lengths of conduit according to size and type. Classify supports, knobs, tubes, cleats, and straps as debris to be removed and disposed.

3.3 DISPOSITION OF MATERIAL

3.3.1 Title to Materials

Except for salvaged items specified in related Sections, and for materials or equipment scheduled for salvage, all materials and equipment removed and not reused or salvaged, become the property of the Contractor and must be removed from Government property. Materials approved for storage by the Contracting Officer must be removed before completion of the contract. Title to materials resulting from demolition and deconstruction, and materials and equipment to be removed, is vested in the Contractor upon approval by the Contracting Officer. The Government will not be responsible for the condition or loss of, or damage to, such property after contract award. Showing for sale or selling materials and equipment on site is prohibited.

- 3.3.3 Salvaged Materials and Equipment
 - a. Salvage items and material to the maximum extent possible.

3.4 CLEANUP

Remove debris and rubbish from project site and similar excavations. Remove and transport the debris in a manner that prevents spillage on streets or adjacent areas. Apply local regulations regarding hauling and disposal.

- 3.5 DISPOSAL OF REMOVED MATERIALS
- 3.5.1 Regulation of Removed Materials

Dispose of debris, rubbish, scrap, and other nonsalvageable materials resulting from removal operations with all applicable federal, state and local regulations.

3.5.2 Burning on Government Property

Burning of materials removed from demolished and deconstructed structures will not be permitted on Government property.

-- End of Section --

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CAST-IN-PLACE CONCRETE

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MISCELLANEOUS CAST-IN-PLACE CONCRETE 05/14

PART 1 GENERAL

1.1 SUMMARY

Perform all work in accordance with ACI 318.

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN CONCRETE INSTITUTE (ACI)

ACI	117	(2010; Errata 2011) Specifications for Tolerances for Concrete Construction and Materials and Commentary
ACI	301	(2016) Specifications for Structural Concrete
ACI	301M	(2016) Metric Specifications for Structural Concrete
ACI	302.1R	(2015) Guide for Concrete Floor and Slab Construction
ACI	304R	(2000; R 2009) Guide for Measuring, Mixing, Transporting, and Placing Concrete
ACI	305R	(2020) Guide to Hot Weather Concreting
ACI	306R	(2016) Guide to Cold Weather Concreting

ACI 318	(2014; Errata 1-2 2014; Errata 3-5 2015; Errata 6 2016; Errata 7-9 2017) Building Code Requirements for Structural Concrete (ACI 318-14) and Commentary (ACI 318R-14)
ACI 318M	(2014; ERTA 2015) Building Code Requirements for Structural Concrete & Commentary
ACI 347R	(2014; Errata 1 2017) Guide to Formwork for Concrete
ACI SP-66 ASTM INTERNATIONAL (AS	(2004) ACI Detailing Manual STM)
ASTM A615/A615M	(2022) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A1064/A1064M	(2022) Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM C31/C31M	(2022) Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33/C33M	(2018) Standard Specification for Concrete Aggregates
ASTM C39/C39M	(2021) Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C94/C94M	(2022a) Standard Specification for Ready-Mixed Concrete
ASTM C143/C143M	(2020) Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150/C150M	(2022) Standard Specification for Portland Cement
ASTM C172/C172M	(2017) Standard Practice for Sampling Freshly Mixed Concrete
ASTM C173/C173M	(2016) Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C231/C231M	(2022) Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260/C260M	(2010a; R 2016) Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C309	(2019) Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete

ASTM	C494/C494M	(2019; E 2022) Standard Specification for Chemical Admixtures for Concrete
ASTM	C595/C595M	(2021) Standard Specification for Blended Hydraulic Cements
ASTM	C618	(2023; E 2023) Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM	C685/C685M	(2017) Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing
ASTM	C920	(2018) Standard Specification for Elastomeric Joint Sealants
ASTM	С989/С989М	(2022) Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM	C1064/C1064M	(2017) Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
ASTM	C1157/C1157M	(2020a) Standard Performance Specification for Hydraulic Cement
ASTM	C1260	(2021) Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM	C1567	(2022) Standard Test Method for Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)
ASTM	C1602/C1602M	(2022) Standard Specification for Mixing Water Used in Production of Hydraulic Cement Concrete
ASTM	D75/D75M	(2019) Standard Practice for Sampling Aggregates
ASTM	D98	(2015) Calcium Chloride
ASTM	D412	(2016; R 2021) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
ASTM	D471	(2016a) Standard Test Method for Rubber Property – Effect of Liquids
ASTM	D1752	(2018) Standard Specification for Preformed Sponge Rubber, Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction

ASTM	E96/E96M	(2022a; E 2023) Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials
ASTM	E1155	(2020) Standard Test Method for Determining Floor Flatness and Floor Levelness Numbers
ASTM	E1155M	(2014) Standard Test Method for Determining Floor Flatness and Floor Levelness Numbers (Metric)
ASTM	E1643	(2018a) Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs
ASTM	E1745	(2017; R 2023) Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs
ASTM	E1993/E1993M	(1998; R 2020) Standard Specification for Bituminous Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs

1.4 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only.

SD-03 Product Data

Air-Entraining Admixture Accelerating Admixture Water-Reducing or Retarding Admixture Curing Materials Expansion Joint Filler Strips, Premolded Joint Sealants - Field Molded Sealants Waterstops Chemical Floor Hardener Batching and Mixing Equipment Conveying and Placing Concrete Formwork Mix Design Data; G Ready-Mix Concrete Curing Compound Mechanical Reinforcing Bar Connectors

SD-06 Test Reports

Aggregates Compressive Strength Testing; G

SD-07 Certificates

Cementitious Materials Pozzolan Aggregates Delivery Tickets

SD-08 Manufacturer's Instructions

Chemical Floor Hardener Curing Compound

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

The Government retains the option to sample and test aggregates and concrete to determine compliance with the specifications. Provide facilities and labor as may be necessary to assist the Government in procurement of representative test samples. Obtain samples of aggregates at the point of batching in accordance with ASTM D75/D75M. Sample concrete in accordance with ASTM C172/C172M. Determine slump and air content in accordance with ASTM C143/C143M and ASTM C231/C231M, respectively, when cylinders are molded. Prepare, cure, and transport compression test specimens in accordance with ASTM C31/C31M. Test compression test specimens in accordance with ASTM C39/C39M. Take samples for strength tests not less than once each shift in which concrete is produced [from each strength of concrete required]. Provide a minimum of five specimens from each sample; two to be tested at 28 days (90 days if pozzolan is used) for acceptance, two will be tested at 7 days for information and one held in reserve.

2.1.1 Strength

Acceptance test results are the average strengths of two specimens tested at 28 days (90 days if pozzolan is used). The strength of the concrete is considered satisfactory so long as the average of three consecutive acceptance test results equal or exceed the specified compressive strength, f'c, but not more than 20 percent, and no individual acceptance test result falls below f'c by more than 500 psi.

2.1.2 Construction Tolerances

Apply a Class "C" finish to all surfaces except those specified to receive a Class "D" finish. Apply a Class "D" finish to all post-construction surfaces which will be permanently concealed. Surface requirements for the classes of finish required are as specified in ACI 117.

2.1.3 Concrete Mixture Proportions

Concrete mixture proportions are the responsibility of the Contractor. Mixture proportions must include the dry weights of cementitious material(s); the nominal maximum size of the coarse aggregate; the specific gravities, absorptions, and saturated surface-dry weights of fine and coarse aggregates; the quantities, types, and names of admixtures; and quantity of water per cubic meter yard of concrete. Provide materials included in the mixture proportions of the same type and from the same source as will be used on the project. The specified compressive strength f'c is 4000 psi at 28 days (90 days if pozzolan is used). The maximum nominal size coarse aggregate is 1 inch, in accordance with ACI 304R. The air content must be between 4.5 and 7.5 percent with a slump between 50 and 125 mm 2 and 5 inches. The maximum water-cementitious material ratio is [0.50]. Submit the applicable test reports and mixture proportions that will produce concrete of the quality required, ten days prior to placement of concrete.

2.2 MATERIALS

Submit manufacturer's literature from suppliers which demonstrates compliance with applicable specifications for the specified materials.

2.2.1 Cementitious Materials

Submit Manufacturer's certificates of compliance, accompanied by mill test reports, attesting that the concrete materials meet the requirements of the specifications in accordance with the Special Clause "CERTIFICATES OF COMPLIANCE".

2.2.1.1 Portland Cement

ASTM C150/C150M, Type I, with tri-calcium aluminates (C3A) content less than 10 percent and a maximum cement-alkali content of 0.80 percent Na2Oe (sodium oxide) equivalent.

2.2.3 Admixtures

Provide admixtures, when required or approved, in compliance with the appropriate specification listed. Retest chemical admixtures that have been in storage at the project site, for longer than 6 months or that have been subjected to freezing, at the expense of the Contractor at the request of the Contracting Officer and will be rejected if test results are not satisfactory.

2.2.4 Water

Mixing and curing water in compliance with the requirements of ASTM C1602/C1602M; free of injurious amounts of oil, acid, salt, or alkali. Submit test report showing water complies with ASTM C1602/C1602M.

2.2.5 Reinforcing Steel

Provide reinforcing bars conforming to the requirements of ASTM A615/A615M, Grade 60, deformed. Provide welded steel wire reinforcement conforming to the requirements of ASTM A1064/A1064M. Detail reinforcement not indicated in accordance with ACI 301M ACI 301 and ACI SP-66. Provide mechanical reinforcing bar connectors in accordance with ACI 301M ACI 301 and provide 125 percent minimum yield strength of the reinforcement bar.

2.2.6 Expansion Joint Filler Strips, Premolded

Expansion joint filler strips, premolded of sponge rubber conforming to ASTM D1752, Type I.

2.2.9 Form Coatings Provide form coating in accordance

with ACI 301M ACI 301.

2.2.11 Curing Materials Provide curing materials in accordance with ACI

301M ACI 301, Section 5.

2.3 READY-MIX CONCRETE

Provide ready-mix concrete with mix design data conforming to ACI 301M ACI 301 Part 4. Submit delivery tickets in accordance with ASTM C94/C94M for each ready-mix concrete delivery, include the following additional information: .

- a. Type and brand cement
- Cement content in 43 kilogram 94-pound bags per cubic meter yard of concrete
- c. Maximum size of aggregate
- d. Amount and brand name of admixture
- e. Total water content expressed by water cementitious material ratio
- 2.4 ACCESSORIES

2.4.2 Chemical Floor Hardener

Provide hardener which is a colorless aqueous solution containing a blend of inorganic silicate or siliconate material and proprietary components combined with a wetting agent; that penetrates, hardens, and densifies concrete surfaces. Submit manufactures instructions for placement of liquid chemical floor hardener.

2.4.3 Curing Compound

Provide curing compound conforming to ASTM C309. Submit manufactures instructions for placing curing compound.

PART 3 EXECUTION

3.1 PREPARATION

Prepare construction joints to expose coarse aggregate. The surface must be clean, damp, and free of laitance. Construct ramps and walkways, as necessary, to allow safe and expeditious access for concrete and workmen. Remove snow, ice, standing or flowing water, loose particles, debris, and foreign matter. Satisfactorily compact earth foundations. Make spare vibrators available. Placement cannot begin until the entire preparation has been accepted by the Government.

3.1.1 Embedded Items

Secure reinforcement in place after joints, anchors, and other embedded items have been positioned. Arrange internal ties so that when the forms are removed the metal part of the tie is not less than 50 mm 2 inches from concrete surfaces permanently exposed to view or exposed to water on the finished structures. Prepare embedded items so they are be free of oil and other foreign matters such as loose coatings or rust, paint, and scale. The embedding of wood in concrete is permitted only when specifically authorized or directed. Provide all equipment needed to place, consolidate, protect, and cure the concrete at the placement site and in good operating condition.

3.1.2 Formwork Installation

Forms must be properly aligned, adequately supported, and mortar-tight. Provide smooth form surfaces, free from irregularities, dents, sags, or holes when used for permanently exposed faces. Chamfer all exposed joints and edges , unless otherwise indicated.

- 3.1.4 Production of Concrete
- 3.1.4.1 Ready-Mixed Concrete

Provide ready-mixed concrete conforming to ASTM C94/C94M except as otherwise specified.

3.1.4.2 Concrete Made by Volumetric Batching and Continuous Mixing

Conform to ASTM C685/C685M.

3.2 CONVEYING AND PLACING CONCRETE Convey and place concrete in

accordance with ACI 301M ACI 301, Section 5.

3.3 FINISHING

3.3.1 Temperature Requirement

Do not finish or repair concrete when either the concrete or the ambient temperature is below 10 degrees C = 50 degrees F.

3.3.2 Finishing Formed Surfaces

Remove all fins and loose materials , and surface defects including filling of tie holes. Repair all honeycomb areas and other defects. Remove all unsound concrete from areas to be repaired. Ream or chip surface defects greater than 13 mm 1/2 inch in diameter and holes left by removal of tie rods in all surfaces not to receive additional concrete and fill with dry-pack mortar. Brush-coat the prepared area with an approved epoxy resin or latex bonding compound or with a neat cement grout after dampening and filling with mortar or concrete. Use a blend of portland cement and white cement in mortar or concrete for repairs to all surfaces permanently exposed to view so that the final color when cured is the same as adjacent concrete.

3.3.3 Finishing Unformed Surfaces

Finish unformed surfaces in accordance with ACI 301M ACI 301, Section 5.

FINISH	LOCATION
Float	
Trowel	Tunnel and basement floors
Broom or Belt	

3.3.3.3 Expansion and Contraction Joints

Make expansion and contraction joints in accordance with the details shown or as otherwise specified. Provide 1/2 inch thick transverse expansion joints where new work abuts an existing concrete. Provide expansion joints at a maximum spacing of 30 feet on center in sidewalks [and at a maximum spacing of 10 feet in slabs], unless otherwise indicated. Provide contraction joints at a maximum spacing of [6] linear feet in sidewalks and at a maximum spacing of 10 feet in slabs, unless otherwise indicated. Cut contraction joints at a minimum of 1 inch deep with a jointing tool after the surface has been finished.

3.4 CURING AND PROTECTION Cure and protect in accordance with

ACI 301M ACI 301, Section 5.

3.5 FORM WORK

Provide form work in accordance with ACI 301M ACI 301, Section 2 and Section 5.

3.5.1 Removal of Forms

Remove forms in accordance with ACI 301M ACI 301, Section 2.

3.6 STEEL REINFORCING

Reinforcement must be free from loose, flaky rust and scale, and free from oil, grease, or other coating which might destroy or reduce the reinforcement's bond with the concrete.

3.6.1 Fabrication

Shop fabricate steel reinforcement in accordance with ACI 318 and ACI SP-66. Provide shop details and bending in accordance with ACI 318 and ACI SP-66.

3.6.2 Splicing

Perform splices in accordance with ACI 318 and ACI SP-66.

3.6.3 Supports

Secure reinforcement in place by the use of metal or concrete supports, spacers, or ties.

3.7 EMBEDDED ITEMS

Before placing concrete, take care to determine that all embedded items are firmly and securely fastened in place. Provide embedded items free of oil and other foreign matter, such as loose coatings of rust, paint and scale. Embedding of wood in concrete is permitted only when specifically authorized or directed.

3.8 CHEMICAL FLOOR HARDENER

Apply Chemical Floor Hardener where indicated, after curing and drying

concrete surface. Dilute liquid hardener with water and apply in three coats. First coat is one-third strength, second coat one-half strength, and third coat two-thirds strength. Apply each coat evenly and allow it to dry 24 hours before applying next coat. Apply proprietary chemical hardeners in accordance with manufacturer's printed directions.

3.9 TESTING AND INSPECTING

Report the results of all tests and inspections conducted at the project site informally at the end of each shift. Submit written reports weekly. Deliver within three days after the end of each weekly reporting period. See Section 01 45 00 QUALITY CONTROL.

3.9.1 Field Testing Technicians

The individuals who sample and test concrete must have demonstrated a knowledge and ability to perform the necessary test procedures equivalent to the ACI minimum guidelines for certification of Concrete Field Testing Technicians, Grade I.

3.9.2 Preparations for Placing

Inspect foundation or construction joints, forms, and embedded items in sufficient time prior to each concrete placement to certify that it is ready to receive concrete.

- 3.9.3 Sampling and Testing
 - a. Obtain samples and test concrete for quality control during placement. Sample fresh concrete for testing in accordance with ASTM C172/C172M. Make six test cylinders.
 - b. Test concrete for compressive strength at 7 and 28 days for each design mix and for every 100 cubic yards of concrete. Test two cylinders at 7 days; two cylinders at 28 days; and hold two cylinders in reserve. Conform test specimens to ASTM C31/C31M. Perform compressive strength testing conforming to ASTM C39/C39M.
 - c. Test slump at the plant for each design mix in accordance with ASTM C143/C143M. Check slump once during each shift that concrete is produced.
 - d. Test air content for air-entrained concrete in accordance with ASTM C231/C231M. Test concrete using lightweight or extremely porous aggregates in accordance with ASTM C173/C173M. Check air content at least once during each shift that concrete is placed.
 - e. Determine temperature of concrete at time of placement in accordance with ASTM C1064/C1064M. Check concrete temperature at least once during each shift that concrete is placed.

3.9.4 Action Required

3.9.4.1 Placing

Do not begin placement until the availability of an adequate number of acceptable vibrators, which are in working order and have competent operators, has been verified. Discontinue placing if any lift is inadequately consolidated.

3.9.4.2 Air Content

Whenever an air content test result is outside the specification limits, adjust the dosage of the air-entrainment admixture prior to delivery of concrete to forms.

3.9.4.3 Slump

Whenever a slump test result is outside the specification limits, adjust the batch weights of water and fine aggregate prior to delivery of concrete to the forms. Make the adjustments so that the watercementitious material ratio does not exceed that specified in the submitted concrete mixture proportion and the required concrete strength is still met.

-- End of Section --

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PLUMBING, GENERAL PURPOSE 11/15, CHG 4: 05/21

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

	AMERICAN	SOCIETY OF	MECHANICAL ENGINEERS (ASME)
ASME	B1.20.1		(2013; R 2018) Pipe Threads, General Purpose (Inch)
ASME	B16.3		(2021) Malleable Iron Threaded Fittings, Classes 150 and 300
ASME	B16.4		(2021) Gray Iron Threaded Fittings; Classes 125 and 250
ASME	B16.5		(2020) Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24 Metric/Inch Standard
ASME	B16.12		(2019) Cast Iron Threaded Drainage Fittings
ASME	B16.15		(2018) Cast Copper Alloy Threaded Fittings Classes 125 and 250
ASME	B16.18		(2021) Cast Copper Alloy Solder Joint Pressure Fittings
ASME	B16.21		(2021) Nonmetallic Flat Gaskets for Pipe
ASME	B16.22		(2021) Wrought Copper and Copper Alloy Solder Joint Pressure Fittings
ASME	B16.23		(2021) Cast Copper Alloy Solder Joint Drainage Fittings - DWV
ASME	B16.24		(2022) Cast Copper Alloy Pipe Flanges, Flanged Fittings, and Valves Classes 150, 300, 600, 900, 1500, and 2500
ASME	B16.29		(2017) Wrought Copper and Wrought Copper Alloy Solder-Joint Drainage Fittings - DWV
ASME	B16.34		(2021) Valves - Flanged, Threaded and Welding End
ASME	B16.39		(2020) Standard for Malleable Iron Threaded Pipe Unions; Classes 150, 250, and 300
ASME	B16.50		(2021) Wrought Copper and Copper Alloy Braze-Joint Pressure Fittings

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ASME	B16.51	(2013) Copper and Copper Alloy Press-Connect Pressure Fittings
ASME	B31.1	(2022) Power Piping
ASME	B31.5	(2022) Refrigeration Piping and Heat Transfer Components
ASME	B40.100	(2022) Pressure Gauges and Gauge Attachments
ASME	BPVC SEC IV	(2017) BPVC Section IV-Rules for Construction of Heating Boilers
ASME	BPVC SEC IX	(2017; Errata 2018) BPVC Section IX-Welding, Brazing and Fusing Qualifications
ASME	BPVC SEC VIII D1	(2019) BPVC Section VIII-Rules for Construction of Pressure Vessels Division 1
ASME	CSD-1 AMERICAN WATER WORKS ASS	(2021) Control and Safety Devices for Automatically Fired Boilers SOCIATION (AWWA)
AWWA	10084	(2017) Standard Methods for the Examination of Water and Wastewater
AWWA	B300	(2018) Hypochlorites
AWWA	B301	(2018) Liquid Chlorine
AWWA	C203	(2020) Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot-Applied
AWWA	C606	(2022) Grooved and Shouldered Joints
AWWA	C651	(2014) Standard for Disinfecting Water Mains
AWWA	C652	(2019) Disinfection of Water-Storage Facilities
AWWA	C700	(2020) Cold-Water Meters - Displacement Type, Metal Alloy Main Case
AWWA	C701	(2019) Cold-Water Meters - Turbine Type for Customer Service
AWWA	D100 AMERICAN WELDING SOCIETY	(2021) Welded Steel Tanks for Water Storage Y (AWS)
AWS A	A5.8/A5.8M	(2019) Specification for Filler Metals for Brazing and Braze Welding
AWS E	32.2/B2.2M	(2016) Specification for Brazing Procedure and Performance Qualification

	ASTM INTERNATIONAL	(ASTM)
ASTM	A47/A47M	(1999; R 2022; E 2022) Standard Specification for Ferritic Malleable Iron Castings
ASTM	A53/A53M	(2022) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM	A74	(2021) Standard Specification for Cast Iron Soil Pipe and Fittings
ASTM	A105/A105M	(2021) Standard Specification for Carbon Steel Forgings for Piping Applications
ASTM	A183	(2014; R 2020) Standard Specification for Carbon Steel Track Bolts and Nuts
ASTM	A193/A193M	(2023) Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service and Other Special Purpose Applications
ASTM	A515/A515M	(2017; R2022) Standard Specification for Pressure Vessel Plates, Carbon Steel, for Intermediate- and Higher-Temperature Service
ASTM	A516/A516M	(2017) Standard Specification for Pressure Vessel Plates, Carbon Steel, for Moderate- and Lower-Temperature Service
ASTM	A518/A518M	(1999; R 2022) Standard Specification for Corrosion-Resistant High-Silicon Iron Castings
ASTM	A536	(1984; R 2019; E 2019) Standard Specification for Ductile Iron Castings
ASTM	A733	(2016; R 2022) Standard Specification for Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples
ASTM	A888	(2021a) Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications
ASTM	B32	(2020) Standard Specification for Solder Metal
ASTM	B42	(2020) Standard Specification for Seamless Copper Pipe, Standard Sizes
ASTM	B43	(2020) Standard Specification for Seamless Red Brass Pipe, Standard Sizes
ASTM	B75/B75M	(2020) Standard Specification for Seamless Copper Tube

ASTM	B88	(2022) Standard Specification for Seamless Copper Water Tube
ASTM	B88M	(2020) Standard Specification for Seamless Copper Water Tube (Metric)
ASTM	B111/B111M	(2018) Standard Specification for Copper and Copper-Alloy Seamless Condenser Tubes and Ferrule Stock
ASTM	B117	(2019) Standard Practice for Operating Salt Spray (Fog) Apparatus
ASTM	B152/B152M	(2019) Standard Specification for Copper Sheet, Strip, Plate, and Rolled Bar
ASTM	B306	(2020) Standard Specification for Copper Drainage Tube (DWV)
ASTM	B370	(2022) Standard Specification for Copper Sheet and Strip for Building Construction
ASTM	B584	(2022) Standard Specification for Copper Alloy Sand Castings for General Applications
ASTM	B813	(2016) Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube
ASTM	B828	(2016) Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings
ASTM	C564	(2020a) Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings
ASTM	C920	(2018) Standard Specification for Elastomeric Joint Sealants
ASTM	C1053	(2000; R 2010) Standard Specification for Borosilicate Glass Pipe and Fittings for Drain, Waste, and Vent (DWV) Applications
ASTM	D638	(2014) Standard Test Method for Tensile Properties of Plastics
ASTM	D1004	(2013) Initial Tear Resistance of Plastic Film and Sheeting
ASTM	D1248	(2016) Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable
ASTM	D1785	(2015; E 2018) Standard Specification for Poly(Vinyl Chloride) (PVC), Plastic Pipe, Schedules 40, 80, and 120

ASTM D2000	(2018) Standard Classification System for Rubber Products in Automotive Applications
ASTM D2235	(2004; R 2016) Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings
ASTM D2239	(2012) Standard Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter
ASTM D2241	(2015) Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)
ASTM D2464	(2015) Standard Specification for Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
ASTM D2466	(2017) Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
ASTM D2467	(2015) Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
ASTM D2564	(2020) Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems
ASTM D2657	(2007; R 2015) Heat Fusion Joining Polyolefin Pipe and Fittings
ASTM D2661	(2014; E 2018) Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40, Plastic Drain, Waste, and Vent Pipe and Fittings
ASTM D2665	(2014) Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings
ASTM D2672	(2014) Joints for IPS PVC Pipe Using Solvent Cement
ASTM D2683	(2020) Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing
ASTM D2737	(2012a) Polyethylene (PE) Plastic Tubing
ASTM D2822/D2822M	(2005; R 2011; E 2011) Standard Specification for Asphalt Roof Cement, Asbestos-Containing

ASTM	D2846/D2846M	(2019) Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems
ASTM	D2855	(2015) Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings
ASTM	D2996	(2017) Standard Specification for Filament-Wound "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe
ASTM	D3035	(2015) Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter
ASTM	D3122	(1995; R 2009) Solvent Cements for Styrene-Rubber (SR) Plastic Pipe and Fittings
ASTM	D3138	(2004; R 2016) Standard Specification for Solvent Cements for Transition Joints Between Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Non-Pressure Piping Components
ASTM	D3139	(2019) Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
ASTM	D3212	(2020) Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM	D3261	(2016) Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing
ASTM	D3311	(2017) Standard Specification for Drain, Waste, and Vent (DWV) Plastic Fittings Patterns
ASTM	D4101	(2017) Standard Classification System and Basis for Specification for Polypropylene Injection and Extrusion Materials
ASTM	D4551	(2017) Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Flexible Concealed Water-Containment Membrane
ASTM	E1	(2014) Standard Specification for ASTM Liquid-in-Glass Thermometers

ASTM	E96/E96M	(2022a; E 2023) Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials
ASTM	F409	(2022) Standard Specification for Thermoplastic Accessible and Replaceable Plastic Tube and Tubular Fittings
ASTM	F437	(2021) Standard Specification for Threaded Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80
ASTM	F438	(2017) Standard Specification for Socket-Type Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40
ASTM	F439	(2019) Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80
ASTM	F441/F441M	(2023) Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80
ASTM	F442/F442M	(2023) Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR)
ASTM	F477	(2014; R 2021) Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM	F493	(2022) Standard Specification for Solvent Cements for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings
ASTM	F628	(2022) Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe with a Cellular Core
ASTM	F877	(2023) Standard Specification for Crosslinked Polyethylene (PEX) Plastic Hot- and Cold-Water Distribution Systems
ASTM	F891	(2016) Standard Specification for Coextruded Poly (Vinyl Chloride) (PVC) Plastic Pipe with a Cellular Core
ASTM	F1290	(2019) Standard Practice for Electrofusion Joining Polyolefin Pipe and Fittings
ASTM	F1760	(2016; R 2020) Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content

ASTM F2387 (2021) Standard Specification for Manufactured Safety Vacuum Release Systems (SVRS) for Swimming Pools, Spas, and Hot Tubs ASTM F2389 (2023) Standard Specification for Pressure-rated Polypropylene (PP) Piping Systems COPPER DEVELOPMENT ASSOCIATION (CDA) CDA A4015 (2016; 14/17) Copper Tube Handbook CSA GROUP (CSA) (2017; Errata 2017; Errata 2018) Plastic CSA B45.5-17/IAPMO Z124 Plumbing Fixtures INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS (IAPMO) IAPMO UPC (2003) Uniform Plumbing Code INTERNATIONAL CODE COUNCIL (ICC) ICC IPC (2021) International Plumbing Code MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS) MSS SP-25 (2018) Standard Marking System for Valves, Fittings, Flanges and Unions MSS SP-44 (2019) Steel Pipeline Flanges MSS SP-58 (2018) Pipe Hangers and Supports -Materials, Design and Manufacture, Selection, Application, and Installation MSS SP-67 (2022) Butterfly Valves MSS SP-70 (2011) Gray Iron Gate Valves, Flanged and Threaded Ends MSS SP-71 (2018) Gray Iron Swing Check Valves, Flanged and Threaded Ends MSS SP-72 (2010a) Ball Valves with Flanged or Butt-Welding Ends for General Service MSS SP-78 (2011) Cast Iron Plug Valves, Flanged and Threaded Ends MSS SP-80 (2019) Bronze Gate, Globe, Angle and Check Valves MSS SP-83 (2014) Class 3000 Steel Pipe Unions Socket Welding and Threaded MSS SP-85 (2011) Gray Iron Globe & Angle Valves Flanged and Threaded Ends

MSS SP-110 (2010) Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends NACE INTERNATIONAL (NACE) (2013) Control of External Corrosion on NACE SP0169 Underground or Submerged Metallic Piping Systems NSF INTERNATIONAL (NSF) NSF 372 (2016) Drinking Water System Components -Lead Content NSF/ANSI 14 (2022) Plastics Piping System Components and Related Materials NSF/ANSI 61 (2022) Drinking Water System Components -Health Effects PLASTIC PIPE AND FITTINGS ASSOCIATION (PPFA) PPFA Fire Man (2016) Firestopping: Plastic Pipe in Fire Resistive Construction PLUMBING AND DRAINAGE INSTITUTE (PDI) PDI G 101 (2010) Testing and Rating Procedure for Hydro Mechanical Grease Interceptors with Appendix of Installation and Maintenance PDI WH 201 (2010) Water Hammer Arresters Standard SOCIETY OF AUTOMOTIVE ENGINEERS INTERNATIONAL (SAE) SAE J1508 (2023) Hose Clamp Specifications U.S. DEPARTMENT OF ENERGY (DOE) (1992; R 2006) Energy Star Energy Energy Star Efficiency Labeling System (FEMP) U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA) EPA SM 9223 (2004) Enzyme Substrate Coliform Test PL 93-523 (1974; A 1999) Safe Drinking Water Act U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA) 10 CFR 430 Energy Conservation Program for Consumer Products 21 CFR 175 Indirect Food Additives: Adhesives and Components of Coatings

SECTION 22 00 00 Page 11

40 CFR 141.80 National Primary Drinking Water Regulations; Control of Lead and Copper;

General Requirements

		UNDERWRITERS	LABORATORIES (UL)		
UL	174		(2004; Safety Water	Reprint Dec 2021) Household Electric Heaters	UL Standard for c Storage Tank
UL	430		(2015; Safety	Reprint Sep 2021) Waste Disposers	UL Standard for
UL	499		(2014; Safety	Reprint May 2023) Electric Heating A	UL Standard for Appliances
UL	732		(2018; Safety	Reprint Aug 2018) Oil-Fired Storage	UL Standard for Tank Water Heaters
UL	1951		(2011; Safety	Reprint Jun 2020) Electric Plumbing	UL Standard for Accessories

1.2 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government.

SD-02 Shop Drawings

Plumbing System; G

Detail drawings consisting of schedules, performance charts, instructions, diagrams, and other information to illustrate the requirements and operations of systems that are not covered by the Plumbing Code. Detail drawings for the complete plumbing system including piping layouts and locations of connections; dimensions for roughing-in, foundation, and support points; schematic diagrams and wiring diagrams or connection and interconnection diagrams. Detail drawings shall indicate clearances required for maintenance and operation. Where piping and equipment are to be supported other than as indicated, details shall include loadings and proposed support methods. Mechanical drawing plans, elevations, views, and details, shall be drawn to scale.

SD-06 Test Reports

Tests, Flushing and Disinfection

Test reports in booklet form showing all field tests performed to adjust each component and all field tests performed to prove compliance with the specified performance criteria, completion and testing of the installed system. Each test report shall indicate the final position of controls.

1.3 STANDARD PRODUCTS

Specified materials and equipment shall be standard products of a manufacturer regularly engaged in the manufacture of such products. Specified equipment shall essentially duplicate equipment that has performed satisfactorily at least two years prior to bid opening. Standard products shall have been in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year use shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been for sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2 year period.

1.3.1 Alternative Qualifications

Products having less than a two-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturer's factory or laboratory tests, can be shown.

1.3.2 Service Support

The equipment items shall be supported by service organizations. Submit a certified list of qualified permanent service organizations for support of the equipment which includes their addresses and qualifications. These service organizations shall be reasonably convenient to the equipment installation and able to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

1.3.3 Manufacturer's Nameplate

Each item of equipment shall have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.

1.3.4 Modification of References

In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" had been substituted for "should" wherever it appears. Interpret references in these publications to the "authority having jurisdiction", or words of similar meaning, to mean the Contracting Officer.

1.3.4.1 Definitions

For the International Code Council (ICC) Codes referenced in the contract documents, advisory provisions shall be considered mandatory, the word "should" shall be interpreted as "shall." Reference to the "code official" shall be interpreted to mean the "Contracting Officer." For Navy owned property, references to the "owner" shall be interpreted to mean the "Contracting Officer." For leased facilities, references to the "owner" shall be interpreted to mean the "lessor." References to the "permit holder" shall be interpreted to mean the "Contractor."

1.3.4.2 Administrative Interpretations

For ICC Codes referenced in the contract documents, the provisions of Chapter 1, "Administrator," do not apply. These administrative requirements are covered by the applicable Federal Acquisition Regulations (FAR) included in this contract and by the authority granted to the Officer in Charge of Construction to administer the construction of this project. References in the ICC Codes to sections of Chapter 1, shall be applied appropriately by the Contracting Officer as authorized by his administrative cognizance and the FAR.

1.4 DELIVERY, STORAGE, AND HANDLING

Handle, store, and protect equipment and materials to prevent damage before and during installation in accordance with the manufacturer's

recommendations, and as approved by the Contracting Officer. Replace damaged or defective items.

- 1.5 PERFORMANCE REQUIREMENTS
- 1.6 REGULATORY REQUIREMENTS

Unless otherwise required herein, plumbing work shall be in accordance with ICC IPC.

1.7 PROJECT/SITE CONDITIONS

The Contractor shall become familiar with details of the work, verify dimensions in the field, and advise the Contracting Officer of any discrepancy before performing any work.

1.9 ACCESSIBILITY OF EQUIPMENT

Install all work so that parts requiring periodic inspection, operation, maintenance, and repair are readily accessible. Install concealed valves, expansion joints, controls, dampers, and equipment requiring access, in locations freely accessible through access doors.

- PART 2 PRODUCTS
- 2.1 MATERIALS
- 2.1.1 Pipe Joint Materials
 - a. Flange Gaskets: Gaskets shall be made of non-asbestos material in accordance with ASME B16.21. Gaskets shall be flat, 1.6 mm 1/16 inch thick, and contain Aramid fibers bonded with Styrene Butadiene Rubber (SBR) or Nitro Butadiene Rubber (NBR). Gaskets shall be the full face or self centering flat ring type. Gaskets used for hydrocarbon service shall be bonded with NBR.
 - b. Brazing Material: Brazing material shall conform to AWS A5.8/A5.8M, BCuP-5.
 - c. Brazing Flux: Flux shall be in paste or liquid form appropriate for use with brazing material. Flux shall be as follows: lead-free; have a 100 percent flushable residue; contain slightly acidic reagents; contain potassium borides; and contain fluorides.
 - d. Solder Material: Solder metal shall conform to ASTM B32.
 - e. Solder Flux: Flux shall be liquid form, non-corrosive, and conform to ASTM B813, Standard Test 1.
 - f. PTFE Tape: PTFE Tape, for use with Threaded Metal or Plastic Pipe.
 - g. Flexible Elastomeric Seals: ASTM D3139, ASTM D3212 or ASTM F477.
 - h. Plastic Solvent Cement for PVC Plastic Pipe: ASTM D2564 and ASTM D2855.
 - i. Plastic Solvent Cement for CPVC Plastic Pipe: ASTM F493.

j. Flanged fittings including, but not limited to, flanges, bolts, nuts and bolt patterns shall be in accordance with ASME B16.5 class 150 and shall have the manufacturer's trademark affixed in accordance with MSS SP-25. Flange material shall conform to ASTM A105/A105M. Blind flange material shall conform to ASTM A516/A516M cold service and

ASTM A515/A515M for hot service. Bolts shall be high strength or intermediate strength with material conforming to ASTM A193/A193M.

- k. Press fittings for Copper Pipe and Tube: Copper press fittings shall conform to the material and sizing requirements of ASME B16.51 and performance criteria of IAPMO PS 117. Sealing elements for copper press fittings shall be EPDM, FKM or HNBR. Sealing elements shall be factory installed or an alternative supplied fitting manufacturer. Sealing element shall be selected based on manufacturer's approved application guidelines.
- 1. Copper tubing shall conform to ASTM B88M ASTM B88, Type K, L or M.
- 2.1.3 Pipe Insulation Material

Insulation shall be as specified in Section 23 07 00 THERMAL INSULATION FOR MECHANICAL SYSTEMS.

2.2 PIPE HANGERS, INSERTS, AND SUPPORTS

Pipe hangers, inserts, and supports shall conform to MSS SP-58.

2.3 VALVES

Valves shall be provided on supplies to equipment and fixtures. Valves 2-1/2 inches and smaller shall be bronze with threaded bodies for pipe and solder-type connections for tubing. Valves 3 inches and larger shall have flanged iron bodies and bronze trim. Pressure ratings shall be based upon the application. Grooved end valves may be provided if the manufacturer certifies that the valves meet the performance requirements of applicable MSS standard. Valves shall conform to the following standards:

Description	Standard
Cast-Iron Gate Valves, Flanged and Threaded Ends	MSS SP-70
Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends	MSS SP-110
Bronze Gate, Globe, Angle, and Check Valves	MSS SP-80

2.18 MISCELLANEOUS PIPING ITEMS

2.18.1 Escutcheon Plates

Provide one piece or split hinge metal plates for piping entering floors, walls, and ceilings in exposed spaces. Provide chromium-plated on copper

alloy plates or polished stainless steel finish in finished spaces. Provide paint finish on plates in unfinished spaces.

2.18.2 Pipe Sleeves

Provide where piping passes entirely through walls, ceilings, roofs, and floors.

2.18.2.1 Sleeves in Masonry and Concrete

Provide steel pipe sleeves or schedule 40 PVC plastic pipe sleeves. Core drilling of masonry and concrete may be provided in lieu of pipe sleeves when cavities in the core-drilled hole are completely grouted smooth.

2.18.2.2 Sleeves Not in Masonry and Concrete

Provide 26 gage galvanized steel sheet or PVC plastic pipe sleeves.

2.18.3 Pipe Hangers (Supports)

Provide MSS SP-58 Type 1 with adjustable type steel support rods, except as specified or indicated otherwise. Attach to steel joists with Type 19 or 23 clamps and retaining straps. Attach to Steel W or S beams with Type 21, 28, 29, or 30 clamps. Attach to steel angles and vertical web steel channels with Type 20 clamp with beam clamp channel adapter. Attach to horizontal web steel channel and wood with drilled hole on centerline and double nut and washer. Attach to concrete with Type 18 insert or drilled expansion anchor. Provide Type 40 insulation protection shield for insulated piping.

PART 3 EXECUTION

- 3.1 GENERAL INSTALLATION REQUIREMENTS
- 3.1.1 Water Pipe, Fittings, and Connections

3.1.1.1 Utilities

The piping shall be extended to fixtures, outlets, and equipment. The hot-water and cold-water piping system shall be arranged and installed to permit draining. The supply line to each item of equipment or fixture, except faucets, flush valves, or other control valves which are supplied with integral stops, shall be equipped with a shutoff valve to enable isolation of the item for repair and maintenance without interfering with operation of other equipment or fixtures. Supply piping to fixtures, faucets, hydrants, shower heads, and flushing devices shall be anchored to prevent movement.

3.1.1.2 Cutting and Repairing

The work shall be carefully laid out in advance, and unnecessary cutting of construction shall be avoided. Damage to building, piping, wiring, or equipment as a result of cutting shall be repaired by mechanics skilled in the trade involved.

3.1.1.3 Protection of Fixtures, Materials, and Equipment

Pipe openings shall be closed with caps or plugs during installation. Fixtures and equipment shall be tightly covered and protected against dirt, water, chemicals, and mechanical injury. Upon completion of the work, the fixtures, materials, and equipment shall be thoroughly cleaned, adjusted, and operated. Safety guards shall be provided for exposed rotating equipment.

3.1.1.4 Mains, Branches, and Runouts

Piping shall be installed as indicated. Pipe shall be accurately cut and worked into place without springing or forcing. Structural portions of the building shall not be weakened. Aboveground piping shall run parallel with the lines of the building, unless otherwise indicated. Branch pipes from service lines may be taken from top, bottom, or side of main, using crossover fittings required by structural or installation conditions. Supply pipes, valves, and fittings shall be kept a sufficient distance from other work and other services to permit not less than 1/2 inch between finished covering on the different services. Bare and insulated water lines shall not bear directly against building structural elements so as to transmit sound to the structure or to prevent flexible movement of the lines. Water pipe shall not be buried in or under floors unless specifically indicated or approved. Changes in pipe sizes shall be made with reducing fittings. Use of bushings will not be permitted except for use in situations in which standard factory fabricated components are furnished to accommodate specific accepted installation practice. Change in direction shall be made with fittings, except that bending of pipe 4 inches and smaller will be permitted, provided a pipe bender is used and wide sweep bends are formed. The center-line radius of bends shall be not less than six diameters of the pipe. Bent pipe showing kinks, wrinkles, flattening, or other malformations will not be acceptable.

3.1.1.7 Thrust Restraint

Plugs, caps, tees, valves and bends deflecting 11.25 degrees or more, either vertically or horizontally, in waterlines 4 inches in diameter or larger shall be provided with thrust blocks, where indicated, to prevent movement. Thrust blocking shall be concrete of a mix not leaner than: 1 cement, 2-1/2 sand, 5 gravel; and having a compressive strength of not less than 14 MPa 2000 psi after 28 days. Blocking shall be placed between solid ground and the fitting to be anchored. Unless otherwise indicated or directed, the base and thrust bearing sides of the thrust block shall be poured against undisturbed earth. The side of the thrust block not subject to thrust shall be poured against forms. The area of bearing will be as shown. Blocking shall be placed so that the joints of the fitting are accessible for repair. Steel rods and clamps, protected by galvanizing or by coating with bituminous paint, shall be used to anchor vertical down bends into gravity thrust blocks.

3.1.3 Joints

Installation of pipe and fittings shall be made in accordance with the manufacturer's recommendations. Mitering of joints for elbows and notching of straight runs of pipe for tees will not be permitted. Joints shall be made up with fittings of compatible material and made for the specific purpose intended.

3.1.3.1 Threaded

Threaded joints shall have American Standard taper pipe threads conforming to ASME B1.20.1. Only male pipe threads shall be coated with graphite or with an approved graphite compound, or with an inert filler and oil, or shall have a polytetrafluoroethylene tape applied.

3.1.3.3 Unions and Flanges

Unions, flanges and mechanical couplings shall not be concealed in walls, ceilings, or partitions. Unions shall be used on pipe sizes 65 mm 2-1/2 inches and smaller; flanges shall be used on pipe sizes 80 mm 3 inches and larger.

3.1.3.6 Copper Tube and Pipe

- Brazed. Brazed joints shall be made in conformance with AWS B2.2/B2.2M,
 ASME B16.50, and CDA A4015 with flux and are acceptable for all pipe sizes. Copper to copper joints shall include the use of copper-phosphorus or copper-phosphorus-silver brazing metal without flux. Brazing of dissimilar metals (copper to bronze or brass) shall include the use of flux with either a copper-phosphorus, copper-phosphorus-silver or a silver brazing filler metal.
- b. Soldered. Soldered joints shall be made with flux and are only acceptable for piping 50 mm 2 inches and smaller. Soldered joints shall conform to ASME B31.5 and CDA A4015. Soldered joints shall not be used in compressed air piping between the air compressor and the receiver.
- c. Copper Tube Extracted Joint. Mechanically extracted joints shall be made in accordance with ICC IPC.
- d. Press connection. Copper press connections shall be made in strict accordance with the manufacturer's installation instructions for manufactured rated size. The joints shall be pressed using the tool(s) approved by the manufacturer of that joint. Minimum distance between fittings shall be in accordance with the manufacturer's requirements.

3.1.3.7 Plastic Pipe

PVC and CPVC pipe shall have joints made with solvent cement elastomeric, threading, (threading of Schedule 80 Pipe is allowed only where required for disconnection and inspection; threading of Schedule 40 Pipe is not allowed), or mated flanged.

3.1.6 Pipe Sleeves and Flashing

Pipe sleeves shall be furnished and set in their proper and permanent location.

3.1.6.1 Sleeve Requirements

Unless indicated otherwise, provide pipe sleeves meeting the following requirements:

- a. Secure sleeves in position and location during construction. Provide sleeves of sufficient length to pass through entire thickness of walls, ceilings, roofs, and floors.
- b. A modular mechanical type sealing assembly may be installed in lieu of a waterproofing clamping flange and caulking and sealing of annular space between pipe and sleeve. The seals shall consist of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and sleeve using galvanized steel bolts, nuts, and pressure plates. The links shall be loosely assembled with bolts to form a continuous rubber belt around the pipe with a pressure plate under each bolt head and each nut. After the seal assembly is properly positioned in the sleeve, tightening of the bolt shall cause the rubber sealing elements to expand and provide a watertight seal between the pipe and the sleeve. Each seal assembly shall be sized as recommended by the manufacturer to fit the pipe and sleeve involved.
- c. Sleeves shall not be installed in structural members, except where indicated or approved. Rectangular and square openings shall be as detailed. Each sleeve shall extend through its respective floor, or roof, and shall be cut flush with each surface, except for special circumstances. Pipe sleeves passing through floors in wet areas such as mechanical equipment rooms, lavatories, kitchens, and other plumbing fixture areas shall extend a minimum of 100 mm 4 inches above the finished floor.
- d. Unless otherwise indicated, sleeves shall be of a size to provide a minimum of one inch clearance between bare pipe or insulation and inside of sleeve or between insulation and inside of sleeve. Sleeves in bearing walls and concrete slab on grade floors shall be steel pipe or cast-iron pipe. Sleeves in nonbearing walls or ceilings may be steel pipe, cast-iron pipe, galvanized sheet metal with lock-type longitudinal seam, or plastic.
- e. Except as otherwise specified, the annular space between pipe and sleeve, or between jacket over insulation and sleeve, shall be sealed as indicated with sealants conforming to ASTM C920 and with a primer, backstop material and surface preparation as specified in Section 07 92 00 JOINT SEALANTS. The annular space between pipe and sleeve, between bare insulation and sleeve or between jacket over insulation and sleeve shall not be sealed for interior walls which are not designated as fire rated.
- f. Sleeves through below-grade walls in contact with earth shall be recessed 1/2 inch from wall surfaces on both sides. Annular space

between pipe and sleeve shall be filled with backing material and sealants in the joint between the pipe and [concrete] [masonry] wall as specified above. Sealant selected for the earth side of the wall shall be compatible with dampproofing/waterproofing materials that are to be applied over the joint sealant. Pipe sleeves in fire-rated walls shall conform to the requirements in Section 07 84 00 FIRESTOPPING.

3.1.6.5 Pipe Penetrations of Slab on Grade Floors

Where pipes, fixture drains, floor drains, cleanouts or similar items penetrate slab on grade floors, except at penetrations of floors with waterproofing membrane as specified in paragraphs FLASHING REQUIREMENTS and WATERPROOFING, a groove 6 to 13 mm 1/4 to 1/2 inch wide by 6 to 10 mm 1/4 to 3/8 inch deep shall be formed around the pipe, fitting or drain. The groove shall be filled with a sealant as specified in Section 07 92 00 JOINT SEALANTS.

3.1.6.6 Pipe Penetrations

Provide sealants for all pipe penetrations. All pipe penetrations shall be sealed to prevent infiltration of air, insects, and vermin.

- 3.1.8 Supports
- 3.1.8.1 General

Hangers used to support piping 50 mm 2 inches and larger shall be fabricated to permit adequate adjustment after erection while still supporting the load. Pipe guides and anchors shall be installed to keep pipes in accurate alignment, to direct the expansion movement, and to prevent buckling, swaying, and undue strain. Piping subjected to vertical movement when operating temperatures exceed ambient temperatures shall be supported by variable spring hangers and supports or by constant support hangers. In the support of multiple pipe runs on a common base member, a clip or clamp shall be used where each pipe crosses the base support member. Spacing of the base support members shall not exceed the hanger and support spacing required for an individual pipe in the multiple pipe run. Threaded sections of rods shall not be formed or bent.

3.1.8.3 Pipe Hangers, Inserts, and Supports

Installation of pipe hangers, inserts and supports shall conform to MSS SP-58 except as modified herein.

- a. Types 5, 12, and 26 shall not be used.
- b. Type 3 shall not be used on insulated pipe.
- c. Type 18 inserts shall be secured to concrete forms before concrete is placed. Continuous inserts which allow more adjustment may be used if they otherwise meet the requirements for type 18 inserts.
- d. Type 19 and 23 C-clamps shall be torqued per MSS SP-58 and shall have both locknuts and retaining devices furnished by the manufacturer. Field-fabricated C-clamp bodies or retaining devices are not acceptable.

- e. Type 20 attachments used on angles and channels shall be furnished with an added malleable-iron heel plate or adapter.
- f. Type 24 may be used only on trapeze hanger systems or on fabricated frames.
- g. Type 39 saddles shall be used on insulated pipe 100 mm 4 inches and larger when the temperature of the medium is 15 degrees C 60 degrees F or higher. Type 39 saddles shall be welded to the pipe.
- h. Type 40 shields shall:
 - (1) Be used on insulated pipe less than 100 mm 4 inches.
 - (2) Be used on insulated pipe 100 mm 4 inches and larger when the temperature of the medium is 15 degrees C 60 degrees F or less.
 - (3) Have a high density insert for all pipe sizes. High density inserts shall have a density of 128 kg per cubic meter 8 pcf or greater.
- i. Horizontal pipe supports shall be spaced as specified in MSS SP-58 and a support shall be installed not over 300 mm 1 foot from the pipe fitting joint at each change in direction of the piping. Pipe supports shall be spaced not over 1.5 m 5 feet apart at valves. Operating temperatures in determining hanger spacing for PVC or CPVC pipe shall be 49 degrees C 120 degrees F for PVC and 82 degrees C 180 degrees F for CPVC. Horizontal pipe runs shall include allowances for expansion and contraction.
- j. Vertical pipe shall be supported at each floor, except at slab-ongrade, at intervals of not more than 4.5 m 15 feet nor more than 2 m 8 feet from end of risers, and at vent terminations. Vertical pipe risers shall include allowances for expansion and contraction.
- k. Type 35 guides using steel, reinforced polytetrafluoroethylene (PTFE) or graphite slides shall be provided to allow longitudinal pipe movement. Slide materials shall be suitable for the system operating temperatures, atmospheric conditions, and bearing loads encountered. Lateral restraints shall be provided as needed. Where steel slides do not require provisions for lateral restraint the following may be used:
 - (1) On pipe 100 mm 4 inches and larger when the temperature of the medium is 15 degrees C 60 degrees F or higher, a Type 39 saddle, welded to the pipe, may freely rest on a steel plate.
 - (2) On pipe less than 100 mm 4 inches a Type 40 shield, attached to the pipe or insulation, may freely rest on a steel plate.
 - (3) On pipe 100 mm 4 inches and larger carrying medium less that 15 degrees C 60 degrees F a Type 40 shield, attached to the pipe or insulation, may freely rest on a steel plate.
- Pipe hangers on horizontal insulated pipe shall be the size of the outside diameter of the insulation. The insulation shall be continuous through the hanger on all pipe sizes and applications.

- m. Where there are high system temperatures and welding to piping is not desirable, the type 35 guide shall include a pipe cradle, welded to the guide structure and strapped securely to the pipe. The pipe shall be separated from the slide material by at least 100 mm 4 inches or by an amount adequate for the insulation, whichever is greater.
- n. Hangers and supports for plastic pipe shall not compress, distort, cut or abrade the piping, and shall allow free movement of pipe except where otherwise required in the control of expansion/contraction.

3.1.8.4 Structural Attachments

Attachment to building structure concrete and masonry shall be by cast-in concrete inserts, built-in anchors, or masonry anchor devices. Inserts and anchors shall be applied with a safety factor not less than 5. Supports shall not be attached to metal decking. Supports shall not be attached to the underside of concrete filled floor or concrete roof decks unless approved by the Contracting Officer. Masonry anchors for overhead applications shall be constructed of ferrous materials only.

3.6 IDENTIFICATION SYSTEMS

3.6.1 Identification Tags

Identification tags made of brass, engraved laminated plastic, or engraved anodized aluminum, indicating service and valve number shall be installed on valves, except those valves installed on supplies at plumbing fixtures. Tags shall be 35 mm 1-3/8 inch minimum diameter, and marking shall be stamped or engraved. Indentations shall be black, for reading clarity. Tags shall be attached to valves with No. 12 AWG, copper wire, chrome-plated beaded chain, or plastic straps designed for that purpose.

3.7 ESCUTCHEONS

Escutcheons shall be provided at finished surfaces where bare or insulated piping, exposed to view, passes through floors, walls, or ceilings, except in boiler, utility, or equipment rooms. Escutcheons shall be fastened securely to pipe or pipe covering and shall be satin-finish, corrosionresisting steel, polished chromium-plated zinc alloy, or polished chromium-plated copper alloy. Escutcheons shall be either one-piece or split-pattern, held in place by internal spring tension or setscrew.

3.9 TESTS, FLUSHING AND DISINFECTION

3.9.1 Plumbing System

The following tests shall be performed on the plumbing system in accordance with ICC IPC, except that the drainage and vent system final test shall include the smoke test. The Contractor has the option to perform a peppermint test in lieu of the smoke test. If a peppermint test is chosen, the Contractor must submit a testing procedure and reasons for choosing this option in lieu of the smoke test to the Contracting Officer for approval.

a. Water Supply Systems Tests.

3.9.2 Defective Work

If inspection or test shows defects, such defective work or material shall be replaced or repaired as necessary and inspection and tests shall be repeated. Repairs to piping shall be made with new materials. Caulking of screwed joints or holes will not be acceptable.

3.9.3 System Flushing

3.9.3.1 During Flushing

Before operational tests or disinfection, potable water piping system

shall be flushed with [hot]potable water. Sufficient water shall be used to produce a water velocity that is capable of entraining and removing debris in all portions of the piping system. This requires simultaneous operation of all fixtures on a common branch or main in order to produce a flushing velocity of approximately 4 fps through all portions of the piping system. In the event that this is impossible due to size of system, the Contracting Officer (or the designated representative) shall specify the number of fixtures to be operated during flushing. Contractor shall provide adequate personnel to monitor the flushing operation and to ensure that drain lines are unobstructed in order to prevent flooding of the facility. Contractor shall be responsible for any flood damage resulting from flushing of the system. Flushing shall be continued until entrained dirt and other foreign materials have been removed and until discharge water shows no discoloration. All faucets and drinking water fountains, to include any device considered as an end point device by NSF/ANSI 61, Section 9, shall be flushed a minimum of 0.25 gallons per 24 hour period, ten times over a 14 day period.

3.9.3.2 After Flushing

System shall be drained at low points. Strainer screens shall be removed, cleaned, and replaced. After flushing and cleaning, systems shall be prepared for testing by immediately filling water piping with clean, fresh potable water. Any stoppage, discoloration, or other damage to the finish, furnishings, or parts of the building due to the Contractor's failure to properly clean the piping system shall be repaired by the Contractor. When the system flushing is complete, the hot-water system shall be adjusted for uniform circulation. Flushing devices and automatic control systems shall be adjusted for proper operation according to manufacturer's instructions. Flow rates on fixtures must not exceed those stated in PART 2 of this Section. Unless more stringent local requirements exist, lead levels shall not exceed limits established by 40 CFR 141.80 (c)(1). The water supply to the building shall be tested separately to ensure that any lead contamination found during potable water system testing is due to work being performed inside the building.

3.9.4 Operational Test

Upon completion of flushing and prior to disinfection procedures, the Contractor shall subject the plumbing system to operating tests to demonstrate satisfactory installation, connections, adjustments, and functional and operational efficiency. Such operating tests shall cover a period of not less than 8 hours for each system and shall include the following information in a report with conclusion as to the adequacy of the system:

- a. Time, date, and duration of test.
- b. Water pressures at the most remote and the highest fixtures.
- c. Operation of each valve, hydrant, and faucet.

3.9.5 Disinfection

After all system components are provided and operational tests are complete, the entire domestic hot- and cold-water distribution system shall be disinfected. Before introducing disinfecting chlorination material, entire system shall be flushed with potable water until any entrained dirt and other foreign materials have been removed.

Water chlorination procedure shall be in accordance with AWWA C651 and AWWA C652 as modified and supplemented by this specification. The chlorinating material shall be hypochlorites or liquid chlorine. The chlorinating material shall be fed into the water piping system at a constant rate at a concentration of at least 50 parts per million

(ppm). Feed a properly adjusted hypochlorite solution injected into the system with a hypochlorinator, or inject liquid chlorine into the system through a solution-feed chlorinator and booster pump until the entire system is completely filled.

Test the chlorine residual level in the water at 6 hour intervals for a continuous period of 24 hours. If at the end of a 6 hour interval, the chlorine residual has dropped to less than 25 ppm, flush the piping including tanks with potable water, and repeat the above chlorination procedures. During the chlorination period, each valve and faucet shall be opened and closed several times.

After the second 24 hour period, verify that no less than 25 ppm chlorine residual remains in the treated system. The 24 hour chlorination procedure must be repeated until no less than 25 ppm chlorine residual remains in the treated system.

Upon the specified verification, the system including tanks shall then be flushed with potable water until the residual chlorine level is reduced to less than one part per million. During the flushing period, each valve and faucet shall be opened and closed several times.

Take additional samples of water in disinfected containers, for bacterial examination, at locations specified by the Contracting Officer. Test these samples for total coliform organisms (coliform bacteria, fecal coliform, streptococcal, and other bacteria) in accordance with [EPA SM 9223] [AWWA 10084]. The testing method used shall be EPA approved for drinking water systems and shall comply with applicable local and state requirements. Disinfection shall be repeated until bacterial tests indicate the absence of coliform organisms (zero mean coliform density per 100 milliliters) in the samples for at least 2 full days. The system will not be accepted until satisfactory bacteriological results have been obtained.

3.12 TABLES

	TABLE II					
	PIPE AND FITTING MATERIALS FO	R PRESSURE	PIPING S	YSTEMS		
Item #	Pipe and Fitting Materials	SERVICE A	SERVICE B	SERVICE C	SERVICE D	
7	Seamless copper pipe, ASTM B42	Х				
8	Seamless copper water tube, ASIM B88, ASIM B88M	X**				
9	Cast bronze threaded fittings, ASME B16.15 for use with Items 5 and 7	Х				

TABLE II							
	PIPE AND FITTING MATERIALS FOR PRESSURE PIPING SYSTEMS						
Item #	Pipe and Fitting Materials	SERVICE A	SERVICE B	SERVICE C	SERVICE D		
10	Wrought copper and bronze solder- joint pressure fittings, ASME B16.22 for use with Items 5, 7 and 8	Х					
11	Cast copper alloy solder-joint pressure fittings, ASME B16.18 for use with Item 8	Х					
12	Bronze and sand castings groovedjoint pressure fittings for non-ferrous pipe ASTM B584, for use with Item 2	Х					
19	Chlorinated polyvinyl chloride (CPVC) plastic hot and cold water distribution system, ASTM D2846/D2846M		Х				

TABLE II							
PIPE AND FITTING MATERIALS FOR PRESSURE PIPING SYSTEMS							
Item #	Pipe and Fitting Materials	SERVICE A	SERVICE B	SERVICE C	SERVICE D		
20	Chlorinated polyvinyl chloride (CPVC) plastic pipe, Schedule 40 and 80, ASTM F441/F441M		Х				
21	Chlorinated polyvinyl chloride (CPVC) plastic pipe (SDR-PR) ASTM F442/F442M		Х				
22	Threaded chlorinated polyvinyl chloride (chloride CPVC) plastic pipe fittings, Schedule 80, ASTM F437, for use with Items 20, and 21		X				
23	Socket-type chlorinated polyvinyl chloride (CPVC) plastic pipe fittings, Schedule 40, ASTM F438 for use with Items 20, 21, and 22		X				
24	Socket-type chlorinated polyvinyl chloride (CPVC) plastic pipe fittings Schedule 80, ASTM F439 for use with Items 20, 21, and 22		X				
25	Polyvinyl chloride (PVC) plastic pipe, Schedules 40, 80, and 120, ASTM D1785		х				
26	Polyvinyl chloride (PVC) pressure-rated pipe (SDR Series), ASTM D2241		x				
27	Polyvinyl chloride (PVC) plastic pipe fittings, Schedule 40, ASTM D2466		x				
28	Socket-type polyvinyl chloride (PVC) plastic pipe fittings, schedule 80, ASTM D2467 for use with Items 26 and 27		x				

TABLE II							
PIPE AND FITTING MATERIALS FOR PRESSURE PIPING SYSTEMS							
Item #	Pipe and Fitting Materials	SERVICE A	SERVICE B	SERVICE C	SERVICE D		
29	Threaded polyvinyl chloride (PVC) plastic pipe fittings, schedule 80, ASTM D2464		x				
30	Joints for IPS PVC pipe using solvent cement, ASTM D2672		Х				
38	Press Fittings		Х				
	<pre>SERVICE: A - Cold Water Service Aboveground, 2" and smaller B - Cold water service above ground, 4" and larger C - Not Used D - Not Used Indicated types are minimum wall thicknesses. ** - Type L - Hard *** - Type K - Hard temper with brazed joints only or type K-soft temper without joints in or under floors **** - In or under slab floors only brazed joints</pre>						

-- End of Section --

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DIVISION 22 - PLUMBING

SECTION 22 07 19.00 40

PLUMBING PIPING INSULATION

02/23

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 - 1.3.1 Recycled Materials
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SECTION 22 07 19.00 40

PLUMBING PIPING INSULATION 02/23

PART 1 GENERAL

Section 22 00 00 PLUMBING, GENERAL PURPOSE applies to work specified in this section.

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM C195	(2007; R 2013) Standard Specification for Mineral Fiber Thermal Insulating Cement
ASTM C449	(2007; R 2013) Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement
ASTM C533	(2017; R 2023) Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation
ASTM C534/C534M	(2023) Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form
ASTM C547	(2022a) Standard Specification for Mineral Fiber Pipe Insulation
ASTM C552	(2022) Standard Specification for Cellular Glass Thermal Insulation
ASTM C553	(2013; R 2019) Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications
ASTM C591	(2022) Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation
ASTM C592	(2022a) Standard Specification for Mineral Fiber Blanket Insulation and Blanket-Type Pipe Insulation (Metal-Mesh Covered) (Industrial Type)
ASTM C647	(2008; R 2013) Properties and Tests of Mastics and Coating Finishes for Thermal Insulation

ASTM C755	(2019b) Standard Practice for Selection of Water Vapor Retarders for Thermal Insulation
ASTM C795	(2008; R 2023) Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel
ASTM C916	(2020) Standard Specification for Adhesives for Duct Thermal Insulation
ASTM C920	(2018) Standard Specification for Elastomeric Joint Sealants
ASTM C1136	(2023) Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation
ASTM D579/D579M	(2015) Standard Specification for Greige Woven Glass Fabrics
ASTM D5590	(2017; R 2021) Standard Test Method for Determining the Resistance of Paint Films and Related Coatings to Fungal Defacement by Accelerated Four-Week Agar Plate Assay
ASTM E84	(2023) Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM E96/E96M NATIONAL FIRE PROTECTION	(2022a; E 2023) Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials N ASSOCIATION (NEPA)
NFPA 220	(2024) Standard on Types of Building Construction
NFPA 255 OF AUTOMOTIVE ENGINEERS	(2006; Errata 2006) Standard Method of Test of Surface Burning Characteristics of Building Materials SOCIETY INTERNATIONAL (SAE)
SAE AMS 3779	(2016; Rev B) Tape Adhesive, Pressure Sensitive Thermal Radiation Resistant, Aluminum Foil/Glass Cloth
SAE AMS-STD-595A	(2017) Colors used in Government Procurement
U.S. DEPARTMENT OF DEFEN	NSE (DOD)
MIL-A-3316	(1987; Rev C; Am 2 1990) Adhesives,
MIL-PRF-19565	Fire-Resistant, Thermal Insulation (1988; Rev C) Coating Compounds, Thermal Insulation, Fire- and Water-Resistant, Vapor-Barrier

1.2 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government.

SD-03 Product Data

```
Adhesives; G
Coatings; G
Insulating Cement; G
Insulation Materials; G
Jacketing; G
Tape; G
```

SD-08 Manufacturer's Instructions

Installation Manual; G

SD-11 Closeout Submittals

Record Drawings

1.3 QUALITY CONTROL

1.3.1 Recycled Materials

Provide thermal insulation containing recycled materials to the extent practicable, provided that the material meets all other requirements of this section. The minimum recycled material content of the following insulation types are:

- a. Rock Wool 75 percent slag by weight
- b. Fiberglass 20-25 percent glass cullet by weight
- c. Plastic Rigid Foam 9 percent recovered material
- d. Polyisocyanurate/Polyurethane 9 percent recovered material
- e. Rigid Foam 9 percent recovered material

Submit recycled materials documentation indicating percentage of postindustrial and post-consumer recycled content per unit of product. Indicate relative dollar value of recycled content products to total dollar value of products included in project.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

2.1.1 Performance Requirements

Provide noncombustible thermal-insulation system materials, as defined by NFPA 220. Provide adhesives, coatings, sealants, facings, jackets, and thermal-insulation materials, except cellular elastomers, with a flame-spread classification (FSC) of 25 or less, and a smoke-developed classification (SDC) of 50 or less. Determine these maximum values in accordance with NFPA 255. Provide coatings and sealants that are nonflammable in their wet state.

Provide adhesives, coatings, and sealants with published or certified temperature ratings suitable for the entire range of working temperatures normal for the surfaces to which they are to be applied.

2.2 COMPONENTS

2.2.1 Insulation

2.2.1.1 Mineral Fiber Insulation

Provide mineral fiber insulation conforming to ASTM C547 and suitable for surface temperatures up to 188 degrees C 370 degrees F. Provide insulation with a density not less than 4-pound per cubic foot and with thermal conductivity not greater than 0.26 Btu-inch per hour per square foot per degree F at 66 degrees C 150 degrees F mean.

2.2.2 Adhesives

2.2.2.1 Lagging Adhesive

Lagging is the material used for thermal insulation, especially around a cylindrical object. This may include the insulation as well as the cloth/material covering the insulation. To resist mold/mildew, ensure lagging adhesive conforms to ASTM D5590 with 0 growth rating. Provide nonflammable and fire-resistant lagging adhesives with a maximum flame spread index of 25 and a maximum smoke developed index of 50 when tested in accordance with ASTM E84. Adhesive are MIL-A-3316, Class 1, pigmented white and suitable for bonding fibrous glass cloth to faced and unfaced fibrous glass insulation board; for bonding cotton brattice cloth to faced and bonding glass tape to joints of fibrous glass board; for bonding lagging cloth to thermal insulation; or Class 2 for attaching fibrous glass insulation to metal surfaces. Apply lagging adhesives in strict accordance with the manufacturer's recommendations for pipe and duct insulation.

2.2.2.2 Vapor-Barrier Material Adhesives

Ensure adhesives conform to the requirements of ASTM C916, Type I, when attaching fibrous-glass insulation to metal surfaces or attaching insulation to itself, to metal, and to various other substrates.

2.2.2.3 Cellular Elastomer Insulation Adhesive

For cellular elastomer insulation adhesive, provide a solvent cutback chloroprene elastomer conforming to ASTM C916, Type I, and is approved by the manufacturer of the cellular elastomer for the intended use.

2.2.3 Insulating Cement

2.2.3.1 General Purpose Insulating Cement

Provide general purpose insulating cement, [diatomaceous silica] [mineral fiber], conforming to ASTM C195. Ensure composite is rated for 982 degrees C 1800 degrees F service, with a thermal-conductivity maximum of 0.85 Btu per inch per hour per square foot for each degree F temperature differential at 93 degrees C 200 degrees F mean temperature for a 1-inch thickness.

2.2.3.2 Finishing Insulating Cement

Provide finishing insulating cement of a mineral-fiber, hydraulic-setting type conforming to ASTM C449.

2.2.4 Caulk

Provide elastomeric joint sealant in accordance with ASTM C920, Type S, Grade NS, Class 25, Use A.

- 2.2.6 Jacketing
- 2.2.6.4 Glass Cloth Jacket

Provide plain-weave glass cloth conforming to ASTM D579/D579M, Style 141, weighing not less than 7.23 ounces per square yard before sizing. Factory apply cloth wherever possible.

Provide leno weave glass reinforcing cloth, 26-end and 12-pick thread conservation, with a warp and fill tensile strength of 7.9 and 5.3 kilonewton per meter 45 and 30 pounds per inch of width, respectively, and a weight of not less than 1.5 ounces per square yard. [At the Contractor's option, Style 191 leno-weave glass cloth conforming to ASTM D579/D579M may be provided.]

- 2.2.7 Coatings
- 2.2.7.3 Outdoor and Indoor Nonvapor-Barrier Finishing (NBF)

Provide a pigmented polymer-emulsion as recommended by the insulation material manufacturer for the surface to be coated.

2.2.7.6 Coating Color

Blend with background of surrounding area for the coating color.

2.2.8 Tape

Provide a knitted elastic cloth glass lagging specifically suitable for continuous spiral wrapping of insulated pipe bends and fittings that

produces a smooth, tight, wrinkle-free surface. Conform to requirements of SAE AMS 3779 and ASTM D579/D579M for tape, weighing not less than 10 ounces per square yard.

2.3 MATERIALS

Submit manufacturer's catalog data for the following items:

- a. Adhesives
- b. Coatings
- c. Insulating Cement
- d. Insulation Materials
- e. Jacketing
- f. Tape

Provide compatible materials that do not contribute to corrosion, soften, or otherwise attack surfaces to which applied, in either the wet or dry state. Meet ASTM C795 requirements for materials to be used on stainless steel surfaces. Provide materials that are asbestos free.

PART 3 EXECUTION

Apply insulation only to the system or component surfaces that have previously been tested and approved by the Contracting Officer.

3.1 PREPARATION

Submit installation drawings for pipe insulation, conforming with the adhesive manufacturer's written instructions for installation. Submit installation manual clearly stating the manufacturer's instructions for insulation materials.

Clean surfaces to remove oil and grease before insulation adhesives or mastics are applied. Provide solvent cleaning required to bring metal surfaces to such condition.

3.2 INSTALLATION OF INSULATION SYSTEMS

Apply materials in conformance with the recommendations of the manufacturer.

Install smooth and continuous contours on exposed work. Smoothly and securely paste down cemented laps, flaps, bands, and tapes. Apply adhesives on a full-coverage basis.

Install insulation lengths tightly butted against each other at joints. Where lengths are cut, provide smooth and square and without breakage of end surfaces. Where insulation terminates, neatly taper and effectively seal ends, or finish as specified. Direct longitudinal seams of exposed insulation away from normal view. Use insulation meeting maximum value conductance as tested at any point, do not use an average. Meet or exceed the specified maximum conductance by adding additional insulation thickness.

3.2.3 Cold-Water and Condensate-Drain Piping

Insulate aboveground pipes, valve bodies, fittings, unions, flanges, and miscellaneous surfaces.

Provide 3/8 inch mineral fiber insulation with glass cloth jacket, Type T-2, with a thickness of not less than 1 inch.

3.3 APPLICATION

3.3.2 Type T-2, Mineral Fiber with Glass Cloth Jacket

Apply factory attached presized, white, glass cloth jacket to piping insulated with mineral fiber. Securely cement jackets, jacket laps, flaps, and bands in place with vapor-barrier adhesive. Provide jacket overlaps not less than 1-1/2 inches and jacketing bands for butt joints 3 inches wide.

Insulate exposed-to-view fittings with preformed mineral-fiber of the same thickness as the pipe insulation. Temporarily secure in place with light cord ties. Install impregnated glass lagging tape with indoor vaporbarrier on 50 percent overlap basis. Blend tape smoothly into the adjacent jacketing. Apply additional coating as needed, using rubber gloved hands to a smooth fillets or contour coatings. Tape ends of insulation to the pipe at valves 2 inches and smaller. Field fabricate and install insulation for concealed fittings and special configurations. Build up insulation from mineral fiber and a mixture of insulating cement and lagging adhesive, diluted with 3 parts water. Finish surfaces with glass cloth or tape lagging.

- Cover all valves 2-1/2 inches and larger and all flanges with preformed insulation of the same thickness as the adjacent insulation.
- Finish exposed-to-view insulation with a minimum 6-mil dry-film thickness of nonvapor-barrier coating suitable for painting.

]3.4 CLOSEOUT ACTIVITIES

Final acceptance of the performed work is dependent upon providing Record Drawings details to the Contracting Officer. Include construction details, by building area, the insulation material type, amount, and installation method. An illustration or map of the pipe routing locations may serve this purpose.

Provide a cover letter/sheet clearly marked with the system name, date, and the words "Record Drawings Insulation/Material" for the data. Forward to the Facilities Maintenance Manager for inclusion in the Maintenance Database."

-- End of Section --
Exhibit C Facility Work Requirements

IMHI Reynolds Building Water Main Replacement Independence Mental Health Institute (IMHI), Independence, Iowa 50644 Request for Quote RFQ919900-02

Due Friday, February 8, 2024, at 2:00 PM (CT)

PROJECT INFORMATION

Facility: Independence Mental Health Institute (IMHI), 2277 Iowa Ave., Independence, Iowa 50644

DAS Project #: 9199.00

Owner: State of Iowa, Department of Administrative Services, Hoover State Office Building, Level 3, 1305 East Walnut Street, Des Moines, IA 50319

Owner's Representative: Jennie Elliott, Iowa Department of Administrative Services, 109 SE 13th Street, Des Moines, IA 50319

Construction Manager: Brian Polzin, The Samuels Group, 2929 Westown Parkway, Suite 200, West Des Moines, Iowa 50266

WORK HOUR RESTRICTIONS

A. Work hours outside of scheduled outages are from 7:00 AM to 5:30 PM, Monday through Friday unless arrangements are made in

advance. No work shall be allowed on days recognized by State of Iowa as holidays.

CONTRACTOR USE OF SITE AND PREMISES

Construction Operations:

Provide access to and from site as required by law and Owner:

1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.

2. Do not obstruct roadways, sidewalks, or other public ways without permission of Owner and permit if required.

Facility will be occupied at all times during duration of work. Contractor personnel shall conduct themselves in an agreeable manner at all times. Failure to do so may result in removal from the work site.

OWNER OCCUPANCY

- A. Owner intends to occupy the Project upon Substantial Completion.
- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.

RULES FOR CONSTRUCTION WORKERS

- A. The staff of the State of Iowa has a responsibility to protect the public by providing a secure environment. All work site rules must be followed to the letter, at all times.
- B. Hot Work Permit Processes and Fire Watch, when necessary, will be adhered to for this project.
- C. All State properties are tobacco free. No smoking will be permitted or tolerated on campus unless in designated areas.

- D. You are permitted access only to the work site and no other area of the institution.
- E. No drugs, alcohol, or firearms are allowed on the work site.
- F. Do not leave money, drugs, alcohol, or firearms in your personal vehicle.
- G. Company and personal vehicles are to be parked and locked in designated or authorized area of the work.
- H. Secure all tools at the end of the day.
- I. Maintain control of all tools, supplies, and debris at all times during the work.
- J. Never leave keys in any vehicle.
- K. Do not give anything to residents or take anything from residents; if they offer, inform your supervisor.
- L. Secure all tools at the end of each day. Never leave tools unattended. All tools shall be checked in at the beginning of the day and checked out at the end of the day.
- M. All delivery vehicles must go directly to the job site. Extra time should be anticipated for all deliveries. Provide 24-hour notice to the facility of deliveries.
- N. During an emergency, follow the instructions of the security staff.
- O. Contractor shall wear clothing of a different color, pattern, fashion, etc. as to distinguish themselves from inmates.

Exhibit D Sample Certification of Insurance

IMHI Reynolds Building Water Main Replacement Independence Mental Health Institute (IMHI), Independence, Iowa 50644 Request for Quote RFQ919900-02

Due Friday, February 8, 2024, at 2:00 PM (CT)

ACORD C				CE	ERTIFICATE OF LIABILITY INSURANCE					DATE (MMIDDIYYYY)	
TCEE	HIS	CERTIFICATE IFICATE DOE: W. THIS CEI	IS ISSI	UED AS A I AFFIRMATI	VEL	Y OF	OF INFORMATION ONLY R NEGATIVELY AMEND, DOES NOT CONSTITUT EDITIEICATE HOLDER	AND CONFERS EXTEND OR AL E A CONTRACT	NO RIGHTS TER THE CO BETWEEN T	UPON THE CERTIFICATE H VERAGE AFFORDED BY T THE ISSUING INSURER(S),	IOLDER. THIS HE POLICIES AUTHORIZES
U t	MPO	RTANT: If the	certific tions o	ate holder	is an cert	ADI ain p	DITIONAL INSURED, the policies may require an en	policy(les) must b idorsement. A sta	e endorsed. itement on th	If SUBROGATION IS WAIV is certificate does not confe	ED, subject t ir rights to th
PRO	KODUCER							CONTACT Agent's Information			
A	Agent's Name Agent's Address							PHONE FAX			
n								LAIC, No. Ext): (A/C, No): E-MAIL			
1	Agent 5 Address							ADDRESS:			1 0000
								Company A (AM Best Rated A/VI or Better) Admit			
NSURED Trade Contractor's Name								INSURER A :		Carrie	
								INSURER B :		With A dru	
								INSURER G :		-	
	the fact of	e wortheads	- torto de	a water a star		110		INSURER D :			
								INSURER E :			
00	VED	ACES		OFP	TIEN	- 477	E MUMPED.	INSURER F :	-	DEVISION NUMBER.	
CC	VEN	S TO CEPTIEY	THAT T	UE DOUICIER	05	AIR	DANCE LISTED BELOW UM	E BEEN ICCHED T	O THE INCLUSE	ID NAMED ABOVE FOR THE P	
II C E	ERTI	FICATE MAY B	HISTAND	DING ANY RE D OR MAY I NS OF SUCH	PERT	AIN,	NT, TERM OR CONDITION THE INSURANCE AFFORDE LIMITS SHOWN MAY HAVE	OF ANY CONTRAC D BY THE POLICI BEEN REDUCED BY	T OR OTHER ES DESCRIBE	DOCUMENT WITH RESPECT T D HEREIN IS SUBJECT TO AL	O WHICH TH
INSF LTR		TYPE OF I	NSURANC	3E	ADDL INSD	SUBR	POLICY NUMBER	POLICY EFF	POLICY EXP	LIMITS N	finimum
		COMMERCIAL GE	NERAL L	IABILITY	x	X	#TRD- CGL	3/1/17	3/1/18	EACH OCCURRENCE \$ 1	,000,00
A		CLAIMS-MADE CCUR				#100 COD	3/1/1/	3/1/10	DAMAGE TO RENTED PREMISES (Ea occurrence) \$		
									MED EXP (Any one person) \$		
								5	PERSONAL & ADV INJURY \$1	.000.000	
	GEN'L AGGREGATE LIMIT APPLIES PER:								GENERAL AGGREGATE ¢2	,000,000	
	-	POUCY X PRO-								PRODUCTS - COMPICE ACC + 1	,000,00
		OTHER:								11-20-00-00-00-00-00-00-00-00-00-00-00-00-	
в	AUTOMOBILE LIABILITY				Y	v	#TRD-AL	3/1/17	3/1/10	COMBINED SINGLE LIMIT	1,000.00
	X ANY AUTO				~	A.	# LOD PLI	-1-1-1-1	3/1/10	BODILY INJURY (Per person) \$,,.
		ALL OWNED SCHEDULED								BODILY INJURY (Per accident) 5	
	HIRED AUTOS NON-OWNED								PROPERTY DAMAGE 5		
									(Prec accident)		
-	-				v	v	#TTDD_TIMD	3/1/17	3/1/18	Excu occuprence 2	000 000
C		EXCESS LIAB CLAMS-MADE		X	~	#10D-OHD	3/ 4/ 4/	3/ 1/ 10	EACH OCCORRENCE 3-		
	1								AGGREGATE 8		
	WORKERS COMPENSATION			-	-	Ampo we	2/2/27	2/2/20	Y PER OTH-		
	AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MITMORE EXCLUDED?			N/A	x	#TDD-WC	3/1/1/	3/1/18	STATUTE ER	00 000	
-									EL. EACH ACCIDENT \$0	00,000	
	(Mar If yes	(Mandatory in NH) If yes, describe under								E.L. DISEASE - EA EMPLOYEE \$ 2	00,000
-	DÉS	CRIPTION OF OPE	RATIONS	below	_		Amon oon			E.L. DISEASE - POLICY LIMIT \$5	00,000
F	OW	mers Con	trat	ors			#TBD-OCP	3/1/17	3/1/18	"Limits equal to CGL	(or) as
TC;	Pr	otective	Lia	bility			11 C C C C C C C C C C C C C C C C C C		1.000	either CGL or OCP, no	t both)
_										and the same of the party the	- so sity
DES	SCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Ramarka Schedule, may be attached if more space is required)										
ad	(Owner) Towa Department of Administrative Services (DAS), Officere Directors										
Me Wa Ad	, (Const, some Departments of Administrative Services (DAS), Officers, Directors,										
	aiver of Subrogation (CGL:AL:WC/EL:UMB/Excess) in favor of: (Owner) Towa Denartment of										
	dministrative Services (DAS), Officers, Directors, Members, Consultants, Agents, and Employees,										
								and a state of the state	and the second second		
Pı	oje	ect XXXX.	XX (Nur	mber varies by p	roject)						
CE	ERTIFICATE HOLDER							CANCELLATION			
I	Iowa Department of Administrative Services (DAS)						Services (DAS)				
1	09 5	E 13th Str	eet					SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFOR			
Des Moines, IA 50319								THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS			
	0.5	and a state of the second second	1222					ACCORDANCE	IN THE POLIC	ar radvisions.	
								AUTHORIZED REPRESENTATIVE			
								AN INVALUEN REPRES	AND INCOME.		
								Signatu	ce .		
							I 1				