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State of New Hampshire

DEPARTMENT OF ADMINISTRATIVE SERVICES
25 Capitol Street
Concord, New Hampshire 03301
(603) 271-3201 | Office@das.nh.gov

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Charles M. Arlinghaus
Commissioner

Catherine A. Keane
Deputy Commissioner

Sheri L. Rockburn
Assistant Commissioner

January 7, 2025

Her Excellency, Governor Kelly A. Ayotte
and the Honorable Council
State House
Concord, New Hampshire 03301

REQUESTED ACTION

Authorize the Department of Administrative Services to make a **Retroactive** amendment to an existing contract with RH White Construction Co, Inc., (VC # 174482) Auburn, MA, for steam distribution system repair and maintenance services by exercising a contract renewal option by increasing the price limitation by $127,030 from $217,530 to $344,560 and extending the completion date from November 1, 2024, to November 1, 2025 effective upon Governor and Executive Council approval. The original contract was approved by Governor and Executive Council on October 4, 2022, Item #46.
56% General Funds, 44% Transfers from Other Agencies.

Funds are available in the following account for Fiscal Year 2025 and are anticipated to be available for Fiscal Year 2026, upon the availability and continued appropriation of funds in the future operating budget, with the authority to adjust encumbrances between fiscal years within the price limitation through the Budget Office, if needed and justified.

01-14-14-141510-21410000, Statehouse Complex

	FY2025	FY2026
048-500226 Contractual Maint. Build-Grnds	$84,687	$42,343

TOTAL: $127,030

EXPLANATION

This request is **Retroactive** because the current contract expired November 1, 2024, and due to workload and delay in vendor responses during initial negotiations this amendment request is now being brought forward for approval. In accordance with RSA 21-I:12, II B, the Department of Administrative Services (DAS), Division of Plant and Property Management is responsible to "provide for the general maintenance of state-owned buildings and grounds, except as otherwise provided by law." The Division of Plant and Property Management (Plant and Property) maintains 91 state owned buildings located throughout the state. DAS constructed a new boiler house and underground steam distribution system in 2021 that provides steam heat from the Boiler House located at 33 Green Street to the State House, State House Annex and State Library. This contract is required to repair and maintain the steam distribution system.

A request for bids was issued and placed on the State of New Hampshire, Bureau of Purchase and Property website on June 1, 2022. Four compliant bids were received and R. H. White Construction Co., Inc. was the low bidder. A copy of the bid summary is included in the original contract attached.

In negotiations with R.H. White Construction Co., Inc. regarding the one-year contract renewal option, Plant and Property proposed an extension under the existing terms and conditions. However, R.H. White counter-proposed a 5% adjustment to hourly labor rates and an increase in the monthly maintenance fee from $1,900 to $3,400. R.H. White attributed the proposed maintenance fee increase to an initial miscalculation of overhead costs, specifically regarding on-call pay for technicians providing standby repair services to Plant and Property. After internal review, and in consideration of R.H. White's extensive experience with the underground steam distribution system, Plant and Property deemed the proposed increases reasonable for a one-year extension. This decision acknowledges the recent loss of institutional knowledge within the Plant and Property due to a staff retirement, and the resulting reliance on R.H. White's expertise. The one-year contract extension will provide Plant and Property with valuable time to facilitate knowledge transfer to current employees responsible for steam system oversight.

Based on the foregoing and due to the satisfactory nature of the business relationship to date, the Department of Administrative Services requests approval of the retroactive amendment to this contract.

Respectfully submitted,

Charles M. Arlinghaus
Commissioner

AMENDMENT 1 TO
THE CONTRACT BETWEEN RH WHITE CONSTRUCTION CO. INC.
AND
THE DEPARTMENT OF ADMINISTRATIVE SERVICES

This AMENDMENT to the CONTRACT ("Amendment") is entered into this 30th day of December 2024, by and between the State of New Hampshire, acting by and through the Commissioner, Department of Administrative Services (hereinafter "State") and RH WHITE CONSTRUCTION CO., INC., (hereinafter "Contractor") (the State and the Contractor may hereinafter singularly and/or collectively be referred to as "Party" or "Parties").

WHEREAS, the Parties entered into a Contract approved by the New Hampshire Governor and Executive Council on October 4, 2022, Item # 46 (Contract).

WHEREAS, the Contract has a provision to extend the initial term of two years for one additional year subject to approval by NH Governor and Council.

WHEREAS the Parties desire to extend the Contract one additional year ending on November 1, 2025.

NOW THEREFORE, the Parties mutually agree to amend the Contract, as follows:

1. Delete in its entirety section 1.7 Completion Date and substitute therefore the following:

   1.7 Completion Date November 1, 2025

2. Delete in its entirety section 1.8 Price Limitation and substitute therefore the following:

   1.8 Price Limitation $344,560

3. Delete in its entirety, Exhibit B, Paragraph 2, and substitute therefore the following:

   4. The term of this non-exclusive contract shall begin on November 2, 2022, through November 1, 2025.

4. Delete in its entirety Exhibit C, Paragraph 1, and substitute therefore the following:

   1. The Contractor hereby agrees to provide "Steam Distribution System Repair and Maintenance Services" at a 5% increase in labor rates in relation to Paragraph 3 for escalation for a not to exceed total of $344,560 for the period commencing on November 2, 2022 through November 1, 2025 (herein after referred to as the contract price) in return for the services described in Exhibit "B".

5. Amend Exhibit C, 2. Monthly Steam Distribution System Repair and Maintenance Coverage Fee = $3,400.

6. Add Exhibit C, Paragraph 12, Invoices to the State shall be emailed to the following addresses:

   State of New Hampshire
   Central Facilities Bureau
   CFB.AP@das.NH.gov

   State of New Hampshire
   Bureau of Court Facilities
   BCF.AP@das.nh.gov

7. This Amendment shall be effective upon the date of approval by the New Hampshire Governor and Executive Council.

8. All other provisions of the Contract not modified or amended herein shall remain in full force and effect.

IN WITNESS WHEREOF, the Parties hereto have set their hands the date first-written above.

RH WHITE CONSTRUCTION CO, INC.

BY: Gerard J. Herr Digitally signed by Gerard J. Herr DN: C=US, E=gherr@rhwhite.com, O=RH White Companies, OU=Corporate, CN=Gerard J. Herr Date: 2024.12.30 14:28:41-05'00'

Gerard J. Herr
(Print Name)

Title: Chief Financial Offier

Date: ______________________

STATE OF NEW HAMPSHIRE

BY: ______________________

Charles Arlinghaus
(Print Name)

Title: Commissioner

Date: 1-7-25

The foregoing Amendment, having been reviewed by this office, is approved as to form and execution on January 22, ~~2024.~~ 2025

OFFICE OF THE ATTORNEY GENERAL

BY: ______________________
Duncan A. Edgar
Assistant Attorney General

This is to certify that the Governor and Council on ______________________ approved the above-mentioned amendment.

Secretary of State Dated: ______________________

By: ______________________
Secretary of State

ACORD

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 04/26/2024

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Willis Towers Watson Northeast, Inc.
c/o 26 Century Blvd
P.O. Box 305191
Nashville, TN 372305191 USA

CONTACT NAME: WTW Certificate Center
PHONE (A/C, No, Ext): 1-877-945-7378
FAX (A/C, No): 1-888-467-2378
E-MAIL ADDRESS: certificates@wtwco.com

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : Travelers Indemnity Company	25658
INSURER B : Travelers Property Casualty Company of Ame	25674
INSURER C : Travelers Casualty and Surety Company	19038
INSURER D :	
INSURER E :	
INSURER F :	

INSURED
R. H. White Construction Company, Inc.
41 Central Street
Auburn, MA 01501

COVERAGES CERTIFICATE NUMBER: W33332735 REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	[X] COMMERCIAL GENERAL LIABILITY [ ] CLAIMS-MADE [X] OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: [ ] POLICY [X] PRO-JECT [ ] LOC OTHER:			VTC2K-CO-6X479261-IND-24	05/01/2024	05/01/2025	EACH OCCURRENCE	$ 2,000,000
							DAMAGE TO RENTED PREMISES (Ea occurrence)	$ 1,000,000
							MED EXP (Any one person)	$ 25,000
							PERSONAL & ADV INJURY	$ 2,000,000
							GENERAL AGGREGATE	$ 4,000,000
							PRODUCTS - COMP/OP AGG	$ 4,000,000
								$
A	AUTOMOBILE LIABILITY [X] ANY AUTO [ ] OWNED AUTOS ONLY [ ] SCHEDULED AUTOS [ ] HIRED AUTOS ONLY [ ] NON-OWNED AUTOS ONLY			VTC2H-CAP-6X47925A-TIA-24	05/01/2024	05/01/2025	COMBINED SINGLE LIMIT (Ea accident)	$ 2,000,000
							BODILY INJURY (Per person)	$
							BODILY INJURY (Per accident)	$
							PROPERTY DAMAGE (Per accident)	$
								$
B	[ ] UMBRELLA LIAB [X] OCCUR [X] EXCESS LIAB [ ] CLAIMS-MADE DED RETENTION $			CUP-6X47925A-24-25	05/01/2024	05/01/2025	EACH OCCURRENCE	$ 5,000,000
							AGGREGATE	$ 5,000,000
								$
C	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y/N ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) No If yes, describe under DESCRIPTION OF OPERATIONS below	N/A		UB-8X75661A-24-25-K	05/01/2024	05/01/2025	[X] PER STATUTE [ ] OTH-ER	
							E.L. EACH ACCIDENT	$ 1,000,000
							E.L. DISEASE - EA EMPLOYEE	$ 1,000,000
							E.L. DISEASE - POLICY LIMIT	$ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

For all work performed.

CERTIFICATE HOLDER

NH Dept. of Administrative Services
25 Capitol St #120
Concord, NH 03301

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Dana M Dixon

SR ID: 25771694 BATCH: 3437367

SECRETARY'S CERTIFICATE

R. H. WHITE CONSTRUCTION CO., INC.

I, Mark L. Donahue, Secretary of R. H. WHITE CONSTRUCTION CO., INC., herein certify that the following is a true copy of a resolution adopted at a special meeting of the Board of Directors of the Corporation duly called and held on Jun 18 _____, 2024:

VOTED: To authorize and empower David H. White, Chairman and Treasurer, Heather Whitney, Assistant Treasurer and Assistant Secretary; Thomas H. White, President, James E. McCarthy, Chief Executive Officer; Gerard J. Herr, Chief Financial Officer, and Jeffrey M. Towle, Chief Operating Officer; or anyone acting singly, to execute all contracts and bonds on behalf of the Corporation.

I further certify that the foregoing resolution and authority vested thereby has not been amended or rescinded and is still in force and effect as of the date hereof.

I further certify that the officers set forth in the resolution are duly elected and acting officers of R. H. WHITE CONSTRUCTION CO., INC.

Witness my hand and seal of the Corporation this 19th day of December, 2024.

Mark L. Donahue, Secretary

R.H. WHITE CONSTRUCTION CO., INC.
CORPORATE
SEAL
1951
MASSACHUSETTS

Client Files/008085/00343/05262290.DOC

State of New Hampshire
Department of State

CERTIFICATE

I, David M. Scanlan, Secretary of State of the State of New Hampshire, do hereby certify that R.H. WHITE CONSTRUCTION CO., INC. is a Massachusetts Profit Corporation registered to transact business in New Hampshire on July 18, 1979. I further certify that all fees and documents required by the Secretary of State's office have been received and is in good standing as far as this office is concerned.

Business ID: 4152
Certificate Number: 0006656124

IN TESTIMONY WHEREOF,
I hereto set my hand and cause to be affixed
the Seal of the State of New Hampshire,
this 2nd day of April A.D. 2024.

David M. Scanlan
Secretary of State

SEP 22'22 PM 4:03 RCVD

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mr

State of New Hampshire

DEPARTMENT OF ADMINISTRATIVE SERVICES
25 Capitol Street – Room 100
Concord, New Hampshire 03301
(603) 271-3201 | Office@das.nh.gov

Charles M. Arlinghaus
Commissioner

Catherine A. Keane
Deputy Commissioner

Sheri L. Rockburn
Assistant Commissioner

September 14, 2022

His Excellency, Governor Christopher T. Sununu
and the Honorable Council
State House
Concord, New Hampshire 03301

REQUESTED ACTION

Authorize the Department of Administrative Services to enter into a contract with R. H. White Construction Co., Inc., (vc# 174482) Auburn, MA for steam distribution system repair and maintenance services in the amount of $217,530. The term of the contract shall begin on November 2, 2022 or upon approval from Governor and Council whichever is later through November 1, 2024 a period of two years (2) with an option to renew for additional year subject to Governor and Council approval. **66% General, 34% Transfer from Other Agencies.**

Funds are available in the following account for Fiscal Years 2023, 2024 and 2025 with the authority to adjust encumbrances between fiscal years within the price limitation through the Budget Office, if needed and justified.

01-14-14-14150000-29500000 General Services Maint & Grnds

	FY 23	FY 24	FY 25
048-500226 – Contract Repairs; Bldg. Grounds	$72,510	$108,765	$36,255

EXPLANATION

In accordance with RSA 21-I:12, II, B, the Department of Administrative Services (DAS), Division of Plant and Property Management is responsible to "provide for the general maintenance of state-owned buildings and grounds, except as otherwise provided by law." DAS constructed a new boiler house and underground steam distribution system that provides steam heat from the Boiler House located at 33 Green Street to the State House, State House Annex and State Library. This contract is required to repair and maintain the steam distribution system.

Bids were solicited from twenty three (23) mechanical companies that provide this type of service. Four bids were received. Attached is a copy of the bid results.

Respectfully submitted,

Charles M. Arlinghaus
Commissioner

RFB DAS 2022-289 Steam Distribution System Repair and Maintenance Services

Bid Award Summary

6/22/2022

Vendor	Bid Summary Totals
RTH Mechanical Contractors	$239,882.00
Northern Peabody, LLC	$267,777.68
John C Digertt Inc	$384,674.00
R. H. White Construction Co., Inc.	**$217,530.00**

RFB DAS 2022-289 Steam Distribution System Repair and Maintenance Services						
Bid Award Summary Detail						
6/22/2022						
Vendor RTH Mechanical Contractors						
	Per Person Hourly Rate Monday through Friday 7:00 AM to 5:00 PM			Per Person Hourly Rate Saturdays, Sundays, Holidays and Monday through Friday 5:01 PM 6:59 AM		
Description	Hours	Rate	Total	Hours	Rate	Total
Master Mechanic	208	135	$28,080.00	16	205	$3,280.00
Journeyman Mechanic	336	130	$43,680.00	16	195	$3,120.00
Apprentice	416	$105.00	$43,680.00	32	$155.00	$4,960.00
Certified Welder	24	$135.00	$3,240.00	24	$205.00	$4,920.00
Monthly Fixed Steam System Distribution Maintenance Coverage Fee (24 months)	24	$2,500.00	$60,000.00			
Permit Fees			$1,800.00			
Materials and Subcontractor Work			$10,000.00			
Sub Contractor Labor			$33,122.00			
Sub Totals			**$223,602.00**			**$16,280.00**
Bid Award Total			**$239,882.00**			

Vendor Northern Peabody, LLC						
	Per Person Hourly Rate Monday through Friday 7:00 AM to 5:00 PM			Per Person Hourly Rate Saturdays, Sundays, Holidays and Monday through Friday 5:01 PM 6:59 AM		
Description	Hours	Rate	Total	Hours	Rate	Total
Master Mechanic	208	$95.54	$19,872.32	16	$166.94	$2,671.04
Journeyman Mechanic	336	$92.50	$31,080.00	16	$161.10	$2,577.60
Apprentice	416	$87.94	$36,583.04	32	$152.32	$4,874.24
Certified Welder	24	$92.50	$2,220.00	24	$161.10	$3,866.40
Monthly Fixed Steam System Distribution Maintenance Coverage Fee (24 months)	24	$4,962.96	$119,111.04			
Permit Fees			$1,800.00			
Materials and Subcontractor Work			$10,000.00			
Sub Contractor Labor			$33,122.00			
Sub Totals			**$253,788.40**			**$13,989.28**
Bid Award Total			**$267,777.68**			

RFB DAS 2022-289 Steam Distribution System Repair and Maintenance Services

Bid Award Summary

6/22/2022

Vendor John C Digertt Inc

	Per Person Hourly Rate Monday			Per Person Hourly Rate Saturdays, Sundays,		
Description	Hours	Rate	Total	Hours	Rate	Total
Master Mechanic	208	$165.00	$34,320.00	16	$267.00	$4,272.00
Journeyman Mechanic	336	$125.00	$42,000.00	16	$202.00	$3,232.00
Apprentice	416	$110.00	$45,760.00	32	$165.00	$5,280.00
Certified Welder	24	$165.00	$3,960.00	24	$247.00	$5,928.00
Monthly Fixed Steam System Distribution Maintenance Coverage Fee (24 months)	24	$8,125.00	$195,000.00			
Permit Fees			$1,800.00			
Materials and Subcontractor Work			$10,000.00			
Sub Contractor Labor			$33,122.00			
Sub Totals			**$365,962.00**			**$18,712.00**
Bid Award Total			**$384,674.00**			

Vendor R.H. White Construction Co., Inc.

	Per Person Hourly Rate Monday			Per Person Hourly Rate Saturdays, Sundays,		
Description	Hours	Rate	Total	Hours	Rate	Total
Master Mechanic	208	$180.50	$37,544.00	16	$248.00	$3,968.00
Journeyman Mechanic	336	$120.00	$40,320.00	16	$179.50	$2,872.00
Apprentice	416	$70.00	$29,120.00	32	$104.50	$3,344.00
Certified Welder	24	$164.00	$3,936.00	24	$246.00	$5,904.00
Monthly Fixed Steam System Distribution Maintenance Coverage Fee (24 months)	24	$1,900.00	$45,600.00			
Permit Fees			$1,800.00			
Materials and Subcontractor Work			$10,000.00			
Sub Contractor Labor			$33,122.00			
Sub Totals			**$201,442.00**			**$16,088.00**
Bid Award Total			**$217,530.00**			

Notice: This agreement and all of its attachments shall become public upon submission to Governor and Executive Council for approval. Any information that is private, confidential or proprietary must be clearly identified to the agency and agreed to in writing prior to signing the contract.

AGREEMENT

The State of New Hampshire and the Contractor hereby mutually agree as follows:

GENERAL PROVISIONS

1. IDENTIFICATION.

1.1 State Agency Name Department of Administrative Services		1.2 State Agency Address 25 Capitol Street, Room 120 Concord, NH 03301	
1.3 Contractor Name R. H. WHITE CONSTRUCTION CO., INC.		1.4 Contractor Address 41 CENTRAL STREET, AUBURN, MA 01501	
1.5 Contractor Phone Number 508-832-3295	1.6 Account Number 010-014-014-141510-29500000-048-500226	1.7 Completion Date November 1, 2024	1.8 Price Limitation $217,530.00
1.9 Contracting Officer for State Agency Michael P. Connor		1.10 State Agency Telephone Number (603) 271-6899	
1.11 Contractor Signature Date: 9/16/2022		1.12 Name and Title of Contractor Signatory CHIEF FINANCIAL OFFICER	
1.13 State Agency Signature Date: 9/20/22		1.14 Name and Title of State Agency Signatory Charles M. Arlinghaus, Commissioner	
1.15 Approval by the N.H. Department of Administration, Division of Personnel *(if applicable)* By:		Director, On:	
1.16 Approval by the Attorney General (Form, Substance and Execution) *(if applicable)* By:		On: 9/22/22	
1.17 Approval by the Governor and Executive Council *(if applicable)* G&C Item number:		G&C Meeting Date:	

Contractor Initials NJ
Date 9-16-22

2. SERVICES TO BE PERFORMED. The State of New Hampshire, acting through the agency identified in block 1.1 ("State"), engages contractor identified in block 1.3 ("Contractor") to perform, and the Contractor shall perform, the work or sale of goods, or both, identified and more particularly described in the attached EXHIBIT B which is incorporated herein by reference ("Services").

3. EFFECTIVE DATE/COMPLETION OF SERVICES.
3.1 Notwithstanding any provision of this Agreement to the contrary, and subject to the approval of the Governor and Executive Council of the State of New Hampshire, if applicable, this Agreement, and all obligations of the parties hereunder, shall become effective on the date the Governor and Executive Council approve this Agreement as indicated in block 1.17, unless no such approval is required, in which case the Agreement shall become effective on the date the Agreement is signed by the State Agency as shown in block 1.13 ("Effective Date").
3.2 If the Contractor commences the Services prior to the Effective Date, all Services performed by the Contractor prior to the Effective Date shall be performed at the sole risk of the Contractor, and in the event that this Agreement does not become effective, the State shall have no liability to the Contractor, including without limitation, any obligation to pay the Contractor for any costs incurred or Services performed. Contractor must complete all Services by the Completion Date specified in block 1.7.

4. CONDITIONAL NATURE OF AGREEMENT.
Notwithstanding any provision of this Agreement to the contrary, all obligations of the State hereunder, including, without limitation, the continuance of payments hereunder, are contingent upon the availability and continued appropriation of funds affected by any state or federal legislative or executive action that reduces, eliminates or otherwise modifies the appropriation or availability of funding for this Agreement and the Scope for Services provided in EXHIBIT B, in whole or in part. In no event shall the State be liable for any payments hereunder in excess of such available appropriated funds. In the event of a reduction or termination of appropriated funds, the State shall have the right to withhold payment until such funds become available, if ever, and shall have the right to reduce or terminate the Services under this Agreement immediately upon giving the Contractor notice of such reduction or termination. The State shall not be required to transfer funds from any other account or source to the Account identified in block 1.6 in the event funds in that Account are reduced or unavailable.

5. CONTRACT PRICE/PRICE LIMITATION/ PAYMENT.
5.1 The contract price, method of payment, and terms of payment are identified and more particularly described in EXHIBIT C which is incorporated herein by reference.
5.2 The payment by the State of the contract price shall be the only and the complete reimbursement to the Contractor for all expenses, of whatever nature incurred by the Contractor in the performance hereof, and shall be the only and the complete compensation to the Contractor for the Services. The State shall have no liability to the Contractor other than the contract price.
5.3 The State reserves the right to offset from any amounts otherwise payable to the Contractor under this Agreement those liquidated amounts required or permitted by N.H. RSA 80:7 through RSA 80:7-c or any other provision of law.
5.4 Notwithstanding any provision in this Agreement to the contrary, and notwithstanding unexpected circumstances, in no event shall the total of all payments authorized, or actually made hereunder, exceed the Price Limitation set forth in block 1.8.

6. COMPLIANCE BY CONTRACTOR WITH LAWS AND REGULATIONS/ EQUAL EMPLOYMENT OPPORTUNITY.
6.1 In connection with the performance of the Services, the Contractor shall comply with all applicable statutes, laws, regulations, and orders of federal, state, county or municipal authorities which impose any obligation or duty upon the Contractor, including, but not limited to, civil rights and equal employment opportunity laws. In addition, if this Agreement is funded in any part by monies of the United States, the Contractor shall comply with all federal executive orders, rules, regulations and statutes, and with any rules, regulations and guidelines as the State or the United States issue to implement these regulations. The Contractor shall also comply with all applicable intellectual property laws.
6.2 During the term of this Agreement, the Contractor shall not discriminate against employees or applicants for employment because of race, color, religion, creed, age, sex, handicap, sexual orientation, or national origin and will take affirmative action to prevent such discrimination.
6.3. The Contractor agrees to permit the State or United States access to any of the Contractor's books, records and accounts for the purpose of ascertaining compliance with all rules, regulations and orders, and the covenants, terms and conditions of this Agreement.

7. PERSONNEL.
7.1 The Contractor shall at its own expense provide all personnel necessary to perform the Services. The Contractor warrants that all personnel engaged in the Services shall be qualified to perform the Services, and shall be properly licensed and otherwise authorized to do so under all applicable laws.
7.2 Unless otherwise authorized in writing, during the term of this Agreement, and for a period of six (6) months after the Completion Date in block 1.7, the Contractor shall not hire, and shall not permit any subcontractor or other person, firm or corporation with whom it is engaged in a combined effort to perform the Services to hire, any person who is a State employee or official, who is materially involved in the procurement, administration or performance of this Agreement. This provision shall survive termination of this Agreement.
7.3 The Contracting Officer specified in block 1.9, or his or her successor, shall be the State's representative. In the event of any dispute concerning the interpretation of this Agreement, the Contracting Officer's decision shall be final for the State.

Contractor Initials ANJ
Date 9-16-22

8. EVENT OF DEFAULT/REMEDIES.
8.1 Any one or more of the following acts or omissions of the Contractor shall constitute an event of default hereunder ("Event of Default"):
8.1.1 failure to perform the Services satisfactorily or on schedule;
8.1.2 failure to submit any report required hereunder; and/or
8.1.3 failure to perform any other covenant, term or condition of this Agreement.
8.2 Upon the occurrence of any Event of Default, the State may take any one, or more, or all, of the following actions:
8.2.1 give the Contractor a written notice specifying the Event of Default and requiring it to be remedied within, in the absence of a greater or lesser specification of time, thirty (30) days from the date of the notice; and if the Event of Default is not timely cured, terminate this Agreement, effective two (2) days after giving the Contractor notice of termination;
8.2.2 give the Contractor a written notice specifying the Event of Default and suspending all payments to be made under this Agreement and ordering that the portion of the contract price which would otherwise accrue to the Contractor during the period from the date of such notice until such time as the State determines that the Contractor has cured the Event of Default shall never be paid to the Contractor;
8.2.3 give the Contractor a written notice specifying the Event of Default and set off against any other obligations the State may owe to the Contractor any damages the State suffers by reason of any Event of Default; and/or
8.2.4 give the Contractor a written notice specifying the Event of Default, treat the Agreement as breached, terminate the Agreement and pursue any of its remedies at law or in equity, or both.
8.3. No failure by the State to enforce any provisions hereof after any Event of Default shall be deemed a waiver of its rights with regard to that Event of Default, or any subsequent Event of Default. No express failure to enforce any Event of Default shall be deemed a waiver of the right of the State to enforce each and all of the provisions hereof upon any further or other Event of Default on the part of the Contractor.

9. TERMINATION.
9.1 Notwithstanding paragraph 8, the State may, at its sole discretion, terminate the Agreement for any reason, in whole or in part, by thirty (30) days written notice to the Contractor that the State is exercising its option to terminate the Agreement.
9.2 In the event of an early termination of this Agreement for any reason other than the completion of the Services, the Contractor shall, at the State's discretion, deliver to the Contracting Officer, not later than fifteen (15) days after the date of termination, a report ("Termination Report") describing in detail all Services performed, and the contract price earned, to and including the date of termination. The form, subject matter, content, and number of copies of the Termination Report shall be identical to those of any Final Report described in the attached EXHIBIT B. In addition, at the State's discretion, the Contractor shall, within 15 days of notice of early termination, develop and submit to the State a Transition Plan for services under the Agreement.

10. DATA/ACCESS/CONFIDENTIALITY/ PRESERVATION.
10.1 As used in this Agreement, the word "data" shall mean all information and things developed or obtained during the performance of, or acquired or developed by reason of, this Agreement, including, but not limited to, all studies, reports, files, formulae, surveys, maps, charts, sound recordings, video recordings, pictorial reproductions, drawings, analyses, graphic representations, computer programs, computer printouts, notes, letters, memoranda, papers, and documents, all whether finished or unfinished.
10.2 All data and any property which has been received from the State or purchased with funds provided for that purpose under this Agreement, shall be the property of the State, and shall be returned to the State upon demand or upon termination of this Agreement for any reason.
10.3 Confidentiality of data shall be governed by N.H. RSA chapter 91-A or other existing law. Disclosure of data requires prior written approval of the State.

11. CONTRACTOR'S RELATION TO THE STATE. In the performance of this Agreement the Contractor is in all respects an independent contractor, and is neither an agent nor an employee of the State. Neither the Contractor nor any of its officers, employees, agents or members shall have authority to bind the State or receive any benefits, workers' compensation or other emoluments provided by the State to its employees.

12. ASSIGNMENT/DELEGATION/SUBCONTRACTS.
12.1 The Contractor shall not assign, or otherwise transfer any interest in this Agreement without the prior written notice, which shall be provided to the State at least fifteen (15) days prior to the assignment, and a written consent of the State. For purposes of this paragraph, a Change of Control shall constitute assignment. "Change of Control" means (a) merger, consolidation, or a transaction or series of related transactions in which a third party, together with its affiliates, becomes the direct or indirect owner of fifty percent (50%) or more of the voting shares or similar equity interests, or combined voting power of the Contractor, or (b) the sale of all or substantially all of the assets of the Contractor.
12.2 None of the Services shall be subcontracted by the Contractor without prior written notice and consent of the State. The State is entitled to copies of all subcontracts and assignment agreements and shall not be bound by any provisions contained in a subcontract or an assignment agreement to which it is not a party.

13. INDEMNIFICATION. Unless otherwise exempted by law, the Contractor shall indemnify and hold harmless the State, its officers and employees, from and against any and all claims, liabilities and costs for any personal injury or property damages, patent or copyright infringement, or other claims asserted against the State, its officers or employees, which arise out of (or which may be claimed to arise out of) the acts or omission of the

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Contractor, or subcontractors, including but not limited to the negligence, reckless or intentional conduct. The State shall not be liable for any costs incurred by the Contractor arising under this paragraph 13. Notwithstanding the foregoing, nothing herein contained shall be deemed to constitute a waiver of the sovereign immunity of the State, which immunity is hereby reserved to the State. This covenant in paragraph 13 shall survive the termination of this Agreement.

14. INSURANCE.
14.1 The Contractor shall, at its sole expense, obtain and continuously maintain in force, and shall require any subcontractor or assignee to obtain and maintain in force, the following insurance:
14.1.1 commercial general liability insurance against all claims of bodily injury, death or property damage, in amounts of not less than $1,000,000 per occurrence and $2,000,000 aggregate or excess; and
14.1.2 special cause of loss coverage form covering all property subject to subparagraph 10.2 herein, in an amount not less than 80% of the whole replacement value of the property.
14.2 The policies described in subparagraph 14.1 herein shall be on policy forms and endorsements approved for use in the State of New Hampshire by the N.H. Department of Insurance, and issued by insurers licensed in the State of New Hampshire.
14.3 The Contractor shall furnish to the Contracting Officer identified in block 1.9, or his or her successor, a certificate(s) of insurance for all insurance required under this Agreement. Contractor shall also furnish to the Contracting Officer identified in block 1.9, or his or her successor, certificate(s) of insurance for all renewal(s) of insurance required under this Agreement no later than ten (10) days prior to the expiration date of each insurance policy. The certificate(s) of insurance and any renewals thereof shall be attached and are incorporated herein by reference.

15. WORKERS' COMPENSATION.
15.1 By signing this agreement, the Contractor agrees, certifies and warrants that the Contractor is in compliance with or exempt from, the requirements of N.H. RSA chapter 281-A *("Workers' Compensation").*
15.2 To the extent the Contractor is subject to the requirements of N.H. RSA chapter 281-A, Contractor shall maintain, and require any subcontractor or assignee to secure and maintain, payment of Workers' Compensation in connection with activities which the person proposes to undertake pursuant to this Agreement. The Contractor shall furnish the Contracting Officer identified in block 1.9, or his or her successor, proof of Workers' Compensation in the manner described in N.H. RSA chapter 281-A and any applicable renewal(s) thereof, which shall be attached and are incorporated herein by reference. The State shall not be responsible for payment of any Workers' Compensation premiums or for any other claim or benefit for Contractor, or any subcontractor or employee of Contractor, which might arise under applicable State of New Hampshire Workers' Compensation laws in connection with the performance of the Services under this Agreement.

16. NOTICE. Any notice by a party hereto to the other party shall be deemed to have been duly delivered or given at the time of mailing by certified mail, postage prepaid, in a United States Post Office addressed to the parties at the addresses given in blocks 1.2 and 1.4, herein.

17. AMENDMENT. This Agreement may be amended, waived or discharged only by an instrument in writing signed by the parties hereto and only after approval of such amendment, waiver or discharge by the Governor and Executive Council of the State of New Hampshire unless no such approval is required under the circumstances pursuant to State law, rule or policy.

18. CHOICE OF LAW AND FORUM. This Agreement shall be governed, interpreted and construed in accordance with the laws of the State of New Hampshire, and is binding upon and inures to the benefit of the parties and their respective successors and assigns. The wording used in this Agreement is the wording chosen by the parties to express their mutual intent, and no rule of construction shall be applied against or in favor of any party. Any actions arising out of this Agreement shall be brought and maintained in New Hampshire Superior Court which shall have exclusive jurisdiction thereof.

19. CONFLICTING TERMS. In the event of a conflict between the terms of this P-37 form (as modified in EXHIBIT A) and/or attachments and amendment thereof, the terms of the P-37 (as modified in EXHIBIT A) shall control.

20. THIRD PARTIES. The parties hereto do not intend to benefit any third parties and this Agreement shall not be construed to confer any such benefit.

21. HEADINGS. The headings throughout the Agreement are for reference purposes only, and the words contained therein shall in no way be held to explain, modify, amplify or aid in the interpretation, construction or meaning of the provisions of this Agreement.

22. SPECIAL PROVISIONS. Additional or modifying provisions set forth in the attached EXHIBIT A are incorporated herein by reference.

23. SEVERABILITY. In the event any of the provisions of this Agreement are held by a court of competent jurisdiction to be contrary to any state or federal law, the remaining provisions of this Agreement will remain in full force and effect.

24. ENTIRE AGREEMENT. This Agreement, which may be executed in a number of counterparts, each of which shall be deemed an original, constitutes the entire agreement and understanding between the parties, and supersedes all prior agreements and understandings with respect to the subject matter hereof.

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EXHIBIT "A"

SPECIAL PROVISIONS

1. **No Special Provisions.**

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EXHIBIT "B"

SCOPE OF SERVICES

1. The Contractor shall provide "Steam Distribution System Repair and Maintenance Services" as described herein, for an underground steam distribution system that provides steam from the Boiler House at 33 Green Street to the State House Annex, State House and State Library in Concord, NH. The Contractor shall provide all supervision, labor, materials, transportation, tools and equipment necessary to satisfactorily complete the work as detailed herein.

2. The term of this non-exclusive contract shall begin on November 2, 2022 or upon approval of the Governor and Executive Council whichever is later, through November 1, 2024 a period of approximately two (2) years. The contract may be extended for one additional year at terms and conditions agreed upon by both parties. Any such extension shall be subject to NH Governor and Council approval.

3. The Steam Distribution System is shown in the plan attached as **Appendix -1.** The steam supply system begins at the main isolation valve in the Boiler House located at 33 Green Street. The steam supply system then proceeds to Vault 1 and at Vault 2 it splits into two loops. One loop proceeds east on School Street to vaults 6, 7 and 8 and eventually terminates at the steam room pressure reducing valves at the State House Annex, 25 Capitol Street. The second loop proceeds north from vault 2 to vaults 3, 4, 5 and 6. At vault 6 the steam loop provides steam to the State Library, 12 Park Street and the State House, 107 North Main Street. The steam supply system terminates at the pressure reducing valves at all three buildings. The Steam Distribution System also includes condensate piping both pressure and gravity drain that travel to and from the Boiler House through all the vaults listed above and to and from the State House, State House Annex and State Library. The condensate system also travels from the State House steam room through a tunnel to the State House Annex steam room.

   The Steam Distribution System includes steam supply piping and condensate return piping and associated equipment.. The steam piping systems are manufactured by Thermacor Process Inc. The supply steam system is a Duotherm 505 Underground Conduit system. The condensate system is a Thermacor HT 406 condensate piping system.

Steam Distribution System Repair Services

4. The Contractor shall provide on call emergency coverage and trained personnel to repair the Steam Distribution System on a 24 hour x 365 day basis as described herein. The Contractor shall utilize workers that are properly trained and qualified to make the necessary Steam Distribution System repairs. Any repairs to the Steam Distribution System shall be completed in accordance with Thermacor procedures with personnel trained and certified by Thermacor Process Inc., **See Appendix-4 Specifications.**

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5. The Contractor shall provide repair services twenty-four (24) hours per day, seven (7) days per week for emergency Steam Distribution System repair services. The Contractor shall provide one (1) dispatch telephone number or other electronic means of communication that shall be available 24/7 for emergencies.

6. The Contractor shall respond by phone or other electronic device to all emergency repair calls within fifteen (15) minutes of reported occurrence. The Contractor shall physically respond to the site within four hours of receipt of notification from the State.

7. The Contractor shall respond by phone or other electronic device to all non – emergency repair calls within eight (8) hours after report of occurrence.

8. The Contractor shall employ sufficient number of properly trained personnel so that all requests for Steam Distribution System inspections and repairs are answered and completed within the required time limitations.

9. The steam and condensate system repair services includes all components in the boiler house, vaults, State House, State House Annex and State Library. Any actual repairs to the Steam Distribution System shall be completed on a **time and materials** basis at rates described in Exhibit C, Payment Terms. Steam Distribution System repairs include the following at a minimum: repair and or replace any defective steam piping and related infrastructure i.e., vents/valves and or traps. Repair and or replace any defective condensate pumps or controls. Repair and or replace any defective insulation, wiring or other equipment within the vaults.

10. The Contractor shall do all the work and furnish all the materials, tools, equipment and safety devices necessary to perform in the manner and within the response times specified. The Contractor shall complete the Steam Distribution System repair work to the satisfaction of the State and in accordance with the specifications and at the rates stated in Exhibit C, Payment Terms.

Steam Distribution System Maintenance Services

Vault Inspection Services

11. Unless directed otherwise by the State, the Contractor shall complete monthly inspections of the Steam Distribution System located in the vaults as described herein. The inspections shall occur within the first two weeks of every month and they shall be coordinated in advance with the State Project Manager. The vault inspections shall be completed on a **time and materials** basis as further detailed in Exhibit C, Payment Terms, subject to approval in advance by the State Project Manager. The Steam Distribution System will be active (approximately 45 lbs. steam pressure) during the monthly vault inspections. The steam will be active during the monthly vault inspections in order not to negatively affect the steam

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distribution to the buildings and our customers. This will also enable the Contractor to check the steam system for proper operation and identify any steam and or condensate leaks. The intent is to identify any issues and schedule any steam system repairs that will require the steam to be shut down in advance so as not to negatively affect state operations. The Contractor shall complete and submit monthly vault inspection forms attached as **Appendix 2**. The monthly inspection forms shall be submitted within ten days of the monthly inspection.

12. The steam vaults shall be inspected at the following locations: Vault 1, Vault 2, Vault 3, Vault 4, Vault 5, Vault 6 Vault 7 and Vault 8. The monthly inspections shall include the following:
    a. Provide equipment, materials and tools to properly open and close all manhole covers. Open and close Fibrelite manhole covers as detailed by Fibrelite in **Appendix 3**. Provide preventative maintenance on all Fibrelite manhole covers as detailed in **Appendix 3**. The Contractor shall notify and obtain approval from the State Project Manager in advance to replace any defective Fibrelite manhole cover seals. The State will supply the replacement seals.
    b. Remove the manhole covers and inspect the condition of the vaults. If any water is in the vaults record the amount of water and notify the State Project Manager.
    c. Inspect the vault entries and document any signs of water ingress or gasket deterioration.
    d. When removing the manhole cover and while looking into the vault, note if there is any steam system leakage or noise that might warrant entry into the vault for investigation. Notify the State Project Manager if entry is needed.
    e. Clean and seal vault 1 metal manhole cover with silicone after each inspection to prevent water infiltration into the vault.
    f. Coordinate any traffic control requirements in advance with the City of Concord before performing any inspections or repairs to the steam distribution system.
    g. Provide traffic control for any monthly inspections and or steam system repairs as required by the City of Concord. The cost for any traffic control will be compensated on a **time and materials** basis subject to approval in advance by the State Project Manager and at rates as defined in Exhibit C, Payment Terms.

<u>Additional Steam Distribution System Maintenance</u>

13. Any requests for Steam Distribution System maintenance and or testing shall be **time and materials** subject to prior approval by the State Project Manager and at rates and terms as stated in Exhibit C, Payment Terms.

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14. The Contractor may be requested to complete preventative maintenance of the steam distribution system including but not limited to:
    a) Pump out water from the steam vaults;
    b) Enter the steam vaults under confined space requirements and complete maintenance inspections of the Steam Distribution System and associated vaults as detailed in **Appendix 4**.
    c) Perform preventative maintenance to the vaults and all Steam Distribution System components including cleaning, sealing cracks, painting of any rusted surfaces and drying of the vault interior surfaces.

15. In addition, the Contractor may be requested to complete preventative maintenance testing of the Steam Distribution System including but not limited to:
    a. A gas pressure drop test to prove the tightness of the following steam loops: Boiler House to Vault 1, Vault 1 to Vault 2, Vault 2 to Vault 3, Vault 3 to Vault 4, Vault 4 to Vault 5, Vault 5 to Vault 6, Vault 6 to the State Library, Vault 6 to the State House, Vault 2 to Vault 7, Vault 7 to Vault 8 and Vault 8 to the State House Annex. The steam supply piping test shall be completed as described in **Appendix 4.** The pressure test inspection will normally be conducted during June or July with the underground steam system depressurized and cooled to a temperature that allows stabilization of the inner air temperature for the pressure drop test. The test normally occurs after the monthly inspections are completed with the Steam Distribution System energized.
    b. Dryness test to check for water infiltration into the void between the steam pipe and metal casing of the following steam loops; Boiler House to Vault 1, Vault 1 to Vault 2, Vault 2 to Vault 3, Vault 3 to Vault 4, Vault 4 to Vault 5, Vault 5 to Vault 6, Vault 6 to the State Library, Vault 6 to the State House, Vault 2 to Vault 7, Vault 7 to Vault 8 and Vault 8 to the State House Annex. The steam supply piping test shall be completed as described in **Appendix 4.**
    c. Drying of the void between the steam pipe and metal casing of the underground steam loops per **Appendix 4.**
    d. Preventative Maintenance Inspections of the Steam Distribution System and associated vaults as specified in **Appendix 4.**

16. The Contractor shall provide proper traffic control protection to complete any steam vault maintenance and or repair work. The cost of traffic control measures shall be **time and materials** subject to prior approval of the State Project Manager at rates and terms as stated in Exhibit C, Payment Terms.

17. The Contractor shall conduct their work so as to interfere as little as possible with State business. They shall at their own expense, wherever necessary or required, furnish safety devices and take such other precautions as may be necessary to protect life and property.

18. The Contractor agrees that any damage or injury to buildings, material and equipment or to other property caused by them during the performance of this service shall be repaired at their own expense.

19. The Contractor shall notify the State Project Manager of any maintenance related issues that are discovered while performing the work.

20. The Contractor shall give all notices and comply with all applicable laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the safety of persons or property or their protection from damage, injury or loss.

21. The Contractor shall secure any permits, schedule inspections and be on site during inspections. The Contractor shall ensure that inspections are made by the appropriate State and or local authority having jurisdiction.

22. The Contractor shall initiate, maintain and supervise all safety precautions and programs in connection with the work. The Contractor shall provide the necessary equipment and comply with all City, State and or Federal safety regulations including but not limited to confined space requirements or inspections of energized steam distribution systems. Any confined space resources required to complete any steam system repair services shall be considered as part of repair or maintenance services. They shall be **time and materials**, at rates as detailed in Exhibit C, Payment Terms subject to approval in advance by the State Project Manager.

23. The Contractor shall also be aware of laws and regulations relating to hazardous materials that may be encountered during construction operations. The health and safety of employees, the general public, and the potential of damage to the overall environment is possible if hazardous materials are not recognized, reported, and the appropriate action taken to dispose of, remove from the site, or otherwise contain the possible contaminants.

24. If any abnormal condition is encountered or exposed that indicates the presence of a hazardous material or toxic waste, work shall be immediately suspended in the project area and the State Project Manager notified. No further work shall be conducted in the area of the contaminated material until the site has been investigated and the State has given approval to continue work in the area. The Contractor shall fully cooperate with the State and perform any remedial work as directed. Work shall continue in other areas of the project unless otherwise directed.

25. The Contractor shall provide adequate supervision of their employees to ensure complete and satisfactory performance of all work in accordance with the terms of the contract.

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26. The Contractor shall provide methods, means, and facilities to minimize noise produced by their operations.

27. The Contractor shall ensure that all materials shall be of the best quality, all work is completed in a professional manner, and all aspects of the project are delivered in good working order, complete and perfect in every respect. All materials and equipment shall be new unless otherwise specified and shall be good quality free from faults and defects.

28. The Contractor shall further ensure that all dirt and debris resulting from the work under any resulting contract shall be disposed of at the end of each day or at the completion of work.

29. The Contractor shall supervise and direct the work, using their best skill and attention. The Contractor shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the work. All aspects of the project shall be subject to the inspection and approval of the State. The Contractor guarantees to repair, replace, re-execute or otherwise correct any defect in workmanship, materials, of the like that fails to conform to the requirements of the State, or that appear during the progress of the work within one year of final acceptance by the State.

30. The Contractor shall perform all the work and furnish all the materials, tools, equipment and safety devices necessary to perform in the manner and within the time hereinafter specified. The Contractor shall complete the entire work to the satisfaction of the State and in accordance with the specifications herein mentioned and at the rates and terms stated in Exhibit C, Payment Terms. All the work and labor furnished under this contract, shall be done and furnished strictly pursuant to, and in conformity with the specifications described herein, and the directions of the State representatives as given from time to time during the progress of the work, under the terms of this contract.

31. The Contractor shall take all responsibility for the work under this contract; for the protection of the work; and for preventing injuries to persons and damage to property and utilities on or about the work. They shall in no way be relieved of their responsibility by any right of the State to give permission or issue orders relating to any part of the work; or by any such permission given on orders issued or by failure of the State to give such permission or issue such orders. The Contractor shall bear all losses resulting to him or to the State on account of the amount or character of the work, or because of the nature of the area in or on which the work is done is differed from what was estimated or expected, or account of the weather, elements or other causes.

32. The Contractor shall be responsible to the State for the acts and omissions of their employees, subcontractors and their agents and employees and other persons performing any of the work under this contract.

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33. All work shall be done in such a manner as not to interfere with the State's operating functions. The Contractor and their employees shall familiarize themselves and comply with all rules and regulations applicable to each project.

34. The work staff shall consist of qualified persons completely familiar with the products and equipment they shall use. The Contracting Officer may require the Contractor to dismiss from the work such employees as deems incompetent, careless, insubordinate, or otherwise objectionable, or whose continued employment on the work is deemed to be contrary to the public interest or inconsistent with the best interest of security and the State.

35. The Contractor or their personnel shall not represent themselves as employees or agents of the State.

36. While on State property, employees shall be subject to the control of the State, but under no circumstances shall such persons be deemed to be employees of the State.

37. All personnel shall observe all regulations or special restrictions in effect at the Boiler House, State House, State House Annex and State Library. All employees much comply with COVID related policies in place for the duration of the contract.

38. The State will:
    a. Provide steam system status, shut down any steam equipment and lock out tag out steam or hot water sources.
    b. Notify state agencies regarding planned or emergency shut downs of the steam distribution system.
    c. Provide snow and or ice removal services. Any required excavation services will be provided by the State with another contractor.

39. All Contractor correspondence and submittals shall be sent to:

State of New Hampshire
Department of Administrative Services
Michael Connor
25 Capitol Street, Room 33
Concord, N.H. 03301

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Date 9-16-22

EXHIBIT "C"

PAYMENT TERMS

1. The Contractor hereby agrees to provide "Steam Distribution System Repair and Maintenance Services" at the rates listed below for a not to exceed total of **$217,530.00** for the period commencing on November 2, 2022 or upon Governor and Council approval whichever is later through November 1, 2024 (herein after referred to as the contract price) in return for the services described in Exhibit "B", Scope of Services.

2. The Contractor shall be paid a fixed rate per month to provide 24 x 7 x 365 coverage to respond to emergency and non-emergency calls to repair the Steam Distribution System as described in Exhibit B, Scope of Services. The monthly fixed Steam Distribution Repair and Maintenance Coverage Fee is a fixed monthly fee paid to the Contractor in arrears to cover the Contractor's overhead cost to maintain the on call coverage, to have available and provide sufficient qualified resources (labor, tools, equipment and Thermacor trained personnel) to respond and complete emergency and non-emergency repairs to the Steam Distribution System as required in this contract. The monthly fixed steam distribution repair and maintenance coverage fee is as follows:

   Monthly Steam Distribution System Repair and Maintenance Coverage Fee = $1,900.00

3. Any repairs or maintenance (including vault inspections) to the Steam Distribution System shall be completed on a **time and materials** basis at rates listed below. The hourly per person rate shall be for the actual amount of time at the respective job sites. The labor rates are fully loaded and include all overhead, profit, superintendence, insurances, training, equipment, travel, and taxes.

   LABOR RATE TABLE

Description	Per Person Hourly Rate Monday through Friday 7:00 AM to 5:00 PM	Per Person Hourly Rate Saturdays, Sundays, Holidays and Monday through Friday from 5:01 PM to 6:59 AM
Master Mechanic	$180.50	$248.00
Journeyman Mechanic	$120.00	$179.50
Apprentice	$70.00	$104.50
Certified Welder	$164.00	$246.00

4. Any materials entering permanently into the Steam Distribution System maintenance (including vault inspections) and repair work shall be invoiced at cost including freight plus 10%.

5. For any machinery or special equipment required to complete the Steam Distribution System maintenance (including vault inspections) and repair services, the Contractor will

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receive a reasonable rental charge to which sum no percentage will be added. The rental charge shall be approved in advance by the State Project Manager before any work begins. The rental rate shall include an operator and all fuel, lubricants, and the upkeep of the equipment. Equipment does not include small tools and accessories for small tools.

6. Any work required by a subcontractor shall not exceed 10% over contractor cost.

7. The Contractor shall secure any permits, schedule inspections and be on site during inspections. The Contractor shall ensure that inspections are completed by the appropriate State and or local authority having jurisdiction. The Contractor will invoice the State for the cost of the permit or inspection fees, at no markup, as part of the Steam Distribution Repair Services. The permit or inspection cost will be itemized on the detailed invoice at the completion of the work.

8. All invoices for **time and materials** shall include the following:

   Detail of the work performed;
   Location and date(s) of services;
   Copies of the Contractor's material invoices to verify markup;
   Number of hours per person worked;

   For vault inspections in addition to the information listed above please provide:

   Vault inspection reports for all inspection locations;
   Electronic copies of any pictures documenting the condition of steam distribution system and vaults.

9. Invoices must be submitted to the State by the Contractor at the rates stated in this contract. The State retains the right to examine the Contractor's invoices for the material used in completing the work.

10. Invoices shall be submitted after completion of work. Special charges, surcharges, processing charges, or fuel charges of any kind (by whatever name) may not be added on at any time.

11. Invoices shall be submitted after completion of the work. Payment shall be paid in full within thirty (30) days after receipt of invoice an acceptance of the work to the State's satisfaction. Payments will be made via ACH unless otherwise specified by the State.

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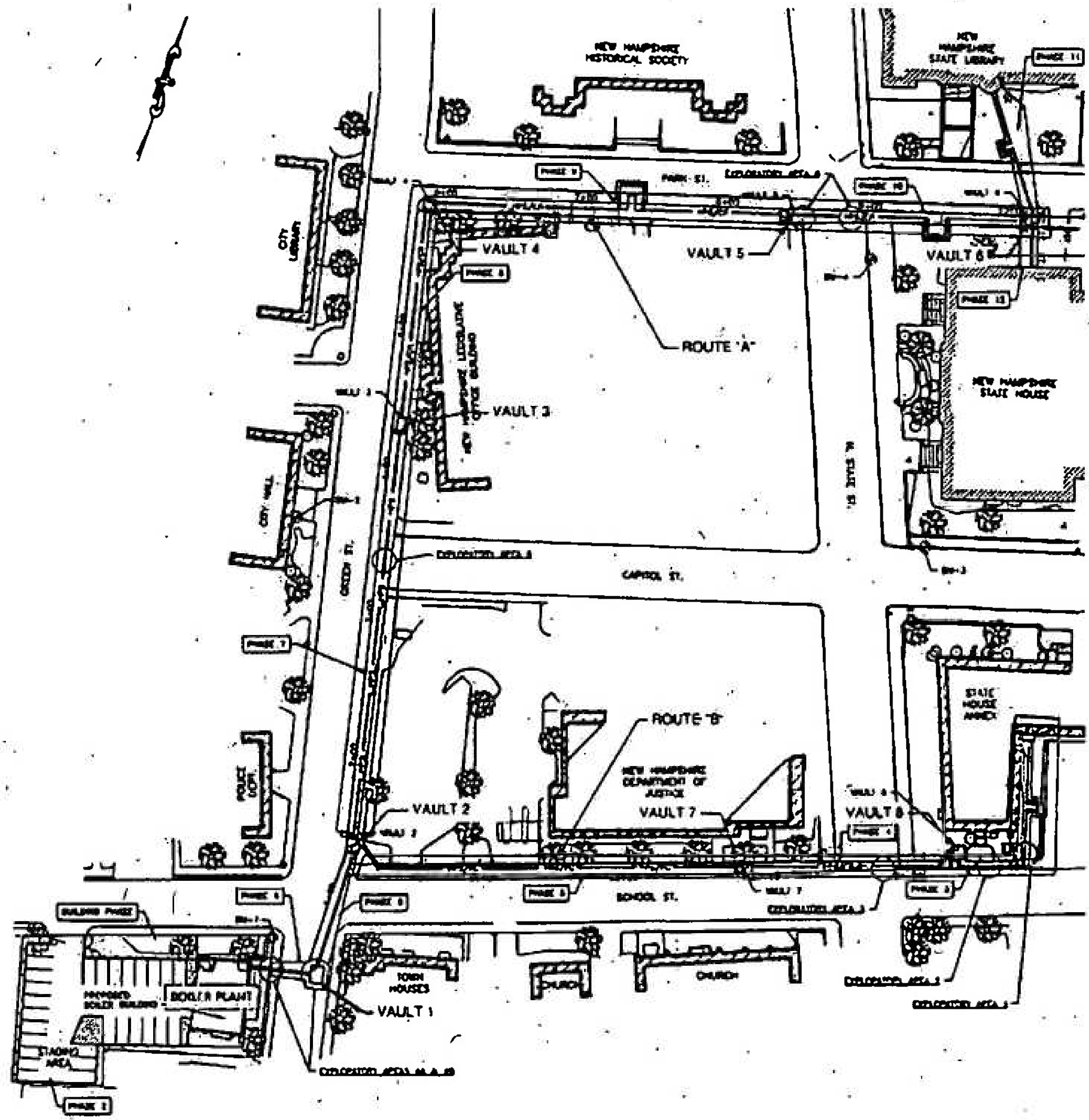
Date___________

RFB DAS 2022-289	
Steam Distribution System Repair and Maintenance Services Specifications	
Appendix 4	
5/23/2022	
Section	Description
07 8400	Firestopping
23 0500	Basic Mechanical Requirements
23 0505	Basic Mechanical Materials and Methods
23 0516	Expansion Fittings for Piping
23 0555	Penetration Firestopping for Mechanical and Plumbing
23 0719	Piping Insulation
23 2115	Underground Mechanical Piping Systems
23 2213	Steam and Steam Condensate Piping
23 2214	Steam and Condensate Heating Specialties
23 5000	Thermacor Air Pressure Test Procedure for Duotherm 505 Underground Conduit System Outer Casing
23 5100	Thermacor Underground Conduit, Test for Dryness, Drying the Conduit Air Space, Conduit System Outer Casing Damage, Conduit System Carrier Pipe Damage
23 5200	Additional Steam Distribution System Vault Inspection Form

APPENDIX 1

STEAM DISTRIBUTION SYSTEM



APPENDIX -2

Monthly Vault Inspection Forms

(One Form required for each Vault.)

Vault # ____________ Date____________

Inspector Name(s):________________________

Is the Vault Wet? Yes___ No___ Not Sure___

If yes, is there standing water? How much < 1"___ 1" to 6"___ >6"___ Not Sure___

If yes, was water pumped out? Yes ___ No ___

Is there an apparent source of the water? If yes, record source in observations.

Is standing water in contact with piping? Yes___ No ___ Not Sure___

When removing the manhole and while looking in the vault was there any indication of steam, system leakage, or noise that might warrant entry into the vault for investigation? If yes, record in observations. If vault entry is made record the results of the investigation in observations.

Observations and notes:

APPENDIX 3

FIBRELITE MANHOLE COVER SYSTEM

1. OPERATING INSTRUCTIONS, ROUND COVER REMOVAL AND REPLACEMENT
2. MONTHLY MAINTENANCE ROUTINE, ROUND FLAT SEALED COVERS
3. SEAL REMOVAL AND REPLACEMENT, ROUND FLAT SEALED COVERS

1. OPERATING INSTRUCTIONS, ROUND COVER REMOVAL AND REPLACEMENT

OPERATING INSTRUCTIONS
FL7A Operation - Round Flat Sealed Cover Removal and Replacement

FIBRELITE

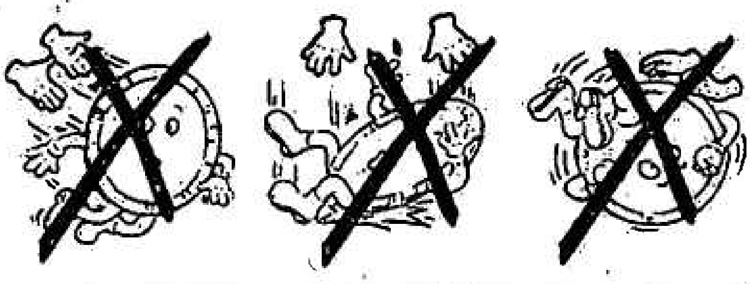
Issue: 29/04/2017

P L E A S E   H A N D   T O   S I T E   O P E R A T O R

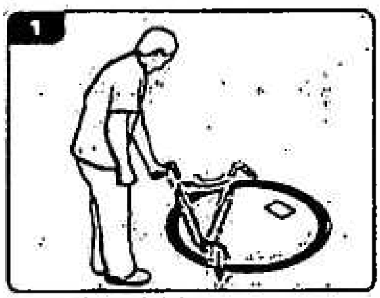
FL90, FL100, FL120, FL180, FL600 and FL760 OPERATING INSTRUCTIONS

WARNING

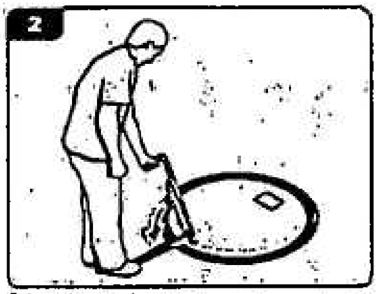
The handle must be used at all times to remove/replace the cover. Do not insert any levering device between the cover and frame. Periodically remove the bung in the base of the key housing to clear debris. Fill with grease or anti-freeze in cold climates during winter.



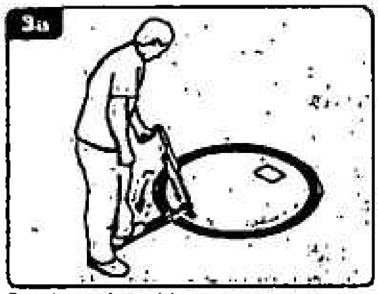
COVER REMOVAL



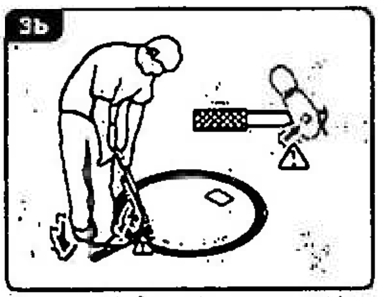
Insert handle, turn clockwise.



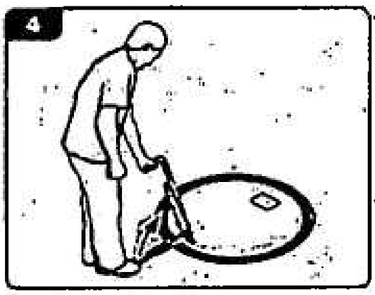
Release foot pedal.



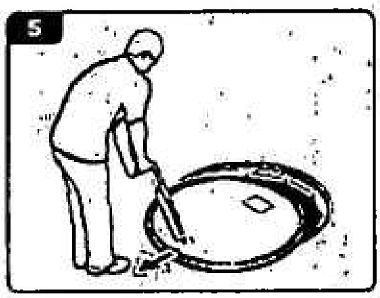
Push down on foot pedal.



If cover will not lift, Stand on lever, stamp on pedal.

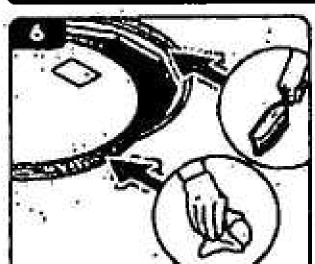


Return lever to upright position.

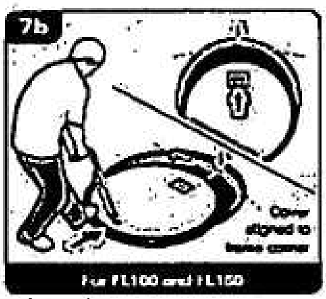


Remove cover.

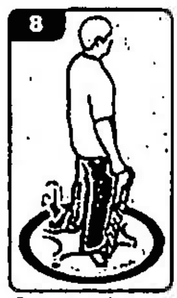
COVER REPLACEMENT



Clean the frame and cover gasket/seal as required.



Align correctly with frame. Push cover into position using your foot.



Stamp cover down.

We've got you covered

UK Office: T: + 44 (0) 1756 799 773
F: + 44 (0) 1756 799 539, E: enquiries@fibrelite.com

USA Office: T: + 1 800 422 2525
F: + 1 (800) 421 3297, E: enquiries@fibrelite.com

Malaysia Office: T: + 603-7847 1860
F: + 603-7846 7769, E: enquiries@fibrelite.com

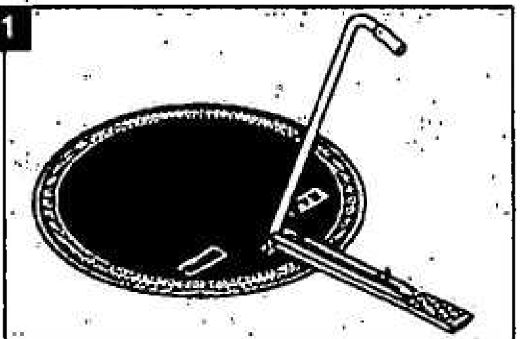
2. MONTHLY MAINTENANCE ROUTINE, ROUND FLAT SEALED COVERS

MAINTENANCE ROUTINE
Flat Sealed Covers - Round

FIBRELITE

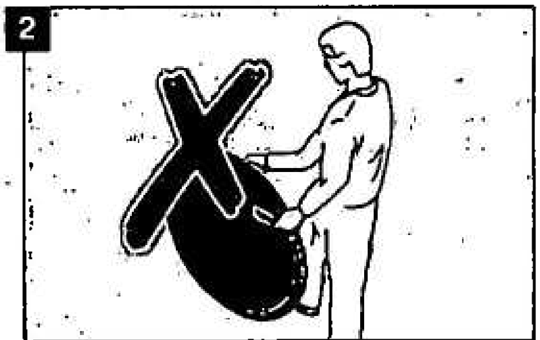
To ensure satisfaction of operation, it is essential that certain maintenance elements are carried out on a regular basis to assist with Management / Monitoring of the information to assess the integrity of the system.

1



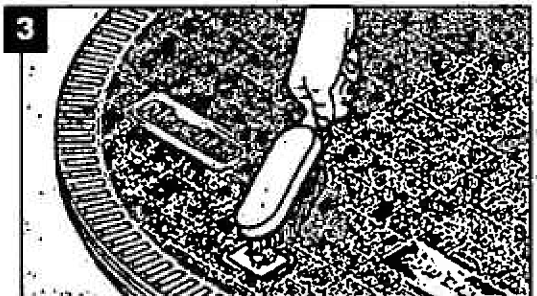
The purpose designed lifting aid (FL7A) must be used at all times to remove and replace the Fibrelite cover. Failure to use the specifically designed lifting aid may result in damage to the cover and injury.

2



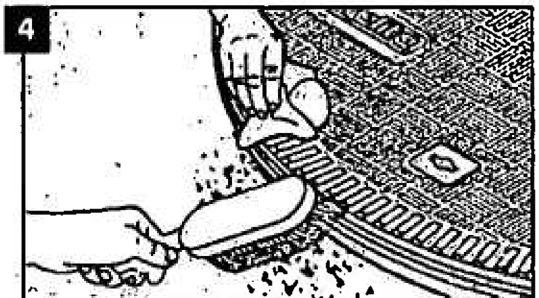
Never attempt to roll the cover as this may damage the cover and the seal.

3



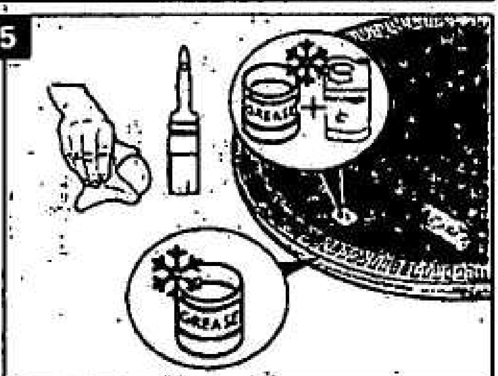
Do not remove the rubber bung from the base of the cover key housing. Remove debris from the key housing with suitable tools.

4



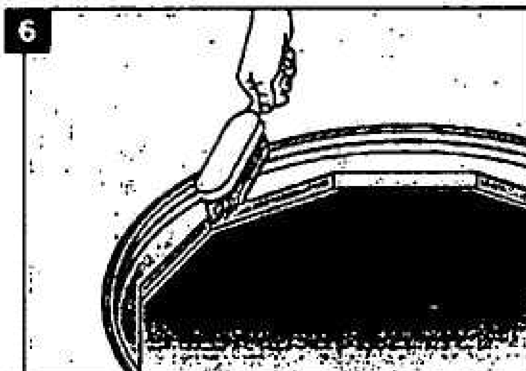
Ensure that the seal and sealing faces of the cover are clean and free from debris as this may damage the seal and compromise the covers water tight effectiveness. It is recommended that a soft bristle brush or clean rag be used to clean the cover.

5



It is recommended that the key housing be filled with grease and antifreeze and the seal be coated in grease in climates that drop below freezing (0°C - 32°F). If grease is applied to the cover seal it must be a non-petroleum based grease, preferably silicone.

6



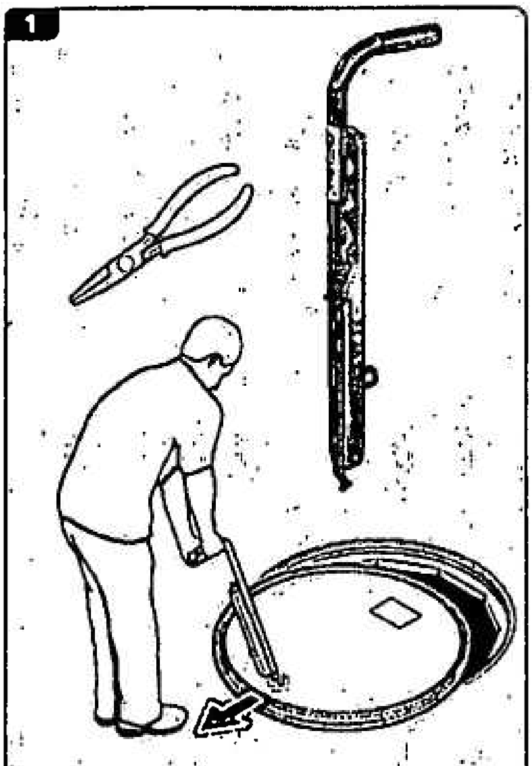
The frame and in particular the sealing faces must be kept free from debris as this may damage the seal and compromise the covers water tight effectiveness. It is recommended that the frame be cleaned with a brush during removal and replacement.

3. SEAL REMOVAL AND REPLACEMENT, ROUND FLAT SEALED COVER

REPLACEMENT INSTRUCTIONS
Round Flat Sealed Covers - Seal Removal and Replacement

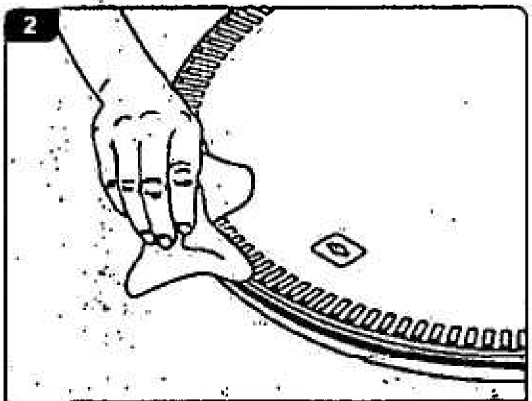
FIBRELITE

1



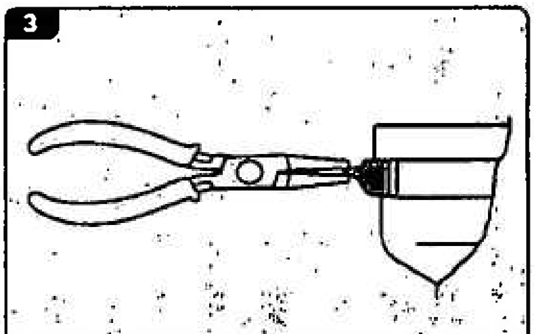
To replace the existing seal, you will require an FL7A lifting handle and a pair of needle nose pliers. To begin, remove the cover from the frame using the FL7A lifting handle.

2



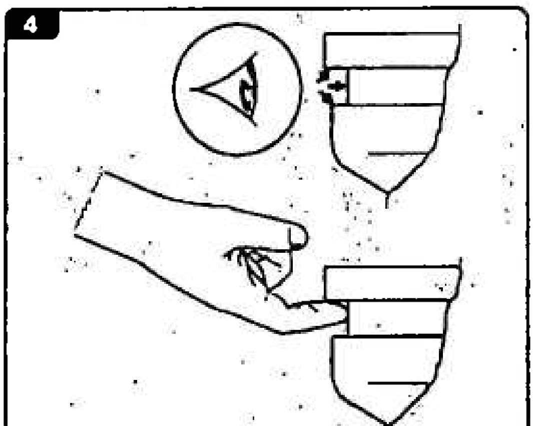
Clean/remove any dirt from the cover and seal.

3



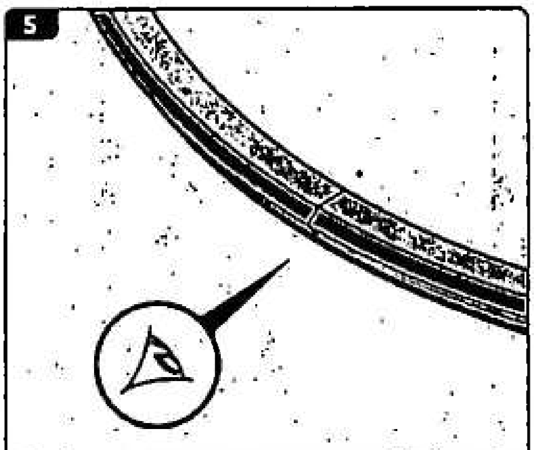
Using a suitable pair of pliers carefully remove the seal from the cover housing.

4



Ensure that the cover seal recess is clean and free from any grit and residue. The seal recess should be smooth and flat to the touch.

5



Visually examine the seal to locate the seal joint.

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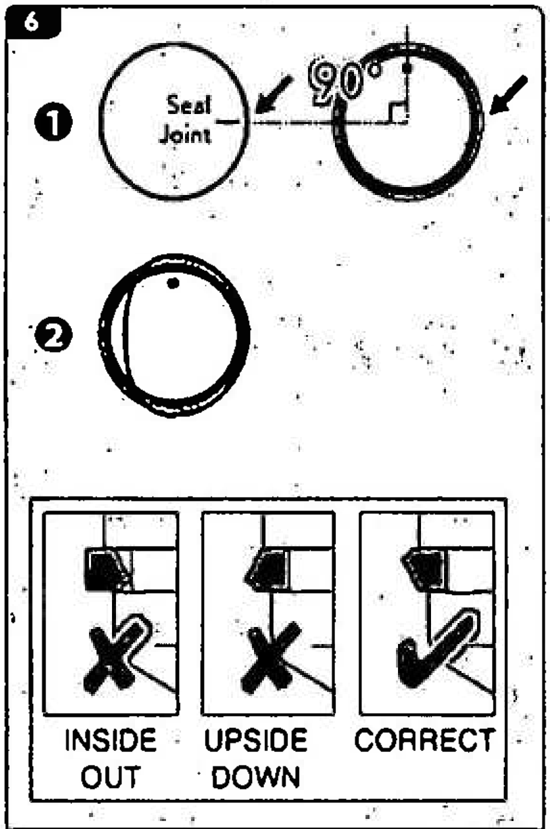
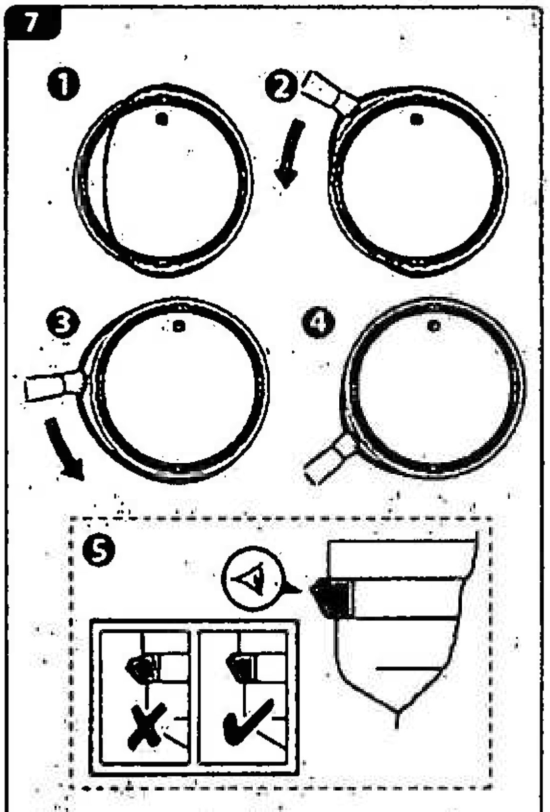
6



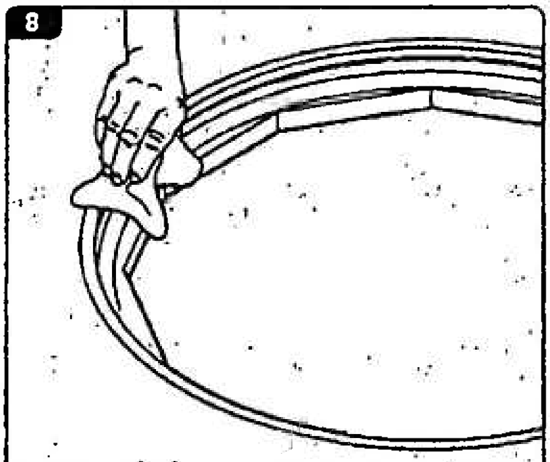
Starting with the seal joint at 90° to the cover key housing, insert the seal into the cover for approximately 50% of the cover circumference.

7



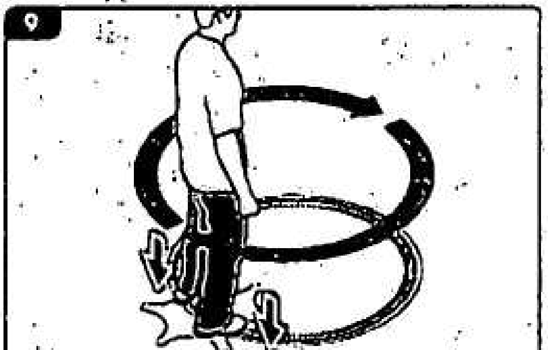
It will be necessary to stretch the remaining length of the seal for it to fit in the cover recess. Visually check to ensure that the seal is correctly fitted.

8



Thoroughly clean the frame prior to positioning the cover.

9



Replace cover into frame and step on edges of cover to seat properly – cover should seat easily into frame so that the top edge of the cover is even with the top of the frame. If cover does not seat properly, ensure that frame is free from residue and that the seal is properly seated in the seal channel.

SECTION 07 8400
FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Firestopping systems.

B. Firestopping of all joints and penetrations in fire resistant rated and smoke resistant assemblies, and other openings indicated.

C. Also refer to the Mechanical Section 23 0555 – Penetration Fire Stopping for Mechanical and Electrical for additional requirements.

1.02 REFERENCES

A. ASTM E119 – Standard Test Methods for Fire Test of Building Construction and Materials; 2015.

B. ASTM E814 – Standard Test Method for Fire Tests of Through-Penetration Fire Stops; 2013a.

C. ASTM E1966 – Standard Test Method for Fire Resistive Joint Systems; 2007 (Reapproved 2011).

D. ASTM E2174 – Standard Practice for On-Site Inspection of Installed Firestops; 2014.

E. ASTM E2393 – Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers; 2010a.

F. ASTM E2307 – Standard Te4st Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, multi-story Test Apparatus; 2015a.

G. ASTM G21 – Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015.

H. ITS (DIR) – Directory of Listed Products; current edition.

I. FM (AG) – FM Approval Guide; current edition.

J. UL 2079-Standard for Tests for Fire Resistance of Building Joint Systems, Current Edition, including All Revisions.

K. UL (DIR) – Online Certifications Directory; current listing at database.ul.com

L. UL (FD) – Fire Resistance Directory; current edition.

1.03 SUBMITTALS

A. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number. Include compliance data showing the product assembly meets or exceeds ASTM E814 or ASTM E1966 as applicable.

B. Product Data: Provide data on product characteristics, performance ratings, and limitations.

C. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.

1.04 QUALITY ASSURANCE

A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.

1. Listing in UL (FRO), FM (AG), or ITS (DIR) will be considered as constituting an acceptable test report.

2. Valid evaluation report published by ICC Evaluation Service, Inc., (ICC-ES) at www.icces.org will be considered as constituting an acceptable test report.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.05 FIELD CONDITIONS

A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation. Maintain minimum temperature before, during and for 3 days after installation of materials.

B. Provide ventilation in areas where solvent- cured materials are being installed.

PART 2 PRODUCTS

2.01 FIRESTOPPING-GENERAL REQUIREMENTS

A. Manufacturers:

1. 3M Fire Protection Products: www.3m.com/firestop
2. Hilti, Inc: www.us.hilti.com/#sle:
3. Nelson Fire Stop Products: www.nelsonfirestop.com

B. Firestopping: Any material meeting requirements.

C. Mold Resistance: Provide firestopping materials with mold and mildew resistance rating of O as determined by ASTM G21.

D. Primers. Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.

2.02 FIRESTOPPING ASSEMBLY REQUIREMENTS

A. Perimeter Fire Containment Firestopping: Use any system that has been tested according to ASTME2307 to have fire resistance F Rating equal to required fire rating of the floor assembly (1 hour unless noted otherwise.)

1. Movement: In addition, provide systems that have been tested to show movement capability as indicated.
2. Temperature Rise: In addition, provide systems that have been tested to show T Rating as indicated.
3. Air Leakage: In addition, provide systems that have been tested to show L Rating as indicated.

B. Floor-to Floor, Wall-to-Wall, and Wall-to-Floor Joints: Except Perimeter, Where Both are Fire-Rated: Use any system that has been tested according to ASTM 1996 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs. (1 Hour unless noted otherwise).

C. Through Penetration Firestopping: Use any system that has been teste according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly. (1 hour unless noted otherwise.)

1. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.

2.03 FIRESTOPPING SYSTEMS

A. Firestopping: Any material meeting requirements.

1. Fire Ratings: Use any system that is listed by FM (AG), ITS (DIR), or UL (FRD) and tested in accordance with ASTM E814 or ASTM E119 with F Rating equal to fire rating of penetrated assembly and minimum T Rating Equal to F Rating and in compliance with other specified requirements.
2. Provide systems meeting 1 hour fire rating; unless noted otherwise.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify opening are ready to receive the work of this section.

3.02 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter that could adversely affect bond of firestopping material.

B. Remove incompatible materials that could adversely affect bond.

3.03 INSTALLATION

A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.

B. Do not cover installed firestopping until inspected by authorities having jurisdiction.

C. Install labeling required by code.

1. Provide stenciled signage reading "__x__HR RATED FIRE WALL-DO NOT PENETRATE"
2. Spray paint stencil above ceiling a 30' intervals on rated walls and within 10' of corners.

3.04 IDENTIFICATION & DOCUMENTATION

A. The firestop contractor is to supply documentation for each single application addressed. This documentation is to identify each penetration location of the entire project.

B. The Documentation Form for through penetrations is to include:

1. A Sequential Location Number.
2. The Project Name.
3. Date of Installation.
4. Detailed description of the penetrations location.
5. Tested System of Engineered Judgment Number.
6. Type of assembly penetrated.
7. A detailed description of the size and type of penetrating item.
8. Size of opening.
9. Number of sides of assemblies addressed.
10. Hour rating to be achieved.
11. Installers Name.

C. Copies of these documents are to be provided to the State Project Manager at the completion of the project.

D. Identify through –penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Permanently attach identification labels to surfaces adjacent to and within 6 inches (150 mm) of firestopping edge so labels will be visible to anyone seeing to remove or change penetrating items or firestopping. Labels shall have a unique QR code for each penetration which can be scanned by the firestop documentation software to identify quickly the penetration attributes. Attach labels permanently to surfaces to on both sides of wall.

E. Include the following information on labels:

1. The words: "Warning-Through Penetration Firestop System- Do Not Disturb. Notify Building Management of Any Damage."

2 Contractor's Name, address, and phone number.

3. Through-Penetration firestop system designation of applicable testing and inspecting agency.

4. Date of Installation.

5. Through-Penetration firestop system manufacturer's name.

6. Installer's Name.

3.05 ADJUSTING AND CLEANING

A. Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.

3.06 PROTECTION

A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 23 0500
BASIC MECHANICAL REQUIREMENTS

PART 1 GENERAL

1.01 RELATED SECTIONS

A. Any general provisions of the Contract.

1.02 SECTION INCLUDES

A. This section includes general administrative and procedural requirements for mechanical installations and repairs. The following administrative and procedural requirements are included in this Section to expand the requirements specified in the Contract.

1. Quality Assurance.
2. Painting.
3. Cutting and Patching.

1.03 REGULATORY REQUIREMENTS

A. Conform to the latest edition of the international Building Code and International Plumbing code adopted by the State of NH.

B. Conform to latest edition of the International Mechanical Code adopted by the State of NH and ASME requirements for steam boiler and piping systems.

C. Conform to latest edition of the International Energy Conservation Code adopted by the State of NH.

D. Obtain City and State permits and request inspections from the authority have jurisdiction and/or as directed by the State Project Manager.

E. Concealed Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

F. Concealed Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installation within unheated shelters.

G. The word "Provide" is defined to mean both furnish and install the specified material and equipment, or service.

1.04 QUALITY ASSURANCE

A. Equipment and appurtenances shall be designed in conformity with ANSI, ASME, IEEE, NEMA. OSHA, AGMA and other generally accepted applicable standards. They shall be of rugged construction and of sufficient strength to withstand all stresses which may occur during fabrication, testing, transportation, installation and all other conditions or operations. All bearings and moving parts shall be adequately protected against wear by bushings and or other accepted means.

B. Ample clearance shall be provided for repairs, inspection and adjustment. Protruding members such as joints, corners and gear covers shall be finished in appearance. All exposed welds shall be ground smooth and corners of structural shapes shall be rounded or chamfered.

C. All mechanical work shall be performed by mechanics who are qualified to do such work and who are normally engaged in this type of work. Because of the complexity of the mechanical work, unskilled labor is not permitted.

PART 2 PRODUCTS

2.01 GENERAL

A. All materials and equipment shall be new and of the best quality and shall conform to standards and carry labels in every case where standards have been established.

B. To the maximum extent possible all mechanical equipment for any one system shall be the product of a single manufacturer, unless specifically dictated otherwise in the Contract. The State Project Manager reserves the right to disapprove and reject equipment from various manufacturers when acceptable components can be secured from fewer manufacturers and to require that source of materials be unified to the maximum extent possible.

2.02 PAINTING

A. All pumps, motors, tanks, heat exchangers and all other factory manufactured and assembled apparatus shall be factory coated with manufacturer's standard shop coated, except where special finishes are specified. Contractor shall touch up all scratched or damaged equipment with paint supplied by the equipment manufacturer. Clean and paint to match original finish, all items scratched or otherwise damaged.

B. Contractor shall paint all steel brackets, supports stands, hangers, pipe end preps, welds etc. Paint with one coast rust inhibitive paint, compatible with all other paints and matching adjacent colors.

Contractor shall paint supplemental steel that is attached to the building structural steel. The supplemental steel shall be painted to match the structural steel color. Hangers, guides and similar equipment that cannot be completely painted after installation shall be painted before installation.

C. Shop-painted structural steel that has been scratched, marred, or damaged by the installation of hangers and /or supplemental steel shall be touched-up to match the original shop paint.

PART 3 EXECUTION

3.01 MECHANICAL INSTALLATIONS

A. General Sequence, coordinate and integrate the various elements of mechanical system, materials and equipment. Comply with the following requirements:

1. Coordinate mechanical systems, equipment and materials installation and report with other building components.
2. Where mounting heights are not detailed or dimensioned, install systems, materials and equipment to provide the maximum headroom possible.
3. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.
4. Install mechanical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installation. Extend grease fittings to an accessible locations.
5. Coordinate work to minimize depressurization of the pressurized system so that the depressurization shall only occur when the system needs to be breached for the authorized work. Safety requirements shall be per State of New Hampshire and Federal requirements. The length of time of depressurization of the system shall be minimized. Equipment and material shall be staged at the work site in advance of the depressurization of the system.

The system shall not be depressurized for work or inspections that do not breach the pressurized system unless otherwise directed by the State Project Manager.

6. Hot Work Safety Procedure: In any instance in which the contractor will be performing welding, soldering, brazing, grinding, or any other flame or spark producing operation a hot work safety procedure is required. The hot work procedure shall be provided to the State Project Manager for review prior to any hot work being performed. Welding within occupied areas shall be scheduled with the State Project Manager in advance of performing the work.
7. Welding and Grinding Fumes and Ventilation: Contractor shall provide temporary ventilation to capture and remove fumes from the occupied buildings to the satisfaction of the State Project Manager.

3.02 CUTTING AND PATCHING

A. General: Perform cutting and patching in accordance with the following requirements and as directed by the State Project Manager.

B. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.

C. Perform cutting, fitting, an patching of mechanical equipment and materials required to :

1. Remove and replace defective work.
2. Remove and replace work not conforming to requirements of the Contract.

3.05 INSTALLATION OF EQUIPMENT AND PIPING

A. All equipment shall be installed true and level. Precision gauges and levels shall be used in setting all equipment and piping.

B. Equipment shall be erected in a neat and workmanlike manner on the foundations and supports.

C. The equipment shall be brought to a proper level by wedges and shims. After the machine has been leveled and aligned, the nuts on the anchor bolts shall be tightened to bond the machine firmly into place against the wedges or shims.

D. Furnish, install and protect all necessary guides, bearing plates, anchor and attachment bolts, and all other appurtenance required to the installation of the equipment. These shall be of ample size and strength for the purpose intended.

E. Anchor bolts shall be provided for equipment mounted on concrete pads.

F. All equipment shall be installed in such a manner as to provide access for routine maintenance, including lubrication.

G. Structural steel supports and miscellaneous steel required for supporting and/or hanging equipment and piping shall be provided and installed by the Contractor. See also painting above.

H. All foundations, anchor pads, piers, thrust blocks, inertia blocks and structural steel supports shall be built to template and reinforced as required for loads imposed on them.

END OF SECTION

SECTION 23 0505
BASIC MECHANICAL MATERIALS AND METHODS

PART 1 GENERAL

1.01 RELATED SECTIONS

A. Any general provisions of the Contract.

1.02 SUMMARY

A. This section includes the following mechanical materials and methods to complement other Division 23 Sections.

1. Piping materials and installation instructions common to most piping systems.
2. Equipment nameplate data requirements.
3. Non-shrink grout for equipment installations.
4. Feld-fabricated metal and wood equipment supports.
5. Installation requirements common to equipment specification sections.
6. Cutting and patching.
7. Selective demolition.

B. Pipe and pipe fitting materials are specified in piping system sections.

1.03 DEFINITIONS

A. Pipe, pipe fittings, and piping include tube, tube fittings, and tubing.

B. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below the roof, spaces above ceilings, unexcavated spaces, crawl spaces and tunnels.

C. Exposed Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms or pump pits.

D. Exposed Exterior Installations: Exposed to vie outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

E. Concealed Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

F. Concealed Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installation within unheated shelters.

G. The word "Provide" is defined to mean both furnish and install the specified material and equipment, or service.

1.04 QUALITY ASSURANCE

A. Qualify welding processes and operators for piping according to ASME Boiler and Pressure Vessel Code, Section IX, Welding and Brazing Qualifications.

1. Comply with provision of ASME B 31 Series Code for Pressure Piping.
2. Certify that each welder has passed AWS qualification tests for the welding processes involved and that certification is current.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end-caps. Maintain end-caps through shipping, storage, and handling to prevent pipe-end damage and prevent entrance of dirt, debris, and moisture.

B. Protect stored pipes and tubes from moisture and grit. Elevate above grade. When stored inside, do not exceed structural capacity of the floor.

C. Protect flanges, fittings, and piping specialties from moisture and dirt.

D. Store plastic pipes protected from direct sunlight, support to prevent sagging and bending.

E. Deliver joint sealer and fire-stopping materials in original unopened container or bundles with labels, informing about manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.

F. Store and handle joint sealer and fire materials in compliance with the manufacturers' recommendations to prevent their deterioration and damage.

1.06 PROJECT CONDITIONS

A. Conditions Affecting selective demolition: the following project conditions apply:

1. Protect adjacent materials indicated to remain. Install and maintain dust and noise barriers to keep dirt, dust, and noise from being transmitted to adjacent areas. Remove protection and barriers after demolition operations are completed.
2. Coordinate the shut-off and disconnection of utility services with the State Project Manager.
3. Notify the State Project Manager a minimum of 2 days before commencing demolition operations, No work shall commence without direct permission of the State Project Manager.
4. Perform demolition in phases as specified, indicated or required.

B. Environmental conditions: Apply joint sealers and fire stopping under temperature and humidity conditions within the limits permitted by the manufacturer. Do not apply joint sealers and fire stopping to wet substrates, provide ventilation per manufacturer's requirements.

PART 2 PRODUCTS

2.01 PIPE AND PIPE FITTINGS

A. Refer to individual piping system specification sections for pipe and fitting materials and joining methods.

B. Elbows for all pipe sizes over 2" diameter shall be long radius type (1.5 the diameter to centerline of pipe).

C. Use reducers, increasers, or reducing tees for change of pipe size. Bushings are not allowed.

D. Utilize eccentric-style reducers (flat on top) in steam piping for connections to control valves and pressure reducing valves. Pitch pipe away from valve body or in-line device to prevent condensate build-up within valve body.

E. Forged steel branch connectors, per the limits set forth in Part 3 of this section, may be used to create branch connections in steel piping systems. All branch connectors shall be 3,000# fittings.

1. "Weld-O-Lets", "Three-O-Lets", or "Sock-O-Lets"
2. "Trans-O-Con".

2.02 JOINING MATERIALS

A. Refer to individual piping system specification sections in Division 23 for special joining materials not listed below.

B. Pipe flange gasket materials: Suitable for the chemical and thermal conditions of the piping system contents.

1. ASME B16.21, non metallic, flat asbestos-free, 1/8 inch maximum thickness, except where thickness or specific material in indicated.

a. Full –Face Type: For flat-face, Class 125 cast-iron and cast –bronze flanges.

b. Narrow-Face Type: For raised-face, Class 250 cast-iron and steel flanges.

2. ASME B16.20 for grooved, ring-joint, steel flanges.

3. AWWA C110, rubber flat face, 1/8-inch thick, except where other thickness is indicated; and full-face or ring type, except where type is indicated.

C. Flange Blots and Nuts: ASME B18.21 carbon steel, except where other material is indicated.

D. Plastic Pipe Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, except where other type or material is indicated.

E. Solder Fill Material: ASTM B32.

1. Alloy Sn95 or Alloy Sn94: Tin (approximately 95percent) and silver (approximately 5 percent), having (0.10-percent lead content.

2. Alloy Sb5: Tin (95 percent) and antimony (5 percent), having 0.20 –percent maximum lead content.

F. Brazing materialsl: Comply with SFA-5.8, Section II, "ASME Boiler Pressure Vessel Code" for brazing filler metal materials appropriate to the materials being joined. Copper-phosphorus alloy brazing filler metal; BcuP-5 (Staysilv), containing 15% silver (Ag) 5% phosphorus (P), remaining elements are copper (CU).

G. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

H. Solvent Cements: Manufacturer's standard solvents complying with the following:

1. Acrylonitrile-Butadiene-Styrene (ABA); ASTM D 2235.

2. Chlorinated Poly (Vinyl Chloride) (CVPC): ASTM F 493.

3. Poly (Vinyl Chloride) (PVC); ASTM D 2564.

4. PVC to ABS Transition: Made to requirements of ASTM D 3138, color other than orange.

I. Plastic Pipe Seals: ASTM F 477, Elastomeric gasket.

J. Flanged, Ductile-Iron Pipe Gasket, Bolts, and Nuts: AWWA C110, rubber gasket, carbon steel bolts and nuts.

K. Couplings for buried piping: Iron body sleeve assemble, fabricated to match outside diameters of plan-end, pressure pipes.

1. Sleeve: ASTM A 126. Class B, gray iron.

2. Followers: STM A 47, Grade 32510 or ASTM A 536 ductile iron.

3. Gaskets: Rubber.

4. Bolts and Nuts: AWWA C111.

5. Finish: Enamel paint.

2.03 PIPING SPECIALITIES

A. Escutcheons: Manufactured wall, ceiling, and floor plates; deep-pattern type, where required to conceal protruding fittings and sleeves.

1. Inside Diameter: Closely fit around pipe, tube, and insulation of insulated piping,

2. Outside Diameter: Completely cover opening.

3. Cast Brass: Split casting, with concealed hinge and set-screw, polished chrome finish.

B. Unions: Malleable-iron, Class 150 for steel piping systems and low pressure service; cast bronze, 125 wsp for coper piping systems and low-pressure service, hexagonal stock, with ball-and socket joints, metal-to-metal bronze seating surfaces; female threaded ends.

C. Dielectric Fittings: Assembly of fitting having insulation material isolating joined dissimilar metals, to prevent galvanic action and stop corrosion.

1. Description: Combination of copper alloy and ferrous metal; threaded, solder, plain, and weld neck end types and matching piping system materials.
2. Insulating Material: Suitable for system fluid, pressure, and temperature.
3. Dielectric Unions: Factory–fabricated, union assembly, for 250 psig minimum working pressure at 180 deg. F. temperature.
4. Dielectric Flanges: Factory fabricated, companion-flange assembly, for 150 or 300 psig minimum pressure to suit system pressures.
5. Dielectric-Flange Insulation Kits: Field-assembled, companion-flange assembly, full-face or ring type. Components include neoprene or phenolic gasket phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
   a. Provide separate companion flanges and steel bolts and nuts for 150 or 300-psig minimum working pressure to suit system pressures.
6. Dielectric waterway fittings: electroplated steel or brass nipple, with an inert and non-corrosive, thermoplastic lining.

D. Mechanical Sleeve Seals: Modular, watertight, mechanical type. Components include interlocking synthetic rubber links shaped to continuously fill annular space between pipe and sleeve. Connecting bolts and pressure plates cause rubber sealing elements to expand when tightened. Coordinate seals wit prefabricated pipe manufacturer for application of mechanical seals with prefab pipe and end seals and wall penetration requirements. Provide a water–tight seal to all pipe penetrations regardless of system used (mechanical seal and /or prefab pipe seal assembly).

E. Pipe Sleeves: The following materials are for wall, floor, slab, and roof penetrations:

1. Steel Sheet Metal: 24 gage or heavier, galvanize sheet metal, round tube closed with welded longitudinal joint.
2. Steel Pipe: ASTM A 53, Type E, Grade A Schedule 40, galvanized, plain ends.
3. Cast-Iron: Cast or fabricated wall pipe equivalent to ductile-iron pressure pipe, having plain ends and integral water stop, except where other features are specified.
4. Wall Penetration Systems: Wall sleeve assembly, consisting of housing, gaskets, and pipe sleeve, with 1 mechanical –joint end conforming to AWWA C110 and 1 plain pipe-sleeve end.
   a. Penetrating Pipe Defection; 5 percent without leakage.
   b. Housing: Ductile-iron casting having waterstop and anchor ring, with ductile-iron gland, steel studs and nuts, and rubber gasket conforming to AWWA C111, of housing and gasket size as required to fit penetrating pipe.
   c. Pipe Sleeve: AWWA C151; ductile-iron pipe.
   d. Housing–to Sleeve: Gasket: Rubber or neoprene, push-on type, of manufacturer's design.

2.04 GROUT

A. Non-shrink, Nonmetallic grout: ASTM C 1107, Grade B.

1. Characteristics: Post-hardening, volume-adjusting, dry, hydraulic-cement grout, non-staining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000 psi, 28-day compression strength.

3. Packaging: Premixed and factory-packaged.

2.05 MECHANICAL EQUIPMENT NAMEPLATE DATA

A. Nameplate: for each piece of power operated mechanical equipment provide a permanent operational data nameplate indicating manufacturer product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliances and similar essential data. Locate nameplates in an accessible location.

2.06 MISCELLANEOUS METALS

A. Steel plates, shapes, bars and bar grating: ASTM A 500. .

B. Cold-formed Steel Tubing: ASTM A 500.

C. Hot rolled steel tubing: ASTM A 501.

D. Non-shrink, nonmetallic grout; Premixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout, recommended for interior and exterior applications.

E. Fasteners: Zinc-coated, type, grade, and class as required.

F. Provide necessary supplemental sell or strut-type framing systems for equipment, ductwork, and pipe support requirements:

2.07 FIRE STOPPING

A. General: Fire stopping caulk, joint fillers, and other related materials compatible with each other and with joint substrates under conditions of service and application. All products shall be installed by manufacturer trained and licensed installers in the manner determined by the manufacturer as tested by an independent testing laboratory.

B. Manufacturers: Subject to compliance with requirements, provide factory–engineered products by one of the flowing:

1. 3M Fire Protection Products.
2. Spec. Seal (Specified Technologies Inc.)
3. Hilti.

2.08 ELASTROMERIC JOINT SEALERS

A. General: Joint sealers, joint fillers and other related materials compatible with each other and with joint substrates under conditions of service and application.

B. General Duty: One-part, neutral core silicone sealant of formulation indicated that is recommended for exposed applications on exterior and interior joints in vertical and horizontal surfaces of concrete, masonry, glass, aluminum, and steel.

C. Wet locations: Provide manufacturer's standard one part, mildew resistant, paintable silicone sealant that is recommended for exposed locations on interior ceramic tile, masonry, and metals in bathroom and shower room locations.

PART 3 EXECUTION

3.01 PIPING STSTEMS- COMMON REQUIREMENTS

A. General: Install piping as described below, except where system Sections specify otherwise. Individual piping system specification Section in Division 23 specify piping installation requirements unique to the piping system.

B. Install piping at indicated slope.

C. Install drains at low points in mains, risers, and branch lines consisting of a tee fitting, ¾" ball valve with hose connection, cap and chain. Install vents at high points. Pitch water piping upward in direction of flow and arrange fittings to permit air to be vented to system high points or to expansion tank, and to permit complete drainage to low points. Use eccentric fittings where necessary.

D. Install components having pressure rating equal to or greater than system operating pressure.

E. Install piping in concealed interior and exterior locations, except in equipment rooms and service areas.

F. Install piping free of sags and bends.

G. Install exposed interior and exterior piping at right angles or parallel to building walls. Diagonal runs are prohibited, except where indicated. Install piping tight to slabs, beams, joists, columns, walls, and other building elements. Allow sufficient space above removable ceiling panels to allow for ceiling panel removal.

H. Install piping to allow application of insulation plus 1-inch clearance around insulation.

I. Locate group of pipes parallel to each other, spaced to permit valve servicing.

J. Install fittings for changes in direction and branch connections.

K. Install couplings according to manufacturers printed instructions.

L. Install pipe escutcheons for pipe penetrations of concrete and masonry walls, wall board partitions, and suspended ceilings.

M. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, concrete floor and roof slabs, and where indicated.

1. Cut sleeve to length for mounting flush with both surfaces.
   a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring where specified.
2. Build sleeves into new walls and slabs as work progresses.
3. Install large enough sleeves to provide 1/4 –inch annular clear space between sleeve and pipe or pipe insulation.

N. Above Grade, Exterior Wall, Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals: sixe sleeve installation of mechanical seals per manufacturer's requirements.

1. Install steel pipe for sleeves smaller than 6 inches.
2. Install cast-iron wall pipes for sleeves 6 inches and larger.
3. Assemble and install mechanical seals according to manufacturer's printed instructions.

O. Below Grade, Exterior Wall, Pipe Penetrations: Install mechanical wall penetrations system sleeves according to manufacturer's printed installation instructions. Coordinate with piping system requirements for mechanical seals.

P. Fire Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with fire stopping sealant material.

Q. Verify final equipment locations for rough in.

R. Refer to equipment specifications in other sections of these specifications for rough-in requirements.

S. Piping Joint Construction: Join pipe and fittings as follows and as specifically required in individual piping system specification sections.

1. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

2. Remove scale, slag, dirt and debris from inside and outside of pipe and fittings before assembly.
3. Soldered Joints: Construct joints according to AWS Soldering Manual, Chapter 22 The Soldering of Pipe and Tube.
4. Brazed Joints: Construct joints according to AWS Brazing Manual, Chapter 28 Pipe and Tube.
5. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full inside diameter. Adjoin pipe fittings and valves as follows:
    a. Note the internal length of threads in fittings or valve ends, and proximity of internal seat or wall, to determine how far pipe should be threaded into joint.
    b. Apply appropriate tape or thread compound to external pipe threads (except where dry seal threading is specified).
    c. Align threads at point of assembly,
    d. Tighten joint with wrench. Apply wrench to valve end into which pipe is being threaded.
    e. Damaged Threads: Do not use pipe or pipe fittings having threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
6. Welded Joints: Construct joints according to WS D10.12 Recommended Practices and Procedures for Welding Low Carbon Steel Pipe using qualified processes and welding operators according to Quality Assurance Article.
    a. All welders shall be certified by an independent AWS certifying agency for welding the piping material, system type, and system pressures for each pipe joint.
    b. Comply with ASME Boiler and Pressure Vessel Code Section IX.
    c. Failure to utilize certified welders shall require the removal and replacement of the piping joint/joints/system at no additional cost to the State.
7. Flanged joints: Align flange surfaces parallel. Select appropriate gasket material, size, type, and thickness for service application. Install a gasket concentrically positioned. Assemble joints by sequencing bolt tightening to make initial contact or flanges and gaskets as flat and parallel as possible.
    a. Use lubricants on bolt threads suitable and applicable for bolt threads.
    b. Tighten bolts gradually and uniformly using torque wrench.
8. Plastic Pipe and Fitting Solvent-Cement Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join pipe and fittings according to the following standards:
    a. Comply with ASTM F 402 for safe handling practice of solvent-cement and primers.
    b. Acrylonitrile-Butadiene-Styrene (ABS); ASTM C 2235 and ASTM D 2661.
    c. Chlorinated Poly (Vinyl Chloride) (CPVC); ASTN D 2846 and ASTM F 493.
    d. Poly (Vinyl Chloride) (PVC) Pressure Application: ASTM D 2672.
    e. Poly (Vinyl Chloride) (PVC) Non-Pressure Application: ASTM D 2885.
    f. PVS to ABS (Non Pressure) Transition: Procedure and solvent cement described in ASTM D 3138.

V. Piping Connections: Except as otherwise indicated make piping connections as specified below.

1. Install unions, in piping 2 inches and smaller, adjacent to each valve and at final connection to each piece of equipment having 2-inches or smaller threaded pipe connection.
2. Install flanges, in piping 2-1/2 inches and larger adjacent to flanged valves and at final connection to each piece of equipment having flanged pipe connection.

3. Wet Piping system (Water): Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.01.1 EQUIPMENT INSTALLATION – COMMON REQUIREMENTS

A. Install equipment to provide the maximum possible headroom, where mounting heights are not indicated. Refer conflicts to State Project Manager.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, except where otherwise indicated.

C. Install mechanical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. Connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location.

D. Install equipment, giving right-of-way to piping system installed at a required slope.

3.02 ERECTION OF METAL SUPPORTS AND ANCHORAGE

A. Cut, fit and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.

B. Field Welding: Comply with AWS D1.1 Structural Welding Code – Steel.

3.03 CUTTING AND PATCHING

A. Cut, channel, chase, and drill floors, walls, partitions, ceiling, and other surfaces necessary for mechanical installations. Perform cutting by skilled mechanics of the trades involved.

B. Repair cut surfaces to match adjacent surfaces.

3.04 GROUTING

A. Install nonmetallic, non-shrink, grout for mechanical equipment base bearing surfaces, pump and other equipment base pates, and anchors. Mix grout according to manufacturer's printed instructions.

B. Clean surfaces that will come into contact with grout.

C. Provide forms for placement of grout, as required.

D. Avoid air entrapment when placing grout.

E. Place grout, completely filling equipment bases,

F. Place grout on concrete bases to provide a smooth-bearing surface for equipment.

G. Place grout around anchors.

H. Cure placed grout according to manufacturers printed instructions.

3.05 SELECTIVE DEMOLITION

A. General: Demolish, remove, demount, and disconnect abandoned mechanical materials and equipment indicated to be removed and not indicated to be salvaged or saved.

B. Materials and Equipment To Be Salvaged: Remove, demount, and disconnect existing mechanical materials and equipment, and debris not indicated to be salvaged, and deliver materials and equipment to the location designated for storage by the State Project Manager.

C. Disposal and Cleanup: Remove for the site and legally dispose of demolished material, equipment, and debris not indicated to be salvaged. Broom –sweep all floors and clean all windows within construction areas.

END OF SECTION

SECTION 23 0516
EXPANSION FITTING FOR PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flexible pipe connectors.

B. Flexible Expansion loops.

C. External Pressurized Expansion Compensalor.

1.02 RELATED REQUIREMENTS

A. Section 23 2213 – Steam and Condensate Piping.

1.03 REFERENCE STANDARDS

A. ASME B16.1 – Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250; 2010.

B. ASME B16.5 – Pipe Flanges and Flanged Fittings NPS ½ Through NPS 24 Metric/Inch Standard; 2013.

C. ASME B16.11 – Forged Fittings, Socket-welding and Threaded; 2011.

D. ASTM A269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing.

E. EJMA – EJMA Standards; Expansion Joint Manufacturers Association; 2003.

1.04 REGULATORY REQUIREMENTS

A. Conform to UL requirements.

PART 2 PRODUCTS

2.01 FLEXIBLE PIPE CONNECTORS – STEEL PIPING

A. Manufacturers:
   1. Mercer Rubber Company: www.mercer-rubber.com.
   2. Metraflex Company: www.metraflex.com

B. Inner Hose: Bronze.

C. Exterior Sleeve: Single braided, stainless steel or bronze.

D. Pressure Rating: 125 psi and 450 degrees F.

E. Joint: As specified for pipe joints.

F. Size: Use pipe sized units.

G. Maximum offset: ¾ inch on each side of installed center line.

2.02 FLEXIBLE EXPANSION LOOP

A. Manufacturers:
   1. Mercer Rubber Company: www.mercer-rubber.com.
   2. Metraflex Company: www.metraflex.com

B. Provide flexible expansion joints of size and type as required. Flexible joints shall consist of two flexible sections of hose and braid, two 90 degree elbows, and a 180 degree return assembled in such a way that the piping does not change direction, but maintains its course along a single axis.

C. Flexible loops shall have a factory supplied, center support nut located at the bottom of the 180 degree return, and a drain/air release plug.

D. Flexible loops shall impart no thrust loads to system support anchors or building structure. Loops shall be installed in a neutral, pre-compressed, or pre-extended condition as required for the application.

E. Install and guide per manufacturer's recommendations. .

F. Materials of construction and end fitting type shall be consistent with pipe materials and equipment/pipe connection fittings.

2.03 EXTERNALLY PRESSURIZED EXPANSION COMPENSATOR

A. Manufacturers:
   1. Metraflex Company; model HPG3: www.metraflex.com.

B. Expansion compensators to be of the packless, externally pressurized type. Pressure rating of 175 psi at 750 degrees F. Axial movements to be rated for 3" compression and ½' extension. Compensator has a maximum operating temperature of 750 degrees F and a maximum operating pressure of 175 psi.

C. Compensators to be all welded construction, with grooved ends, compatible for Victaulic OGS-200 roll groove for Schedule 80 steel piping.

D. Constructed of multiple-ply 304 stainless steel bellows, carbon steel shroud, integral guide rings, and internal liner. System line pressure to be external to the bellows to minimize squirm.

E. Al materials of construction, pressure ratings, and end fittings shall be appropriate for the application.

F. Piping must be properly guided and anchored per the recommendations of the Expansion Joint Manufacturers Association.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with EJMA (Expansion Joint Manufacturers Association) Standards.

C. Install flexible pipe connectors on pipes connected to vibration isolated equipment. Provide line size flexible connectors.

D. Install flexible connector at right angles to displacement. Install one end immediately adjacent to isolated equipment and anchor other end. Install in horizontal plane unless indicated otherwise.

E. Provide support and equipment required to control expansion and contraction of piping. Provide flexible expansion joints where required.

END OF SECTION

SECTION 23 0555
PENETRATION FIRESTOPPING FOR MECHANICAL AND PLUMBING

PART 1 GENERAL

1.01 RELATED DOCUMENT

A. 07 8400 Firestopping

1.02 DEFINITIONS

A. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in fire rated wall and floor assemblies.

1.03 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

Only tested firestop systems shall be used in specific locations as follows:

A. Penetrations of the passage of duct, piping (HVAC and Plumbing) and other mechanical equipment through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.

1.04 REFERENCES

A. Test Requirement: ASTM E 814, "Standard Method of Fire Tests of Through Penetration Fire Stops".

B. Test Requirements: UL 1479, "Fire Test of Through-Penetration Firestops".

C. Underwriters Laboratories (UL) of Northbrook, IL publishes tested systems in their "FIRE RESISTANCE DIRECTORY" that is updated annually.

1. UL Fire Resistance Directory:
   a. Firestop Devices (XHJI)
   b. Fire Resistance Ratings (BXRH)
   c. Through –Penetration Firestop Systems (XHEZ)
   d. Fill, Voids, or Cavity Material (XHHW)
   e. Forming Materials (XHKU)

D. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments

E. Inspection Requirements: ASTM E 2174, "Standard Practice for On-site Inspection of Installed Fire Stops.

F. ASTM E 84, "Standard Test Method for Surface Burning Characteristics of Building Materials".

G. All current State of New Hampshire building codes and NFPA 101 – Life Safety Code.

1.05 QUALITY ASSURANCE

A. Firestop System installation must meet requirements of ASTM E 814 or UL 1479 tested assemblies that provide a fire rating equal to that of construction being penetrated.

B. Proposed firestop materials and methods hall conform to applicable governing codes having local jurisdiction.

C. Firestop System do not reestablish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult with a structural engineer prior to penetrating any load bearing assembly..

D. For those firestop applications that exist for which no UL tested system is available through a manufacturer, a manufacturer's engineering judgement derived from similar UL system designs or other tests will be submitted to local authorities having jurisdiction (AHJ) for their review and approval prior to installation. The State Project Manager will not review or comment on applications. Engineering, judgment drawings must follow requirements set forth by the International Firestop Council.

1.06 INSTALLER QUALIFICATIONS

A. Engage an experienced Installer who is certified and /or licensed by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements. A manufacturer's willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.

B. Installation Responsibility; assign installation of through –penetration firestop system and fire-resistive joint systems in Project to a single sole source firestop specialty contractor.

C. The work is to be installed by a contractor with at least one of the following qualifications:

FM 4991 Approved Contractor

UL Approved Contractor

Firestop Manufacturer-Accredited Fire Stop Specialty Contractor

C. Firm with not less than 3 years' experience with fire stop installation.

E. Successfully completed noted not less than 3 comparable scale projects using similar systems.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL label where applicable.

B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.

C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements.

D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.

E. Do not use damaged or expired materials.

1.08 PROJECT CONDITIONS

A. Do not use materials that contain flammable solvents. Provide temporary ventilation as required to prevent fume migration to adjacent occupied areas.

B. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.

C. Weather Conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.

D. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

E. The Contractor shall fully remove and replace existing fire-stopped penetrations that are being re-used or enlarged; do not reuse existing firestopping – complete removal is required by the Contractor. Existing or new firestopping damaged by the work of the Contractor shall be fully removed and replaced.

PART 2 PRODUCTS

2.01 FIRESTOPPING-GENERAL

A. Provide firestopping composed of components that are compatible with each other, the substrates forming openings and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer base on testing and field experience.

B. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.

C. Provide and install additional wall framing, blocking, masonry, and similar to match existing conditions as required to comply with the manufacturer's rated assembly detail and system.

D. Penetrations of Fire Resistance Rated Walls: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.

1. F-Rating: Not less than the fire-resistance rating of the wall construction being penetrated.

E. Penetrations in Horizontal Assemblies: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.

1. F-Rating: Minimum of 1-hour rating, but no less than the fire-resistance rating of the floor construction being penetrated.

2. T-Rating: when penetrant is located outside of a wall cavity, minimum of 1-hour rating, but not less that the fire-resistance rating of the floor construction being penetrated.

F. Penetrations in Smoke Barriers: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.

1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at both ambient and elevated temperatures.

G. Mold Resistance: Provide penetration firestopping with mold and mildew resistance rating of 0 as determined by ASTM G21.

H. Where necessary based on existing conditions and limited accessibility, provide manufacturer or contractor engineered one –sided firestop assemblies.

2.02 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with through penetration firestop systems (XHEZ) listed in Volume II of the UL Fire Resistance Directory, provide products of the following manufacturers as identified below:

1. Hilti, Inc.
2. Specified Technologies, Inc.
3. Nelson Firestop Products, Inc.
4. Additional manufacturers accepted equal in all performance ratings, listing and experience. Field conditions and applications may warrant a combination of manufacturers.

2.03 MATERIALS

A. Use only firestop products that have been UL 1479 of ASTM E 814 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.

B. Pre-installed firestop dev ices for use with noncombustible and combustible pipes (closed and open systems) penetrating concrete floors and/or gypsum walls the following products are acceptable:

1. Hilti Cast-In Place firestop Device (CP680-P) for use with combustible penetrants.
2. Hilti Cast-In Place Firestop Device (CP 680-M) for use with noncombustible penetrants.
3. Hilti Firestop Speed Sleeve (CP 653) for use with cable penetrations.
4. Hilti Firestop Drop-In Device (CFS-DID) for use with noncombustible and combustible penetrants.
5. Hilti Firestop Block (CFS-BL)

C. Sealants, caulking materials, or foams for use with non-combustible items including steel pipe, c copper pipe, rigid steel conduit and electrical metallic tubing (EMT), the following products are acceptable:

1. Hilti Intumescent Firestop Sealant (FS-ONE MAX)
2. Hilti Fire Foam (CP 620)
3. Hilti Flexible Firestop Sealant (CP 606)

D. Sealants or caulking materials for use with sheet metal ducts, the following products are acceptable:

1. Hilti Flexible Firestop Sealant (P 606)
2. Hilti Intumescent Firestop Sealant (FS-ONE Max)

E. Intumescent sealants, caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe, the following products are acceptable:

1. Hilti Intumescent Firestop Sealant (FS-ONE-MAX)

F. Foams, intumescent sealants, or caulking materials for use with flexible cable or cable bundles, the following products are acceptable:

1. Hilti Intumescent Firestop Sealant (FS-ONE-MAX)
2. Hilt Fire Foam (CP 620)
3. Hilti Flexible Firestop Sealant (CP 606)

G. Non-curing, re-penetrable, intumescent putty or foam materials for use with flexible cable or cable bundles, the following products are acceptable:

1. Hilti Firestop Putty Stick (CP 618)
2. Hilti Firestop Plug (CFS-PL)

H. Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping system), the following products are acceptable:

1. Hilti Firestop Collar (CP 643N)
2. Hilti Firestop Collar (CP 644)
3. Hilti Wrap Strips (CP 648E/648S)

I. Materials used for large openings and complex penetrations made to accommodate cable trays and bundles, multiple steel and coper pipes, electrical busways in raceways, the following products are acceptable:

1. Hilti Firestop Mortar (CP637)

2. Hilti Firestop Block (CFS-BL)
3. Hilti Fire Foam (CP 620)
4. Hilti Firestop board (CP 675T)

J. Non curing, re-penetrable materials used for large openings and complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:
   1. Hilti Firestop Block (CFS-BL)
   2. Hilti Firestop Board (CP 657T)

K. For blank opening made in fire-rated wall or floor assemblies, where future penetration of pipes, conduits, or cables is expected, the following products are acceptable:
   1. Hilti Firestop Block (CFS-BL)
   2. Hilti Firestop Plug (CFS-PL)

L. Provide a firestop system with a "F" Rating as determined by UL 1479 or ASTM E 814 which is equal to the time rating of construction being penetrated.

PART 3 EXECUTION

3.01 PREPARATION

A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
   1. Verify penetrations are properly sized and in suitable condition for application of materials.
   2. Surfaces to which firestop materials will be applied shall be free of dirt, grease oil, rust, laitance, release agents, water repellents, and any other substances that my affect proper adhesion.
   3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials..
   4. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
   5. Repair, rebuild, and provide additional wall framing and finish wall materials as required to provide proper and adequate wall assembly at the top and bottom of walls for proper installation and adherence of the firestopping system.
   6. Remove existing firestopping material as required from both sides of the penetration to permit proper installation of new system.
   7. Do not proceed until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Regulatory Requirements: Install firestop materials in accordance with UL Fire Resistance Directory.

B. Manufacturer's Instruction: Comply with manufacturer's instruction for installation of through – penetration joint materials.
   1. Seal all holes or voids made by penetrations to ensure an air and water resistant seal.
   2. Protect materials from damage on surfaces subjected to traffic.

3.03 FIELD QUALITY CONTROL

A. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.

B. Keep areas of work accessible until reviewed by the State Project Manager.

3.04 IDENTIFICATION & DOCUMENTATION

A. The firestop contractor is to supply documentation for each single application addressed. This documentation is to identify each penetration location of the entire project.

B. The Documentation Form for through penetrations is to include:

1. A Sequential Location Number.
2. The Project Name.
3. Date of Installation.
4. Detailed description of the penetrations location.
5. Tested System of Engineered Judgment Number.
6. Type of assembly penetrated.
7. A detailed description of the size and type of penetrating item.
8. Size of opening.
9. Number of sides of assemblies addressed.
10. Hour rating to be achieved.
11. Installers Name.

C. Copies of these documents are to be provided to the State Project Manager at the completion of the project.

D. Identify through –penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Permanently attach identification labels to surfaces adjacent to and within 6 inches (150 mm) of firestopping edge so labels will be visible to anyone seeing to remove or change penetrating items or firestopping. Labels shall have a unique QR code for each penetration which can be scanned by the firestop documentation software to identify quickly the penetration attributes. Attach labels permanently to surfaces to on both sides of wall.

E. Include the following information on labels:

1. The words: "Warning-Through penetration Firestop System- Do Not Disturb. Notify Building Management of Any Damage."
2 Contractor's Name, address, and phone number.
3. Through-Penetration firestop system designation of applicable testing and inspecting agency.
4. Date of Installation.
5. Through-Penetration firestop system manufacturer's name.
6. Installer's Name.

3.05 ADJUSTING AND CLEANING

A. Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.

END OF SECTION

SECTION 23 0719

PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. HVAC and plumbing piping insulation.

B. Jackets and accessories.

1.02 REFERENCE STANDARDS

A. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.

B. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded Hot Plate Apparatus; 2013.

C. ASTM C534 – Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2016.

D. ASTM C585 – Standard Practice for Inner and Outer Diameters of Thermal Insulation for Nominal Sizes of Pipe and Tubing; 2010 (Reapproved 2016).

D. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2010.

E. ASTM E84; UL 723 - Standard Method of Test of Surface Burning Characteristics of Building Materials; National Fire Protection Association; 2016.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum three years of experience.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.05 FIELD CONDITIONS

A. Maintain ambient conditions required by manufacturers of each product.

B. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.01 REQUIREMENTS FOR ALL PRODUCTS OF THIS SECTION

A. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84, UL 723.

B. Fittings shall be insulated with die-cut and formed insulation.

2.02 GLASS FIBER

A. Manufacturers:

1. Knauf Insulation: www.knaufusa.com.
2. Johns Manville Corporation: www.jm.com.
3. Owens Corning Corp: www.owenscorning.com.
4. CertainTeed Corporation; www.certainteed.com.

B. Insulation: ASTM C547; rigid molded, noncombustible.

1. 'K' value: ASTM C177, 0.24 at 75 degrees F.
2. Maximum service temperature: 850 degrees F.
3. Maximum moisture absorption: 0.2 percent by volume.
4. Comply with State of New Hampshire energy code requirements.

C. Insulation: ASTM C547 and ASTM C795; semi-rigid, noncombustible, end grain adhered to jacket.
1. 'K' value: ASTM C177, 0.24 at 75 degrees F.
2. Maximum service temperature: 650 degrees F.
3. Maximum moisture absorption: 0.2 percent by volume.
4. Comply with State of New Hampshire energy code requirements.

D. Vapor Barrier Jacket: White kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.

E. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.

F. Vapor Barrier Lap Adhesive:
1. Compatible with insulation.

G. Insulating Cement/Mastic:
1. ASTM C195; hydraulic setting on mineral wool.

2.03 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

A. Manufacturer:
1. Armacell LLC; www.armacell.us
2. Aeroflex USA, Inc.; www.aeroflex.com.
3. K-Flex US LLC; www.kflexusa.com.

B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534 Grade 3; use molded tubular material wherever possible.
1. Minimum Service Temperature: -40 degrees F.
2. Maximum Service Temperature: 220 degrees F.
3. Connection: Waterproof vapor barrier adhesive.

C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.

D. Jacket: None.

2.04 JACKETS

A. PVC Plastic.
1. Manufacturers:
   a. Speedline Corporation; www.speedline.com
   b. Johns Manville Corporation; Zeston 2000 Series Color PVC: www.jm.com.
2. Jacket: One piece molded type fitting covers and sheet material. Color: See below.
   a. Minimum Service Temperature: 0 degrees F.
   b. Maximum Service Temperature: 150 degrees F.
   c. Moisture Vapor Permeability: 0.002 per inch, maximum per ASTM E96/E96M.
   d. Thickness: 10 mil.
   e. Connections: Brush on welding adhesive.
3. Covering Adhesive Mastic: Compatible with insulation.

B. Aluminum.
1. Manufacturers:

a. Pabco-Childers Metals

2. Jacket: 3105/3003 Aluminum alloy roll or sheet jacketing with 3 mil polysurlyn moisture barrier; matching 2-piece fitting covers complete with vapor barrier and strapping hardware.

3. Stucco embossed finish. Color to be determined by State Project Manager.

2.05 INSERTS AND SHIELDS

A. Manufacturers:
   1. Thermal Pipe Shields Inc: www.thermalpipeshields.com.

B. Insulation: ASTM C-553 Type 1; calcium silicate.
   1. 'K' value: 0.38 at 75 degrees F.
   2. Temperature range: +40 to +1200 degrees F.

C. Jacket: ASTM A-527, 360 degree galvanized G90 steel all around insulation.

2.06 PREFORMED REMOVABLE THERMAL INSULATION JACKETS

A. Preformed Insulation Jackets
   1. Manufacturers:
      a. Insultech / Shannon Enterprises (www.insultech.com)
      b. Thermaxx Jackets (www.thermaxxjackets.com)

   2. Outer Facing (Cold Face): Silicone Coated Fiberglass Fabric, PTFE Coated Fiberglass Fabric.
   3. Insulation: Silica Aerogel, Fiberglass Yarn Needle, or Vitreous Silicate Fiber Mat. Hydrophobic and non-asbestos.
   4. Inner Facing (Hot Face): Amorphous Silica Fabric, PTFE Coated Fiberglas Fabric.
   5. Fastening Method: Method C: Velcro straps and stainless steel D-Ring.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that piping has been tested before applying insulation materials.
B. Verify that surfaces are clean and dry, with foreign material removed.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions and NAIMA National Insulation Standards.

B. Sleeves: Provide welded 14GA sheet metal or Schedule 10 pipe sleeves through new or existing masonry block and/or brick walls. Core drill new or existing concrete walls or floors.

C. Exposed Piping: Locate insulation and cover seams in least visible locations.

D. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, and flexible connections.

E. For hot piping conveying fluids 120 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation. For hot piping conveying fluids over 120 degrees F, insulate flanges and unions at equipment. Fittings shall be insulated with die-cut and formed insulation.

F. Glass fiber insulated pipes conveying fluids above ambient temperature:
   1. Provide standard jackets, with vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with

outward clinch expanding staples.

2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Fittings shall be insulated with die-cut and formed insulation. Finish with glass cloth and adhesive or PVC fitting covers.

G. Inserts and Shields:

1. Application: Piping 1-1/2 inches diameter or larger.
2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
3. Insert location: Between support shield and piping and under the finish jacket.
4. Insert configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
5. Insert material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.

H. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Interrupt insulation as required to maintain wall assembly rating and to comply with fire caulking requirements. Finish ends at supports, protrusions, and interruptions.

END OF SECTION

SECTION 23 2115

UNDERGROUND MECHANICAL PIPING SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pre- insulated piping system for high pressure steam suitable for direct burial.

B. Pre–insulated piping system for gravity steam condensate suitable for direct burial. HVAC and plumbing piping insulation.

C. Jackets and accessories.

1.02 RELATED REQUIREMENTS

A. Section 23 0500 – Basic Mechanical Requirements.

B. Section 23 0516 – Expansion Fittings and Loops for Piping.

C. Section 23 2213 – Steam and Condensate Piping

1.03 REFERENCE STANDARDS

A. ASME B16.9 Factor-Made Wrought Steel Butt-welding Fittings.

B. ASME B16.11 Forged fittings, Socket Welding and Threaded.

C. ASME B31.1 – Power Piping.

D. AWS B2.1-Welding Procedure and Performance Qualification.

E. ASTM A53/A53M – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012

1.04 QUALITY ASSURANCE

A. Installer/Repair Person Qualifications – Company specializing in performing work of the type specified in this section, with minimum five years of experience.

B. Installer/Repair Person Training: The Contractor shall provide to the State Project Manager written certifications from the pre-insulated piping system manufacturer indicating that each workman responsible for, and working on, the installation, welding, sealing and testing of the pre-insulated piping system has been formally trained by the manufacturer in the specific pipe installed.

Factory training of Contractor's personnel shall be a minimum of 4-hours actual in-person contact time.

Untrained staff are not permitted to install, weld, close, or test the piping systems. Failure to provide certifications or to permit untrained personnel to work on the piping systems shall be at the Contractor's full and unlimited risk.

C. Welder Qualifications: Certified in accordance with ASME BPVC-IX.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Where possible, store materials inside and protected from weather. Where outside storage is necessary, elevate above grade and protect from blowing dirt, sand and prolonged UV exposure.

B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

C. Protect piping system from entry of foreign materials by temporary covers and isolating parts of the completed system.

1.06 FIELD CONDITIONS

A. Do not install underground piping when bedding is wet or frozen. Provide dry and heated conditions as required to install or repair piping. Provide dewatering services as required to maintain dry trenching during excavation, pipe installation and repair, testing and backfilling.

PART 2 PRODUCTS

2.01 PREINSULATED HIGH-PRESSURE STEAM PIPING SYSTEM.

A. Manufacturer:

1. Thermacor Process Inc.: www.thermacor.com

Representative: Ron Mahan, R.L. Stone (518) 782-7900

B. Pre-insulated Piping. Factory pre-insulated steel piping for the specified service. The system shall be a combination of a drainable, dryable, testable type conduit system, suitable for all ground water and soil conditions, site Classification "A" (Federal Construction Guide Spec. 02695), with an external covering of polyurethane insulation and an HDPE jacket. The system shall be as specified below:

C. Conduit. The conduit shall be 10-gauge, welded, smooth-wall black steel conforming to ASTM A-211, A-139, A-134, and A-135. Conduit shall be tested at the factory to insure air and watertight welds prior to any fabrication or application of coating; no internal coating of conduit.

D. Conduit Closure. Conduit closures shall be 10-gauge steel, furnished with the conduit at a ratio of one closure for each fabricated item or length. Closure shall be field welded over adjacent units as directed by the manufacturer.

E. Carrier Piping. High pressure steam carrier piping shall be Schedule 40 Steel, ASTM A-53; Grade B, ERW. Pipe joints shall be welded in accordance with the Pressure Piping Code ASME/ANSI B31.1 and as directed by the manufacturer.

F. Class "A" Pipe Insulation. The piping insulation between carrier and conduit piping shall be mineral wool applied to the thickness as specified by the manufacturer.

G. Fittings. Factory pre-fabricated ells, loops and tees shall consist of pipe, insulation, and conduit conforming to the same specification as specified for straight sections of pipe. Expansion loops shall be designed by the manufacturer in accordance with the stress limits as dictated by the Power Piping Code, ASME/ANSI B31.1. Loop piping shall be installed in conduit suitably sized to handle indicated pipe movement.

H. Terminal ends of conduits inside manholes, pits, or building walls shall be equipped with end seals consisting of a ½" steel plate welded to the pipe and conduit. End seals shall be equipped with drain and vent openings. Terminate all conduits 2" beyond the inside face of manhole or building walls.

I. Pipe Anchors, Prefabricated anchors shall consist of steel plate, welded to pipe and conduit. The steel anchor plate shall ½' thick and shall be 1-1/2" larger horizontally and 1-1/2" larger vertically than the HDPE jacket outer diameter. Heat shrink wrap shall be used to seal the overlap of anchor water shed over the HDPE jacket.

J. Thrust Blocks. Concrete thrust block shall be cast over the anchor plate and conduit, large enough for firm anchorage into undisturbed trench sidewalls and /or bottom. The concrete block shall be at least 36" in length and extend a minimum of 12" beyond the top and bottom of the anchor plate.

K. Sleeves. Wall sleeves with leak plates shall be provided at all building and manhole entries to provide an effective moisture barrier. The space between the conduit and wall sleeve shall be made watertight by use of Link-seal pipe penetration seals or equal assemblies, which will also provide electrical isolation.

L. Conduit Insulation. The steel conduit for the steam shall be insulated with polyurethane foam insulation to a minimum thickness of 1". Insulation shall be rigid, 90% closed cell polyurethane with a minimum 2.4 lbs. per cubic foot density, compressive strength of 30 psi @ 75 degrees Fahrenheit, and coefficient of thermal conductivity (K factor) not higher than .16 @ 75 degrees Fahrenheit per ASTM C518. Maximum conduit interface temperature shall not exceed 212 degrees Fahrenheit.

M. Outer Jacket. Jacketing material shall be extruded, black, high density polyethylene (HDPE), having a minimum wall thickness of 200 mils. The inner surface of the HDPE jacket shall be oxidized by means of corona treatment or other approved methods. This ensures a security bond between the jacket and foam insulation preventing any ingression of water at the jacket/foam interface.

N. Joints. Straight section joints are jacketed with an electro-fusion welded split sleeve HDPE, pressure tested joint closure. The joint shall be pressure tested at 5 psi for 5 minutes while simultaneously soap tested at the joint closure's seams for possible leaks After passing the pressure test, the joints are insulated using polyurethane foam and a closure patch is welded (as per specified joint closure instructions) over the foam holes. All joint closures and insulation shall occur at straight sections of pipe.

Conduit fittings are factory pre-fabricated and re-insulated with urethane to the thickness specified and jacketed with a molded, extrusion welded, or butt fusion welded PE jacket. No taping or hot air welding shall be allowed.

O. Leak Protection Monitoring. Electric Resistance Monitoring (ERM) system consists of a copper wire embedded in the foam of each piece of pre-insulated pipe and fittings. The piping system manufacturer shall factory install the wire in a manner that prevents touching the steel carrier pipe. The Contractor shall connect the wire together at each field joint with a recommended crimping tool. After crimping the wire at a joint, the Contractor shall check the joint pieces for continuity of the wire and electrical isolation from the carrier pipe by use of a standard analog ohmmeter.

2.02 PRE INSULATED STEAM CONDENSATE PIPING SYSTEM

A. Manufacturer: Thermacor Process Inc. All piping shall be form the same manufacturer.

B. Pre-Insulated Piping. A complete HDPE jacketed system of factory pre-insulated steel piping for the specified service. The jacket throughout the entire system shall incorporate electric fusion, butt fusion, or extrusion welding at all fittings, joint closure, or other points of connection. This shall create a jacket that is seamless throughout the entire system with the exception of anchors, whose water shed rings are sealed with a double wrap heat shrink material prohibiting the ingression of water.

C. Piping System. The system shall be termed a high temperature foam system, with water spread limiting devices capable of preventing the deterioration of foam and spread of groundwater located at each individual factory piece, a resistance based leak detection monitoring system in the foam, and thermally insolated anchors as described herein.

D. Carrier Pipe. Carrier pipe shall be schedule 80 Steel ASTM A-53; Grade B., ERW (Type E), for pipe sizes 2" and larger; and shall be ASTM A-106, Grade B, for pipe sizes 1-1/2" and smaller. Condensate return piping shall be as strong (XS is the same as Schedule 80 through 8"). All carbon steel pipe shall have ends cut square and beveled for butt-welding. Straight sections of factory insulated pipe shall have 6" of exposed pipe at each end for field joint fabrication.

E. Insulation. Insulation shall be polyisocyanurate foam insulation bonded to both the jacketing an carrier pipe and either spray applied,or high pressure injected with one shot into the annular space between carrier pipe and jacket with a nominal thickness of 2-1/2" for systems operating below 366 degrees Fahrenheit. Insulation shall be rigid, 85% closed cell foam insulation with not less than 2.4 pounds per cubic foot density, having a compressive strength of not less than 30 psi@ 75 degrees Fahrenheit and a coefficient of thermal conductivity (K-Factor) not higher than 0.17 @ 75 degrees Fahrenheit. Maximum operating temperature of the system shall not exceed 366 degrees Fahrenheit.

F. Water Stops. Water spread limiting devices shall be provided at each spool piece and length of pipe. A steel disk shall be welded to the carrier pipe and extend into the high temperature foam, embedded between the foam insulation and HDPE jacket. The longitudinal length of the water stop will be determined by the manufacturer based on project design conditions to sufficiently dissipate the heat from the carrier pipe protecting the integrity of the high temperature insulation.

The water stop shall have been manufacturer tested and proved to contain for a minimum of 12 months the spread of groundwater through the system that is capable of flashing to steam when in contact with the hot carrier pipe. This spread of moisture shall be contained in the immediate area of a field joint and not allowed to spread further.

Testing data and results shall be provided by the Manufacturer that the Manufacturer's water stop limiting device is capable of isolating water spread to within 5" of the joint area on a pipe operating in excess of 300 degrees Fahrenheit, with a column of water exposed and boiling in the joint area for the entire 6 month period.

G. Jacket. Jacketing material shall be extruded, black, high density polyethylene (HDPE), having a minimum wall thickness of 125 mils for jacket sizes less than or equal to 12"; 150 mils for jacket sizes greater than 12" to 20" and 175 mils for jacket sizes larger than 20". The jacket throughout the entire system shall incorporate electric fusion, butt fusion, or extrusion welding at all HDPE fittings, joint closures, or other points of connection. This shall create a jacket that is seamless throughout the entire system with the exception of anchors, whose water shed rings are sealed with a double wrap heat shrink materials prohibiting the ingression of water.

The inner surface of the HDPE jacket shall be oxidized by means of corona treatment or other approved methods to create a security bond to the foam.

H. Joints. Straight run joints are insulated using a high temperature foam to the thickness specified and jacketed with an electric fusion pressure testable joint closure. The joint closure will be fused to the adjacent jacket material creating a weld as strong as or stronger than the jacket. Shrink material and adhesive shall not be allowed as primary sealing means.

The joint will be pressure tested at 5 psi for 5 minutes while simultaneously soap tested at the joint closure' seams for possible leaks. After passing the pressure test, the field joint is insulated and closure patches are welded (as per specified joint closure instructions) over the foaming holes. All joint closures and insulation shall occur at straight sections of pipe.

I. Terminations inside of manholes shall have a corrosion coated steel sleeve protecting the foam. This steel sleeve shall be field welded onto the carrier pipe and come up and extend back on the jacket a distance of 16". A high temperature shrink sleeve 4" wide shall be used to seal the steel sleeve to the HDPE jacket.

J. Fittings. Fittings are factory pre-fabricated and pre-insulated with polyisocyanurate to the thickness specified and jacketed with a one piece seamless molded HPDE fitting cover, a butt fusion welded, or an extrusion welded and mitered HDPE jacket. No taping shall be allowed as primary sealing method. All fitting jackets/covers shall be connected to the straight lengths of pipe by electro fusion, butt fusion, or extrusion welding.

The HDPE jacket Electro-Fusion wires should be at least 1 inch on each side longitudinally past the opening between the pipe assembly sections. The longitudinal length of the HDPE jacket needs to take this account when ordering the jacket.

Carrier pipe fittings shall be butt-welded, except for sizes smaller than 2", which shall be socket-welded. Fittings include expansion loops, elbows, tees, reducers, and anchors. Elbows, loops, offsets, or any other direction changes shall conform to the standards set by ANSI B31.1, Code for Power Piping.

K. Anchors. Anchors shall be designed as thermally isolated so that any portion of exposed plate does not exceed 200 degrees Fahrenheit. The metal anchor shall be welded to a standard weight casing that is extended in parallel into the high temperature foam insulation, before turning down and fully welded to the carrier pipe. The anchor casing shall be insulated between the carrier pipe and the HDPE jacket. The overall length of the anchor casing, along with the insulation requirements shall be determined by the manufacturer who shall submit a finite element heat analysis showing profile of the pipe and anchor heat distribution with a maximum exposed anchor plate temperature of not more than 200 degrees Fahrenheit. The finite element analysis shall be representative of the temperature of not more than 200 degrees Fahrenheit. The finite element analysis shall be representative of the pipe size and operating temperature specified. Anchors shall be ½" thick steel plates and shall incorporate a steel water shed ring sealed to the HDPE jacket with a heat shrink wrap.

L. Expansion /contraction compensation will be accomplished utilizing factory pre-fabricated and pre-insulated expansion elbows, Z-bends, expansion loops, and anchors specifically designed for the intended application. Flexible expansion pads shall be utilized for external expansion compensation on all fittings having expansion in excess of ½". Expansion pads shall be a minimum one inch thick and shall extend to cover both the inside and outside radius of the fittings.

M. Leak Protection Monitoring. Electric Resistance Monitoring is provided to leak detect the entire system. The ERM system consists of a copper wire embedded in the foam of each piece of pre-insulated pipe and fittings. The piping system manufacturer shall install the wire in a manner that prevents touching the steel carrier pipe. The Contractor shall connect the wires together at each field joint with a recommended crimping tool. After crimping the wire at a joint, the Contactor shall check the jointed pieces for continuity of the wire and electrical isolation from the carrier pipe by use of a standard analog ohmmeter. This check shall be repeated after each crimp until the entire system is connected.

PART 3 EXECUTION

3.01 PREPARATION

A. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

B. Clean the pipe per manufacturer's requirements.

3.02 INSTALLATION

A. The installing contractor shall be responsible to excavate, repair, weld, test, place in trench, backfill, or otherwise treat and install the system as per the specifications and the directions furnished by the manufacturer.

B. Trench bottom shall have a minimum of 6 inches of sand and backfill with 12 inches thick sand as measured from the outside of the conduit casings. Back with 12 inches thick sand over the top of the casing, as measured from the outside of the largest conduit. Beach sand or any sand with large amounts of chloride shall not be permitted. All field-cutting of the pipe shall be performed in accordance with the manufacturer's installation instructions.

C. Foundation for conduit system shall be firm and stable. Foundation and backfill must be free from rocks or substances that could damage the system coating.

D. Piping shall not be installed in standing water. The Contractor shall protect all trenches from water intrusion or shall fully dewater as required. Trenches shall be maintained in a dry condition until final field testing and closure is completed. Piping that is placed and subsequently impacted by water (rain or snow) shall be fully removed, the sand beds replaced, and the piping re-set and re-tested.

E. Weld Record; Contractor shall complete a weld record that clearly locates and documents any pipe or conduit HPS steel casing joints of the steam, condensate, and pumped condensate piping that are installed or repaired. The Record shall identify a location, date of completed test for each joint. Submit Weld Record to the State Project Manager after completion of the steam distribution system repair.

F. Back filling shall not commence until the conduit system has been satisfactorily pressure tested for the carrier pipes and the outer conduit casings and the ERM has been tested; see Testing of Pipe below. Extreme care must be exercised to protect the piping systems during backfilling and compacting, Piping damaged during backfilling shall be repaired and /or replaced and re-tested at no additional cost to the State.

3.03 CLEANING OF PIPE

A. Prior to hydrostatic testing of pipe, the Contractor shall clean the interior of all new pipe installed under this specification section.

3.04 TESTING OF PIPE

A. The Contractor shall be solely responsible to perform all testing required by this specification. All tests shall be witnessed and signed off by the State Project Manager. Testing and re-testing (where required) until a satisfactory result is achieved.

All tests shall be witnessed and signed off by the State Project Manager or its Agent.

B. Tests of underground piping shall be coordinated with the State Project Manager. It is acceptable to pressure test sections of carrier and conduit piping and the ERM system between vaults.

Do no insulate joints or backfill prior to acceptance of all tests. Upon completion of a successful tests and acceptance by the State Project Manager, the trench for those sections of piping, can be backfilled. Piping that has been backfilled without acceptance by the State Project Manager shall be unearthed, re-tested, and accepted at no additional cost of the State.

The Contractor is responsible to protect the piping system in part and in whole until accepted by the State Project Manager. Damaged sections of pipe, fittings, or sections that repeatedly fail the pressure tests shall be replaced at the Contractor's sole cost.

Utilize pressure gauges within testing range (0-15 PSI, 0-30 PSI, 1-100 PSI) with accuracy to +-1% full scale (or as directed by the manufacturer).

C. A hydrostatic pressure test of the carrier pipe shall be performed at one and one-half times the normal system operating pressure (75 psig) for not less than 15 minutes. Care shall be taken to insure all trapped air is removed from the system prior to the test. Appropriate safety precautions shall be taken to guard against possible injury to personnel in the event of a failure. The installing contractor shall repair all leaks by re-welding and the system shall be retested.

Test to zero leakage; leaks are not acceptable.

D. The conduit HPS steel casing of the steam piping system shall be air tested at 15 to 25 psi. Soap check the welds and if no bubbles show the joint is satisfactory. Repair any conduit leaks and test prior to making joint closures.

E. The conduit HTPE outer casing of the steam piping system shall be air tested at 5 psi. Soap check the HTPE fused joints and if no bubbles show the joint is satisfactory. Repair any conduit leaks and test prior to making joint closures.

F. ERM system and ERM Panel tests are required by the Contractor with the State Project Manager or representative present. Test per Thermacor procedure requirements.

G. Complete the Thermacor Field Logs contained in the Thermacor installation procedure for the conduit HTPE outer casing and ERM system and Panel tests.

H. When testing and if necessary re-testing, has been completed, and no leaks are remaining, provide confirmation of testing and successful completion with no remaining leaks, to the State Project Manager.

END OF SECTION

SECTION 23 2213

STEAM AND STEAM CONDENSATE PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pipe and pipe fittings.

B. Pipe hangers and supports.

C. Valves and accessories.

D. Steam piping system.

E. Steam condensate piping system.

1.02 RELATED REQUIREMENTS

A. Section 23 0500 – Basic Mechanical Requirements

B. Section 23 0719 - Piping Insulation.

1.03 REFERENCE STANDARDS

A. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; The American Society of Mechanical Engineers; 2011.

B. ASME B31.1 – Power Piping; 2016.

C. ASME B31.9 - Building Services Piping; The American Society of Mechanical Engineers; 2014 (ANSI/ASME B31.9).

D. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Welding, Brazing, and Fusing Qualifications; American Society of Mechanical Engineers; 2015.

E. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless; 2012.

F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.

G. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2015.

H. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).

I. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; American Welding Society; 2011-AMD 1.

J. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2015.

K. ASME Section I, ASME Boiler and Pressure Vessel Code (BPVC), Section I: Rules for Construction of Power Boilers (2017).

L. ASME Section IX, ASME Boiler and Pressure Vessel Code (BPVC), Section IX: Welding and Brazing Qualifications (2017).

1.04 SYSTEM DESCRIPTION

A. When more than one piping system material is selected, ensure systems components are compatible and joined to ensure the integrity of the system is not jeopardized. Provide necessary joining fittings. Ensure flanges, unions, and couplings for servicing are consistently provided.

B. Use unions downstream at valves and at equipment or apparatus connections. Use dielectric unions where joining dissimilar materials. Do not use direct threaded connections.

C. Provide flanges at valve and equipment connections; do not use direct welded or threaded connections.

D. Provide pipe hangers and supports in accordance with ASME B31.9 or MSS SP-58 unless indicated otherwise.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section, with minimum three years of documented experience.

C. Welder Qualifications: Certified in accordance with ASME BPVC-IX.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labelling in place. Inspect for damage.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

A. Conform to ASME B31.9 code for installation of piping systems.

B. Provide the State Project Manager a certificate of compliance from the Authority Having Jurisdiction indicating approval of welders.

C. Welding Materials and Procedures: Conform to ASME BPVC-IX and applicable state labor regulations.

2.02 MEDIUM AND HIGH PRESSURE STEAM PIPING (150 PSIG (1034 KPA) MAXIMUM)

A. Steel Pipe: ASTM A53/A53M, Schedule 40, black.
   1. Fittings: ASME B16.3 malleable iron Class 250, or ASTM A234/A234M wrought steel welding type.
   2. Joints: Threaded (up to and including 2"diameter); AWS D1.1/D1.1M welded (greater than 2" diameter).
   3. Provide weld-neck style flanges equal to and greater than 4" diameter for piping connections for the boilers, boiler room equipment, and valve bodies in all areas.

2.03 LOW PRESSURE STEAM PIPING (15 PSIG (103 KPA) MAXIMUM)

A. Steel Pipe (up to 1½" Piping): ASTM A53/A53M, Schedule 40, black.
   1. Fittings: ASME B16.3 malleable iron Class 250, or ASTM A234/A234M wrought steel welding type or Viega MegaPress fittings with EPDM sealing element.
   2. Installation: Fittings shall be installed using a Rigid MegaPress tool only. All installers must be trained by the manufacturer on proper installation.

B. Steel Pipe (2" to 6" Piping): ASTM A53/A53M, Schedule 40, black.
   1. Fittings: ASME B16.3 malleable iron Class 250, or ASTM A234/A234M wrought steel welding type.

2.04 MEDIUM AND HIGH PRESSURE STEAM CONDENSATE PIPING

A. Steel Pipe: ASTM A53/A53M, Schedule 80, black.
   1. Fittings: ASME B16.3 malleable iron Class 250, or ASTM A234/A234M wrought steel.
   2. Joints: Threaded, or AWS D1.1/D1.1M welded.

2.05 LOW PRESSURE STEAM CONDENSATE PIPING AND PRESSURE RELIEF VALVE VENT PIPING

A. Condensate Steel Pipe (½" to 1½" Piping): ASTM A53/A53M, Schedule 80, black.
   1. Fittings: ASME B16.3 malleable iron Class 250, or ASTM A234/A234M wrought steel, or Viega MegaPress fittings with EPDM sealing element.
   2. Joints: Threaded, or AWS D1.1/D1.1M welded, or Viega MegaPress.
      a. Installation: Fittings shall be installed using a Rigid MegaPress tool only.
      b. Installers must be personally trained by the manufacturer on proper installation.

B. Condensate Steel Pipe (2" to 6" Piping): ASTM A53/A53M, Schedule 80, black.
   1. Fittings: ASME B16.3 malleable iron Class 250, or ASTM A234/A234M wrought steel.
   2. Joints: Threaded, or AWS D1.1/D1.1M welded.

C. <u>Pressure Relief Valve Steel Pipe</u> (all sizes/locations): ASTM A53/A53M, Schedule 80, black.
   1. Fittings: ASTM A234/A234M wrought steel
   2. Joints: AWS D1.1/D1.1M welded.
   a. Installation: Welded joints and fittings only; no exceptions; full length of discharge piping.

2.06 UNIONS, FLANGES, AND COUPLINGS

A. Unions for Pipe 2 Inches (50 mm) and Under:
   1. Ferrous Piping: 150 psig (1034 kPa) galvanized malleable iron, threaded.
   2. Copper Pipe: Bronze, soldered joints.

B. Flanges for Pipe Over 2 Inches (50 mm):
   1. Ferrous Piping: Class 150, ANSI forged steel flanges (cast not permitted).
      a) Provide weld neck flanges for steam piping that is 4" diameter and greater regardless of steam system operating pressure.
      b) Provide socket-type flanges for high pressure steam pipe (greater than 15PSI) that is less than 4" diameter.
      c) Slip-on flanges are not permitted for high pressure steam service regardless of diameter (systems operating at greater than 15PSI).
      d) Slip-on flanges shall be permitted for low pressure steam systems (systems operating less than 15PSI) on piping that is less than 4" diameter.
   2. Copper Piping: Bronze.
   3. Gaskets: Preformed non-asbestos graphite fiber manufactured for high pressure steam service; match flange rating and bolt dimensions.
      a) Garlock Sealing Technologies
      b) Thermoseal / Klingersil
      c) APG.
   4. Bolts / Studs: Grade 8, Coarse Thread. Threaded rod for use as studs is not permitted. Provide anti-seize thread compound specifically manufactured for the application.

      Do <u>not</u> use thread compound as gasket lubricant or sealant.

C. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.07 GATE and GLOBE VALVES

A. Manufacturers:
   1. Conbraco Industries: www.apollovalves.com.
   2. NIBCO, Inc: www.nibco.com.
   3. Milwaukee Valve Company: www.milwaukeevalve.com.

B. Up To and Including 2 Inches (50 mm):
   1. Bronze body, bronze trim, screwed bonnet, non-rising stem, lock shield stem, rising stem or outside screw & yoke, solid wedge disc, alloy seat rings, solder ends. Class 250.

C. Over 2 Inches (50 mm):
   1. Iron body, bronze trim, bolted bonnet, rising stem, hand-wheel, rising stem or outside screw and yoke, solid wedge disc with bronze seat rings, flanged ends. Class 250.

D. Factory handle or gear drive hand-wheel (see below).

2.08 BALL VALVES

A. Manufacturers:
   1. Conbraco Industries: www.apollovalves.com.
   2. NIBCO, Inc: www.nibco.com.
   3. Milwaukee Valve Company: www.milwaukeevalve.com.

B. Up To and Including 2 Inches (50 mm):
   1. Bronze one piece body, chrome plated bass ball, Teflon seats and stuffing box ring, lever handle with balancing stops, solder ends with union.

C. Over 2 Inches (50 mm):
   1. Flanged; Cast steel body, chrome plated steel ball, Teflon seat and stuffing box seals
   2. Lever handle or gear drive hand-wheel (see below).

2.09 SWING CHECK VALVES

A. Manufacturers:
   1. Hammond Valve Company: www.hammondvalve.com.
   2. NIBCO, Inc.: www.nibco.com.
   3. Milwaukee Valve Company: www.milwaukeevalve.com.

B. Up To and Including 2 Inches (50 mm):
   1. Bronze or iron body, bronze trim, bronze rotating swing disc with composition seat, solder ends.

C. Over 2 Inches (50 mm):
   1. Iron body, bronze trim, bronze or bronze faced rotating swing disc, renewable disc and seat, flanged ends.

2.10 STRAINERS

A. Manufacturers:
   1. Spirax/Sarco: www. spiraxsarco.com
   2. Mueller Steam Specialty: www.muellersteam.com
   3. Armstrong Company: www.armstronginternational.com.

B. Up To and Including 2 Inches (50 mm):
   1. Cast iron body, stainless steel strainer; flanged or threaded. Class 250.
   2. Provide with full-size, full port blow down valve and cap.

C. Over 2 Inches (50 mm):
   1. Cast iron body, stainless steel strainer; flanged or Threaded, Class 250
   2. Provide with full-size, full port blow down valve and cap.

2.11 CHAINWHEEL OPERATORS

A. Manufacturers:
   1. Babbitt Chainwheels
   2. Roto-Hammer
   3. Trumbull Manufacturing

B. Aluminum chainwheel, guide arm and cap, and zinc plated carbon steel attachment set for clamping to the valve hand wheel

C. Provide for valves that are mounted at 8'-0"AFF or higher.

2.12 MANUFACTURED SLEEVE-SEAL SYSTEMS

A. Manufacturers:
   1. GPT Industries; Link-Seal: www.gptindustries.com.
   2. The Metraflex Company; MetraSeal: www.metraflex.com.

B. Modular/Mechanical Seal:
   1. Synthetic rubber interlocking links continuously fill annular space between pipe and wall/casing opening.
   2. Provide watertight seal between pipe and wall/casing opening.
   3. Elastomer element size and material in accordance with manufacturer's recommendations.
   4. Glass reinforced plastic pressure end plates.

PART 3 EXECUTION

3.01 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare piping connections to equipment with flanges or unions.

D. Keep open ends of pipe free from scale and dirt. Whenever work is suspended during construction protect open ends with temporary plugs or caps.

E. After completion, fill and clean systems.

F. Mechanical Couplings: Contractor's personnel performing the work shall be factory-trained and certified in the fabrication and installation of mechanical couplings for steam and condensate piping in the materials and diameters of the project.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Route piping in orderly manner, plumb and parallel to building structure, and maintain gradient.

C. Install piping to conserve building space and avoid interference with use of space.

D. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

E. Inserts:
   1. Provide inserts for placement in concrete formwork.
   2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
   3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches (100 mm).
   4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
   5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.

F. Provide clearance for installation of insulation and access to valves and fittings.

G. Provide access where valves and fittings are not exposed. Coordinate size and location of access doors.

H. Slope steam piping one inch in 40 feet (0.25 percent) in direction of flow. Use eccentric reducers to prevent puddling of condensate in the pipeline. Use eccentric reducers at pressure reducing valves and control valves – flat on top; pitch piping away from valve on entering and exit to prevent puddling of condensate within the valve body.

I. Slope steam condensate piping one inch in 40 feet (0.25 percent) unless defined on the drawings. Provide drip trap assembly at low points, before control valves, and as noted on the drawings. Pipe condensate from trap to nearest condensate receiver. Provide loop vents over trapped sections.

J. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welds. Paint to match structural building framing.

K. Prepare unfinished pipe, fittings, supports, and accessories ready for finish painting.

L. Install valves with stems upright, diagonal, or horizontal, not inverted.

M. Install globe body valves in direction of flow.

N. Weld Record: Contractor shall complete a weld record that clearly locates and documents any pipe joints of the steam, condensate, and pumped condensate piping that are installed or repaired. The record shall identify a location, date, welder, supervisor, base material joined, test pressure, test inspector, and, date of completed test for each joint. Submit Weld Record to the State Project Manager after completion of the steam distribution system repair.

3.03 TESTING OF PIPE

A. The Contractor shall be solely responsible to perform all testing required by this specification. All tests shall be witnessed and signed off by the State Project Manager. Testing and re-testing (where required) until a satisfactory result is achieved.

All test shall be witnessed and signed off by the State Project Manager or its Agent.

B. Tests of piping shall be coordinated with the State Project Manager, It is acceptable to pressure test sections of piping between vaults as directed by the State Project Manager or its Agent.

Do not insulate joints or backfill prior to acceptance of all tests. Upon completion of successful tests and acceptance by the State Project Manager, the trench for those sections of piping, can be backfilled. Piping that has been backfilled without acceptance by the State Project Manager shall be unearthed, re-tested, and accepted at no additional cost of the State.

The Contractor is responsible to protect the piping system in part, and in whole until accepted by the State Project Manager. Damaged sections of pipe, fittings, or sections that repeatedly fail the pressure tests shall be replaced.

Utilize pressure gauges within testing range (1-100 PSI) with accuracy to += 1% full scale.

C. A hydrostatic pressure test of the carrier pipe shall be performed at one and one-half times the normal system operating pressure (75 psig) for not less than 15 minutes. Care shall be taken to insure all trapped air is removed from the system prior to the test. Appropriate safety precautions shall be taken to guard against possible injury to personnel in the event of a failure. The installing contractor shall repair all leaks by re-welding and the system shall be retested.

Test to zero leakage; visually inspect the joints; leaks are not acceptable.

F. If disturbed during the work, the ERM system and ERM Panel tests are required to be tested by the Contractor with the State Project Manager or its Agent present. Test per Thermacor requirements of Section 23 2115.

G. When testing and if necessary re-testing, has been completed, and no leaks are remaining, provide confirmation of testing and successful completion with no remaining leaks, to the Sate Project Manager.

END OF SECTION

SECTION 23 2214

STEAM AND CONDENSATE HEATING SPECIALITIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Steam Traps.

B. Steam Air Vents.

C. Condensate Return Units.

D. Pressure Reducing Valves.

E. Steam Safety Valves.

1.02 RELATED REQUIREMENTS

A. Section 23 0719 – Piping Insulation.

B. Section 23 2213 – Steam and Seam Condensate Piping.

1.03 REFERENCE STANDARDS

A. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; The American Society of Mechanical Engineers; 2011.

B. ASME B31.1 – Power Piping; 2016.

C. ASME B31.9 - Building Services Piping; The American Society of Mechanical Engineers; 2014 (ANSI/ASME B31.9).

D. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Welding, Brazing, and Fusing Qualifications; American Society of Mechanical Engineers; 2015.

E. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless; 2012.

F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.

G. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2015.

H. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).

I. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; American Welding Society; 2011-AMD 1.

J. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2015.

K. ASME Section I, ASME Boiler and Pressure Vessel Code (BPVC), Section I: Rules for Construction of Power Boilers (2017).

L. ASME Section IX, ASME Boiler and Pressure Vessel Code (BPVC), Section IX: Welding and Brazing Qualifications (2017).

1.04 QUALITY ASSURANCE

A. Perform Work in accordance with State of New Hampshire standard for installation of boilers and pressure vessels.

B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum three years of documented experience.

C. Products Requiring Electrical Connection: Listed and classified by UL as suitable or the purpose indicated.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labelling in place. Inspect for damage.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

2.01 STEAM TRAPS

A. Manufacturers:

1. Armstrong International, Inc. www.armstronginternational.com

B. Steam Trap Applications:

1. Drip legs for steam mains, steam boiler headers, and pressure reducing stations.

C. Steam Trap Performance:

1. Select to handle minimum of two times maximum condensate load of apparatus served.
2. Pressure Differentials:
   a. Low Pressure Systems (5 psi (34 kPa) and less); ½ psi (3.4 kPa).
   b. Low Pressure Systems (15 psi (103 kPa) maximum); 2 psi (13.8 kPa).
   c. Medium Pressure Steam (60 psi (414 kPa) maximum): 15 psi (103) kPa).

D. Inverted Bucket Traps: ASTM A126, cast iron body with bolted cover, stainless steel bucket, stainless steel seats and plungers, and stainless steel lever mechanism with knife edge operating surfaces.

1. Rating: 120 psi (627 kPa) WSP.
2. Features: Access to internal parts without disturbing piping plug, bottom drain plugs.
3. Accessories:
   a. Integral inlet strainer of stainless steel.
   b. Integral inlet check valve.
   c. Integral bimetal air-vent.

E. Float and Thermostatic Traps: ASTM A126 cast iron body and bolted cover, stainless steel or bronze bellows type air vent, stainless steel or copper float, stainless steel lever and valve assembly.

1. Rating: 125 psi (860 kPa) WSP.
2. Features: Access to internal parts without disturbing piping, bottom drain plug.
3. Accessories: Gage glass with shut-off cocks.

F. Thermodynamic Traps: Stainless steel body, disc, and cap.

1. Rating 600 psi (4140 kPa) WSP.
2. Features:
   a. Stainless steel insulation cap.
   b. Steel blow down valve.

2.02 STEAM AIR VENTS

A. Manufacturers:

1. Armstrong International, Inc: www.armstronginternational.com.
2. Bell and Gossett, a xylem brand: www.bellgossett.com.
3. Spirax-Sarco: www.spriraxsarco.com/us.

B. 125 psi (860) kPa) WSP: Balanced pressure type: cast brass body and cover; access to internal parts without disturbing piping; stainless steel bellows: stainless steel valve and seat.

2.03 CONDENSATE RETURN UNITS

A. Manufacturers:

1. Skidmore Pump
2. Hoffman-Watchman

B. Condensate Return Units: Consist of receiver, inlet strainer, pumps, float switches, control panel and accessories.

C. Condensate Receiver: Cast iron, equipped with externally adjustable float switches, water level gage, dial thermometer, pressure gages on pump discharge, bronze isolation valves between pumps and receiver, and lifting eye bolts.

D. Inlet Strainer: Cast iron with vertical self-cleaning bronze screen and large dirt pocket, mounted on inlet piping. Screen shall be easily removable for cleaning.

E. Duplex Pumps: One stage, vertical design, bronze fitted with stainless steel shaft, bronze impeller, renewable bronze case ring, mechanical shaft seal, close coupled to 1750 rpm motor.

F. All seals shall be high temperature designed for steam condensate application.

G. Control Cabinet:

1. NEMA 250 enclosure, UL listed, with piano hinged door, grounding lug, terminal strip, and fusible control circuit transformer.
2. Combination magnetic starters with overload relays, circuit breakers and cover interlock.
3. Mechanical alternator.
   a. Operate pumps on high level, alternating after each cycle.
   b. Operate second pump upon failure or first pump and alarm.
4. Auto-Off switch.
5. Test button, high level alarm light, acknowledge button, alarm horn.

2.04 PRESURE REDUCING VALVES

A. Manufacturers:

1. Spence Engineering Co., Inc: www.spenceengineering.com.

B. Bronze or cast iron body, stainless or chrome steel valve spring, stem, and trim, phosphor bronze diaphragm, pilot operated, threaded up to 2 inches (50) mm), flanged over 2 inches (50mm).

2.05 PRESURE RELIEF VALVES (NON-BOILER REMOTE LOCATIONS)

A. Manufacturers:

1. Armstrong International: www.armstronginternational.com.

Spence Engineering Co., Inc: www.spenceengineering.com.

B. Bronze body, stainless steel valve spring, stem, and trim, direct pressure activated, capacities: ASME certified and labelled.

C. Accessories: Drip pan-elbow with drain connection: pipe to exterior,

PART 3 EXECUTION

3.01 INSTALLATION

A. Install steam and steam condensate piping and specialties in accordance with ASME B31.9.

B. Install steam traps with union or flanged connections at both ends.

C. Pressure reducing station shall be one stage and shall produce a flat reduced pressure curve over range of capacity. Locate pilot operator control downstream of valve at a distance recommended by the manufacturer.

D. Rate relief valves for pressure upstream of pressure reducing station, for full operating capacity. Set relief at maximum 20 percent above reduced pressure.

E. Terminate relief valves to outdoors. Provide drip pan elbow with drain connection to nearest floor drain. .

END OF SECTION

SECTION 23 5000
Thermacor Air Pressure Test Procedure for Duotherm 505 Underground Conduit System Outer Casing

The Contractor may be requested to complete an air test of the conduit system to prove its tightness. After the monthly inspection has been performed, the pressure test inspection shall be conducted with the underground steam system depressurized and cooled to a temperature that allows stabilization of the inner air temperature for the pressure drop test. The underground conduit system outer casing consists of 11 sections.

Obtain the following devices:

1. Air Compressor or bottled gas(For 15 to 25 psig air pressure)
2. Pressure Regulator(For 15 to 20 psig air pressure)
3. Pressure Relief Valve(Set to 25 psig)
4. Pressure Gauge(0 to 30 psig, with accuracy to +- 1% full scale)
5. Isolation Valves
6. Plugs for the check valves and manual valve.

Pressure Regulator and Relief Valves. A pressure regulator and relief valve on the air compressor side ensures the conduit in not over pressurized. The conduit system has pipe supports and anchors that can cause back pressure. The relief shall be set at 25 psig.

During the annual air drop test the system is pressurized to 15 to 20 psig for 30 minutes minimum. No leakage is allowed as determined by no change in pressure on the pressure gauge.

Test Record; Contractor shall complete an air drop test record that clearly locates and documents the section of the conduit tested. The record shall identify a location, date, mechanic, supervisor, test pressure, test inspector, and, date of completed test for each section. Submit Test Record to the State Project Manager after completion of the test.

All tests shall be witnessed and signed off by the State Project Manager or its Agent.

The air testing procedure shall be as follows:

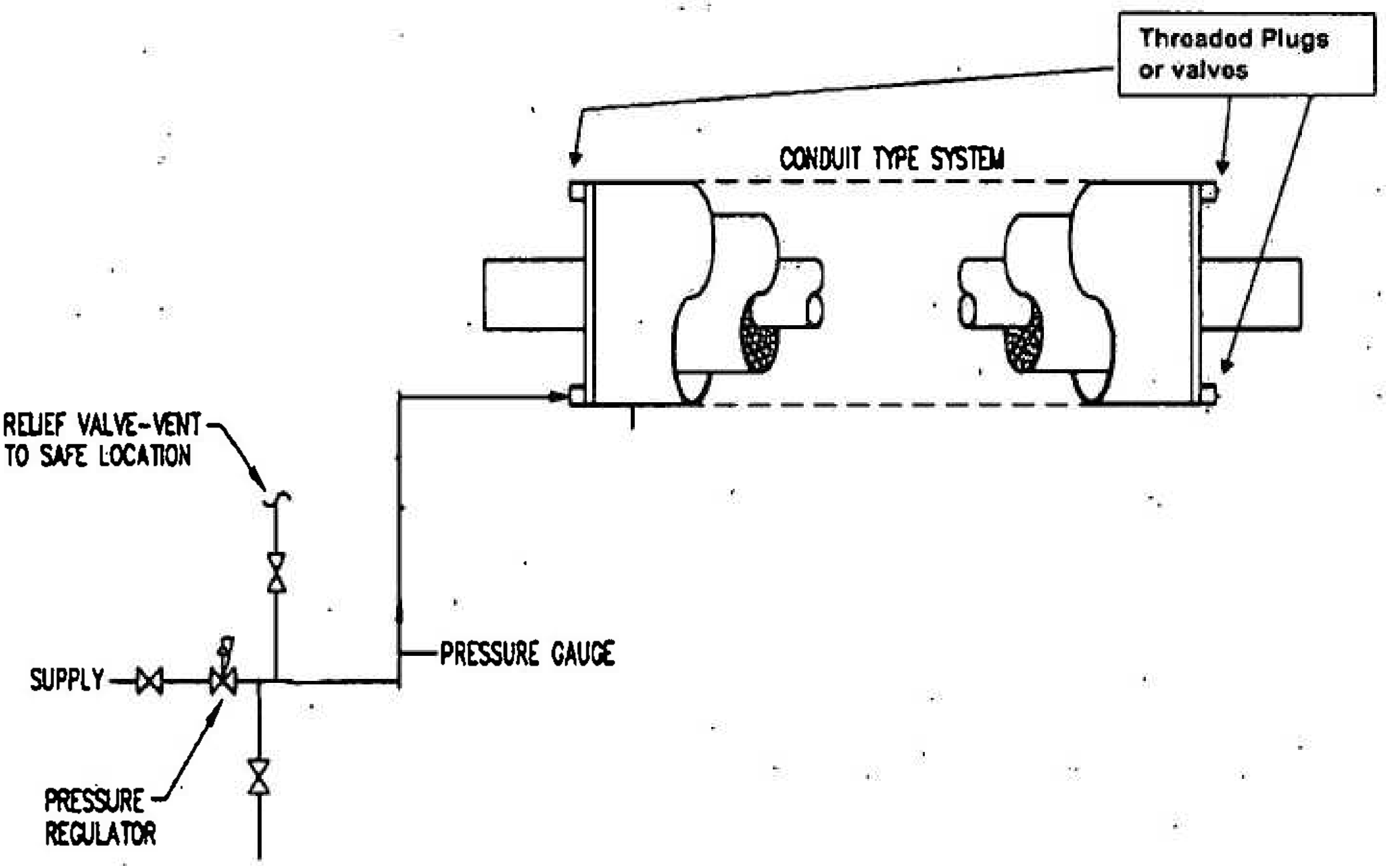
1) Remove or install threaded plugs in the check valves in the upper section of the pipe and shut the manual valve or install a plug in the lower section of the pipe.

2) Set up the equipment as shown on the diagram below.

3) Slowly pressurize the conduit system to 15 to 20 psig and allow the pressure to stabilize.

4) After the section air pressure has stabilized conduct the air drop test.

5) Once the conduit section has been tested depressurize the system and install the removed system equipment or remove the plugs or open the manual valve in order to reestablish normal operation.


Threaded Plugs or valves
CONDUIT TYPE SYSTEM
RELIEF VALVE-VENT TO SAFE LOCATION
PRESSURE GAUGE
SUPPLY
PRESSURE REGULATOR

SECTION 23 5100
Thermacor Underground Conduit, Test For Dryness, Drying the Conduit Air Space, Conduit System Outer Casing Damage, Conduit system Carrier Pipe Damage

Test for Dryness

To test for dryness within an underground conduit system, hold a cool mirror next to the end of the underground conduit vent discharge or vent discharge pipe, while circulating dry and clean gas through the underground conduit outer casing. If the cool mirror does not fog, the carrier pipe insulation should be considered dry. If it is suspected that the conduit was flooded during installation, the drying procedure below must be performed, and the dew point tamust be documented.

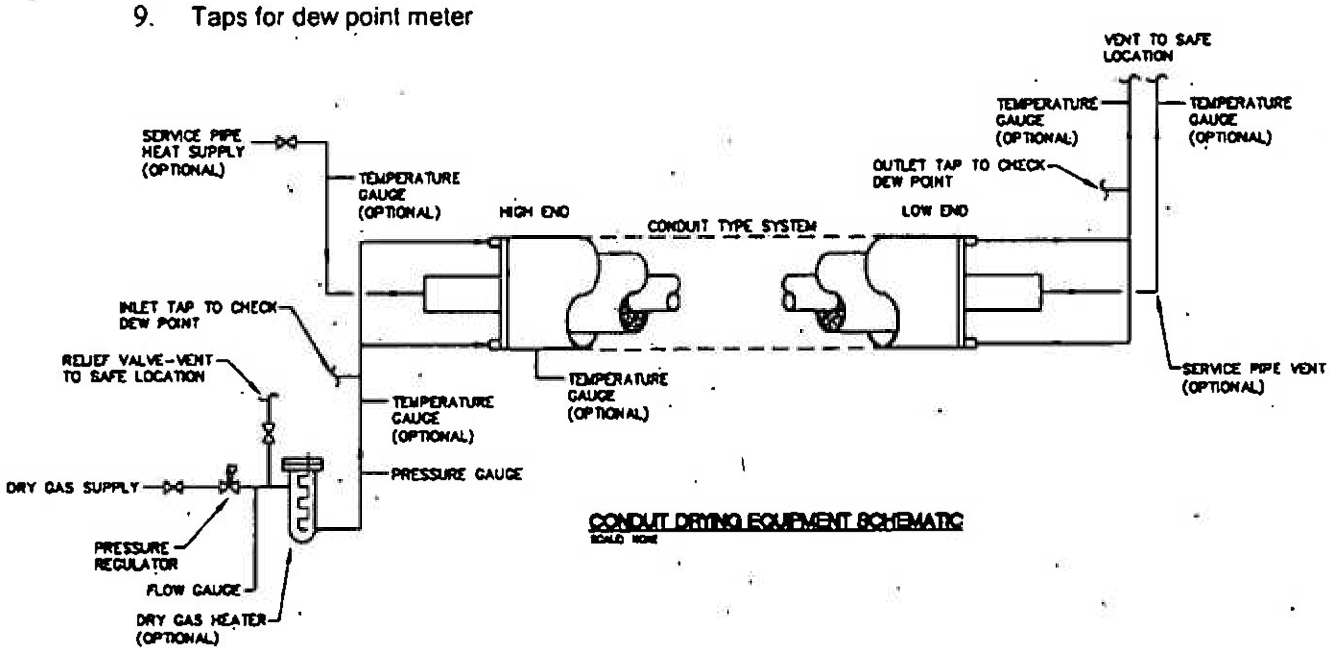
Drying the Conduit Air Space

The normal method employed requires the introduction of a dry gas such as dry Nitrogen or dry, oil free compressed air into the conduit high point vent, preferably with heat applied to the piping system (where applicable), with the drain and lowpoint vent open to force any free water out of the conduit and to allow the moisture the gas has adsorbed to escape from the conduit.

The most economical method uses dry, compressed air, due to the large amount of gas required to adequately dry the system.

Dry Gas Equipment: The following equipment is listed in-order to simplify the dry gas [illegible]

1. Dry gas
2. Gas flow gauge (SCFM)
3. Pressure regulator
4. Pressure relief valve
5. Dew point meter
6. Dry Gas Heater and temperature gauges if heating the gas.
7. Isolation valves
8. Piping
9. Taps for dew point meter



CONDUIT DRYING EQUIPMENT SCHEMATIC

Dry Gas: If you elect to use dry compressed air, it must be oil free and have a dew point of - 20°F or lower. Your air compressor should have a membrane or desiccant dryer to achieve a -20°F dew point temperature. Do not use a refrigerant drier for drying. They cannot produce air with a low enough dew point. Note: A low dew point air temperature means the air is dry and will absorb more moisture in the conduit, resulting in a faster drying time. The dry gas must be delivered continuously at the required airflow rate.

Gas Flow Gauge: Measures the flow rate in standard cubic feet per minute (SCFM) of the dry gas and allows you to adjust and monitor the amount of gas being introduced into the conduit to a safe level while introducing enough gas to dry the conduit. The conduit system should not have a gas flow rate that is high enough to exceed the pressure rating of the conduit system. If backpressure exceeds 15 psig, the conduit system can be damaged. High gas flow in the conduit can also damage the insulation due to the velocity of the gas.

Note: The gas flow should be between 10 and 20 f/sec. The SCFM required to dry theconduit depends on the size of the conduit air space. This can be calculated as follows:SCFM= air space cross sectional area (ft2) x air velocity (f/sec) x 60 (sec/min)

The air space cross sectional area is the Conduit ID minus the insulated service pipe OD (orcarrier pipe OD if this is a containment system).

The airflow can be increased or decreased to optimize the drying process (water removal rate).

Pressure Regulator and Relief Valves: A pressure regulator and relief valve on the dry gas side ensures the conduit is not over pressurized. The manufacture of a conduit type system has pipe supports and anchors that can cause back pressure. Backpressure can increase as the flowrate of the dry gas is increased. A conduit system has a pressure rating of 15 psig, due to the mitered construction of the fittings.

Dew Point Meter: Use an electronic dew point meter to monitor the gas escaping from the conduit to determine the dew point temperature and drying of the conduit system.

Thermacor recommends heating the carrier pipe during the drying process, if possible. It should be noted that overheating of the conduit can cause permanent damage to the conduit coating and the carrier pipe insulation. Overheating of the pipe system can also result in thermal expansion that is greater than the system is designed for.

Temperature gauges should be used to monitor the heating of the conduit system to includethe carrier pipe. The conduit temperature should not exceed 160°F to prevent thin film coating damage or 200°F to prevent urethane-insulated conduit coating damage.

Drying Procedure

1.) Before beginning the drying procedure, make sure all mud, dirt, sand, or debris has been cleaned from the conduit ID. This may result in conduit being flushed out with clean fresh water. It is possible to inspect the first few feet of any conduit system by sliding the insulation off the carrier pipe to assess this problem. After determining the status of dirt and debris in the conduit and removing same, replace the carrier pipe insulation. Flush the conduit if necessary.

2.) Pressure test the service pipe per Section 23 2115 Underground Mechanical Piping Systems. Air test the conduit per Section 23 5000 Thermacor Air Pressure Test Procedure for Duotherm 505 Underground Conduit System Outer Casing. Locate and repair any leaks.

3.) Drain any water from the conduit using the drains at the low points of the system. Remove all standing water. Water should drain to the low point if the conduit system has been installed with the proper slope.

4.) Set up the equipment. The dry gas supply should be introduced at the high point ventend of the conduit system. The gas exits the conduit at the low point vent and drain ports on the system.

5.) Record the dry gas flow rate, initial pressure and both the inlet and outlet dew point temperatures. Increase the dry gas flow rate as required to speed up the drying process, however, **NEVER** exceed the pressure rating of the conduit system, 15 psig.Do not over pressurize the system. Monitoring the velocity of the dry gas in the air space helps determine the speed of the drying process and prevents damage to the insulation or conduit.

6.) Continue drying the conduit air space until the dew point temperature of the conduit airspace is 20°F or lower. Once this dew point temperature is reached, the conduit has been dried.

Note: The time required for the drying process cannot be determined. Drying depends on thesize of the conduit, the length of the pipe run, the amount of water in the conduit and the amount of water absorbed by the insulation, the thickness of the insulation, the flow rate of the dry gas, whether heat is being used to speed up the drying process and the inlet dew point temperature of the dry gas being used. The length of time required for the drying process cantake a few days or weeks depending on the factors noted above.

Conduit System Outer Casing Damage

Should the outer casing of the underground conduit system be penetrated or damaged in any manner, it should be repaired immediately. Contact **Thermacor Process INC**. for recommendations and assistance in making any repairs to the underground conduit system.

Locate the damage to the underground conduit system. Excavate the area around the damaged portion of the underground conduit system and make all necessary repairs to the outer casing in accordance with the recommendations of **Thermacor Process INC.**

After any repair to the underground conduit system, the underground conduit outer casing should be air-tested per Section 23 5000 Thermacor Air Pressure Test Procedure for Duotherm 505 Underground Conduit System Outer Casing to prove its tightness.

If the damaged underground conduit system has been flooded with water, it should be drained anddried as described above in "Drying Procedures".

Conduit system Carrier Pipe Damage

Should the carrier piping within the underground conduit system be damaged in any manner, it should be repaired immediately. Contact **Thermacor Process INC.** for recommendations and assistance in making any repairs to the underground conduit system.

Locate the damage to the underground conduit system. Excavate the area around the damaged portion of the underground conduit system and make all necessary repairs inaccordance with the recommendations of **Thermacor Process INC.**

After any repair to the underground conduit system, the underground conduit outer casing should be air-tested per Section 23 5000 Thermacor Air Pressure Test Procedure for Duotherm 505 Underground Conduit System Outer Casing to prove its tightness.

If the damaged underground conduit system has been flooded with water, it should be drained and dried as described above in "Drying Procedures".

SECTION 23.5200
Additional Steam Vault Inspection Form
(One Form required for each Vault)

Vault#____________________ Date_________________

Inspector Name(s)____________________

Condition of Piping Insulation

Are there any sections of compromised insulation? Yes_____ No_____ Not Sure_____

Are there any sections of pipe/equipment that are not insulated? Yes__ No__ Not Sure____

If ale, identify insulation type an jacketing that needs to be replaced__________________

____

____

Additional Observations and Notes:____

____

____

____

Condition of Pipe Supports

Are the pipe supports painted, galvanized or bare? Painted_____Galvanized____ Bare____
Not Sure_______

If painted, what color and what is he condition of the paint?_________________________

____

____

Are there any signs of corrosion or damage on the supports? Yes___ No___ Not Sure____

Do all pipe supports appear to be bearing load? Yes____ No____ Not Sure____

Are all pipe supports securely mounted? Yes____ No____ Not Sure____

Are all exposed metal surfaces costed with corrosion resistant coating? Yes___ No ____

Is recoating required? Yes____ No____ If so, indicate location(s) below:

Additional Observations and Notes:____

____

____

____

Condition of Pipe Penetration Seals:

Do the seals show any sign of deterioration? Yes____ No____ Not Sure_____

Are the seals intact? Yes____ No____ Not Sure_____

Are there any signs of current or previous water ingress? Yes____ No____ Not Sure____

Additional Observations and Notes:____

____

____

____

Condition of Entry Points to the Vaults:

Is the ladder safe to use? Yes____ No____ Not Sure_____

Additional Observations and Notes:____

____

____

____

Steam Traps:

Are there any trap leaks? Yes____ No____ Not Sure____

Is there any loose or compromised insulation on or around traps? Yes___No___ Not Sure___

Is there any audible water hammer? Yes____ No____ Not Sure_____

Sound Check for Hot Traps:

Listen to trap(s) operate

Does there appear to be continuous flow? Yes____ No____ Not Sure______

Check for intermittent flow.

Does the trap sound like it is cycling? Yes____ No____ Not Sure_____

Is the Trap blowing live steam? Yes____ No____ Not Sure____

Notes and mechanical sounds:____

____

____

Additional observations and notes____
____
____
____

Piping: Piping Vents and Drains

Note check vale positions on underground piping conduit drain telltales. If any are open, note which line it is on.

Inspect casing drains and vents for signs of leakage. Is any water present when the plug is removed? Yes____ No_____

Assess condition of visible piping and underground conduit system. Note any corrosion or deterioration.

Inspect condition of end seals. Do they require corrosion resistant recoating? Yes___ No___

Inspect condition of gland seals. Are they tight? Yes____ No____

Check packing for wear due to friction and heat hardening? Yes____ N0____

Do the gland seals require corrosion resistant recoating? Yes____ No____

Inspect flange connections. Do the nuts and bolts need to be re-torqued? Yes____ No____

Inspect wire condition on leak detection system. Also note any exposed electrical wires.

Additional observations and notes:____
____
____

For All Valves:

Visually inspect valve body insulation. Note findings.

Visually inspect valve stems and handwheel. Note findings.

Visually inspect for signs of leakage through packing, gasketed valve body covers and in threaded or flanged piing connections. Note findings.

Note check valve positions.

Additional Observations and Notes:____
____
____

For All Vaults:

Note presence of any concrete cracks > 6" in length and /or 1/16" width:

Note any areas of spalling or delaminating concrete > 6" x 8"

Exposed concrete reinforcement: Is any reinforcing steel visible? Yes___ No___ Not Sure___

Is there any lose concrete debris on the ground? Yes____ No____ Not Sure____

Note condition of mechanical connections for pipe supports, ladders, etc.

Additional Observations and Notes:____

State of New Hampshire

Department of State

CERTIFICATE

I, David M. Scanlan, Secretary of State of the State of New Hampshire, do hereby certify that R.H. WHITE CONSTRUCTION CO., INC. is a Massachusetts Profit Corporation registered to transact business in New Hampshire on July 18, 1979. I further certify that all fees and documents required by the Secretary of State's office have been received and is in good standing as far as this office is concerned.

Business ID: 4152

Certificate Number : 0005831231

IN TESTIMONY WHEREOF,

I hereto set my hand and cause to be affixed the Seal of the State of New Hampshire, this 18th day of July A.D. 2022.

David M. Scanlan

Secretary of State

SECRETARY'S CERTIFICATE

R. H. WHITE CONSTRUCTION CO., INC.

I, Mark L. Donahue, Secretary of R. H. WHITE CONSTRUCTION CO., INC., herein certify that the following is a true copy of a resolution adopted at the annual meeting of the Board of Directors of the Corporation duly called and held on July 14, 2022:

VOTED: To authorize and empower David H. White, Chairman, Treasurer and Assistant Secretary; James E. McCarthy, President and Chief Executive Officer; and, Robert N. Jacobson, Chief Financial Officer; or any one acting singly, to execute all contracts and bonds on behalf of the Corporation.

I further certify that the foregoing resolution and authority vested thereby has not been amended or rescinded and is still in force and effect as of the date hereof.

I further certify that the officers set forth in the resolution are duly elected and acting officers of R. H. WHITE CONSTRUCTION CO., INC.

Witness my hand and seal of the Corporation this 16TH day of SEPTEMBER, 2022.

Mark L. Donahue, Secretary

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 07/21/2022

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Willis Towers Watson Northeast, Inc.
c/o 26 Century Blvd
P.O. Box 305191
Nashville, TN 372305191 USA

CONTACT NAME: Willis Towers Watson Certificate Center
PHONE (A/C, No, Ext): 1-877-945-7378 FAX (A/C, No): 1-888-467-2378
E-MAIL ADDRESS: certificates@willis.com

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A: Zurich American Insurance Company	16535
INSURER B: American Guarantee and Liability Insurance	26247
INSURER C:	
INSURER D:	
INSURER E:	
INSURER F:	

INSURED
R. H. White Construction Company, Inc.
41 Central Street
Auburn, MA 01501

COVERAGES

CERTIFICATE NUMBER: W25461696 REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY; CLAIMS-MADE; X OCCUR; GEN'L AGGREGATE LIMIT APPLIES PER: POLICY; X PRO-JECT; LOC; OTHER:	Y	Y	GLO - 0146159-05	05/01/2022	05/01/2023	EACH OCCURRENCE	$ 2,000,000
							DAMAGE TO RENTED PREMISES (Ea occurrence)	$ 1,000,000
							MED EXP (Any one person)	$ 25,000
							PERSONAL & ADV INJURY	$ 2,000,000
							GENERAL AGGREGATE	$ 4,000,000
							PRODUCTS - COMP/OP AGG	$ 4,000,000
								$
A	AUTOMOBILE LIABILITY; X ANY AUTO; OWNED AUTOS ONLY; SCHEDULED AUTOS; HIRED AUTOS ONLY; NON-OWNED AUTOS ONLY	Y	Y	BAP - 0146158-05	05/01/2022	05/01/2023	COMBINED SINGLE LIMIT (Ea accident)	$ 2,000,000
							BODILY INJURY (Per person)	$
							BODILY INJURY (Per accident)	$
							PROPERTY DAMAGE (Per accident)	$
								$
B	UMBRELLA LIAB; X OCCUR; X EXCESS LIAB; CLAIMS-MADE; DED; X RETENTION $ 10,000	Y	Y	SXS 0259162-04	05/01/2022	05/01/2023	EACH OCCURRENCE	$ 5,000,000
							AGGREGATE	$ 5,000,000
								$
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y/N; ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) No; If yes, describe under DESCRIPTION OF OPERATIONS below	N/A	Y	WC 0146157-06	05/01/2022	05/01/2023	X PER STATUTE; OTH-ER	
							E.L. EACH ACCIDENT	$ 1,000,000
							E.L. DISEASE - EA EMPLOYEE	$ 1,000,000
							E.L. DISEASE - POLICY LIMIT	$ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
Steam Distribution System Repair and Maintenance Services

Certificate Holder is included as an Additional Insured as respects to General Liability where required by contract. General Liability policy shall be Primary and Non-contributory with any other insurance in force for or which may be purchased by Additional Insured where required by contract.
Waiver of Subrogation applies in favor of Certificate Holder with respects to General Liability where required by

CERTIFICATE HOLDER

State of New Hampshire, Dept of Administrative Services
Michael P. Connor
25 Capitol St., Room 33
CONCORD, NH 03301

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE
Julie M Powers

SR ID: 22863316 BATCH: 2604078

ADDITIONAL REMARKS SCHEDULE

AGENCY		NAMED INSURED
Willis Towers Watson Northeast, Inc.		R. B. White Construction Company, Inc. 41 Central Street Auburn, MA 01501
POLICY NUMBER See Page 1		
CARRIER See Page 1	NAIC CODE See Page 1	EFFECTIVE DATE: See Page 1

ADDITIONAL REMARKS

THIS ADDITIONAL REMARKS FORM IS A SCHEDULE TO ACORD FORM,
FORM NUMBER: 25 FORM TITLE: Certificate of Liability Insurance

contract.

Certificate Holder is included as an Additional Insured as respects to Auto Liability.
Auto Liability policy shall be Primary and Non-contributory with any other insurance in force for or which may be purchased by Additional Insured.
Waiver of Subrogation applies in favor of Certificate Holder with respects to Auto Liability.

Certificate Holder is included as an Additional Insured as respects to Umbrella/Excess Policy where required by contract.
Umbrella/Excess Policy shall be Primary and Non-contributory with any other insurance in force for or which may be purchased by Additional Insured where required by contract.
Waiver of Subrogation applies in favor of Certificate Holder with respects to Umbrella/Excess Policy where required by contract.

Waiver of Subrogation applies in favor of Certificate Holder with respects to Workers Compensation where required by contract and as permitted by law.