

NEW STATES CONTRACTING

1ST COPY



CONTRACT NO. A913

**PASSAIC VALLEY SEWERAGE COMMISSION
600 WILSON AVENUE
NEWARK, NEW JERSEY 07105**

CONTRACT AND SPECIFICATIONS

FOR

**INSULATION SERVICES ON AN AS NEEDED BASIS
FOR A TWO (2) YEAR PERIOD**

SEPTEMBER 2013

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CONTRACT NO. A913
PASSAIC VALLEY SEWERAGE COMMISSION
600 WILSON AVENUE
NEWARK, NEW JERSEY 07105

CONTRACT AND SPECIFICATIONS
FOR
INSULATION SERVICES ON AN AS NEEDED BASIS
FOR A TWO (2) YEAR PERIOD

THIS AGREEMENT, made and executed this 11th day of October , 2013, by and between the Passaic Valley Sewerage Commission, a public body of the County of Essex, State of New Jersey, hereinafter called the "Commission," acting through its Executive Director, and

New States Contracting
A Subsidiary of Irex Corporation
2400 Main Street
Sayreville, New Jersey 08872

a corporation chartered under the laws of the State of Pennsylvania partnership, individual with principals offices at

120 North Lime Street P.O. Box 1268
Lancaster PA 17608

hereinafter called the "Contractor."

WITNESSETH: That the said Contractor has agreed and by these presents does agree with the Commission, for the Prices bid and stipulated in the Proposal herein contained or hereunto annexed and under the terms and conditions expressed in Bonds bearing even date with these presents, and herein contained or hereunto annexed, to furnish at his own cost and expense all the necessary materials, labor, superintendence, tools, and appliances and shall execute, construct, and finish and test in an expeditious and workmanlike manner all the work as described in the contract specifications commencing the work within ten (10) days from the date of Notice to Proceed and executing the same within the time and proceed in the manner specified and in conformity with the requirements set forth in the Contract Documents herein contained or hereunto attached and in accordance with the Contract Specifications of said Work.

In the event that the contract documents, exclusive of the Contractor's Bid Form, are in conflict with the Contractor's Bid or Bid Form, the provisions, terms and conditions of the Commission Contract Documents and specifications shall bind the parties.

The Contractor shall proceed with the said Work in a prompt and diligent manner and shall do all parts thereof at such times in such order as the Commission may approve. Further, he shall complete the whole of said Work in accordance with the Contract Documents to the satisfaction of the Commission.

The Commission shall not be liable to the Contractor for any neglect, default, delay or interference of or by another other contractor, nor shall any such neglect, default, delay or interference of any other contractor, or alteration which may be required in said Work, release the Contractor from the obligation to finish the said Work within the time aforesaid or from the damages to be paid in default thereof.

Name and addresses of each person or company interested in the Contract:

It is hereby mutually agreed that the Commission is to pay and the Contractor is to receive the amount bid (less retainage, if any) as stipulated in the proposal herein contained or hereto annexed, as full compensation for furnishing all material and labor and in all respects completing the herein described work in the manner and under the conditions herein specified, and for fully complying with the terms and conditions of this Contract.

Subject to the applicable provisions of law, the Contract shall be in full force and effect from and after the date when a fully executed and approved counterpart hereof is delivered to the Contractor at the address set forth above and shall remain and continue in full force and effect until after the expiration of the warranty period and the Contractor and the sureties are finally released by the Commission.

IN WITNESS WHEREOF: The parties hereto have executed this agreement the day and year first above mentioned.

PASSAIC VALLEY SEWERAGE COMMISSION

(SEAL)

BY:



MICHAEL DEFRANCISCI, EXECUTIVE DIRECTOR

ATTEST BY:




PASSAIC VALLEY SEWERAGE COMMISSION

GREGORY TRAMONTOZZI, GENERAL COUNSEL, ACTING CLERK

NEW STATES CONTRACTING, LLC

CONTRACTOR NAME

BY:



CONTRACTOR

(SEAL)

ATTEST BY:



CONTRACTOR

Colleen A Wojtowicz
Notary Public
State of New Jersey
My Commission Expires 11/1/2016



00305

AWARD SHEET

(Including Terms and Conditions Applicable to the Proposal)

Contract No. A913

A913 INSULATION SERVICES ON AN AS NEEDED BASIS
FOR A TWO (2) YEAR PERIOD

Name of Contractor: New States Contracting

Business Name: New States Contracting

Mailing Address: 2400 Main Street, Ext. Suite 10
(Mailing Address must include Street Address)
Sayreville, New Jersey 08872

Telephone No. 732-525-0100 Fax No. 732-525-0044

Contact Person: Michael Migliore

- A. The Bidder shall provide supervision, labor, equipment, materials and supplies necessary to perform installation of insulation, mold remediation and asbestos removal repair on as needed basis at the PVSC Plant.

It is the intent of this contract to provide for supplementary repair work and related services which are provided on an as needed "Time and Material" basis for various tasks including but not limited to emergency services, unscheduled repairs and system modification tasks.

The Contractor shall specialize in the insulation installation and repair industry. The Contractor shall have a minimum of 10 years of experience as outlined in Section 01710, Qualifications of Contractor and Division 10, Specialties, with worker experience not less than 3 years.

The Contractor shall ensure that all requested work shall be performed by personnel who are trained and certified to provide the type of service specified, as outlined in section 01710 – Qualification of Contractor.

All work shall be performed on a time and material (T&M) basis and shall be in accordance with the contractor's T&M Schedule (Section 00400) which shall be submitted with the bid and will become part of this contract.

Costs for supervision and labor shall include all cost factors, such as wages, benefits, travel time, fuel, insurance, overhead and profit, general and administrative (G&A) and all other additional expenses. Billing time for the maintenance, testing and repair services performed is to begin at the start of work at PVSC and end at the time leaving PVSC. The minimum billable time for a call in will be four (4) hours.

The contractor hourly rate submitted for straight time will cover PVSC's normal working hours of 7:45AM to 4:15PM Monday through Friday in accordance with Division 1, Section 01046 - Working Hours. The overtime hourly rate will be used during weekdays after 40 hours per week or for services provided on weekends, Holidays or when being requested to work during PVSC non-normal working hours. Overtime hourly work (if approved) will be billed at a cost of 1.5 times the T&M schedule rate.

The contractor shall be available 7 days a week for 24 hour notice on-call and emergency service work during the life of this contract and will be compensated at the respective hourly rates.

Materials shall be billed at cost plus a 15% markup fee.

Specialty Subcontractor work shall be billed at cost plus 5% mark-up fee.

For purposes of evaluating and comparing bids, the contractor shall provide the following cost (see Section 00400) to maintain a work crew at a PVSC facility, for a period of two (2) forty (40) hour work weeks per year. The Contractor hourly rates for labor shall commence from the actual time the Contractor reports at the PVSC Facility requiring service until the time leaving PVSC. PVSC will maintain appropriated records showing the actual time the contractor spent on the job. Actual billings will be based on the lump sum and unit costs presented by the bidder and actual quantities provided. The contractor will not be compensated for any traveling time between place of business and the PVSC Facility where work is to be performed.

All bid items listed in the Schedule of Lump Sum Tasks and Rates (see Section 00400) shall be filled out in all subsections of this form. Failure to do so would be considered a non-responsive bid and may be cause for the bid to be rejected.

The hypothetical work crew described is for bid evaluation purposes only. Actual crews, equipment and duration will vary, depending on the specific task to be done.

The Commission reserves the right to perform work with its own work force or obtain competitive pricing from a third party. The Commission is also under no obligation to use the contractor's work force.

The work required under this contract is indeterminate and will be performed on a "Time and Material" basis. When a specific task is required; a "not to exceed" price and time frame will be established for the task. Contractor's time required to develop a cost proposal for any given task or project and the time spent in pre-construction meeting(s) shall not be compensable.

The term of this contract is for a two (2) year period, beginning from the Notice to Proceed date. All prices shall hold firm and not be subject to increase during the term of the contract.

The work shall proceed in the manner specified and in conformity with the requirements set forth in the Contract Documents herein contained or hereunto attached and in accordance with the Contract Specifications.

In the event of a conflict between the bid specifications (request for proposal, invitation to bid, etc.) and the contractors bid submission (proposal, response, etc.) the terms of the specifications (or otherwise as referenced) shall govern the agreement between PVSC and the contractor.

- B. All prices are exclusive of N. J. State and Federal Taxes. The Passaic Valley Sewerage Commission is an agency of the State of New Jersey and is exempt from the New Jersey Sales and Use Taxes, pursuant to Section 9(a)(1) of the New Jersey Sales and Use Tax Act (N.J.S.A. 54:32B-1 et seq.).
- C. The cost of all Warrantees shall be included.
- D. The bidder's price shall be inclusive, including all labor, equipment, consumables, inspection and transportation. Bidder shall not include the cost of any services provided by PVSC.
- E. Prices shall also include all transportation charges on materials removed from site and charges pertaining to disposal and other costs pertaining to the execution of the work.
- F. The Commission reserve the right to make no award and reject all bids should, in their judgment it be in the public interest to do so.
- G. The successful Bidder shall maintain for the duration of the work to be done under this contract, Liability Insurance in the amounts specified in the General Conditions, Section 00727. Upon execution of the contract, the contractor shall furnish the PVSC with all certificates of insurance as required and set forth herein.
- H. It is the bidder's responsibility to visit the PVSC facilities to inspect and to verify all locations, dimensions, conditions and access as needed to perform the contract work. Arrangements for the

site visit can be made by contacting Mr. Kenneth B. LaPenta, Mechanical Engineer at (973) 817-5767.

- I. No variations will be permitted to the terms and conditions of the contract. Terms and conditions are in accordance with N. J. Laws for Public Bidding and the policies of the Passaic Valley Sewerage Commission. Any bids that include variations to the terms and conditions will be considered non-responsive and will be rejected.
- J. If the Bidder intends to offer alternatives to the materials, equipment and/or services specified, then it is mandatory that the Bidders list and explain in detail any and all such exceptions to the specifications on the attached "Bidders Exception" sheet, and shall submit the sheet with his bid. If the exception involves material or equipment, the Bidder shall also include technical data to show that the exception is equal to or better than those specified. It is understood that if no exception is listed on the "Bidders Exceptions" sheet, the Bidder shall supply all the materials, equipment and/or services exactly as prescribed and shall return the "Bidders Exception" sheet marked "NONE".
- K. Only Bidders with 10 years of experience with a similar type of work and necessary licenses will be considered. See section 01710, Certification of this experience, and the names and addresses of at least three (3) customers from whom similar work was performed within the last three (3) years, shall be supplied with the bid. A certification questionnaire form is included for the Contractor's convenience.
- L. Unless prevented by strike or strikers which prevent construction or delivery of equipment or supplies from the manufacturer, failure to complete the work within the specified time shall be considered an abandonment of the contract and the Commission may seek redress for damages.
- M. The work must be completed without interrupting the operation of the PVSC Treatment Plant. The contractor must schedule his operations in detail with PVSC as noted in Div. 1, Section 01310 of Contract Specifications.
- N. Payment will be made in accordance with the Schedule as specified in Division 1, Section 01025.
- O. **Proposals shall be enclosed in opaque sealed envelopes, addressed to Passaic Valley Sewerage Commission, 600 Wilson Avenue, Newark, New Jersey 07105, with the name and address of the bidder plainly marked upon the outside thereof. (If forwarded by preferably registered mail, the sealed envelope containing the proposal, marked as directed above must be enclosed in another envelope addressed as specified in the Proposal.) The outside envelope containing the bids must clearly identify the bid number, contract name and bid opening date. Failure to properly identify the contents may result in the bid being rejected.**

To the extent that N.J.S.A. 2A:30A-2 applies to the project and its related work and/or any agreement between PVSC and the Contractor, all exceptions contained in N.J.S.A. 2A:30A-2(a) shall apply solely for the benefit of PVSC.

T&M SCHEDULE

1. For purposes of evaluating and comparing bids, the Bidder shall provide the following cost to maintain a hypothetical work crew at PVSC Facility, for a period of two (2) forty (40) hour work weeks per year.	YEAR 1	YEAR 2
<p>A. Hourly Rate per Person including all wages, labor, travel, taxes, insurance (including Liability Insurance), overhead, licenses, qualifications, equipment, profit and all other mark-ups and costs:</p> <p>1. Insulator (Foreman) \$ _____ /Hr. x 80 Hrs.</p> <p>2. Insulator (Journeyman) \$ _____ /Hr. x 80 Hrs.</p> <p>B. Material Mark-up including all insurance, overhead, profit and any other mark-up shall be fifteen (15) percent.</p> <p>Formula: Hypothetical cost/wk. x % markup \$30,000.00 X 1.15</p> <p>C. Specialty Sub-consultant Allowance</p> <p>1. Asbestos Abatement \$40,000 X 1.05</p> <p>2. Mold Remediation \$40,000 X 1.05</p>	<p>= \$ _____ (A1)</p> <p>= \$ _____ (A2)</p> <p>= \$ 34,500.00 (B)</p> <p>= \$ 42,000.00 (C1)</p> <p>= \$ 42,000.00 (C2)</p>	<p>= \$ _____ (A1)</p> <p>= \$ _____ (A2)</p> <p>= \$ 34,500.00 (B)</p> <p>= \$ 42,000.00 (C1)</p> <p>= \$ 42,000.00 (C2)</p>
<p>Year 1: Total (Sum of A1, A2, B, C1 and C2)</p> <p>Year 2: Total (Sum of A1, A2, B, C1 and C2)</p>	<p>= \$ _____</p>	<p>= \$ _____</p>
<p>TOTAL (Sum of Years 1 and 2)</p>	<p>\$ 259,430.00</p>	

Two Hundred Fifty Nine Thousand Four Hundred Thirty Dollars

See attached cost breakdown

T&M Schedule

		Year 1	Year 2	Year 1	Year 2
Insulator					
Foreman	80 Hours	\$ 105.00 per Hour	\$ 106.50 per Hour	\$ 8,400	\$ 8,520
Mechanic	40 Hours	\$ 102.50 per Hour	\$ 104.00 per Hour	\$ 4,100	\$ 4,160
Apprentice	40 Hours	\$ 65.25 per Hour	\$ 66.00 per Hour	\$ 2,610	\$ 2,640
Material with 15% Mark-up				\$ 34,500	\$ 34,500
Asbestos Allowance*				\$ 40,000	\$ 40,000
*Self performed no subcontractor mark-up required					
Mold Remediation*				\$ 40,000	\$ 40,000
*Self performed no subcontractor mark-up required					
Sub Total				\$ 129,610	\$ 129,820
Total Years 1 and 2				<u>\$ 259,430</u>	
Hourly Rates include all wages, labor, travel taxes, insurance (including Liability Insurance) overhead, licenses, qualifications, equipment profit and all other mark-ups and costs.					

00306 NON-COLLUSION AFFIDAVIT

CONTRACT NO. A913

STATE OF NEW JERSEY

COUNTY OF

§

I, Joe Checkovich of the New States Contracting in the County of Middlesex and State of N.J., of full age, being duly sworn according to law, on my oath depose and say that:

I am President of New States Cont. the Bidder making the Bid for this Project.

I execute the said Bid with full authority to do so.

I, and to the best of my knowledge, the Bidder, and any officer, director, employee or other representative of the bidder, have not, directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free, competitive bidding in connection with the above-named Project.

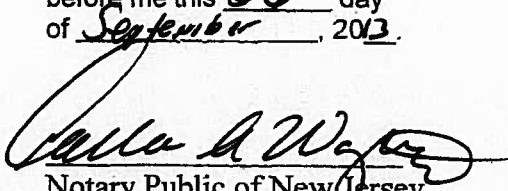
All statements contained in said Bid and all Contract Documents and in this affidavit are true and correct, and made with full knowledge that the Passaic Valley Sewerage Commission rely upon the truth of the statements contained in said Bid and Contract Documents, and in the statements contained in this Affidavit, in awarding the Contract for said Project.

I further warrant that no person or selling agency has been employed or retained to solicit or secure such contract agreement or understanding for a commission, percentage, brokerage or contingent fee except bona fide employees or bona fide established commercial or selling agencies maintained by the Bidder.

Sworn _____ on _____ Behalf
of: _____

Name of Bidder: 

Sworn and subscribed to
before me this 26 day
of September, 2013.


Notary Public of New Jersey

Colleen A Wojtowicz
Notary Public
State of New Jersey
My Commission Expires 11/1/2016

00403

**PASSAIC VALLEY SEWERAGE COMMISSION
CONTRACT NO. A913 - SUBCONTRACTOR LISTING**

Failure to complete this Section may be a cause for the bid to be rejected.

The undersigned proposes to use the following subcontractors to perform the work indicated (use additional sheets as required).

<u>Work to be Performed</u>	<u>Name(s) and Address of Subcontractor(s)**</u>	<u>License Number(s)</u>
1. Plumbing & Gas Fitting and all Kindred Work	<u>none</u> _____ _____	_____
2. Heating and Ventilation and all Kindred Work	<u>none</u> _____ _____	_____
3. Electrical Work	<u>none</u> _____ _____	_____
4. Structural Steel and Ornamental Iron Work	<u>none</u> _____ _____	_____

Joe Checkovich - President

Name and Title of Authorized Representative


Signature of Authorized Representative

****IMPORTANT NOTE:** Whenever a Bid sets forth more than one subcontractor for any of the specialty trade categories (1) through (4) specified hereinabove in this section, the Bidder shall submit to PVSC a certificate signed by the bidder listing each subcontractor named in the Bid for that category. The certificate shall set forth the scope of work for which the subcontractor has submitted a price quote and which the Bidder has agreed to award to each subcontractor should the Bidder be awarded the contract. The certificate shall be submitted to PVSC simultaneously with the list of subcontractors. The certificate may take the form of a single certificate listing all subcontractors or, alternatively, a separate certificate may be submitted for each subcontractor.

00404

PUBLIC WORKS CONTRACTOR REGISTRATION

**CONTRACT NO. A913
PASSAIC VALLEY SEWERAGE COMMISSION
600 WILSON AVENUE
NEWARK, NEW JERSEY 07105**

PUBLIC WORKS CONTRACTOR REGISTRATION

**CONTRACT NO. A913
INSULATION SERVICES ON AN AS NEEDED BASIS
FOR A TWO (2) YEAR PERIOD**

1. In accordance with "The Public Works Contractor Registration Act," P.L. 1999, c238 (N.J.S.A 34:11 – 56.48 et seq.) amended by P.L. 2003, C091

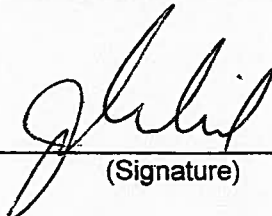
"No contractor shall bid on any contract for public work as defined in section 2 of P.L 1963, c150 (C34:11 – 56.26) unless the contractor is registered pursuant to this act. No contractor shall list a subcontractor in a bid proposal for the contract unless the subcontractor is registered pursuant to P.L 1999, c238 (C34:11 – 56.48 et seq.) at the time the bid is made. No contractor or subcontractor, including a subcontractor not listed in the bid proposal, shall engage in the performance of any public work subject to the contract, unless the contractor is registered pursuant to that act." (N.J.S.A/ 34:11 – 56.51)

"Contractor means a person, partnership, association, joint stock company, trust corporation, or other legal business entity or successor thereof who enters into a contract which is subject to the provisions of the "New Jersey Prevailing Wage Act," P.L 1963, c150 (C34:11 – 56.25 et seq.) and includes any subcontractor or lower tier subcontractor of a contractor defined herein" (N.J.S.A/ 34:11 – 56.50)

2. Proof of registration is required before an award can be made:

"Each contract shall, after the bid is made and prior to the awarding of this contract, submit to the public entity the certificates of registration for all subcontractors listed in the bid proposal. Applications for registration shall not be accepted as a substitute for a certificate of registration for the purposes of this section." (N.J.S.A/ 34:11 – 56.55)

3. On and after August 16, 2003, Contractors and their listed subcontractors bidding on covered work shall provide proof of the required registration prior to the contract award. [As a practical matter, proof of required registration should be submitted with the Bid].
4. By signing this form, the Contractor certifies that they shall provide proof of the required registration prior to the contract award.


(Signature) 9/26/13
(Date)

Joe Checkovich - President

(Name and Title of Signer - Please type)

END OF SECTION

Certificate Number
618332

Registration Date: 02/02/2013
Expiration Date: 02/01/2015



State of New Jersey

Department of Labor and Workforce Development Division of Wage and Hour Compliance

Public Works Contractor Registration Act

Pursuant to N.J.S.A. 34:11-56.48, et seq. of the Public Works Contractor Registration Act, this certificate of registration is issued for purposes of bidding on any contract for public work or for engaging in the performance of any public work to:

New States Contracting LLC
2013

Responsible Representative(s):

Joseph Checkovich, President
Kurt Nale, Member
D. Rick Baptista, Member
Mike Miglior, Member
Mike Andrew, Member

Responsible Representative(s):

Harold J. Wirths

Harold J. Wirths, Commissioner
Department of Labor and Workforce Development

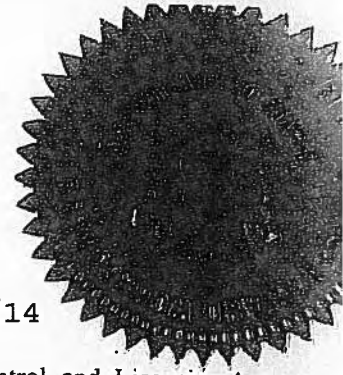
NON TRANSFERABLE

This certificate may not be transferred or assigned and may be revoked for cause by the Commissioner of Labor and Workforce Development.

STATE OF NEW JERSEY
DEPARTMENT OF LABOR AND WORKFORCE DEVELOPMENT
DIVISION OF PUBLIC SAFETY & OCCUPATIONAL SAFETY & HEALTH
ASBESTOS CONTROL & LICENSING SECTION

ASBESTOS LICENSE

LICENSE NUMBER: 00749



ISSUE DATE 1/08/13

EXPIRATION DATE: 1/09/14

THIS LICENSE has been issued in accordance with and is subject to the provisions of the Asbestos Control and Licensing Act, N.J.S.A. 34:5A-32 et seq.

Employer: New States Contracting LLC.

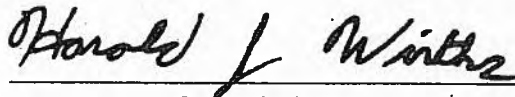
Address: 120 North Lime Street

Lancaster PA 17602

Responsible Individual: Type "A" LICENSE to perform any type of asbestos work

This license is VALID ONLY FOR THE EMPLOYER NAMED HEREIN and must be readily available at the work site for inspection by the Commissioners of Labor and Workforce Development and Health & Senior Services and the contracting agency.

Joseph Checkovich, President



Commissioner

00826

FOAMGLAS® insulation

February 11, 2009

Material Safety Data Sheet

SECTION 1 – CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: FOAMGLAS® insulation, FOAMGLAS® One™ insulation, FOAMGLAS® HLB insulation

Manufacturer/Supplier:
Pittsburgh Corning Corporation
800 Presque Isle Drive
Pittsburgh, PA 15239

Information Number: 724-327-6100
CHEMTREC: 800/424-9300

Generic Name: cellular glass insulation

Use: Insulation of tanks, spheres, piping, roofs and equipment

General Comments: General information and emergency information available 8:00 AM – 5:00 PM Monday through Friday.

CHEMTREC telephone number is to be used only in the event of chemical transportation emergencies involving a spill, leak, fire, exposure, or accident involving chemicals. All non-emergency questions should be directed to technical service.

SECTION 2 – COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient	App. % by Vol.	CAS #
Hydrogen Sulfide	< 1.2	7783-06-4
Carbon Monoxide	0 - 4	630-08-0
Carbon Dioxide	85 - 95	124-38-9
Glass Dust	Varies	NA

SECTION 3 – HAZARDOUS IDENTIFICATION

HYDROGEN SULFIDE

(EFFECTS OF OVEREXPOSURE TO HYDROGEN SULFIDE GAS WHEN CELLS ARE BROKEN WITHOUT ADEQUATE VENTILATION)

ROUTES OF EXPOSURE: Inhalation, Eyes.

IMMEDIATE EFFECTS:

Inhalation - headache, nausea, and difficult breathing, dizziness . The sense of smell may be fatigued over time. The odor and irritating effects do not offer dependable warning to workers who maybe exposed to gradually increasing amounts and therefore become used to it.

Eyes - irritation and inflammation of the mucous membrane, tearing, sensitivity to light

CHRONIC:

Inhalation – Chronic poisoning results in headache, inflammation of the eyelids and the mucous membrane that lines the inner surface of the eyelids, digestive disturbances, weight loss and general weakness.

Material Safety Data Sheet

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE TO HYDROGEN SULFIDE: Pre existing upper respiratory and lung diseases such as, but not limited to bronchitis, emphysema and asthma, pulmonary heart disease or eye problems.

GLASS PARTICLES
EFFECTS OF EXPOSURE TO GLASS PARTICLES

ROUTES OF EXPOSURE: Inhalation, Eyes, Skin, Ingestion.

IMMEDIATE EFFECTS:

Inhalation - dryness and irritation of the mucous membranes and respiratory tract.
Eyes - irritation and inflammation of the mucous membrane, tearing, sensitivity to light
Skin - irritation or abrasion from glass particles.
Ingestion - possible abrasion of mouth and throat from glass particles.

CHRONIC:

Inhalation – Prolonged or repeated overexposure to airborne glass dust can lead to inflammation and scarring of lung tissue.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE TO GLASS PARTICLES: None known

SECTION 4 – FIRST AID MEASURES

GENERAL ADVICE:

INHALATION: Move the exposed person to fresh air at once, apply artificial respiration if needed. Call poison center, physician or emergency medical service giving CAS names and numbers of gases. Encourage victim to cough, spit out, and blow nose to remove dust. If breathing is difficult, GET MEDICAL ATTENTION.

SKIN CONTACT: Wash thoroughly without pressure. If irritation persists or skin is broken, consult physician.

EYE CONTACT: Flush with potable water for 15 minutes, do not rub or apply pressure. Consult physician or emergency medical service

INGESTION: Do not induce vomiting. Consult physician, emergency medical service or poison center.

SECTION 5 – FIRE FIGHTING MEASURES

SUITABLE EXTINGUISHING MEDIA: water, dry chemical or carbon dioxide

EXPLOSION DATA:

Material Safety Data Sheet

SENSITIVITY TO MECHANICAL IMPACT: NA
SENSITIVITY TO STATIC DISCHARGE: NA

SPECIAL FIRE FIGHTING PROCEDURES: May release hydrogen sulfide and carbon monoxide gas when involved in a fire. The small amounts of hydrogen sulfide and carbon monoxide released are not expected to contribute to the intensity of a fire. Wear self contained breathing apparatus and protective clothing.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

PRECAUTIONS FOR PERSONNEL: Wear proper protective clothing and equipment.

ENVIRONMENTAL PRECAUTIONS: Ensure adequate ventilation. Use dustless methods. All in accordance with local, state and federal government regulations.

PROCESS FOR CLEANING: Collect in sift proof containers. Avoid generation of dust.

SECTION 7 – HANDLING AND STORAGE

EXPOSURE GUIDELINES: Engineering Controls: When cutting, grinding, crushing, or drilling FOAMGLAS® insulation, provide general or local ventilation systems, as needed, to maintain airborne dust concentrations below the regulatory limits. Local vacuum collection is preferred since it prevents release of contaminants into the work area by controlling it at the source. Other technologies that may aid in controlling airborne respirable dust include wet suppression, ventilation, process enclosure, and enclosed employee work stations. When exposed to dust above recommended limits, wear a suitable NIOSH-approved respirator with a protection factor appropriate for the level of exposure. Seek guidance from a qualified industrial hygienist or safety professional, prior to respirator selection and use.

HANDLING: Avoid generation of dust. Wash hands before eating, drinking, smoking or using toilet..

STORAGE: If storing for long periods, protect product from weather

KEEP AWAY FROM CHILDREN

RESPIRATORY PROTECTION: Use nuisance dust mask when cutting or abrading with adequate ventilation. Seek guidance from a qualified industrial hygienist or safety professional, prior to dust mask/respirator selection and use. (Supplied air or self-contained breathing apparatus in poorly ventilated areas is required when cutting or crushing of FOAMGLAS® insulation causes PEL of hydrogen sulfide and carbon monoxide gases to be exceeded.

VENTILATION: Use local exhaust when cutting. Use mechanical ventilation when crushing large volumes.

PROTECTIVE GLOVES: Gloves - rubber impregnated canvas - for abrasion protection..

EYE PROTECTION: When cutting, grinding, crushing, or drilling FOAMGLAS® insulation, wear safety glasses with side shields or dust goggles

Material Safety Data Sheet

in dusty environments. Goggles for dust protection while cutting or abrading in wind or overhead work.

OTHER PROTECTIVE MEASURES: Normal work clothes including long sleeved shirt is recommended.

SPECIAL PRECAUTIONS: Respirable dust particles may be generated by crushing, cutting, grinding or drilling FOAMGLAS® insulation. Follow protective controls listed in the Exposure Guidelines above when handling these products.

SECTION 8 – EXPOSURE RESTRICTIONS AND PERSONAL PROTECTION

Ingredient	App. % by Vol.	EXPOSURE LIMITS			CAS #
		TLV*	NIOSH REL TWA	PEL**	
Hydrogen Sulfide	< 1.2	10 ppm	UN	10 ppm TWA	7783-06-4
Carbon Monoxide	0 - 4	25 ppm	UN	50 ppm TWA	630-08-0
Carbon Dioxide	85 - 95	5000 ppm	UN	5000 ppm TWA	124-38-9
Glass Dust	Varies	10 mg/m ³	UN	15 mg/m ³ 5 mg/m ^{3a} (^a respirable)	NA

ADDITIONAL ADVICE: PEL for hydrogen sulfide may be reached if 1 cubic ft of material is crushed in a closed space of 3000 cubic ft. See Section 7.

* American Conference of Governmental Industrial Hygienists.

** OSHA 29 CFR 1917.24

SECTION 9 – PHYSICAL PROPERTIES

Freezing Point: °C (°F)	NA	Flash Point : °C (°F) TCC	NA
Boiling Point: °C (°F)	NA	Ignition Temperature: °C (°F)	NA
Vapor Pressure (MM Hg):	NA	Flammable Limits: LEL	NA
		UEL	NA
Melting Point: : °C (°F)	732 (1350)	Specific Gravity (H ₂ O = 1):	0.11 – 0.22
Vapor Density (Air = 1)	NA	Percent Volatile By Volume (%)	NA
Solubility in Water:	Insoluble	pH:	NA
Appearance and Odor:	Black cellular material, no odor unless cut or crushed	Evaporation Rate (BuAC=1)	NA
Odor Threshold:	0.002 ppm	Coefficient of Water/Oil Distribution:	NA

Material Safety Data Sheet

SECTION 10 – STABILITY AND REACTIVITY

STABILITY: Stable

CONDITIONS TO AVOID: NA

MATERIALS TO AVOID: NA

HAZARDOUS POLYMERIZATION: Will Not Occur.

HAZARDOUS DECOMPOSITION PRODUCTS: None

SECTION 11 – TOXICOLOGICAL INFORMATION

CAS #	INGREDIENT	DERMAL LD50	INHALATION LD50	ORAL LD50
7783-06-4	Hydrogen Sulfide	NE	444 ppm-rat 634 ppm-mus	NE
630-08-0	Carbon Monoxide	NE	1807 ppm-rat 2444 ppm-mus	NE
124-38-9	Carbon Dioxide	NE	NE	NE
NA	Glass Dust	NE	NE	NE

CAS #	INGREDIENT	CARCINOGENICITY		TERATOGENICITY	MUTAGENICITY
		ACGIH	IARC		
7783-06-4	Hydrogen Sulfide	NE	NE	NE	NE
630-08-0	Carbon Monoxide	NE	NE	NE	NE
124-38-9	Carbon Dioxide	NE	NE	NE	NE
NA	Glass Dust	NE	NE	NE	NE

Note:

SECTION 12 – ECOLOGICAL INFORMATION

VOLATILE ORGANIC COMPOUNDS: 0 Grams Per Liter (g/l). 0 Pounds Per Gallon (lb/g).

SECTION 13 – DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Disposal should be made in accordance with Federal, State and Local regulations.

SECTION 14 – TRANSPORT INFORMATION

SHIPPING CLASS: Not Regulated

Material Safety Data Sheet

SECTION 15 – REGULATORY INFORMATION

SARA SECTION 302:

SARA (311,312) HAZARD CLASS:

SARA (313) CHEMICALS:

NONE

CERCLA:

NA

CPSC CLASSIFICATION:

HMIS: FLAMMABILITY: 0 REACTIVITY: 0 HEALTH: 0

NFPA: FLAMMABILITY: 0 REACTIVITY: 0 HEALTH: 0

WHMIS CLASSIFICATION: D 2B

CALIFORNIA PROPOSITION 65:

- ☐ A. This product contains a chemical known to the State of CA to cause birth defects or other reproductive harm.
- ☐ B. This product contains a chemical known to the State of CA to cause cancer.
- ☐ C. This product contains a chemical known to the State of CA to cause cancer and birth defects or other reproductive harm.

SECTION 16 – OTHER INFORMATION

NA = not applicable

NE = not established

UN = unavailable

CL = Ceiling Limit

NEGL = Negligible

PROP. = Proprietary

“THE DATA INCLUDED HEREIN ARE PRESENTED IN ACCORDANCE WITH THE VARIOUS ENVIRONMENT, HEALTH AND SAFETY REGULATIONS. IT IS THE RESPONSIBILITY OF A RECIPIENT OF THIS DATA TO REMAIN CURRENTLY INFORMED ON CHEMICAL HAZARD INFORMATION, TO DESIGN AND UPDATE ITS INFORMED ON CHEMICAL HAZARD INFORMATION, TO DESIGN AND UPDATE ITS OWN PROGRAM AND TO COMPLY WITH ALL NATIONAL, FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS APPLICABLE TO SAFETY, OCCUPATIONAL HEALTH, RIGHT-TO-KNOW AND ENVIRONMENTAL PROTECTION.”

WHILE THE INFORMATION AND RECOMMENDATIONS SET FORTH HEREIN ARE BELIEVED TO BE ACCURATE, PITTSBURGH CORNING CORPORATION MAKES NO WARRANTY WITH RESPECT THERETO, AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

FOAMGLAS® is a registered trademark of Pittsburgh Corning Corporation.



Material Name:
Fiber Glass Wool Commercial & Industrial Insulation

Safety Data Sheet
ID: 1009

Section 1 - Product and Company Identification

Hazard Label WARNING label

Company Information

Johns Manville
Insulation Systems
P.O. Box 5108
Denver, CO 80127 USA

Telephone: 303-978-2000 8:00AM-5:00PM M-F
Internet Address: <http://www.jm.com>
Emergency: 800-424-9300 (Chemtrec, In English)

Trade Names:

1000 Series Spin Glas® Board;
13/16" Micro-Aire® Duct Board;
800 Series Spin-Glas® Board Insulations;
Blended Blowing Wool;
Fabrication Board;
Grooved Duct Board;
Hullboard (Incombustible);
Hullinsul® Fiber Glass Board;
Incombustible Microlite®;
Insul-SHIELD® Coated Black;
Linacoustic® RC;
Mat-Faced Micro-Aire® Duct Board;

Micro-Flex™ Large Diameter Pipe and Tank Wrap;
Micro-Lok® HP;
Micro-Lok® Pipe Insulation;
Micromat Rx™;
Permacote® Linacoustic® (Types: Standard, HP, and R-300);
Precipitator Spin Glas®;
R series Microlite® (plain, FSK, PSK, & vinyl faced);
Spin Glas® HTB 26 & 23;
Spiracoustic Plus™;
SuperDuct™ Boards;
SuperDuct™ RC Boards

Section 2 - Hazards Identification

Emergency Overview

Inhalation of excessive amounts of dust from the product may cause temporary upper respiratory irritation and/or congestion—remove individual to fresh air.

In high temperature applications, treatment, curing, or in geographic areas of high heat and humidity, this product may release gases irritating to the eyes, nose and throat. In confined or poorly ventilated areas, use air supplied respirators during the first heat-up cycles.

Inhalation

Temporary mechanical irritation may occur upon exposure to dust or fibers released from cutting this product.

Irritation of the upper respiratory tract, coughing, and congestion may occur in extreme exposures. Severe irritation of the mouth, nose, and throat, as well as signs of central nervous system depression (drowsiness, dizziness, headache), may occur upon inhalation of vapors or gases.

Skin

Temporary irritation (itching) or redness may occur.

Ingestion

This product is not intended to be ingested (eaten). If ingested, it may cause temporary irritation to the gastrointestinal (digestive) tract.

Eyes

Temporary irritation (itching) or redness may occur.

Ears

Temporary irritation (itching) or redness may occur.

Primary Routes of Entry (Exposure)

Eyes, skin, inhalation (breathing dust and fibers) and ingestion.

Target Organs

Nose (nasal passages), throat, lungs, skin, eyes

Medical Conditions Aggravated by Exposure

Pre-existing chronic respiratory, skin, or eye diseases or conditions.

Section 3 - Composition/Information on Ingredients

CAS #	Component	Percent
Not Applicable	Continuous Filament Glass Fiber	1-10**
Not Applicable	Fiber Glass Wool	50-98
Not Available	Non-woven, AP, FSK, PSK, or vinyl facings; or vinyl, acrylic, or latex coatings	0-40
Not Available	Urea extended phenol-formaldehyde binder (cured)	2-18*
Not Available	Urea extended phenol-melamine formaldehyde binder (cured)	2-18*
Not Available	Acrylic Coating (present in SuperDuct RC only)	0-10
25038-59-9	Polyester fiber (present in black products only)	1-10
50-00-0	Formaldehyde	<1
1333-86-4	Carbon black, bound (present in black products only)	<1
1309-64-4	Antimony trioxide	0.1-3

Component Information

* Binder may be either of these.

** Component of scrim facings

Antimony trioxide (fire retardant) may be present in the facings and/or adhesives. Occupational exposure to airborne antimony trioxide is not expected to occur due to product form(s) and intended use(s). Exposure limit is given for reference only.

Formaldehyde may be released by partial hydrolysis of the urea formaldehyde polymer.

General Product Description

Gold, yellow, or black fibrous glass blanket, board, or formed shapes, with or without facings.

Section 4 - First Aid Measures**First Aid: Inhalation**

If dust is inhaled in excess of exposure limits referenced in section 8 of this safety data sheet, remove individual to fresh air. Drink water to clear throat, and blow nose to remove dust. A saline spray in the nose may help clear any fibers.

First Aid: Skin

Wash gently with soap and water to remove dust and fibers. Alternatively, fibers can be removed from the skin by use of ordinary masking or wrapping tape. Should irritation persist, seek medical attention.

First Aid: Ingestion

Rinse mouth with water to remove dust and fibers and drink plenty of water to help reduce irritation. If irritation persists, seek medical attention.

First Aid: Eyes

Do not rub or scratch eyes. Dust particles may cause the eye to be scratched. Flush eyes with large amounts of water until irritation subsides. If irritation persists, seek medical attention.

First Aid: Ears

Wash exposed skin with soap and water. If irritation develops in the inner ear, seek medical attention.

First Aid: Notes to Physician

Dust from the product may cause mechanical irritation of the eyes, skin, and upper respiratory tract. Treat symptomatically.

Irritating gases may be released under conditions of high heat or humidity. At high levels, these could cause severe upper respiratory and eye irritation. Formaldehyde gas is a skin and respiratory sensitizer. Treatment should be directed toward removing the source of irritation with symptomatic treatment as necessary.

Section 5 - Fire Fighting Measures**Flash Point:** Not applicable**Upper Flammable Limit (UFL):** Not applicable**Auto Ignition:** Not determined**Rate of Burning:** Not determined**General Fire Hazards**

There is no potential for spontaneous fire or explosion. Inorganic glass fibers are naturally non-combustible and non-flammable.

Method Used: Not applicable**Lower Flammable Limit (LFL):** Not applicable**Flammability Classification:** Not determined

Extinguishing Media

Carbon dioxide (CO₂), water, water fog, dry chemical.

Fire Fighting Equipment/Instructions

No special procedures are expected to be necessary for this product. Normal fire fighting procedures should be followed to avoid inhalation of smoke and gases.

Section 6 - Accidental Release Measures

Clean-Up Procedures

Pick up large pieces. Vacuum dusts. If sweeping is necessary, use a dust suppressant such as water. Do not dry sweep dust accumulation. These procedures will help to minimize potential exposures.

Section 7 - Handling and Storage

Handling Procedures

Use protective equipment as described in Section 8 of this safety data sheet when handling uncontained material. Handle in accordance with good industrial hygiene and safety practices.

Storage Procedures

Warehouse storage should be in accordance with package directions, if any. Material should be kept clean, dry, and in original packaging.

Section 8 - Exposure Controls / Personal Protection

Exposure Guidelines

A: General Product Information

The Occupational Safety and Health Administration (OSHA) has not adopted specific occupational exposure standards for fiber glass. Fiber glass is treated as a nuisance dust and is regulated by OSHA as a particulate not otherwise regulated (total dust) shown in CFR 1910.1000 Table Z-3.

Respirable fraction 5 mg/m³

Total dust 15 mg/m³

JM has adopted the fiber glass industry voluntary Product Stewardship Program (PSP), formerly the NAIMA-OSHA Health and Safety Partnership Program (HSPP). Under the PSP, JM recommends that exposures be limited to the voluntary concentration of 1 f/cc TWA for fibers longer than 5 microns with a diameter less than 3 microns. This will help minimize potential irritation effects. The PSP also includes the PPE recommendations described below.

B: Component Exposure Limits

Formaldehyde (50-00-0)

OSHA: 0.75 ppm TWA

0.5 ppm Action Level; 0.75 ppm TWA; 2 ppm STEL (Irritant and potential cancer hazard - see 29 CFR 1910.1048)

3 ppm TWA (unless specified in 1910.1048)

ACGIH: 0.3 ppm Ceiling

Carbon black, bound (present in black products only) (1333-86-4)

OSHA: 3.5 mg/m³ TWA

3.5 mg/m³ TWA

ACGIH: 3.5 mg/m³ TWA

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment: Eyes/Face

Safety glasses with side shields are recommended to keep dust out of the eyes.

Personal Protective Equipment: Ears

Use ear protection (earplugs, hood, or earmuffs) to prevent airborne dust or fibers from entering the ear, if necessary.

Personal Protective Equipment: Skin

Leather or cotton gloves should be worn to protect against mechanical abrasion. See also Personal Protective Equipment: General, below.

Personal Protective Equipment: Respiratory

A respirator should be used if ventilation is unavailable, or is inadequate for keeping dust and fiber levels below the applicable exposure limits referenced in Section 8 of this SDS. Wear a NIOSH-certified disposable or reusable particulate respirator with an efficiency rating of N95 or higher (per 42 CFR 84) when dust or fiber concentrations exceed the applicable exposure limits. Operations such as sawing, blowing, tear out, and spraying may generate airborne fiber concentrations requiring a higher level of respiratory protection. For exposures up to 50 times the established exposure limits use a full-face respirator, rated N99 or higher.

Ventilation

In fixed manufacturing settings, local exhaust ventilation should be provided at areas of cutting, milling or other processing to remove airborne dust and fibers.

Personal Protective Equipment: General

Wear a cap, a loose-fitting, long-sleeved shirt and long pants to protect skin from irritation. Exposed skin areas should be washed with soap and water after handling or working with fiber glass. Clothing should be washed separately from other clothes, and the washer should be rinsed thoroughly (run empty for a complete wash cycle). This will reduce the chances of fiber glass being transferred to other clothing.

Section 9 - Physical & Chemical Properties

Appearance:	Gold, yellow, or black fibrous glass blanket, board, or formed shapes, with or without facings.	Odor:	Mild formaldehyde
Physical State:	Solid	pH:	Not applicable
Vapor Pressure:	Not applicable	Vapor Density:	Not applicable
Boiling Point:	Not applicable	Melting Point:	>704°C/1300°F
Solubility (H₂O):	Nil	Specific Gravity:	Variable
VOC:	Not determined		

Section 10 - Stability & Reactivity Information**Stability**

These products are not reactive.

Hazardous Decomposition

May form carbon dioxide and carbon monoxide.

Hazardous Polymerization

Will not occur.

Section 11 - Toxicological Information**Acute Toxicity****A: General Product Information**

If dust evolves from this product during use it may cause temporary mechanical irritation or scratchiness of the throat and/or itching of the eyes and skin.

Exposure to formaldehyde may cause eye and upper respiratory irritation, and possible respiratory or skin sensitization (allergy). If sensitization occurs, subsequent exposures to formaldehyde may worsen asthma or other respiratory problems, and cause allergic-type reactions.

B: Component Analysis - LD50/LC50**Formaldehyde (50-00-0)**

Inhalation LC50 Rat: 0.578 mg/L/4H; Oral LD50 Rat: 500 mg/kg

Carbon black, bound (present in black products only) (1333-86-4)

Oral LD50 Rat: >15400 mg/kg; Dermal LD50 Rabbit: >3 g/kg

Antimony trioxide (1309-64-4)

Oral LD50 Rat: >34600 mg/kg

Carcinogenicity**A: General Product Information**

Exposure to formaldehyde has been associated with the development of nasopharyngeal cancer in laboratory animals and humans. Formaldehyde has been classified as a known human carcinogen, Group 1, by the International Agency for Research on Cancer (IARC). The US Occupational Safety and Health Administration (OSHA) and the US National Toxicology Program (NTP) consider formaldehyde to have carcinogenic potential. OSHA specifically regulates formaldehyde under 29 CFR 1910.1048.

B: Component Carcinogenicity**Continuous Filament Glass Fiber**

ACGIH: A4 - Not Classifiable as a Human Carcinogen (listed under Synthetic Vitreous Fibers)
IARC: Group 3 - Not Classifiable (IARC Monograph 81 [2002] (listed under Man-made mineral fibres), Monograph 43 [1988])

Fiber Glass Wool

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans (listed under Synthetic Vitreous Fibers)
NTP: Reasonably Anticipated To Be A Human Carcinogen (respirable size)
IARC: Group 3 - Not Classifiable (IARC Monograph 81 [2002] (listed under Man-made mineral fibres), Monograph 43 [1988])

Formaldehyde (50-00-0)

ACGIH: A2 - Suspected Human Carcinogen
OSHA: 0.5 ppm Action Level; 0.75 ppm TWA; 2 ppm STEL (Irritant and potential cancer hazard - see 29 CFR 1910.1048)
NTP: Reasonably Anticipated To Be A Human Carcinogen (Possible Select Carcinogen)
IARC: Group 1 - Known Human Carcinogen

Carbon black, bound (present in black products only) (1333-86-4)

ACGIH: A4 - Not Classifiable as a Human Carcinogen
IARC: Group 2B - Possibly Carcinogenic to Humans (IARC Monograph 93 [in preparation], Monograph 65 [1996])

Antimony trioxide (1309-64-4)

ACGIH: A2 - Suspected Human Carcinogen (production)
IARC: Group 2B - Possibly Carcinogenic to Humans (IARC Monograph 47 [1989])

Chronic Toxicity

Continuous Filament Glass Fiber: No chronic health effects are known to be associated with exposure to continuous filament fiber glass. Results from epidemiologic studies have not shown any increases in respiratory disease or cancer. The International Agency for Research on Cancer (IARC) has classified continuous filament fiber glass as a Group 3 substance, not classifiable as to its carcinogenicity to humans. Because of the large diameter of continuous filament fibers, these products are not considered respirable.

The U.S. Department of Health and Human Services, National Toxicology Program (NTP 1998, 2000, 2002) classified glass wool (respirable size) as reasonably anticipated to be a human carcinogen, based on sufficient evidence of carcinogenicity in animals. This assessment was originally prepared in 1993-1994 for the 7th Report on Carcinogens (NTP 1994), but has not been updated since then in the 8th, 9th, or 10th Reports on Carcinogens (NTP 1998, 2000, 2002).

Prolonged, excessive exposures to vapors may cause nervous system, kidney and liver damage.

Section 12 - Ecological Information**Ecotoxicity****A: General Product Information**

No data available for this product.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Formaldehyde (50-00-0)

Material Name: Fiber Glass Wool Commercial & Industrial Insulation

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ID: 1009**

96 Hr LC50 Pimephales promelas: 22.6-25.7 mg/L [flow-through]; 96 Hr LC50 Lepomis macrochirus: 1510 µg/L [static]; 96 Hr LC50 Brachydanio rerio: 41 mg/L [static]; 96 Hr LC50 Oncorhynchus mykiss: 0.032-0.226 ml/L [flow-through]; 96 Hr LC50 Oncorhynchus mykiss: 100-136 mg/L [static]; 96 Hr LC50 Pimephales promelas: 23.2-29.7 mg/L [static]; 96 Hr EC50 water flea: 20 mg/L; 48 Hr EC50 Daphnia magna: 2 mg/L

Carbon black, bound (present in black products only) (1333-86-4)
24 Hr EC50 Daphnia magna: >5600 mg/L

Antimony trioxide (1309-64-4)
96 Hr LC50 Pimephales promelas: >80 mg/L [static]; 96 Hr LC50 Brachydanio rerio: >1000 mg/L [static]
72 Hr EC50 Selenastrum capricornutum: 67 mg/L
48 Hr EC50 Daphnia magna: >1000 mg/L

Section 13 - Disposal Considerations

US EPA Waste Number & Descriptions

General Product Information

This product is not expected to be a hazardous waste when it is disposed of according to the U.S. Environmental Protection Agency (EPA) under Resource Conservation and Recovery Act (RCRA) regulations. Product characterization after use is recommended to ensure proper disposal under federal and/or state requirements.

Disposal Instructions

Dispose of waste material according to Local, State, Federal, and Provincial Environmental Regulations.

Section 14 - Transport Information

International Transport Regulations

These products are not classified as dangerous goods according to international transport regulations.

Section 15 - Regulatory Information

US Federal Regulations

A: General Product Information

SARA 311/312: This product is not classified as hazardous under SARA 311/312.

B: Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Formaldehyde (50-00-0)

SARA 302: 500 lb TPQ

SARA 313: 0.1 % de minimis concentration

CERCLA: 100 lb final RQ; 45.4 kg final RQ

Antimony trioxide (1309-64-4)

CERCLA: 1000 lb final RQ; 454 kg final RQ

State Regulations

A: General Product Information

The glass fibers in this product are not known to be regulated.

Other state regulations may apply. Check individual state requirements.

Material Name: Fiber Glass Wool Commercial & Industrial Insulation

**Safety Data Sheet
ID: 1009**

B: Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS #	CA	FL	MA	MN	NJ	PA
Formaldehyde	50-00-0	Yes	No	Yes	Yes	Yes	Yes
Carbon black, bound (present in black products only)	1333-86-4	Yes	No	Yes	Yes	Yes	Yes
Antimony trioxide	1309-64-4	Yes	No	Yes	Yes	Yes	Yes

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):
WARNING! This product contains a chemical known to the state of California to cause cancer.

Component	CAS #
Fiber Glass Wool ('related to Fibrous glass)	Not Applicable
Formaldehyde	50-00-0
Antimony trioxide	1309-64-4

TSCA Status

This product and its components are listed on the TSCA 8(b) inventory.

None of the components listed in this product are listed on the TSCA Export Notification 12(b) list.

International Regulations

A: General Product Information

These products are considered articles under both U.S. and international product regulations and as such, these products do not require registration or notification on the various country-specific inventories.

B: Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Continuous Filament Glass Fiber	Not Applicable	1 % (related to Fibrous glass)
Fiber Glass Wool	Not Applicable	1 % (related to Fibrous glass)
Formaldehyde	50-00-0	0.1 %

WHMIS Classification

Controlled Product Classification: D2A

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations. This SDS contains all the information required by the Controlled Products Regulations.

Section 16 - Other Information

Other Information

Prepared for:
Johns Manville
Insulation Systems
P. O. Box 5108
Denver, CO USA 80217-5108

Prepared by:
Johns Manville Technical Center
P.O. Box 625005
Littleton, CO USA 80162-5005

The information herein is presented in good faith and believed to be accurate as of the effective date given. However, no warranty, expressed or implied, is given. It is the buyer's responsibility to ensure that its activities comply with Federal, State or provincial, and local laws.

Date	MSDS #	Reason
04/28/04	1009-2.0106	Regulatory update. Minor edits.

Material Name: Fiber Glass Wool Commercial & Industrial Insulation**Safety Data Sheet
ID: 1009**

05/20/04	1009-2.0107	Sect. 1 Removal of discontinued trade names: 824 CAN Spin-Glas®; 830 CAN Spin-Glas®; Acoustic Backing Board; BS 476, EcoTherm™ Industrial Pipe Insulation; Fabricated Duct Board; Permacote Spiracoustic™; Pipe and Tank Insulation; Rigid Round™ (faced); Spiracoustic™; SuperRound®.
08/05/04	1009-2.0108	Sect. 1 Label ID edit. Removal of discontinued trade name, Micro-Flex CTS.
03/22/05	1009-2.0108	Sect. 1 addition of Insul-SHIELD® Coated Black from MSDS 1010. Addition of Blended Blowing Wool. Edits to Sect. 2 for new additions.
10/03/05	1009-2.0110	Section 1, SuperVane was removed. Discontinued product.
11/17/05	1009-2.0111	Regulatory update. Minor edits in Sections 8, 11, and 15. Removed all revision notes prior to 2004. Revision notes are stored in database archives.
01/31/07	1009-2.0112	Addition of Micro-Lok HP to trade names. Updates made throughout SDS for current trade names listed on this SDS. Section 15 TSCA 12b edits. Removed DBDO. These products are articles under TSCA and DBDO does not need to be reported under TSCA 12b.
06/26/07	1009-2.0113	Addition of Micromat Rx to trade names. Minor edits throughout. Addition of WHMIS classification in section 15.
04/28/08	1009-2.0114	Updated SDS to GHS format.
03/16/09	1009-2.0115	Addition of 13/16" Micro-Aire® Duct Board to trade names.
11/23/09	1009-2.0116	Removed Zeston Hi-Lo Temp® Insulation Inserts from trade names.

End of Sheet 1009



Material Name: PVC Pipe Fitting Covers & Jacketing

Safety Data Sheet
ID: 2001

Section 1 - Product and Company Identification

Hazard Label No label required

Company Information

Johns Manville
Insulation Systems
P.O. Box 5108
Denver, CO 80127 USA

Telephone: 303-978-2000 8:00AM-5:00PM M-F
Internet Address: <http://www.jm.com>
Emergency: 800-424-9300 (Chemtrec, In English)

Trade Names:

Ceel-Co® 300 PVC Fitting Covers and Jacketing;
Ceel-Co® 550 PVC Fitting Covers and Jacketing;
PVC Drain Pans;

Zeston® 300 Series PVC Fitting Covers and Jacketing;
Zeston® 2000 Series PVC Fitting Covers and Jacketing;
Z-Tape

Use: Specifically designed for industrial and commercial applications.

Section 3 - Composition/Information on Ingredients

General Product Description

Pre-formed, molded plastic sheets and shapes of varying colors.

Section 4 - First Aid Measures

First Aid: Inhalation

None required

First Aid: Skin

None required

First Aid: Ingestion

None required

First Aid: Eyes

None required

First Aid: Ears

None required

Section 5 - Fire Fighting Measures

Flash Point: Not applicable

Upper Flammable Limit (UFL): Not applicable

Auto Ignition: Not determined

Rate of Burning: Not determined

General Fire Hazards

There is no potential for spontaneous fire or explosion. If exposed to fire, product may melt and drops of molten product may cause burns.

Extinguishing Media

Carbon dioxide (CO₂), dry chemical.

Fire Fighting Equipment/Instructions

No special procedures are expected to be necessary for this product. Normal fire fighting procedures should be followed to avoid inhalation of smoke and gases.

Method Used: Not applicable

Lower Flammable Limit (LFL): Not applicable

Flammability Classification: Not determined

Section 6 - Accidental Release Measures

Clean-Up Procedures

Pick up large pieces. Vacuum dusts.

Section 7 - Handling and Storage

Handling Procedures

Use protective equipment as described in Section 8 of this safety data sheet when handling uncontained material. Handle in accordance with good industrial hygiene and safety practices.

Storage Procedures

Warehouse storage should be in accordance with package directions, if any. Material should be kept clean, dry, and in original packaging.

Section 8 - Exposure Controls / Personal Protection

A: Component Exposure Limits

This material has no components listed.

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment: Eyes/Face

None required

Personal Protective Equipment: Ears

None required

Personal Protective Equipment: Skin

None required

Personal Protective Equipment: Respiratory

None required

Ventilation

None required

Personal Protective Equipment: General

None required

Section 9 - Physical & Chemical Properties

Appearance: Pre-formed, molded plastic sheets and shapes of varying colors.

Odor: No odor

Physical State: Solid

pH: Not determined

Vapor Pressure: Not determined

Vapor Density: Not determined

Boiling Point: Not determined

Melting Point: Not determined

Solubility (H₂O): Nil

Specific Gravity: Variable

Freezing Point: Not applicable

Evaporation Rate: Not applicable

Percent Volatile: 0

VOC: Not determined

Section 10 - Stability & Reactivity Information

Stability

These products are not reactive.

Hazardous Decomposition

This product will decompose at temperatures >300°C. May form carbon dioxide and carbon monoxide.

Hazardous Polymerization

Will not occur.

Section 11 - Toxicological Information

Acute Toxicity

A: General Product Information

If dust evolves from this product during use it may cause temporary mechanical irritation or scratchiness of the throat and/or itching of the eyes and skin.

B: Component Analysis - LD50/LC50

This material has no components listed.

Component Carcinogenicity

This material has no components listed.

Section 12 - Ecological Information

Ecotoxicity

A: General Product Information

No data available for this product.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

This material has no components listed.

Section 13 - Disposal Considerations

US EPA Waste Number & Descriptions

A: General Product Information

This product is not expected to be a hazardous waste when it is disposed of according to the U.S. Environmental Protection Agency (EPA) under Resource Conservation and Recovery Act (RCRA) regulations. Product characterization after use is recommended to ensure proper disposal under federal and/or state requirements.

B: Component Waste Numbers

This material has no components listed.

Disposal Instructions

Dispose of waste material according to Local, State, Federal, and Provincial Environmental Regulations.

Section 14 - Transport Information

International Transport Regulations

These products are not classified as dangerous goods according to international transport regulations.

Section 15 - Regulatory Information

US Federal Regulations

A: General Product Information

SARA 311/312: This product is not classified as hazardous under SARA 311/312.

B: Component Analysis

This material has no components listed.

State Regulations

A: General Product Information

Other state regulations may apply. Check individual state requirements.

B: Component Analysis - State

This material has no components listed.

A: TSCA Status

This material has no components listed.

International Regulations

A: General Product Information

These products are considered articles under both U.S. and international product regulations and as such, these products do not require registration or notification on the various country-specific inventories.

B: Component Analysis - WHMIS IDL

This material has no components listed.

WHMIS Classification

This is not a WHMIS controlled product. This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations. This SDS contains all the information required by the Controlled Products Regulations.

Section 16 - Other Information

Other Information

Prepared for:

Johns Manville

Insulation Systems

P. O. Box 5108

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Prepared by:

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The information herein is presented in good faith and believed to be accurate as of the effective date given. However, no warranty, expressed or implied, is given. It is the buyer's responsibility to ensure that its activities comply with Federal, State or provincial, and local laws.

Material Name: PVC Pipe Fitting Covers & Jacketing

**Safety Data Sheet
ID: 2001**

Date	MSDS #	Reason
08/01/00	2001-1.0000	New MSDS authoring system.
12/14/00	2001-1.0001	Minor editing.
07/16/03	2001-1.0002	Combined MSDS 2117 with this MSDS.
01/07/05	2001-1.0003	Addition of PVC Drain Pans to Sect. 1.
02/01/08	2001-1.0004	Regulatory update. Updated SDS to GHS format.

End of Sheet 2001

00700

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00700 GENERAL CONDITIONS

00701 The Contractor enters into this agreement with the full knowledge of the conditions and requirements of the specifications, including the physical characteristics above, on and below the surface of the ground where applicable.

00702 The Contractor will, simultaneously with the execution of this contract, deliver to PVSC a surety bond of a surety company qualified to do business in New Jersey, and shall be listed in the current Federal Register, Department of the Treasury Circular 570. "Surety Companies acceptable on Federal Bonds." The said surety bond will provide that the surety company will become surety for the faithful performance of the work and shall be in an amount equal to the contract price, and shall be so conditioned as to indemnify PVSC against any losses due to the failure of the Contractor to conform to the requirements.

The form of the surety bond shall be subject to the approval of the Chief Counsel of PVSC and shall be in accordance with the requirements of N.J.R.S. 2A:44-143 to 147.

00703 The Contractor agrees that during the entire term of the contract it will pursue the work faithfully and diligently and will, at all times, have the necessary sources of supply, labor, material and machinery necessary to complete the contract in accordance with the terms of the specifications.

00704 All work done under this contract shall be done to the satisfaction of the Engineer of PVSC, who shall in all cases determine the amount, quality, acceptability and fitness of the material and work which are to be paid for hereunder and shall decide any questions which may arise as to the fulfillment of this decision thereon shall be final and conclusive. The word "Engineer" shall mean the person holding the position of Manager of Plant Engineering of the Passaic Valley Sewerage Commission, or his duly authorized representative.

00705 If the Contractor should be adjudged a bankrupt, or if it should make a general assignment for the benefit of its creditors, or if a receiver should be appointed on account of its insolvency, or if it should persistently or repeatedly refuse or should fail to supply enough skilled workmen or proper materials, or if it should fail to make prompt payment to subcontractors for material, labor, or equipment rental, or persistently disregard laws, ordinances, or other instructions of the Engineer, or this contract, then PVSC, upon the certificate of the Engineer that sufficient cause exists to justify such action, may without prejudice to any other right or remedy and after giving the Contractor thirty (30) days written notice, terminate the employment of the Contractor. The termination of the employment of the Contractor under the provisions of this paragraph shall not relieve the surety of its responsibility.

00706 The Contractor shall be responsible for all parts of its work, either temporary or permanent, until the contract is accepted by PVSC and it shall thoroughly protect all work, finished or unfinished, against damage from any cause. Risk of loss shall remain with the Contractor until the work has been accepted by a resolution duly adopted by PVSC. The use of part or all of the work by PVSC shall not relieve the Contractor of its responsibility until such time as the work has been formally accepted by resolution. The Contractor shall conduct its operations in such a manner as to provide maximum safety for all employees on the work and the public as well, and shall comply with the requirements of all New Jersey and Federal Statutes governing safety requirements for employees.

00707 All notices, demands, requests, instructions, approvals and claims shall be in writing. Any notice to or demand upon the Contractor shall be sufficiently given if delivered at the office of the Contractor specified in the bid (or at such other offices as the Contractor may from time to time designate to the Engineer in writing) or if deposited in the United States mail in a sealed, postage prepaid envelope, or delivered by telephone electronic/facsimile (FAX) transmission system. All papers required to be delivered to PVSC shall, unless otherwise specified to the Contractor in writing, be delivered to the office of PVSC AT 600 Wilson Avenue, Newark, New Jersey and any notice to or demand upon PVSC shall be sufficiently given if delivered to the

said office, or if deposited in the United States mail in a sealed, postage-prepaid envelope, certified mail, return receipt requested.

- 00708** No final payment shall be made until the Engineer has certified to PVSC that the work has been completed by the Contractor in accordance with the requirements of the plans, specifications and contract.
- 00709** The Contractor shall not assign the contract or sublet it in whole or in part without the prior written consent of PVSC, nor shall the Contractor assign any monies due or becoming due to it without the prior written consent of PVSC.
- 00710** This contract, and all incorporations by reference together with the plans, specifications and bid documents, constitutes the entire agreement and understanding between the parties. This contract may not be modified, altered, abridged, amended or supplemented, except by written agreement executed by the parties.
- 00711** Neither the inspection by the Engineer or any agent or employee of PVSC, nor any order by PVSC for the payment of money, nor any payment for, or acceptance of, the whole or any part of the work, by PVSC or the Engineer, nor any possession taken by PVSC or their employees, shall operate as a waiver of any provisions of this contract, or of any right to damage herein provided, nor shall any waiver of any breach of the contract be held to be a waiver of any or subsequent breach. Any remedy provided in this Contract shall be taken and construed as cumulative, that is, in addition to each and every other remedy herein provided, and PVSC shall also be entitled as of right to a writ of injunction against any breach of any of the provisions of this contract.
- 00712** The Contractor covenants and agrees that anything in this contract or in the contract documents to the contrary notwithstanding, or regardless of any matter, thing, contingency or condition unforeseen or otherwise, present or future, the Contractor shall not be entitled to receive any additional or further sums of money than the amounts in said contract documents provided, except pursuant to a written change order duly authorized by a resolution of PVSC; and the failure of PVSC to insist upon strict performance of any of the terms, covenants, agreements, provisions or conditions in this contract or in the contract documents or any one or more instances, shall not be construed as a waiver of relinquishment for the future of any such terms, covenants, agreements, provisions and conditions, but the same shall be and remain in full force and effect with power and authority on the part of PVSC to enforce the same or cause the same to be enforced at any time, without prejudice to any other rights which PVSC may have against the Contractor under this contract or the contract documents.
- 00713** Plans, specifications and the within contract shall be construed in accordance with the laws of the State of New Jersey.
- 00714** The Contractor shall commence with the work on the project within ten (10) days after notice to proceed unless stated otherwise herein.
- 00715** The Contractor has agreed that is has carefully examined the site of the work, the form of the contract and specifications and the drawings referred to therein, and will provide all necessary machinery, tools, apparatus, and other means for construction and do all the work and furnish all the materials called for by the within contract and the specifications and the requirements under them of the Engineer and in accordance with the bidders notice, information for bidders, plans, general requirements, specifications, etc., all of which are incorporated herein as though fully set forth and form a part of this contract.
- 00716** The Contractor is held to have visited the site prior to the time of submitting bids and to have apprised and informed itself of all conditions at the site. Any information furnished by a representative of PVSC upon such matters shall in no way relieve the Contractor from risk or responsibility in fulfilling all of the terms of the contract; nor shall PVSC assume any responsibility or incur any liability as the result of furnishing of information by any representative.

- 00717** Any information as to the location of existing substructures and utilities shown on the contract drawings is not guaranteed as to accuracy by PVSC and PVSC incurs no responsibility or obligation to the Contractor or others in connection therewith.
- 00718** The Contractor shall not employ any subcontractor that PVSC may object to as incompetent or unfit; nor shall the Contractor subcontract to any person that has submitted a bid proposal for the award of the contract. Additionally, the Contractor shall not enter into any joint venture of any kind whatsoever relating to the within construction. PVSC may waive the provisions of this paragraph in its sole and absolute discretion, upon submission of a written request by the Contractor for a waiver supported by a disclosure of all of the facts and circumstances accompanied by a copy of the joint venture contract agreement or understanding.
- 00719** The Contractor agrees that it is as fully responsible to PVSC for the acts and omissions of its subcontractors and of persons either directly or indirectly employed by them, as it is for the acts and omissions of persons directly employed by it.
- 00720** The Contractor will be required to comply with the requirements of Local Public Contracts Law (NJAC 40A:11-1 et. Seq.) and all New Jersey Statutes affecting public contracts; more particularly, but not limited to, the provisions of the Statutes hereinafter recited. All statutes not referred to herein but required by law to be applicable to public contracts are incorporated herein as though fully set forth.
- 00721** Representatives of PVSC shall have access to the work when it is in progress. Any inspection costs incurred by PVSC by reason of any breach or derelictions by the Contractor shall be chargeable to the Contractor.
- 00722** The Contractor must arrange for its own utilities, paying for all permits, connections, consumption, as required of whatsoever kind.
- 00723** **NOT APPLICABLE TO THIS CONTRACT**
- 00724** To the fullest extent permitted by law, the Contractor shall indemnify, defend, and hold harmless PVSC and its commissioners, officers, directors, employees, and agents (collectively, the "Indemnified Parties" and individually, an "Indemnified Party") from and against any and all claims, damages, losses, fines, civil penalties, liabilities, judgments, costs and expenses of any kind or nature whatsoever, including, but not limited to, interest, court costs and attorneys' fees, which in any way arise out of or result from any act(s) or omission(s) by Contractor (or anyone directly or indirectly employed by Contractor, including sub-contractors, or anyone for whose acts Contractor may be liable) in the performance or non-performance of services or other obligations under this agreement or in the use or occupancy of any facilities or equipment provided by the Indemnified Parties, including, but not limited to, injury to or death of any person, damage to or destruction of any property, real or personal (including, but not limited to, property owned, leased or under the control of the Indemnified Parties), and liability or obligations under or with respect to any violation of federal, state and local laws, regulations, rules, codes and ordinances (including, but not limited to, those concerning environmental protection).

This section shall apply regardless of whether or not the damage, loss, or injury complained of arises out of or relates to the negligence (whether active, passive or otherwise) of, or was caused in part by, an Indemnified Party. However, nothing contained in this section shall be construed as a release or indemnity by Contractor of an Indemnified Party from or against any loss, liability, or claim to the extent arising from the gross negligence or willful misconduct of that Indemnified Party.

This section shall not be construed to negate, abridge or otherwise reduce any other right to indemnity which would otherwise exist in favor of any Indemnified Party, or any obligation of Contractor, or its officers, directors, employees, agents, contractors, or sub-contractors to indemnify an Indemnified Party. Contractor's obligations under this section shall not be limited by any limitation on the amount or type of damages, compensation, or benefits paid or payable by Contractor under workers' compensation laws, disability benefits laws, or other employee benefit laws or regulations.

The indemnification obligations of this section shall survive termination or expiration of the Contract.

- 00725** The contractor shall provide proof of its business registration with the New Jersey Department of Treasury with its bid. Failure to submit proof of business registration is a fatal defect by law that cannot be cured and cause for rejection of the bid.

The Contractor shall list all subcontractors that it intends to employ in its bid proposal, the subcontractor's State license number and business registration certificate from the NJ Department of Treasury.

00726 NOT USED IN THIS CONTRACT

- 00727** The Contractor must procure and maintain during the term of this contract the following types of insurance coverage, which shall be consistent with the terms of the specifications and general and supplemental conditions:

1. Commercial General Liability ("GCL") insurance, for personal injury and property damage liability of not less than five million dollars (\$5,000,000) combined single limit for each occurrence/five million dollars (\$5,000,000) aggregate;
2. Comprehensive automobile liability insurance coverage of not less than one million dollars (\$1,000,000) combined single limit;
3. Workers' compensation with limits in accordance with New Jersey law; and
4. Employer liability insurance with limits of at least five hundred thousand dollars (\$500,000).

PVSC and its commissioners, officers, directors, employees, and agents shall be named as additional insureds on the CGL and comprehensive automobile liability policies, and, within 20 days of the Notice of Intent to Award Contract, the Contractor shall provide evidence of same in the form of certified endorsements specifically naming PVSC and its commissioners, officers, directors, employees, and agents as additional insureds. The submission of a Certification of Insurance will not serve as adequate proof that PVSC and its commissioners, officers, directors, employees, and agents have been named as additional insureds.

Each insurance policy shall contain a provision stating that neither the insured, nor the insurer may cancel, materially change, or refuse renewal without a minimum 30 days prior written notice to PVSC. In the event of cancellation due to non-payment of premiums, said notice shall be at least 10 days prior to cancellation. All insurance required pursuant to this section shall remain in full force and effect until the final contract payment, or until the end of the warranty period whichever is later.

Each insurance policy shall provide that neither the Contractor, nor its insurer, shall have any right to subrogation against PVSC. Any and all policies of insurance maintained by the Contractor shall be primary without contribution from any insurance procured, carried, and/or maintained by PVSC.

In the event the Contractor is permitted to utilize any subcontractor, the Contractor shall require the subcontractor's insurance coverage to be at least equal to the requirements set forth above, including, without limitation, the provisions regarding the naming of additional insureds and the Contractor's insurance being primary. In the alternative, the Contractor may insure the activities of its subcontractors under its own policies. The Contractor is responsible for and will assume all liabilities for any insurance deficiency or delinquency of a subcontractor or any claim that may result because of the deficiency or delinquency.

The Contractor's insurance carrier(s) shall also provide an endorsement insuring, accepting and including the requirement of indemnification and defense as set forth in General Conditions Section 00724.

- 00728** Before the final acceptance of the work, the Contractor shall remove all equipment, temporary work, unused materials and rubbish, and temporary buildings; shall repair or replace in an acceptable manner all private or public property which may have been damaged, destroyed, moved or removed on account of the prosecution of the work; and shall leave the site and all adjacent properties in a neat and presentable condition wherever its operations have disturbed conditions existing at the time of the starting of the work.
- 00729** No final or semifinal payment shall be made until the Contractor has executed and delivered a release to PVSC and every member, agent or employee thereof, from all claims and liability to the Contractor for everything and anything done or furnished, or of any person relating to or affecting the work. (Semifinal payment shall mean payment for all work performed under the contract, except retainage held as a guarantee against warrantee claims.)
- 00730** Before final or semifinal payment, the Contractor shall deliver to PVSC an affidavit of payment of all claims of suppliers and subcontractors. In the event that any supplier or subcontractor has not been paid and the claim is disputed by the Contractor, the Contractor shall submit all of the facts in its affidavit and PVSC shall be authorized, in the exercise of its discretion, to withhold from the payment the sum of money sufficient to guarantee payment of the claim. Nothing contained herein, however, shall incur any responsibility by PVSC to any material man or subcontractor, nor shall anything contained herein give rise to a cause of action by any subcontractor or supplier against PVSC.
- 00731** Before final acceptance and final or semifinal payment by PVSC, the Contractor shall deliver to PVSC a complete release of all liens arising out of the contract. Contractor agrees that at no time shall any municipal liens, mechanical liens, notices of intention, or secured instruments be filed against the work and should PVSC be compelled to remove or discharge a municipal lien, mechanics lien, notice of intention or secured instrument, the Contractor shall reimburse PVSC for all costs.
- 00732** Before final or semifinal payment the Contractor shall deliver to PVSC a consent or the Surety to the final payment. Release of final payment shall act to release PVSC of all claims by the Contractor's performance of the contract.
- 00733** **NOT APPLICABLE TO THIS CONTRACT**
- 00734** All payments under the within contract shall be upon the written certification of the Engineer.
- To the extent applicable, pursuant to N.J.S.A. 2A:30A-2(f), disputes regarding whether a party has failed to make payments required pursuant to N.J.S.A. 2A:30A-2 may be submitted to a process of alternative dispute resolution. Alternative dispute resolution permitted by this section shall not apply to disputes concerning the bid solicitation or award process, or to the formation of contracts or subcontracts. In any civil action brought to collect payments pursuant to this section, the action shall be conducted inside of this State and the prevailing party shall be awarded reasonable costs and attorney fees.**
- 00735** **NOT APPLICABLE TO THIS CONTRACT**
- 00736** In the event that the vendor, unless prevented by strike or strikers, which prevents delivery of parts or services, and shall fail to furnish the materials, or services listed in this contract as per the specifications, and according to all the terms of this contract, the Commission reserve the right to rescind the contract and purchase the materials, or services through the open market, and the vendor agrees to pay the excess costs, if any, between the amount paid for same and the amount calculated at the contract price.
- 00737** During the performance of this contract, the contractor agrees as follows:
- The contractor or subcontractor, where applicable, will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Except with respect to affectional or sexual orientation and gender identity or expression,

the contractor will ensure that equal employment opportunity is afforded to such applicants in recruitment and employment, and that employees are treated during employment, without regard to their age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Such equal employment opportunity shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Public Agency Compliance Officer setting forth provisions of this nondiscrimination clause.

The contractor or subcontractor, where applicable will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex.

The contractor or subcontractor will send to each labor union, with which it has a collective bargaining agreement, a notice, to be provided by the agency contracting officer, advising the labor union or workers' representative of the contractor's commitments under this act and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

The contractor or subcontractor, where applicable, agrees to comply with any regulations promulgated by the Treasurer, pursuant to N.J.S.A. 10:5-31 et seq., as amended and supplemented from time to time and the Americans with Disabilities Act.

When hiring or scheduling workers in each construction trade, the contractor or subcontractor agrees to make good faith efforts to employ minority and women workers in each construction trade consistent with the targeted employment goal prescribed by N.J.A.C. 17:27-7.2; provided, however, that the Dept. of LWD, Construction EEO Monitoring Program may, in its discretion, exempt a contractor or subcontractor from compliance with the good faith procedures prescribed by the following provisions prescribed by the following provisions, A, B and C, as long as the Dept. of LWD, Construction EEO Monitoring Program is satisfied that the contractor or subcontractor is employing workers provided by a union which provides evidence, in accordance with standards prescribed by the Dept. of LWD, Construction EEO Monitoring Program, that is percentage of active "card carrying" members who are minority and women workers is equal to or greater than the targeted employment goal established in accordance with N.J.A.C. 17:27-7.2. The contractor or subcontractor agrees that a good faith effort shall include compliance with the following procedures:

- A. If the contractor or subcontractor has a referral agreement or arrangement with a union for a construction trade, the contractor or subcontractor shall, within three (3) business days of the contract award, seek assurances from the union that it will cooperate with the contractor or subcontractor as it fulfills its affirmative action obligations under this contract and in accordance with the rules promulgated by the Treasurer pursuant to N.J.S.A. 10:5-31 ET SEQ., as supplemented and amended from time to time and the Americans with Disabilities Act. If the contractor or subcontractor is unable to obtain said assurances from the construction trade union as least five (5) business days prior to the commencement of construction work, the contractor or subcontractor agrees to afford equal employment opportunities minority and women workers directly, consistent with this chapter. If the contractor's or subcontractor's prior experience with a construction trade union, regardless of whether the union has provided said assurances, indicates a significant possibility that the trade union will not refer sufficient minority and women workers consistent with affording equal employment opportunities as specified in this chapter, the contractor or subcontractor agrees to be prepared to provide such opportunities to minority and women workers directly, consistent with this chapter, by complying with the hiring or scheduling procedures prescribed under (B) below; and the contractor or subcontractor further agrees to take said action immediately if it determines that the union is not referring minority and women workers consistent with the equal employment opportunity goals set forth in this chapter.

- B. If good faith efforts to meet targeted employment goals have not or cannot be met for each construction trade by adhering to the procedures of (A) above, or if the contractor does not have a referral agreement or arrangement with a union for a construction trade, the contractor or subcontractor agrees to take the following actions:
- 1) To notify the public agency compliance officer, the Dept. of LWD, Construction EEO Monitoring Program, and minority and women referral organizations listed by the Division pursuant to N.J.A.C. 17:27-5.3, of its workforce needs, and request referral of minority and women workers;
 - 2) To notify any minority and women workers who have been listed with it as awaiting available vacancies;
 - 3) Prior to commencement of work, to request that the local construction trade union refer minority and women workers to fill job openings, provided the contractor or subcontractor has a referral agreement or arrangement with a union for the construction trade;
 - 4) To leave standing requests for additional referral to minority and women workers with the local construction trade union, provided the contractor or subcontractor has a referral agreement or arrangement with a union for the construction trade, the State Training and Employment Service and other approved referral sources in the area;
 - 5) If necessary to lay off some of the workers in a given trade on the construction site, layoffs shall be conducted in compliance with the equal employment opportunity and non-discrimination standards set forth in this regulation, as well as with applicable Federal and State court decisions;
 - 6) To adhere to the following procedure when minority and women workers apply or are referred to the contractor or subcontractor:
 - i) The contractor or subcontractor shall interview the referred minority or women worker.
 - ii) If said individuals have never previously received any document or certification signifying a level of qualification lower than that required in order to perform the work of the construction trade, the contractor or subcontractor shall in good faith determine the qualifications of such individuals. The contractor or subcontractor shall hire or schedule those individuals who satisfy appropriate qualification standards in conformity with the equal employment opportunity and non-discrimination principles set forth in this chapter. However, a contractor or subcontractor shall determine that the individual at least possesses the requisite skills, and experience recognized by a union, apprentice program or a referral agency provided the referral agency is acceptable to the Dept. of LWD, Construction EEO Monitoring Program. If necessary, the contractor or subcontractor shall hire or schedule minority and women workers who qualify as trainees pursuant to these rules. All of the requirements, however, are limited by the provisions of (C) below.
 - iii) The name of any interested women or minority individual shall be maintained on a waiting list, and shall be considered for employment as described in (i) above, whenever vacancies occur. At the request of the Dept. of LWD, Construction EEO Monitoring Program, the contractor or subcontractor shall provide evidence of its good faith efforts to employ women and minorities from the list to fill vacancies.
 - iv) If, for any reason, said contractor or subcontractor determines that a minority individual or a woman is not qualified or if the individual qualifies as an advanced trainee or apprentice, the contractor or subcontractor shall inform the individual in writing of the reasons for the determination, maintain a copy of the

determination in its files, and send a copy to the public agency compliance officer and to the Dept. of LWD, Construction EEO Monitoring Program.

- 7) To keep a complete and accurate record of all requests made for the referral of workers in any trade covered by the contract, on forms made available by the Dept. of LWD, Construction EEO Monitoring Program and submitted promptly to the Dept. of LWD, Construction EEO Monitoring Program upon request.
- C. The contractor or subcontractor agrees that nothing contained in (B) above shall preclude the contractor or subcontractor from complying with the union hiring hall or apprenticeship policies in any applicable collective bargaining agreement or union hiring hall arrangement, and, where required by custom or agreement, it shall send journeymen and trainees to the union for referral, or to the apprenticeship program for admission, pursuant to such agreement or arrangement. However, where the practices of a union or apprenticeship program will result in the exclusion of minorities and women or the failure to refer minorities and women consistent with the targeted county employment goal, the contractor or subcontractor shall consider for employment persons referred pursuant to (B) above without regard to such agreement or arrangement; provided further, however, that the contractor or subcontractor shall not be required to employ women and minority advanced trainees and trainees in numbers which result in the employment of advanced trainees and trainees as a percentage of the total workforce for the construction trade, which percentage significantly exceeds the apprentice to journey worker ratio specified in the applicable collective bargaining agreement, or in the absence of a collective bargaining agreement, exceeds the ratio established by practice in the area for said construction trade. Also, the contractor or subcontractor agrees that, in implementing the procedures of (B) above, it shall, where applicable, employ minority and women workers residing within the geographical jurisdiction of the union.

After notification of award, but prior to signing a construction contract, the contractor shall submit to the public agency compliance officer and the Dept. of LWD, Construction EEO Monitoring Program an initial project workforce report (Form AA 201) electronically provided to the public agency by the Dept. of LWD, Construction EEO Monitoring Program, through its website, for distribution to and completion by the contractor, in accordance with N.J.A.C. 17:27-7. The contractor also agrees to submit a copy of the Monthly Project Workforce Report once a month thereafter for the duration of this contract to the Division and to the public agency compliance officer.

The contractor agrees to cooperate with the public agency in the payment of budgeted funds, as is necessary, for on-the-job and/or off-the-job programs for outreach and training of minorities and women.

- D. The contractor and its subcontractors shall furnish such reports or other documents to the Dept. of LWD, Construction EEO Monitoring Program as may be requested by the Dept. of LWD, Construction EEO Monitoring Program from time to time in order to carry out the purposes of these regulations, and public agencies shall furnish such information as may be requested by the Dept. of LWD, Construction EEO Monitoring Program for conducting a compliance investigation pursuant to **Subchapter 10 of the Administrative Code (NJAC 17:27)**.

00738 NOT APPLICABLE TO THIS CONTRACT

00800 SUPPLEMENTAL CONDITIONS – INDEX

- 00821 Anti-Discrimination**
- 00822 Foreign Corporations**
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00800 SUPPLEMENTAL CONDITIONS

00821 N.J.R.S. 10:2-1 – Anti-Discrimination

Every contract for or on behalf of the State or any county or municipality or other political subdivision of the State, or any agency of or authority created by any of the foregoing, for the construction, alteration or repair of any public building or public work or for the acquisition of materials, equipment, supplies or services shall contain provisions by which the contractor agrees that:

- a. In the hiring of persons for the performance of work under this contract or any subcontract hereunder, or for the procurement, manufacture, assembling or furnishing of any such materials, equipment, supplies or services to be acquired under this contract, no contractor, nor any person acting on behalf of such contractor or subcontractor, shall by reason of race, creed, color, national origin, ancestry, marital status, sex, affectional or sexual orientation, discriminate against any person who is qualified and available to perform the work to which the employment relates;
- b. No contractor, subcontractor, nor any person on his behalf shall in any manner, discriminate against or intimidate any employee engaged in the performance of work under this contract or any subcontract hereunder, or engaged in the procurement, manufacture, assembling or furnishing of any such materials, equipment, supplies or services to be acquired under such contract, on account of race, creed, color, national origin, ancestry, marital status, sex, affectional or sexual orientation;
- c. There may be deducted from the amount payable to the contractor by the contracting public agency, under this contract, a penalty of \$50.00 for each person for each calendar day during which such person is discriminated against or intimidated in violation of the provisions of the contract; and
- d. This contract may be canceled or terminated by the contracting public agency, and all money due or to become due hereunder may be forfeited, for any violation of this section of the contract occurring after notice to the contractor from the contracting public agency of any prior violation of this section of the contract.

00822 N.J.R.S. 14A:13-3 – Foreign Corporations

1. No foreign corporation shall have the right to transact business in this State until it shall have procured a certificate of authority to do so from the Secretary of State. A foreign corporation may be authorized to do in this State any business which may be done lawfully in this State by a domestic corporation, to the extent that it is authorized to do such business in the jurisdiction of its incorporation, but no other business.
2. Without excluding other activities which may not constitute transacting business in this State, a foreign corporation shall not be considered to be transacting business in this State, for the purposes of this act, by reason of carrying on in this State any one or more of the following activities:
 - a. Maintaining, defining or otherwise participating in any action or proceeding, whether judicial, administrative, arbitral or otherwise, or effecting the settlement thereof or the settlement of claims or disputes;
 - b. Holding meetings of its directors or shareholders;
 - c. Maintaining bank accounts or borrowing money, with or without security, even if such borrowings are repeated and continuous transactions and even if such security has a situs in this State;
 - d. Maintaining offices or agencies for the transfer, exchange and registration of its securities, or appointing and maintaining trustees or depositaries with relation to its securities.

3. The specification in subsection 14A:13-3(2) does not establish a standard for activities which may subject a foreign corporation to service of process or taxation in this State.

00823 N.J.R.S. 34:11-56.27 – Prevailing Wages

Every contract in excess of \$2,000 for any public work to which any public body is a party or for public work to be done on property or premises leased or to be leased by a public body, shall contain a provision stating the prevailing wage rate which can be paid (as shall be designated by the commissioner) to the workers employed in the performance of the contract and the contract shall contain a stipulation that such workers shall be paid not less than such prevailing wage rate. Such contract shall also contain a provision that in the event it is found that any workers, employed by the contractor or any subcontractor covered by said contract, has been paid a rate of wages less than the prevailing wage required to be paid by such contract the public body or lessor may terminate the contractor's or subcontractor's right to proceed with the work, or such part of the work as to which there has been a failure to pay required wages and to prosecute the work to completion or otherwise. The contractor and his sureties shall be liable to the public body or lessor for any excess costs occasioned thereby.

N.J.S.A. 34:11-56.26(5) has added to the existing prevailing wage requirements off-site workers who custom fabricate plumbing, heating, cooling, ventilation, or exhaust duct systems and mechanical insulation as part of a public works project.

N.J.S.A. 34:11-55.25 et seq., requires that all public works employers shall submit a certified payroll record to the public body or lessor which contracted for the public work project each payroll period within ten (10) days of the payment of wages. The public body shall receive, file and make available for inspection during normal business hours the certified payroll records. A copy of the certified payroll form may be obtained by contacting the New Jersey Department of Labor, Division of Workplace Standards, Public Contracts Section, CN 389, Trenton, New Jersey 08625-0389.

NOTE: Prevailing wage rates will not apply or be applicable to any contract unless an appendix from the New Jersey Department of Labor which includes the "Prevailing Wage Rate Determination," listing the prevailing wage levels is attached to the contract.

00824 N.J.R.S. 52:25-24.2 – Statement of Ownership

No corporation or partnership shall be awarded any contract nor shall any agreement be entered into for the performance of any work or the furnishing of any materials or supplies, the cost of which is to be paid with or out of any public funds, by the State, or any county, municipality or school district, or any subsidiary or agency of the State, or of any county, municipality or school district, or by any authority, board, or commission which exercises governmental functions, unless prior to the receipt of the bid or accompanying the bid, of said corporation or said partnership, there is submitted a statement setting forth the names and addresses of all stockholders in the corporation or partnership who own 10% or more of its stock, of any class or of all individual partners in the partnership who own a 10% or greater interest therein, as the case may be. If one or more such stockholder or partner is itself a corporation or partnership, the stockholders holding 10% or more of that corporation's stock, or the individual partners owning 10% or greater interest in that partnership, as the case may be, shall also be listed. The disclosure shall be continued until all names and addresses of every noncorporate stockholder, and individual partner, exceeding the 10% ownership criteria established in this act, has been listed.

00825 N.J.R.S. 52:33-2 and -3 – Use of Domestic Materials

52:33-2 Notwithstanding any inconsistent provision of any law, and unless the head of the department, or other public officer charged with the duty by law, shall determine it to be inconsistent with the public interest, or the cost to be unreasonable, only domestic products and materials shall be acquired or used for any public work. This requirement is specifically set forth in N.J.A.C. 40A:11-18 and is incorporated herein by reference and made a part hereof.

This section shall not apply with respect to domestic materials to be used for any public work, if domestic materials of the class or kind to be used are not mined, produced or manufactured, as the case may be, in the United States in commercial quantities and of a satisfactory quality.

52:33-3 Every contract for the construction, alteration, or repair of any public work in this state shall contain a provision that in the performance of the work the contractor and all subcontractors shall use only domestic materials in the performance of the work; but if the head of the department or other public officer authorized by law to make the contract shall find that in respect to some particular domestic materials it is impracticable to make such requirement or that it would unreasonably increase the cost, an exception shall be noted in the specifications as to that particular material, and a public record made of the findings which justified the exception.

00826 Hazardous Materials

All hazardous material whether sold, delivered, and/or used to perform a service on the PVSC site, shall be properly labeled in accordance with the New Jersey Worker and Community Right to Know Act (P.L. 1983, c315, N.J.S.A. 34:5A-1 et seq.). The bidder shall include with his bid proposal the Material Safety Data Sheets, for all the products that he intends to deliver to the PVSC under this bid. The vendor shall comply with these terms otherwise his bid will be disqualified.

Hazardous material not complying with this act will cause the PVSC to reject shipments or deny the use of such materials on its site. The vendor shall be responsible for any cost incurred for materials found not to be in compliance with the act. The PVSC will make the sole determination if this act is being violated, and the vendor shall abide by this decision. Violation of this act may be considered an abandonment of the contract, and the Commission may seek redress under the Default Article of the contract.

00827 Certified Payroll

Effective February 18, 1992 Regulation N.J.A.C. 12:60 and 6.1 of the New Jersey Prevailing Wage Act, N.J.S.A. 34:11-55.25 et seq., requires that all public works employers shall submit a certified payroll record to the public body or lessor which contracted for the public work project each payroll period within ten (10) days of the payment of wages. The public body shall receive, file and make available for inspection during normal business hours the certified payroll records.

A copy of the certified payroll form may be obtained by contacting the New Jersey Department of Labor, Division of Workplace Standards, Public Contracts Section, CN 389, Trenton, New Jersey 08625-0389, telephone (609) 292-2259.

00828 Set-Aside Contract Compliance

Contractor shall comply with the New Jersey Regulations governing minority and female contractor and subcontractor participation on construction contracts as required by N.J.S.A. 52:32-17. The regulations, which are more specifically set forth in N.J.A.C. 17:14-1.1 et seq., are incorporated herein by reference and made a part hereof.

00829 NOT APPLICABLE TO THIS CONTRACT

00830 N.J.A.C. 40a:11-17 – Number of Working Days Specified

All specifications for the doing of any public work for a contracting unit shall fix the date before which the work shall be completed, or the number of working days to be allowed for its completion; and every such contract shall contain a provision for a deduction, from the contract price, or any wages paid by the contracting unit to any inspector or inspectors necessarily employed by it on the work, for any number of days in excess of the number allowed in the specifications.

00831 NOT APPLICABLE TO THIS CONTRACT

00900 PUBLIC LAW 2005, CHAPTER 51 FORMERLY: EXECUTIVE ORDER 134

Background Information

On September 22, 2004, then-Governor James E. McGreevey issued Executive Order 134, the purpose of which was to insulate the negotiation and award of State contracts from political contributions that posed a risk of improper influence, purchase of access or the appearance thereof. To this end, Executive Order 134 prohibited State departments, agencies and authorities from entering into contracts exceeding \$17,500 with individuals or entities that made certain political contributions. Executive Order 134 was superseded by Public Law 2005, c. 51, signed into law on March 22, 2005 ("Chapter 51").

On September 24, 2008, Governor Jon S. Corzine issued Executive Order No. 117 ("E.O. 117"), which is designed to enhance New Jersey's efforts to protect the integrity of procurement decisions and increase the public's confidence in government. The Executive Order builds upon the provisions of Chapter 51.

Two-Year Certification Process

Upon approval by the State, the Certification and Disclosure of Political Contributions form (CH51.1R1/21/2009) is valid for a two (2) year period. Thus, if a vendor receives approval on Jan 1, 2009, the certification expiration date would be Dec 31, 2011. Any change in the vendor's ownership status and/or political contributions during the two-year period will require the submission of new Chapter 51/EO117 forms to the State Review Unit. **Please note that it is the vendor's responsibility to file new forms with the State should these changes occur.**

Prior to the awarding of a contract, the agency should first send an e-mail to CD134@treas.state.nj.us to verify the certification status of the vendor. If the response is that the vendor is NOT within an approved two-year period, then forms must be obtained from the vendor and forwarded for review. If the response is that the vendor is within an approved two-year period, then the response so stating should be placed with the bid/contract documentation for the subject project.

Instructions for Completing the Forms

NOTE: Please refer to the next section, "Useful Definitions for Purposes of Ch. 51 and E.O. 117," for guidance when completing the forms.

Part 1: VENDOR INFORMATION

Business Name -- Enter the full name of the Vendor, including trade name if applicable.

Business Type -- Select the vendor's business organization from the list provided.

Address, City, State, Zip and Phone Number -- Enter the vendor's street address, city, state, zip code and telephone number.

Vendor Email -- Enter the vendor's primary email address.

Vendor FEIN -- Please enter the vendor's Federal Employment Identification Number.

Part 2: PUBLIC LAW 2005, Chapter 51 / EXECUTIVE ORDER 117 (2008) DUAL CERTIFICATION

Read the following statements and verify that from the period beginning on or after October 15, 2004, no contributions as set forth at subsections 1(a)-(c) have been made by either the vendor or any individual whose contributions are attributable to the vendor pursuant to Executive Order 117 (2008).

NOTE: Contributions made prior to November 15, 2008 are applicable to Chapter 51 only.

Part 3: DISCLOSURE OF CONTRIBUTIONS MADE

Check the box at top of page 2 if no reportable contributions have been made by the vendor.

If the vendor has no contributions to report, this box must be checked.

Name of Recipient Entity – Enter the full name of the recipient entity.

Address of Recipient Entity – Enter the recipient entity's street address.

Date of Contribution – Indicate the date of the contribution.

Amount of Contribution – Enter the amount of the reportable contribution.

Type of Contribution – Select the type of contribution from the list provided.

Contributor Name – Enter the full name of the contributor.

Relationship of Contributor to the Vendor -- Indicate relationship of the contributor to the vendor, e.g. officer or partner of the company, spouse of officer or partner, resident child of officer or partner, parent company of the vendor, subsidiary of the vendor, etc.

NOTE: If form is being completed electronically, click "Add a Contribution" to enter additional contributions. Otherwise, please attach additional pages as necessary.

Part 4: CERTIFICATION

Check box A if the person completing the certification and disclosure is doing so on behalf of the vendor and all individuals and/or entities whose contributions are attributable to the vendor.

Check box B if the person completing the certification and disclosure is doing so on behalf of the vendor only.

Check box C if the person completing the certification and disclosure is doing so on behalf of an individual and/or entity whose contributions are attributable to the vendor.

Enter the full name of the person authorized to complete the certification and disclosure, the person's title or position, date and telephone number.

USEFUL DEFINITIONS FOR THE PURPOSES OF Ch. 51 and E.O. 117

- **"Vendor"** means the contracting entity.
- **"Business Entity"** means any natural or legal person, business corporation, professional services corporation, limited liability company, partnership, limited partnership, business trust, association or any other legal commercial entity organized under the laws of New Jersey or any other state or foreign jurisdiction. The definition also includes (i) if a business entity is a for-profit corporation, any officer of the corporation and any other person or business entity that owns or controls 10% or more of the stock of the corporation; (ii) if a business entity is a professional corporation, any shareholder or officer; (iii) if a business entity is a general partnership, limited partnership or limited liability partnership, any partner; (iv) if a business entity is a sole proprietorship, the proprietor; (v) if the business entity is any other form of entity organized under the laws of New Jersey or any other state or foreign jurisdiction, any principal, officer or partner thereof; (vi) any subsidiaries directly or indirectly controlled by the business entity; (vii) any political organization organized under 26 U.S.C.A. § 527 that is directly or indirectly controlled by the business entity, other than a candidate committee, election fund, or political party committee; and (viii) with respect to an individual who is included within the definition of "business entity," that individual's spouse or civil union partner and any child residing with that person.¹
- **"Officer"** means a president, vice-president with senior management responsibility, secretary, treasurer, chief executive officer, or chief financial officer of a corporation or any person routinely performing such functions for a corporation. Please note that officers of non-profit entities are excluded from this definition.
- **"Partner"** means one of two or more natural persons or other entities, including a corporation, who or which are joint owners of and carry on a business for profit, and which business is organized under the laws of this State or any other state or foreign jurisdiction, as a general partnership, limited partnership, limited liability partnership, limited liability company, limited partnership association, or

- other such form of business organization.
- **"Reportable Contributions"** are those contributions, including in-kind contributions, in excess of \$300.00 in the aggregate per election made to or received by a candidate committee, joint candidates committee, or political committee; or per calendar year made to or received by a political party committee, legislative leadership committee, or continuing political committee.
- **"In-kind Contribution"** means a contribution of goods or services received by a **candidate committee, joint candidates committee, political committee, continuing political committee, political party committee, or legislative leadership committee**, which contribution is paid for by a person or entity other than the recipient committee, but does not include services provided without compensation by an individual volunteering a part of or all of his or her time on behalf of a candidate or committee.
- **"Continuing Political Committee"** includes any group of two or more persons acting jointly, or any corporation, partnership, or any other incorporated or unincorporated association, including a political club, political action committee, civic association or other organization, which in any calendar year contributes or expects to contribute at least \$4,300 to aid or promote the candidacy of an individual, or the candidacies of individuals, for elective public office, or the passage or defeat of a public questions, and which may be expected to make contributions toward such aid or promotion or passage or defeat during a subsequent election, provided that the group, corporation, partnership, association or other organization has been determined by the Commission to be a continuing political committee in accordance with N.J.S.A. 19:44A-8(b).
- **"Candidate Committee"** means a committee established by a candidate pursuant to N.J.S.A. 19:44A-9(a), for the purpose of receiving contributions and making expenditures.
- **"State Political Party Committee"** means a committee organized pursuant to N.J.S.A. 19:5-4.
- **"County Political Party Committee"** means a committee organized pursuant to N.J.S.A. 19:5-3.
- **"Municipal Political Party Committee"** means a committee organized pursuant to N.J.S.A. 19:5-2.
- **"Legislative Leadership Committee"** means a committee established, authorized to be established, or designated by the President of the Senate, the Minority Leader of the Senate, the Speaker of the General Assembly, or the Minority Leader of the General Assembly pursuant to N.J.S.A. 19:44A-10.1 for the purpose of receiving contributions and making expenditures.
- **"Political Party Committee"** means:
 1. The State committee of a political party, as organized pursuant to N.J.S.A. 19:5-4;
 2. Any county committee of a political party, as organized pursuant to N.J.S.A. 19:5-3; or
 3. Any municipal committee of a political party, as organized pursuant to N.J.S.A. 19:5-2.

Agency Submission of Forms

The agency should submit the completed and signed Two-Year Vendor Certification and Disclosure forms, together with a completed Ownership Disclosure form, either electronically to cd134@treas.state.nj.us or regular mail at Chapter 51 Review Unit, P.O. Box 039, 33 West State Street, 9th Floor, Trenton, NJ 08625. Original forms should remain with the Agency and copies should be sent to the Chapter 51 Review Unit.

Questions & Answers

Questions regarding the interpretation or application of Public Law 2005, Chapter 51 (N.J.S.A. 19:44A-20.13) or Executive Order 117 (2008) may be submitted electronically through the Division of Purchase and Property website at <http://www.state.nj.us/treasury/purchase/execorder134.shtml>. Responses to previous questions are posted on the website, as well as additional reference materials and forms.

NOTE: The Chapter 51 Q&A on the website **DOES NOT** address the expanded pay-to-play requirements imposed by Executive Order 117. The Chapter 51 Q&A are only applicable to contributions made prior to November 15, 2008. There is a separate, combined Chapter 51/E.O. 117 Q&A section dealing specifically with issues pertaining to contributions made after November 15, 2008, available at: <http://www.state.nj.us/treasury/purchase/execorder134.shtml#state>.

¹ Contributions made by a spouse, civil union partner or resident child to a candidate for whom the contributor is eligible to vote or to a political party committee within whose jurisdiction the contributor resides are permitted.

DIVISION 1 - GENERAL REQUIREMENTS

01010 SCOPE OF WORK

The Contractor shall provide Supervision, Labor, Equipment, Materials and Supplies necessary to perform insulation services on an as needed basis.

Work shall include but not be limited to the following:

- Piping Systems
- Equipment
- Ducting Systems
- HVAC and Refrigeration Systems
- Plumbing Systems
- Boiler, Steam and Condensate Systems
- Hot and Cold Water Domestic Water Systems
- Chilled water and Cooling Tower Systems
- Cryogenic Systems and Equipment

The Contractor shall specialize in the Insulation industry. The Contractor shall have a minimum of ten (10) years of experience. The Contractor shall ensure that all requested work shall be performed by personnel who are trained and certified to provide the type of service specified.

01011 ERRORS OR OMISSIONS OF DETAILS IN SPECIFICATIONS

Errors in the specifications which are purely typographical shall be interpreted as would be the logical conclusion or brought to the attention of the Owner for interpretation.

The Contractor is required to check all dimensions and quantities on any drawings or schedules made available by the Owner, and shall notify the Owner of all errors therein which he may discover by such examination.

01025 PAYMENT

The contractor's estimate will be based upon work completed and certified by the Plant Engineer on the eighteenth (18th) day before the Commissions' meeting date. A schedule of meeting dates will be furnished to the Contractor. The estimate must be submitted to PVSC's Plant Engineer within two (2) working days of the above cutoff date. Payment will be made to the contractor during the week following the Commissions' meeting.

A vendor invoice shall be submitted for every item of material purchased for this contract for which payment is being requested plus a 15% mark-up fee. The hypothetical material cost in Section 00400 Supplement to Bid Forms is strictly hypothetical. The Contractor will get paid only for the actual invoices for lump sum insulation, mold remediation and asbestos abatement projects materials, and/or labor purchased on the project.

Overtime hourly work (if approved) will be billed at a cost of 1.5 times the T&M schedule rate.

To assure timely payment, bills must be received by the PVSC Plant Engineering Department not less than (18) days prior to the Commission meeting date. (Meeting dates will be provided by PVSC.)

01037 REPLACEMENTS

In the event of damage to any PVSC property or equipment, immediate necessary repairs and/or replacements shall be made subject to the approval of the Engineer, and at no additional cost to the Owner.

In the event of damage to any equipment critical to the Sewerage Treatment Plant, repairs will be made by PVSC and the cost will be backcharged to the Contractor.

01038 CARE AND PROTECTION OF PROPERTY AND MATERIALS

From the commencement of the work until its completion, the Contractor shall be solely responsible for damages caused to the property of the Owner, for the care, protection and security of the work covered by the contract, and for all materials delivered to the site or incorporated in the work.

01040 CONCURRENT WORK AND OTHER CONTRACTORS

The right is reserved by the Owner to do work using its own forces or other contractors and to permit public utility companies and others to do work during the progress and within the limits of or adjacent to the Project, and the Contractor shall conduct his work and cooperate with such other parties so as to cause as little interference as possible with such other work, as the Owner may direct.

If, in the judgment of the Owner, the joint occupation of the site of the work by the Owner or by two (2) or more contractors working on different contracts at the same time actually impedes progress in the work herein described, the Owner may extend the time for the completion of the work and in an amount which accords with and compensates for the delays so caused.

01046 WORKING HOURS

Contractor will have access to the site and work of this contract during normal PVSC working hours (7:45 a.m. to 4:15 p.m.), five (5) days per week, with the exception of PVSC Holidays. Other hours require PVSC consent and approval. A list of PVSC Holidays will be provided to the Contractor.

01048 SUBCONTRACTS AND SUBCONTRACTORS

The Contractor shall, within ten (10) days after "Notice to Proceed" notify the Engineer in writing of the names, addresses and experience records of subcontractors (if any) he proposes for principal parts of the work other than those required to be used per Section 00403. PVSC reserves the right to review the qualifications of all subcontractors and to reject any deemed not qualified to perform the work required. Subcontractors must be covered by insurance as required in the General Conditions, Sections 00725, 00726 and 00727.

The Contractor agrees that he is as fully responsible to the Owner for the acts and omissions of his subcontractors and of persons either directly or indirectly employed by them as he is for acts and omissions of persons directly employed by him. He further agrees that he will bind his subcontractors to each and every part of the Contract Documents.

Nothing contained in the Contract Documents shall create any contractual relation between any subcontractor and the Owner.

01049 WORK BY PVSC PERSONNEL

The right is reserved by the owner to do work using its own forces and/or other contractors to do work during the progress and within the limits of or adjacent to the work of this contract, and this contractor shall conduct his work and cooperate with such other parties so as to cause as little interference as possible with such other work.

01300 SUBMITTALS

The Contractor shall submit for the Owner's review and approval, Shop Drawings showing the details of all materials, equipment and installations which the Contractor proposes to furnish in conformance with the Specifications. The Shop Drawings shall be reviewed for conformance with all the Contract Documents.

The Shop Drawings shall consist of catalog cuts, manufacturer's details, text, drafted drawings, layout drawings, assembly drawings, floor plans and any other documents which describe the item being submitted.

Shop Drawings shall give all ratings, configurations, dimensions and ancillary items in sufficient detail to enable the Owner to pass on the suitability of the equipment, materials or layout for the purpose intended. The drawings shall, where needed for clarity, include outline and sectional views, and detailed dimensions and designations of the kind of material. Drawings for submission shall be coordinated by the Contractor with the drawings previously approved and with the existing space, equipment, structure, and all other requirements of the Contract.

The Contractor shall submit two (2) copies of all Shop Drawings for approval. The Owner shall retain one (1) copies for his records, and return one (1) to the Contractor.

01310 SCHEDULING

The contractor shall report to the site with adequate workforce to perform all service work requested or to make necessary repairs commencing within three (3) days of receiving notice from PVSC by telephone, e-mail, US mail and/or fax.

01410 TESTING OF MATERIALS

The Commission may hire a testing laboratory to determine if the materials conform to the specifications. If the specifications are not met, the materials will be rejected and the cost of testing will then be paid by the vendor.

01420 INSPECTION AND ACCEPTANCE

Inspection of materials by the Commissions' personnel shall not relieve the vendor of any obligations to fulfill the terms of this contract, and any defective part found at the time of installation shall be made good. All unsuitable materials shall be rejected notwithstanding that such part and materials have been previously overlooked by the engineer and accepted.

01421 DEFECTIVE WORK, EQUIPMENT OR MATERIALS

If the Contractor shall fail or neglect to replace any defective work or to discard condemned materials within two (2) days after the service by the Owner of an order to replace such defective work or discard such equipment or materials, or to prove to the satisfaction of the Owner that he is initiating effective efforts to replace defective materials, the Owner may cause such defective work to be replaced or the condemned materials to be discarded, and acceptable materials provided. The expense thereof shall be deducted from the monies as are or may become due under this contract; or if such monies are not sufficient to meet said expense, the additional monies shall be furnished by the contractor or his Surety. If, during the warranty period provided for hereinafter, any work done in accordance with that article shall be found defective before the end of the warranty period, such defective work shall be made good in the same manner as provided herein. The Owner will have the option at all times to allow the defective or improper work to stand and to accept an equitable deduction from the contract price therefore.

01422 OWNER'S RIGHT TO DO WORK AND THREE-DAY CLAUSE

If the Contractor or his subcontractors should neglect to prosecute the work properly or fail to perform any provisions of the contract documents, the Owner, after three (3) days written notice to the Contractor may without prejudice to any other remedy he may have, make good such

deficiencies and may deduct the cost thereof from the payment then or thereafter due the Contractor.

01602 TOOLS, EQUIPMENT AND UTILITIES

All tools, and equipment, required to perform the work described in the contract shall be provided by the Contractor.

01603 SAFETY

The Contractor is solely responsible for the safety of its employees, subcontractors, suppliers and representatives, including but not limited to the development and implementation of effective safety practices and programs in accordance with Federal, State and Local requirements.

Prior to commencing any work at the site the Contractor shall designate in writing to PVSC the name of the person who is their on-site safety officer. The contractor shall provide a competent safety officer that must be on the project site at all times. The competent safety officer must hold (or furnish suitable proof of course completion and application for), at a minimum, a valid 10 Hour OSHA Construction card prior to the performance of any work under the contract. The contractor shall also furnish personnel meeting the requirements of "competent person" as defined by OSHA for all applicable aspects of the work.

The Contractors designated on-site safety officer shall be in charge of all of the safety programs of the Contractor and will be responsible to ensure the proper development, implementation and enforcement of all necessary and appropriate safety practices. The Contractor's designated on-site safety officer shall be on site **at all times** that work is being conducted, and shall be solely responsible for supervision of the Contractor's employees, subcontractors, suppliers and representatives for safety.

The Contractor throughout the work of this contract shall comply with the PVSC Safety Rules, as well as the Federal Occupational Safety and Health Act and the applicable New Jersey Department of Labor Administrative Codes. The Contractor will be provided with a copy of the PVSC Safety Rules, these rules, including the wearing of protective head gear, shall be strictly enforced by the Contractor in respect to his own employees, subcontractor's employees, and other personnel engaged in business with the Contractor on PVSC's property.

Contractor's (and subcontractor's) personnel when on PVSC property shall wear OSHA approved hard hats and shall prominently display the Company Name or Logo on the hard hat.

The Contractor is advised of the 15 MPH speed limit on all plant roads, and will be held responsible for his employees (and subcontractors) compliance with this and all rules for traffic safety in the plant.

The Contractor's attention is directed toward several OSHA Safety and Health Standards and New Jersey Labor Department Administrative Codes that influence the conduct of his work in specific areas.

1. OSHA Confined Space Standard, 29 CFR 1910.146 – Work in Confined Spaces
2. OSHA Control of Hazardous Energy (Lockout/Tagout) Standard, 29 CFR 1910.147 (Electrical energy lockout and other energy sources such as steam, air, liquids.)
3. NJAC 7:31-1-6 – Toxic Catastrophe Prevention Act

Before any work commences on PVSC property, the Contractor's Superintendent shall contact the PVSC Facility Supervisor at the site. The PVSC Supervisor will inform the Contractor of the PVSC emergency plant evacuation plan and where he is to assemble his personnel.

The Contractor shall instruct and show his personnel where to assemble, at the sound of the PVSC emergency evacuation siren. The Facility Supervision will notify the Contractor's

personnel of the emergency evacuation route they are to follow. At the assembly point, the Contractor's person in charge shall account for all his personnel, supply transportation, and see that they utilize the prescribed evacuation route.

Where portions of the work of the contract fall under the authority of these Administrative Codes for Public Employees, the Contractor shall at all times maintain safety standards for his employees at least as comprehensive as that imposed by the Codes. This includes, for example (and not limited to), monitoring of air in confined spaces with appropriate instrumentation for noxious or toxic gases % oxygen, and lockout and tagout of hazardous energy such as electrical, steam, air or liquids under pressure.

The Contractor shall be responsible for providing first aid, and emergency medical assistance for any of his employees injured on the work site. The Contractor shall be responsible for arranging emergency assistance with local hospitals, and/or EMT services. The Contractor's arrangements shall be submitted in writing, with required telephone numbers to PVSC's Security Department. PVSC Security will summon the Contractor's emergency personnel, if the Contractor calls PVSC Security from any in plant telephone.

Contractor's personnel will not be treated in the PVSC Dispensary for minor injuries, cuts or services.

01604 MATERIALS HANDLING AND STORAGE

Material storage and staging area shall be approved by the Owner. All equipment and materials to be incorporated in the work shall be so placed as not to injure the work or the Owner's property as so that free access may be had at any time to all parts of the work, and to all utility installations in the vicinity of the work.

Materials and equipment shall be kept neatly piled and compactly and conveniently stored so as to inconvenience as little as possible travel in the area. Contractor shall obtain approval of PVSC for storage of his materials and equipment.

All loss, injury, or damage to the work or materials from whatever cause, shall be made good at the Contractor's expense.

Contractor shall be responsible for daily cleanup. All removed materials, rubbish and other things not required to be incorporated in the work shall be promptly removed from the property.

The Contractor will be responsible for the security of his tools, equipment and all his materials.

Any spillage caused by the Contractor, his subcontractors, suppliers or his equipment, while on PVSC property, shall be the Contractor's responsibility to properly clean up at the Contractor's expenses. The cleanup shall meet all Federal and State requirements, including proper documentation as may be required.

01630 DOMESTIC PRODUCTS AND MATERIALS

In accordance with NJAC 40A:11-18, only products and materials produced, mined or manufactured in the United States which will ultimately become the property of the PVSC may be used in this contract.

This section shall not apply with respect to domestic materials, if domestic materials of the class or kind to be used are not mined, produced or manufactured, as the case may be, in the United States in commercial quantities and of a satisfactory quality or in respect to some particular domestic materials it is impracticable to make such requirement or that it would unreasonably increase the cost, an exception shall be permitted. Any request for exception of this requirement shall be in writing and shall be approved by the Engineer.

01710 QUALIFICATION OF CONTRACTOR

The Contractor shall have experience in the construction modifications or maintenance in Sewerage Treatment Plants, Pump Stations or similar facilities.

The Contractor shall specialize in the Insulation industry. The Contractor shall have a minimum of ten (10) years of experience. The Contractor shall ensure that all requested work shall be performed by personnel who are trained and certified to provide the type of service specified.

The Contractor and his personnel must be experienced in insulation installation, mold remediation and/or asbestos abatement as specified below. All work shall be performed by personnel who are trained and certified to provide the type of service specified herein.

The Contractor and/or subcontractor must submit with his contract proposal all information as required by Section 00403 – Subcontractor Listing.

The Contractor shall only use a crew supervisor with at least three (3) years' documented experience in the crafts listed in section 00400 – Supplements to Bid Forms and in the application of the insulation materials as referenced in Divisions 1, 10 and 15 as specified by PVSC for the subject work. The Contractor shall submit a certification of this experience for foremen scheduled to supervise the work. The certification for the foremen shall include that person's craft(s) and the names and address of at least three (3) customers that they have performed similar work for within the past (3) years. No worker will be permitted on site to perform any work unless the certifications for the particular foremen they hired has been submitted, approved, and on file in PVSC's Engineering Department.

Where asbestos removal is part of the Contractor's scope of work, both the contractor and workers shall submit State of New Jersey Department of Labor Asbestos Licenses.

01720 TRADE PRACTICE/SUPERVISION

The Contractor shall retain skilled craftsmen for the duration of the job and shall provide continual supervision to insure that good trade practices, including safety, are adhered to.

Further, the Contractor's Superintendent and trade Foreman shall be available for consultation with regard to work performed under this specification, to the PVSC designated representative, throughout each day for the duration of the contract.

Contractor will be held responsible for the conduct of his personnel on site, and shall promptly remove individuals who are drunk, disorderly, or found with controlled substances, when requested by the Owner.

Parking for Contractor trucks and employees vehicles with the plant is at the Commission convenience. Parking shall be where designated by the Commission and is subject to change.

01730 WARRANTY AND QUALITY ASSURANCE

Contractor shall warrant all work to PVSC for one (1) year against defective materials and workmanship. Warranty to begin from date of substantial completion as defined/determined by PVSC.

Inspection of work and materials by the Owner shall not relieve the Contractor of any obligations to fulfill the terms of this contract, and any defective work found at the time of installation shall be made good. All unsuitable materials shall be rejected notwithstanding that such materials have been previously overlooked by the Owner and accepted.

The work site shall remain open to the Owner for purposes of inspection. The Owner reserves the right to halt progress as he deems the specifications or the intent of the specifications are

not being adhered to. The terms Owner, Engineer or Plant Engineer, shall be construed to be interchangeable in this Contract.

END OF SECTION

DIVISION 7: FIRE

07841 THROUGH PENETRATION FIRESTOP SYSTEMS

PART 1 - GENERAL

1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 Summary

- A. This Section includes through-penetration firestop systems for penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items.
- B. Related Sections include the following:
 - 1. Division 7 Section "Fire-Resistive Joint Systems."
 - 2. Division 13 Sections specifying fire-suppression piping penetrations.
 - 3. Division 15 Sections specifying duct and piping penetrations.
 - 4. Division 16 Sections specifying cable and conduit penetrations.

1.03 Performance Requirements

- A. General: For penetrations through [the following]fire-resistance-rated constructions, including both empty openings and openings containing penetrating items, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated.
 - 1. Fire-resistance-rated walls including fire partitions and fire barriers.
 - 2. Fire-resistance-rated horizontal assemblies including floors.
- B. Rated Systems: Provide through-penetration firestop systems with the following ratings determined per ASTM E 814 or UL 1479:
 - 1. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
- C. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that, after curing, do not deteriorate when exposed to these conditions both during and after construction.
 - 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 - 2. For floor penetrations with annular spaces exceeding 4 inches (100 mm) in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved, either by installing floor plates or by other means.

3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
- D. For through-penetration firestop systems exposed to view, provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

1.04 Submittals

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For each through-penetration firestop system, show each type of construction condition penetrated, relationships to adjoining construction, and type of penetrating item. Include firestop design designation of qualified testing and inspecting agency that evidences compliance with requirements for each condition indicated.
 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
- C. Through-Penetration Firestop System Schedule: Indicate locations of each through-penetration firestop system, along with the following information:
 1. Types of penetrating items.
 2. Types of constructions penetrated, including fire-resistance ratings and, where applicable, thicknesses of construction penetrated.
 3. Through-penetration firestop systems for each location identified by firestop design designation of qualified testing and inspecting agency.
- D. Qualification Data: For Installer.
- E. Product Certificates: For through-penetration firestop system products, signed by product manufacturer.

1.05 Quality Assurance

- A. Installer Qualifications: A firm experienced in installing through-penetration firestop systems similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its through-penetration firestop system products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.
- B. Installation Responsibility: Assign installation of through-penetration firestop systems and fire-resistive joint systems in Project to a single qualified installer.
- C. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, through one source from a single manufacturer.
- D. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in Part 1 "Performance Requirements" Article:
 1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.

2. Through-penetration firestop systems are identical to those tested per testing standard referenced in "Part 1 Performance Requirements" Article. Provide rated systems complying with the following requirements:
 - a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
 - b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:
 - 1) UL in its "Fire Resistance Directory."

1.06 Delivery, Storage and Handling

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life if applicable, qualified testing and inspecting agency's classification marking applicable to Project, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.07 Project Conditions

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.08 Coordination

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- C. Notify Owner's inspecting agency at least seven days in advance of through-penetration firestop system installations; confirm dates and times on days preceding each series of installations.
- D. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until each installation has been examined by [Owner's inspecting agency and] building inspector, if required by authorities having jurisdiction.

PART 2 - PRODUCTS

2.01 Manufacturers

- A. Available Products: Subject to compliance with requirements, through-penetration firestop systems that may be incorporated into the Work include, but are not limited to, those systems indicated that are produced by one of the following manufacturers:
 1. A/D Fire Protection Systems Inc.

2. Grace, W. R. & Co. - Conn.
3. Hilti, Inc.
4. Johns Manville.
5. Nelson Firestop Products.
6. NUCO Inc.
7. RectorSeal Corporation (The).
8. Specified Technologies Inc.
9. 3M; Fire Protection Products Division.
10. Tremco; Sealant/Weatherproofing Division.
11. USG Corporation.

2.02 Firestopping, General

- A. Compatibility: Provide through-penetration firestop systems that are compatible with one another; with the substrates forming openings; and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
- B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
 1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-/rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 2. Temporary forming materials.
 3. Substrate primers.
 4. Collars.
 5. Steel sleeves.

2.03 Fill Materials

- A. General: Provide through-penetration firestop systems containing the types of fill materials indicated in the Through-Penetration Firestop System Schedule at the end of Part 3 by referencing the types of materials described in this Article. Fill materials are those referred to

in directories of referenced testing and inspecting agencies as "fill," "void," or "cavity" materials.

- B. **Cast-in-Place Firestop Devices:** Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- C. **Latex Sealants:** Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
- D. **Firestop Devices:** Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- E. **Intumescent Composite Sheets:** Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.
- F. **Intumescent Putties:** Non-hardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- G. **Intumescent Wrap Strips:** Single-component intumescent elastomeric sheets with aluminum foil on one side.
- H. **Mortars:** Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a non-shrinking, homogeneous mortar.
- I. **Pillows/Bags:** Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives.
- J. **Silicone Foams:** Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, non-shrinking foam.
- K. **Silicone Sealants:** Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. **Grade:** Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and non-sag formulation for openings in vertical and other surfaces requiring a non-slumping, gunnable sealant, unless indicated firestop system limits use to non-sag grade for both opening conditions.
 - 2. **Grade for Horizontal Surfaces:** Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.
 - 3. **Grade for Vertical Surfaces:** Non-sag formulation for openings in vertical and other surfaces.

2.04 Mixing

- A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.01 Examination

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of work.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 Preparation

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with firestop system manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

3.03 Through-Penetration Firestop System Installation

- A. General: Install through-penetration firestop systems to comply with Part 1 "Performance Requirements" Article and with firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.04 Identification

- A. Identify through-penetration firestop systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of edge of the firestop systems so that labels will be visible to anyone seeking to remove penetrating items or firestop systems. Use mechanical fasteners for metal labels. For plastic labels, use self-adhering type with adhesives capable of permanently bonding labels to surfaces on which labels are placed and, in combination with label material, will result in partial destruction of label if removal is attempted. 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 Field Quality Control

- A. Inspecting Agency: Owner will engage a qualified, independent inspecting agency to inspect through-penetration firestops. Independent inspecting agency shall comply with ASTM E 2174 requirements including those related to qualifications, conducting inspections, and preparing test reports.
- B. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.
- C. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued and firestop installations comply with requirements.

3.06 Cleaning and Protecting

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce systems complying with specified requirements.

3.07 Through-Penetration Firestop System Schedule

- A. Where UL-classified systems are indicated, they refer to alpha-alpha-numeric designations listed in UL's "Fire Resistance Directory" under product Category XHEZ.
- B. Firestop Systems with No Penetrating Items[FS-<#>]:
1. [Available]UL-Classified Systems: [C-AJ-] [C-BJ-] [F-A-] [W-J-] [W-L-] <Insert one or more four-digit numbers> [0001-0999].

2. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Silicone sealant.
 - c. Intumescent putty.
 - d. Mortar.
- C. Firestop Systems for Metallic Pipes, Conduit, or Tubing[FS-<#>]:
 1. [Available]UL-Classified Systems: [C-AJ-] [C-BJ-] [C-BK-] [F-A-] [F-B-] [F-C-]
 2. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Silicone sealant.
 - c. Intumescent putty.
 - d. Mortar.
- D. Firestop Systems for Nonmetallic Pipe, Conduit, or Tubing[FS-<#>]:
 1. [Available]UL-Classified Systems: [C-AJ-] [C-BJ-] [F-A-] [F-B-] [F-C-] [W-J-] [W-L-] <Insert one or more four-digit numbers> [2001-2999].
 2. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Silicone sealant.
 - c. Intumescent putty.
 - d. Intumescent wrap strips.
 - e. Firestop device.
- E. Firestop Systems for Electrical Cables[FS-<#>]:
 1. [Available]UL-Classified Systems: [C-AJ-] [C-BJ-] [F-A-] [F-B-] [F-C-] [W-J-] [W-L-] <Insert one or more four-digit numbers> [3001-3999].
 2. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Silicone sealant.
 - c. Intumescent putty.
 - d. Silicone foam.
 - e. Pillows/bags.

F. Firestop Systems for Cable Trays[FS-<#>]:

1. [Available]UL-Classified Systems: [C-AJ-] [C-BJ-] [F-A-] [F-B-] [F-C-] [W-J-] [W-K-] [W-L-] <Insert one or more four-digit numbers> [4001-4999].
2. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Intumescent putty.
 - c. Silicone foam.
 - d. Pillows/bags.
 - e. Mortar.

G. Firestop Systems for Insulated Pipes[FS-<#>]:

1. [Available]UL-Classified Systems: [C-AJ-] [C-BJ-] [F-A-] [F-C-] [W-J-] [W-L-] <Insert one or more four-digit numbers> [5001-5999].
2. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Intumescent putty.
 - c. Silicone foam.
 - d. Intumescent wrap strips.

H. Firestop Systems for Miscellaneous Electrical Penetrants[FS-<#>]:

1. [Available]UL-Classified Systems: [C-AJ-] [F-A-] [W-L-] <Insert one or more four-digit numbers> [6001-6999].
2. Type of Fill Materials: One or more of the following:
 - a. Latex sealant.
 - b. Intumescent putty.
 - c. Mortar.

I. Firestop Systems for Miscellaneous Mechanical Penetrants[FS-<#>]:

1. [Available]UL-Classified Systems: [C-AJ-] [F-C-] [W-J-] [W-L-] <Insert one or more four-digit numbers> [7001-7999].
2. Type of Fill Materials: One or both of the following:
 - d. Latex sealant.
 - e. Mortar.

J. Firestop Systems for Groupings of Penetrants[FS-<#>]:

1. [Available]UL-Classified Systems: [C-AJ-] [C-BJ-] [F-A-] [F-C-] [W-J-] [W-L-] <Insert one or more four-digit numbers> [8001-8999].
2. Type of Fill Materials: One or more of the following:
 - f. Latex sealant.
 - g. Mortar.
 - h. Intumescent wrap strips.
 - i. Firestop device.
 - j. Intumescent composite sheet.

07920 – JOINT SEALANTS

PART 1 - GENERAL

1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 Summary

- A. This Section includes joint sealants for the following applications:
 1. Perimeter joints between materials listed above and frames of doors windows and louvers.
 2. Interior joints in the following vertical surfaces and horizontal non-traffic surfaces:
 - a. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
- B. Related Sections include the following:
 1. Division 4 Section "Unit Masonry Assemblies" for masonry control and expansion joint fillers and gaskets.
 2. Division 7 Section "Fire-Resistive Joint Systems" for sealing joints in fire-resistance-rated construction.
 3. Division 9 Section "Gypsum Board Assemblies" for sealing perimeter joints of gypsum board partitions to reduce sound transmission.

1.03 Performance Requirements

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
- B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.04 Submittals

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Samples for Verification: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.
- E. SWRI Validation Certificate: For each elastomeric sealant specified to be validated by SWRI's Sealant Validation Program.

1.05 Quality Assurance

- A. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
 - 2. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.

1.06 Project Conditions

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 3. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer[or are below 40 deg F (5 deg C)].
 - 4. When joint substrates are wet.
 - 5. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 - 6. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 PRODUCTS

2.01 Manufacturers

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

2.02 Materials, General

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.03 Elastomeric Joint Sealants

- A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be non-staining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

2.04 Latex Joint Sealants

- A. Latex Sealant: Comply with ASTM C 834, Type P, Grade NF.
- B. Available Products:
 - 7. Bostik Findley; Chem-Calk 600.
 - 8. Pecora Corporation; AC-20+.
 - 9. Schnee-Morehead, Inc.; SM 8200.
 - 10. Sonneborn, Division of ChemRex Inc.; Sonolac.
 - 11. Tremco; Tremflex 834.

2.05 Preformed Joint Sealants

- A. Preformed Silicone-Sealant System: Manufacturer's standard system consisting of precured low-modulus silicone extrusion, in sizes to fit joint widths indicated, combined with a neutral-curing silicone sealant for bonding extrusions to substrates.
 - 12. Available Products:
 - b. Dow Corning Corporation; 123 Silicone Seal.
 - c. GE Silicones; UltraSpan US1100.
 - d. Pecora Corporation; Sil-Span.
 - e. Tremco; Spectrem Ez Seal.
- B. Preformed Foam Sealant: Manufacturer's standard preformed, precompressed, open-cell foam sealant that is manufactured from high-density urethane foam impregnated with a nondrying, water-repellent agent; is factory produced in precompressed sizes in roll or stick form to fit joint widths indicated; is coated on one side with a pressure-sensitive adhesive and covered with protective wrapping; develops a watertight and airtight seal when compressed to the degree specified by manufacturer; and complies with the following:
 - 1. Available Products:
 - a. EMSEAL Joint Systems, Ltd.; Emseal 25V.
 - b. illbruck Sealant Systems, Inc.; Wilseal 600.
 - c. Polytite Manufacturing Corporation; Polytite B.
 - d. Polytite Manufacturing Corporation; Polytite Standard.

e. Sandell Manufacturing Co., Inc.; Polyseal.

2. Properties: Permanently elastic, mildew resistant, non-migratory, non-staining, and compatible with joint substrates and other joint sealants.

a. Density: Manufacturer's standard.

2.06 Joint-Sealant Backing

A. General: Provide sealant backings of material and type that are non-staining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.07 Miscellaneous Materials

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 EXECUTION

3.01 Examination

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 Preparation

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

- a. Concrete.
 - b. Masonry.
- 3. Remove laitance and form-release agents from concrete.
- 4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
- B. Joint Priming: Prime joint substrates[, where recommended in writing by joint-sealant manufacturer,] based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.03 Installation of Joint Sealants

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
- F. Installation of Preformed Tapes: Install according to manufacturer's written instructions.
- G. Installation of Preformed Silicone-Sealant System: Comply with the following requirements:
1. Apply masking tape to each side of joint, outside of area to be covered by sealant system.
 2. Apply silicone sealant to each side of joint to produce a bead of size complying with preformed silicone-sealant system manufacturer's written instructions and covering a bonding area of not less than 3/8 inch (10 mm). Hold edge of sealant bead 1/4 inch (6 mm) inside masking tape.
 3. Within 10 minutes of sealant application, press silicone extrusion into sealant to wet extrusion and substrate. Use a roller to apply consistent pressure and ensure uniform contact between sealant and both extrusion and substrate.
 4. Complete installation of sealant system in horizontal joints before installing in vertical joints. Lap vertical joints over horizontal joints. At ends of joints, cut silicone extrusion with a razor knife.
- H. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping, taking care not to pull or stretch material, producing seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to sealant in compliance with sealant manufacturer's written instructions.

3.04 Field Quality Control

- A. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field-adhesion-test log.
- B. Inspect tested joints and report on the following:
1. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
 2. Whether sealants filled joint cavities and are free of voids.
 3. Whether sealant dimensions and configurations comply with specified requirements.

3.05 Cleaning

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.06 Protection

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION

DIVISION 10 SPECIALTIES-

10000 GENERAL INSULATION INSTALLATION WORK

10001 SCOPE OF WORK

The work of this section includes all supervision, labor, materials, equipment, and incidentals necessary to perform inspection of existing insulating materials for asbestos and mold. Scope of work includes disinfection and removal of mold or asbestos contaminated insulation materials in compliance with federal state and local regulations. Scope also included any surface preparation recommended by insulation manufacturer(s), proper support shielding at support locations, and outer protective skin, sheathing, or coatings to insulated piping, ducting and equipment at various PVSC Facilities as directed by the Engineer on an as needed basis.

The work shall include but shall not be limited to insulation of piping, ducting, and equipment as specified and in accordance with Division 15, Section 15081 Piping and Equipment Insulation of this specification.

- Preparation of existing piping, ducting, and equipment surfaces for installation of new insulating materials. Existing surfaces and insulating materials may include mold contaminated materials, asbestos, or require may require application to surfaces that are mold-contaminated, cracked, flaked, loose, peeling or to which remnants of previously applied insulation materials exist.
- Perform all asbestos removal in accordance with referenced standards of EPA, DOL ACLA and NJAC.
- Surface restoration work generally involves horizontal, vertical and obstructed duct, piping or equipment surfaces. Repairs shall include surface preparation, removal of contaminated or failed insulation material, and dispose of removed material specified by the owner in compliance with federal, state and local regulations.
- Provide all materials and equipment to replace the defective insulation material as directed by plant engineer, in accordance with the T&M Schedule and in accordance with the Bidder's unit cost price schedule..
- The Contractor shall refer to PVSC drawings available from PVSC archives, provided by the PVSC engineer or project representative.
- Provide and erect all ladders or any additional man-lift equipment required for access to designated areas, including scaffolding.
- Apply primers, mastics, vapor-barriers, support shields, sheathing and top coat per contract and manufacturers specification.
- Clean-up and disposal of all residue from surface preparation and other debris or related materials. Contractor shall be responsible for disposal of all spoils including sand blast materials. (Also refer to paragraphs 00728 and 10016 for clean-up and final acceptance.)
- Care is to be taken so no materials from the surface preparation or overspray materials contaminate other areas inside or outside the insulated piping, ducting or equipment..
- Work surfaces and materials are to be kept dry at all times during the course of the work. No work will be permitted on wet surfaces, or at temperatures below or above that recommended by the insulation manufacturer.
- It is the contractor's responsibility to assure that workers shall wear appropriate personal protective equipment (PPE) and request appropriate shutdowns and lock/tag clearance to protect workers from exposure hot or cold temperatures.

- It is the contractor's responsibility to assure that workers shall wear appropriate (PPE) and breathing apparatus where applicable to protect workers from airborne mold, asbestos, and disinfection chemicals and biocides in accordance MSDS recommended procedures for safe handling and with EPA and OSHA guidelines and standards.
- Where handling mold contaminated or asbestos containing materials, it is the contractor's responsibility to assure that at a minimum workers shall be protected from airborne mold spores or dried mold dust with appropriate NIOSH #N95 single filtering face piece disposable respirator.
- It is the contractor's responsibility to assure that workers shall provide and conduct hot-work permit procedures including monitoring for air content with an LEL meter for contaminants present in the work area, which could be explosive or flammable, decrease oxygen content, have toxic properties. It is the contractor's responsibility to provide adequate ventilation equipment and/or take appropriate actions to bring air content to within acceptable limits.
- It is the contractor's responsibility to designate a full time safety officer to monitor and assure that all work is performed in a safe manner at all times while on PVSC.
- The contractor shall conduct the work in a safety conscious fashion in accordance with Section 01603. This shall include all rules and codes relating to containment procedures and VOC emissions.

10002 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

(Refer to ASTM Reference Standards listed in Division 15, Section 15081 Piping and Equipment Insulation, entitled "References")

B. Environmental Protection Agency

1. EPA 402-K-01-001 Mold Remediation in Schools and Commercial Buildings

C. Department of Labor Asbestos Control and Licensing Act (ACLA) (N.J.S.A. 34:5A-32 et.seq.) and regulations (NJAC 12:120) Link: http://wd.dol.state.nj.us/labor/lse/employee/asbestos_controlandlicensing.html

Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

10003 SUBMITTALS

A Submit as a minimum the following in accordance with Section 01301:

1. Manufacturer's literature and product data listed in Division 15, Section 15081 Piping and Equipment Insulation, entitled "Submittals").

10004 QUALIFICATIONS, GENERAL

The Contractor shall have experience in the construction modifications or maintenance in Sewerage Treatment Plants, Pump Stations or similar facilities.

- The contractor shall insure that all requested insulation work, asbestos abatement work, and mold removal work; shall be performed by personnel who are trained to provide the type of service specified, such as insulator, or laborer for Asbestos and Hazardous Waste Removal. And as outlined with in this contract and in Section 01710 Qualifications of Contractor.

10005 MATERIALS, PARTS AND SUPPLIES

All parts and materials supplied by Contractor under the contract resulting from this Invitation and Bid shall be new, first quality products meeting original equipment manufacturer (OEM) specifications, but are not required to be provided by the OEM.

All materials and supplies shall be billed at cost plus a 15% contractor markup fee. The Contractor must submit a clear and legible copy of the original material invoice with his payment request in order to get reimbursed for the materials.

The pricing of all materials and supplies must be reasonable and competitive with prevailing market pricing.

Examples of reimbursable materials, consumables, and rental supplies include, but are not limited to the following:

- Molded Fiberglass Insulation
- Flexible Elastomeric Cellular Insulation
- Cellular Glass Insulation
- Semi-rigid Fiberglass Board
- Jacketing
- Accessories (Staples, stainless steel bands, wires, cement, adhesives, sealers, protective finishes, sheathing, fittings and fitting covers, etc.)
- Thermal Hanger Shields
- Associated man lifts and/or scaffolds
- Compressors
- Post-Cure Heating Equipment
- Brushes, rollers, extension handles etc.

Examples of items that are to be included with the Contractor General Equipment and are not considered reimbursable materials and supplies include but are not limited to the following:

- Hand Tools
- Power Tools
- Grinders
- Portable Mixers
- Shovels and Rakes
- Various Floats
- Special safety equipment for accessibility (unless pre-approved by PVSC)
- Ladders up to 40 foot extension.
- Airless spray equipment including nozzle tips
- Computers and Office Equipment
- Containment Protection i.e. tarps, drop cloths, etc.

10006 OEM or SPECIALTY SUBCONTRACTOR SERVICES

When requested by the Engineer, work shall include the services of a qualified factory-trained field representative of the manufacturer or specialty subcontractor to properly assist the Contractor for diagnostic services, repair and removal, or installation and startup at cost +5%. The Contractor must submit clear legible copy of the OEM or Specialty Subcontractors services invoice with his payment request in order to get reimbursed for their services.

The pricing of the OEM and Specialty Subcontractor Services must be reasonable and competitive with prevailing market pricing.

10007 QUALIFICATIONS, GENERAL

The Contractor shall have experience in the construction modifications or maintenance in Sewerage Treatment Plants, Pump Stations or similar facilities.

The contractor shall insure that all requested insulation repair work shall be performed by personnel who are trained to provide the type of service specified, and as outlined in Section 01710 Qualifications of Contractor.

10008 DELIVERY, STORAGE AND HANDLING

- A. Products shall be stored in conformity with the manufacturer's recommendations.

10009 AREAS OF WORK

The areas of work to be repaired, modified etc. will be determined by the Engineer.

10010 SURFACE PREPARATION

- A. All areas to be insulated or re-insulated shall be prepared in strict accordance with the Manufacturer's recommendations as described in application or installation instructions, and as specially directed by the PVSC engineer or project representative.
- B. Piping surfaces to receive re-insulating materials shall be clean and sound; frost, dew, dirt, grease, oil, process residue and free of all loose previous insulation and coating materials or foreign matter which may affect the bond or performance of the adhesive, mastic, barrier material or grout.
- C. Remove scaling, broken, loose and disintegrating materials, by use of hand tools, power driven sanders or sandblast equipment, down to solid wall material in accordance with manufacturer's recommendations.
- E. Remove all loose rust, oil or other deleterious substances which may affect the bond or performance of the new insulation materials

10011 JOB CONDITIONS

- A. Perform all work during dry and proper temperature conditions in accordance with the manufacturer's recommendations. All furnished work shall be protected during inclement weather with tarpaulins or heavy gage polyethylene sheeting.

10012 INSTALLATION - GENERAL

- A. All products shall be stored, mixed and applied in strict compliance with the manufacturer's recommendations and as directed by the Engineer
- B. Prior to any work contractor is to confirm that the existing insulation to be removed is non-asbestos containing. This shall be confirmed by testing through a licensed, third-party asbestos testing and monitoring firm.

- C. The contractor, or sub-contractor, used for the purpose of asbestos removal shall be an N.J. licensed asbestos removal contractor.

10013 WORKMANSHIP

All protective coating, finishing and painting work shall be performed and completed in a first class manner.

Items or surfaces not being painted or coated but which are adjacent to surfaces to be cleaned and painted shall be protected against contamination and damage during the preparation and painting operations. Particular care shall be taken to prevent sand or cleaning agents from entering moving mechanical linkage, joints, electric motors, drive chains, bearings, journals, or other moving parts. Nameplates, instruction plates, and similar plates shall be masked or otherwise protected during cleaning and coating, painting and finishing operations.

Particular care shall also be taken to prevent damage to nearby property, automobiles, etc., due to wind drift and airborne particles of either the cleaning agents or finish material.

10014 REPLACEMENTS

In the event of detriment to any PVSC owned equipment due to such causes as mechanical damage, overspray and contamination, immediate necessary repairs and/or replacements shall be made, subject to the approval of the Engineer, and at no additional cost to the Owner.

10015 PRODUCT HANDLING

Deliver all packaged materials to the job-site in their original unopened containers with all labels intact and legible at time of inspection. Storage of materials on site shall be limited to those materials which have been specified and approved by the PVSC Plant Engineer and in areas also so approved.

Store all materials in an approved manner, all materials must be protected at all times from moisture (rain, etc.). The Contractor shall be responsible for the security of materials.

10017 CONTRACTOR OWNED EQUIPMENT

Should the contractor be required to supply equipment that he owns and is not included within these contract requirements he must submit the hourly rate for such Contractor owned equipment.

The pricing of all contractors owned equipment must be reasonable and competitive with prevailing market pricing and as per Equipmentwatch.com

All rates shall include all fuel, lubricants, supplies, small tools, necessary attachment, repairs, overhaul, any maintenance, storage fees and insurance required.

Idle time for equipment will not be paid for, except where the equipment has been held on the site on a standby basis at the request of the Engineer.

END OF SECTION

DIVISION 15: MECHANICAL

15081: PIPING AND EQUIPMENT INSULATION

PART 1 – GENERAL

1.01 Section Includes

- I. This section includes insulation and jacketing requirements for piping systems, including piping, valves and accessories. The Contractor shall provide all labor, materials, equipment and incidentals as shown, specified or required to furnish and install the piping insulation work.

1.02 Related Specifications

- A. None

1.03 Payment

- A. No separate payment will be made for work under this section except as provided for in the Specifications.

1.04 References

- | | | |
|----|-----------------------------|---|
| A. | ASTM C 195 | Standard Specification for Mineral Fiber Thermal Insulating Cement |
| B. | ASTM C 240 | Standard Test Methods of Testing Cellular Glass Insulation Block |
| C. | ASTM C 411 | Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation |
| D. | ASTM C534 | Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form |
| E. | ASTM C 552 | Standard Specification for Cellular Glass Thermal Insulation |
| F. | ASTM C 547 | Standard Specification for Mineral Fiber Pipe Insulation |
| G. | ASTM C 1136 | Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation. |
| H. | ASTM D 1056 | Standard Specification for Flexible Cellular Materials – Sponge or Expanded Rubber |
| I. | ASTM E 84 | Standard Test Method for Surface Burning Characteristics of Building Materials |
| J. | ASTM E 96 | Standard Test Method for Water Vapor Transmission of Materials |
| K. | International Building Code | |

- L. Uniform Construction Code – State of New Jersey
- M. International Energy Conservation Code
- N. International Mechanical Code
- O. NFPA 255 Surface Burning Characteristics of Building Materials

1.05 Submittals

- A. General: The Contractor shall provide all submittals, including the following, as specified in Division 1 of the Specifications.
- B. Product Data:
 - 1. Insulation and related materials. Submit the manufacturer's technical product data, insulation materials, densities, fire ratings, flame-spread ratings, smoke-developed ratings, fuel contributed ratings, material safety data sheets and installation instructions for each type of piping insulation and related materials. Submit a schedule showing the manufacturer's product number k-value, thickness, and furnished accessories for each piping system requiring insulation.
 - 2. PVC jacketing. Submit the manufacturer's technical data for jacketing and related materials.
- C. Installation Drawings: Complete assembly, layout and installation drawings with clearly marked dimensions.

1.06 Quality Assurance and Qualifications

- A. Manufacturer's Qualifications: Provide insulation from firms regularly engaged in manufacture of piping insulation products, of the types and sizes required, whose products have been in satisfactory use in similar services for not less than three (3) years.
- B. Installer's Qualifications: Use a single firm with at least five (5) years successful installation experience on projects with insulations similar to that required for this project.

1.07 Delivery, Storage and Handling

- A. General: Deliver, store and handle all products and materials as specified in Division 1 and as follows.
- B. Labeling: Deliver the insulation, coverings, cements, adhesives and coatings to the site in containers with the manufacturer's stamp or label, affixed showing the fire hazard indexes of products.
- C. Protection: Protect the insulation against dirt, water, and chemical and mechanical damage. Do not install damaged or wet insulation. Remove damaged materials from the project site.

PART 2 – PRODUCTS

2.01 Manufacturers

- A. General: Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted for approval.

B. Style A Insulation

1. Johns Manville Corp.
2. Owens-Corning Fiberglass Corp.

C. Style B Insulation

1. Armstrong World Industries, Inc.
2. Rubatex Corp.

D. Style C Insulation

1. Pittsburgh Corning Corp.

E. Style D Insulation

1. Johns Manville Corp.
2. Owens-Corning Fiberglass Corp.

F. Jacketing

1. Johns Manville – PVC Zeston

G. Thermal Hanger Shields

1. Pipe Shields Inc.

2.02 Flame/Smoke Ratings

- A. Piping insulation shall have a composite (insulation, jackets, coverings, sealers, mastics and adhesives) flame-spread index of 25 or less, fuel-contributed rating of 50 or less, and smoke-developed index of 50 or less, as tested by ASTM E 84 (NFPA 255) method. Any treatments of jackets or facings to impart flame and smoke safety shall be permanent. The use of water-soluble treatments shall be prohibited.

2.03 Building Code Compliance

- A. Piping insulation products shall comply with the Uniform Construction Code – State of New Jersey, 2009 International Building Code, 2009 International Mechanical Code and with the 2009 International Energy Conservation Code.

2.04 Materials

A. Style A Insulation – Molded Fiberglass Pipe Insulation

1. Style A insulation shall be heavy-duty, bonded fibrous glass sectional pipe insulation with a thermal conductivity not exceeding 0.26 BTU per hour square foot per degree F per inch thickness at 50 degrees F mean temperature and not exceeding 0.3 BTU per hour per square foot per degree F per inch thickness at 200 degrees F mean temperature. Insulation shall be provided with factory-applied vapor retarder. The vapor retarder shall be an ASJ (all-service jacket) type meeting the requirements of ASTM C 1136 Type 1 and consisting of laminated white Kraft paper, reinforcing scrim and foil. The insulation shall meet the requirements of ASTM C 547 Type 1. Insulation shall be rated for use at temperatures up to 850 degrees F.

2. **Joints and Seams:** Provide joints and seams meeting one of the following requirements:
 - a. **Field cemented joints:** All joints and seams shall be sealed with approved adhesive, and the joints covered with joint sealing tape at least three (3") inches in width, permanently adhered.
 - b. **Sealing Strips:** All longitudinal joints shall be sealed with integral adhesive sealing strip, and butt joints shall be covered with three (3") inch width of vapor barrier butt joint strip tape.
3. **Fittings, flanges and valves:** Provide insulation meeting one of the following requirements:
 - a. Fittings, flanges and valves shall be insulated with fiberglass molded or segmented insulation, and wrapped with joint sealing tape of matching color.
 - b. Alternatively fittings, flanges and valves may be insulated with factory cut glass blanket.

B. Style B Insulation – Flexible Elastomeric Cellular Insulation

1. Style B insulation shall be flexible elastomeric type, closed cell, cylindrical or sheet type as required by the application. Flexible elastomeric insulation shall have a thermal conductivity not exceeding 0.27 BTU per hour per square foot per degree F per inch thickness at 75 degrees F mean temperature. Water absorption shall be less than 5% (ASTM D 1056). Water vapor permeability shall not exceed 0.10 perms per inch in accordance with ASTM E 96 Procedure A. The insulation shall meet the requirements of ASTM C534 and ASTM D 1056.
2. **Joints and Seams:** All joints shall be cut straight and butted with no gaps. Seal all joints with the manufacturer's recommended adhesive.
3. **Fittings, flanges and valves:**
 - a. Seams and mitered joints shall be adhered using the manufacturer's recommended adhesive. Screwed fittings shall be sleeved and adhered with a minimum one (1") inch overlap onto the adjacent insulation.
 - b. Flanges, strainers, couplings and valves shall be insulated using donuts, then covered with sheet or oversize tubular insulation.
4. **Coating:**
 - a. Where insulation is installed outdoors directly exposed to sunlight, coatings shall be provided to protect the insulation from ultraviolet radiation. Coatings shall be as recommended by the insulation manufacturer and approved by the Engineer. When using Armaflex Exterior Coating material shall be two (2) coats of "Armaflex WB Finish".

C. Style C Insulation – Cellular Glass

1. Cellular glass insulation shall have a water absorption not exceeding 0.2 percent (ASTM C 240), have 0.20 perms-inch water vapor permeability (ASTM E 96), service temperature range of at least 0 to 220 degrees F, a minimum density of 8.0 lbs. per cubic foot, compressive strength of 100 psi, and maximum thermal conductivity of 0.32 BTU per hour per square foot per degree F per inch thickness at 75 degrees F average temperature. Where field-applied stainless steel jacketing is not required over the insulation, the insulation shall be provided with a factory-applied facing of

aluminum foil laminated to glass fiber reinforced white vinyl facing. The insulation shall meet the requirements of ASTM C 552.

2. Joints and Seams:

- a. Insulation joints shall be sealed with the insulation manufacturer's recommended vapor-resistant joint sealant.
 - b. Factory-applied facing shall have its longitudinal seams sealed with vapor-resistant adhesive and butt joints shall be wrapped with three (3") inch width joint sealing tape, all as recommended by the insulation manufacturer and approved by the Engineer.
- 3. Fittings, flanges and valves:** Fittings, flanges and valves shall be insulated with preformed cellular glass insulation. Fitted insulation segments shall be used on sizes for which preformed shapes are not manufactured, of the same material and thickness and applied in the same manner as for pipe insulation.
- 4. Where indicated on the Contract Drawings or in the Specifications, the interior bore of the insulation shall be coated to prevent abrasion of the pipe. For pipe operating near ambient temperature, the coating shall be a gypsum cement molding plaster such as U. S. Gypsum Hydrocal B-11, or equal, as recommended by the insulation manufacturer.**

D. Style D Insulation – Fiberglass Pipe and Tank

1. Style D insulation shall be fiberglass pipe and tank insulation consisting of semi-rigid fiberglass board bonded to a flexible vapor retarder. Insulation shall have a thermal conductivity not exceeding 0.27 BTU per hour per square foot per degree F per inch thickness at 75 degrees F mean temperature and 0.43 BTU per hour per square foot per degree F per inch thickness at 250 degrees F mean temperature. Insulation shall be rated for use over an operating temperature range of 0 to 650 degrees F in accordance with ASTM C411. Insulation shall be provided with factory applied vapor retarder. The vapor retarder shall be an ASJ (all service jacket) type consisting of laminated white Kraft paper, reinforcing scrim and foil. ASJ shall be rated for use over a temperature range of -20 to 150 degrees F and shall meet the requirements of ASTM 1136 Type 1.
2. Joints and Seams: All joints and seams shall be sealed with approved adhesive, and the joints covered with joint sealing tape at least three (3") inches in width, permanently adhered.
3. Fittings, flanges and valves: Provide insulation meeting one of the following requirements:
 - a. Fittings, flanges and valves shall be insulated with fiberglass molded or segmented insulation, and wrapped with joint sealing tape of matching color.
 - b. Alternatively, fittings, flanges and valves may be insulated with factory cut glass blanket.

E. Jacketing

1. PVC jacketing shall not be less than 30 mil thick. PVC jacketing shall be Zeston 2000 Series PVC as manufactured by Johns Manville, or approved equal.

F. Accessories

1. Provide staples, bands, wires and cement as recommended by the insulation manufacturer and approved by the Engineer for the applications indicated.
2. Provide adhesives, sealers, and protective finishes as recommended by the insulation manufacturer and approved by the Engineer for the applications indicated.

G. Thermal Hanger Shields

1. Provide insulated pipe protectors consisting of a 360 degree high density, 100 psi, waterproofed calcium silicate inserts encased in 360 degree sheet metal. On cold water pipes provide protectors with insulation extended 1 (1") inch beyond the sheet metal shield. On heat-traced pipe, protectors shall be provided with grooves to accommodate the heat tracing.
2. Provide the thickness of the insulation insert to be the same as the adjoining pipe insulation, and sheet metal gauge in accordance with the manufacturer's recommendations.
3. Provide metal components manufactured of Type 316 stainless steel. Pipe hangers and supports provided in conjunction with the thermal hanger shields shall meet the requirements of paragraph 2.06.

2.05 HVAC Insulation

A. General Information:

1. All HVAC insulation and adhesives shall be made of material which will not support combustion and shall be considered fire resistant. Prior to the commencement of the work, the Contractor shall submit a schedule of the proposed insulation materials and the methods of application to be used to the Engineer for review.
2. The insulation shall have composite (insulation, jacket or facing, and adhesive used to adhere the facing or jacket to the insulation) fire and smoke hazard ratings, not exceeding Flame Spread of 25, Smoke Developed of 50, and Fuel Contributed of 50. Accessories, such as adhesives, mastics, cements, tapes and cloth for fittings shall have component ratings not exceeding Flame Spread of 25, Smoke Developed of 50 and Fuel Contributed of 50. All products or their shipping cartons shall bear a label indicating that flame and smoke ratings do not exceed these ratings. Any treatment of jackets or facings to impart flame and smoke safety shall be permanent. The use of water soluble treatments will be prohibited.

B. Piping Insulation:

1. General Piping Insulation

- a. All heating and cooling water pipelines shall be insulated. The piping shall be cleaned, tested and painted as specified prior to the application of the insulation. All surfaces of pipe jacketing shall be smooth and even. All sectional pipe covering shall be removable and stopped and beveled off a sufficient distance from all flanges and screwed joints to permit easy removal of flange bolts and screwed joints. All insulation shall be product of Owens Corning, Johns Manville, or approved equal.
- b. Fittings and valves shall be insulated with molded or mitered segments of same thickness, type and finish as adjoining pipe covering. Flanged and screwed joints shall be insulated with sectional or block insulation, removable and replaceable. The flanged and screwed joints insulation shall be filled with cement as recommended by the manufacturer.

- c. Pipe insulation shall be A, B or C as indicated in the piping schedule, listed in Paragraph 2.06, Pipe Schedules.
- d. A or B piping insulation systems shall have a composite (insulation jacket and adhesive) Fire and Smoke Hazard rating as tested by ASTM E84 not exceeding:

Flame Spread	25
Smoke Developed	50

- e. A or B piping insulation shall have attached a vapor barrier consisting of a laminate of high density Kraft paper bonded to aluminum foil reinforced with fiberglass yarn.
- f. A, B and C piping insulation shall be covered with a 30 mil PVC jacket.

Jacketing shall be installed in accordance with manufacturer's recommendations. All insulated fittings shall be finished in the same manner, using PVC preformed fitting covers and fabricated covers made from the same material for valves, flanges, tees, in line accessories, etc. Jacketing system shall be Zeston 2000, as manufactured by Johns Manville, or approved equal.

- g. Pipe supports fitted over the outside of the insulation shall have load distributing, stainless steel sheet metal shields positioned between the insulation and the pipe support. The shield shall have a round contour to match the curvature of the pipe insulation and shall cover the lower 120 degrees of the pipe insulation circumference.
- h. Pipe insulation shall be continuous through interior walls and floor openings, except where walls or floors are required to be firestopped, required to have a fire resisting rating or required to be gas tight.
- i. All in line piping accessories, e.g. expansion tanks, air separators, heat exchangers, etc., shall be insulated under this section in accordance with the requirements for the adjacent piping.

2. Type A Insulation

- a. Shall be installed on pipes carrying hot water for the purpose of reducing heat loss and preventing injury to workers.
- b. Shall be fiberglass preformed pipe insulation with thermal conductivity of not more than 0.23 BTU-in./hr.-sq. ft.-degrees F at 75 degrees F mean temperature meeting or exceeding ASTM C547 Class I requirements for pipes up to and including 36 inches nominal pipe size.
- c. Shall be 1-1/2 inch thick for piping 2-1/2 inches and smaller, 2 inch thick for piping 3 inches to six inches, 2-1/2 inch thick for 8 inches and larger.
- d. All valves and in line accessories shall be insulated with the same thickness, type and finish as the adjoining pipe covering.

3. Type B Insulation

- a. Shall be installed on pipes carrying cold water for the purpose of eliminating sweating.
- b. Shall be identical to Type A except that the thickness shall be 1-1/2 inch around the pipe and fittings.
- c. All valves and in line accessories shall be insulated with the same thickness, type and finish as adjoining pipe covering.

4. Type C Insulation

- a. Insulation shall be foamed plastic type, closed cell, cylindrical or sheet type as required by the application, Armstrong Cork, Co. "Armaflex" or Owens Corning. Apply in strict accordance with manufacturer's recommendations. All joints shall be cut straight and butted with no gaps. Seal all joints with the manufacturer's recommended adhesive. The minimum thickness of insulation for all refrigerant piping, fittings and accessories shall be one (2") inch.

C. Equipment Insulation

1. All equipment listed below shall be insulated with 1-1/2 inch thick glass fiber board having a density of not less than 3.0 lbs./cubic foot and a thermal conductivity of not more than .23 BTU-in.hr.,-sq. ft.-degrees F at 75 degrees mean temperature. The insulation shall consist of an aluminum foil reinforced with fiberglass yarn and laminated to Kraft. It shall be secured with copper clad wire or pins and clips on 12 inch centers. All voids shall be filled with insulating cement; all joints and breaks in the vapor facing shall be adhered with vapor barrier adhesive. The facing shall be finished with 316 stainless steel lock on jacketing system.
2. The following equipment shall be insulated:
 - a. Heat exchangers.
 - b. All base mounted pumps. (Pumps shall be provided with removable, insulated metal covers).
 - c. Expansion tanks.
 - d. Air separators.
 - e. Condensate Recovery System

2.06 Pipe Schedules

A. General

1. The Contractor shall furnish and install all piping, and appurtenances as specified, as shown on the Contract Drawings and including, but not limited to, the following schedule.

B. Abbreviations and Legends

1. The following abbreviations and legends shall be used in the reading of the schedule:

a. Service

CWS/R	-	Cooling Water Supply/Return
BD	-	Boiler Drain and Boiler Relief Valve Discharge
DR	-	Drain – Miscellaneous
HW/S/R	-	Hot Water Supply/Return
MU	-	Make-Up Water
NG	-	Natural Gas
REF	-	Refrigerant
DCW	-	Domestic Cold Water
NPW	-	Not Potable Water

b. Material

DI	-	Ductile Iron
CU	-	Copper
STL	-	Steel
SS	-	Stainless Steel

c. Wall Thickness

CL	-	Class
SCH	-	Schedule
PC	-	Pressure Class

d. Type of Joint

FLG	-	Flanged
SLD	-	Soldered
THD	-	Threaded
WLD	-	Welded

e. Type of Fittings

MI	-	Malleable Iron
STL	-	Steel
BR	-	Bronze
SS	-	Stainless Steel

f. Protection

1) Exterior

PR	-	Primer Applied
"A" Ins	-	Type A Insulation
"B" Ins	-	Type B Insulation
"C" Ins	-	Type C Insulation

2) Interior

ACCL	-	Asphalt Coated Cement Line
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C. Schedule

The schedules are presented on the following pages.

INTERIOR AND EXPOSED PIPING

Service	Nominal Pipe Size (Inches)	Material	Wall Thickness	Type of Joint	Type of Fittings	Working Pressure (psig)	Test Pressure (psig)	Protection		Remarks
								Interior	Exterior	
MU	0 to 3	CU	TYP K	SLD	BR/CU	100	150	--	"B" INS	1-1/2 inch thick INS
DCW/NPW	Up to 2-1/2	STL	SCH 40	THD	MI	100	150	--	"A" INS	1-1/2 inch thick INS
DCW/NPW	3 TO 12	STL	SCH 40	FLG	STL	100	150	--	"A" INS	1-1/2 inch thick INS
HWS/R & STEAM	Up to 2-1/2	STL	SCH 40	THD	MI	100	150	--	"A" INS	2 INCH THICK Ins
HWS/R & STEAM	3 to 6	STL	SCH 40	WLD/FLG	STL	100	150	--	"A" INS	2 inch thick INS
HWS/R & STEAM	8 to 24	STL	SCH 40	WLD/FLG	STL	100	150	--	"A" INS	2-1/2 inch thick INS
NG	Up to 12	STL	SCH 80	WLD	STL	50	200	--	PR	
BD	Up to 2-1/2	STL	SCH 40	THD	MI	25	40	--	"B" INS	1-1/2 inch thick INS
DR	Up to 3	CU	TYP L	SLD	BR/CU	100	150	--	"C" INS	1 inch thick INS

NOTE: Where multiple joint types are indicated (i.e. WLD/FLG), the Contractor shall use welded type except when connecting to valves and equipment where flanged joints are required.

SCHEDULE OF PIPE SUPPORTS

Diameter of Pipe	Hanger Type	Diameter of Hanger Rod	Type of Anchor	Adjustable Pipe Saddle Supports	Bracket Support
To 2"	Fig. 65	3/8"	Fig. 279	-	Fig. 194
2" up to 4"	Fig. 260	1/2"	Fig. 279	-	Fig. 195
4"	Fig. 260	5/8"	Fig. 279	Fig. 264	Fig. 199
6"	Fig. 260	3/4"	Fig. 279	Fig. 264	Fig. 199
8" to 10"	Fig. 260	7/8"	Fig. 282	Fig. 264	Fig. 199
12"	Fig. 260	7/8"	-	Fig. 264	Fig. 199

- (1) Use multiple hanger rods
- (2) Trapeze with chair
- (3) To be used for 14 inch pipes only. Bracket supports not to be used for larger pipes.

Note: All hangers, hanger rods, hanger hardware, shall be fabricated of galvanized steel. Figure numbers shown in this schedule refer to Grinnell Company, Inc. and are used to indicate type and size required. Equivalent models by Basic Engineers, Carpenter Patterson, or approved equal shall be acceptable.

2.07 Insulation of Cryogenic and Low Temperature Oxygen Piping of Standard Plant

Refer to Appendix 3

PART 3 - EXECUTION

3.01 Inspection

- A. General: Examine areas and conditions under which piping insulation is to be installed. Do not proceed with Work until unsatisfactory conditions have been corrected in a manner acceptable for insulation installation, as determined by the Engineer.

3.02 Installation

- A. General: Install piping insulation products in accordance with the manufacturer's recommendations and approved shop drawings, and as specified in Division 1. Install piping insulation products in accordance with the 2009 International Building Code NJ Edition and the 2009 International Mechanical Code. Install all products in accordance with the recognized industry practices so that insulation serves its intended purpose. Insulated thermal hangers shields shall be installed at all support points, except where otherwise indicated.

B. Piping Insulation:

1. **Order of Installation:** Install insulation on pipe systems subsequent to the installation of heat tracing, painting, testing, and acceptance tests. Piping shall be field tested and approved by the Engineer prior to installation of insulation.
2. **Cleaning and Drying:** Pipe surfaces shall be cleaned and dried prior to insulating.
3. **Insulation Surfaces:** Install the insulation materials with smooth, even and flush adjoining surfaces. Butt insulation joints firmly together to form a complete and tight fit over the surfaces to be covered. Insulate each continuous run of piping with full length units of insulation, with a single cut piece to complete the run. Do not use cut pieces or scraps abutting each other.
4. **Vapor Barrier:** Maintain integrity of the vapor-barrier jackets on pipe insulation, and protect to prevent puncture or other damage. Vapor barrier materials shall be applied to form a complete, unbroken vapor seal over the entire insulated piping system.
5. **Insulating Fittings:** Cover valves, fittings and similar items in each piping system with an equivalent thickness and composition of insulation as applied to the adjoining pipe run. Install factory molded, precut or job fabricated units except where a specific form or type is indicated.
 - a. Unless indicated otherwise, piping insulation shall be extended without interruption through interior walls, floors and similar piping penetrations. Annular spaces between pipe and pipe sleeves shall be thoroughly packed with fibrous glass blanket and caulked with mastic so as to be soundproof and vermin-tight. Provide fibrous glass blanket with properties equivalent to the insulation Style installed on the piping.
 - b. Do not extend insulation through walls or floors that are fire rated or are required to be gas-tight.
6. **Pipe Hangers:**
 - a. Butt pipe insulation against pipe hanger insulation inserts.
 - b. For hot pipes, apply a three (3") inch wide vapor barrier tape or band over the butt joints.
 - c. For cold piping apply a wet coat of the vapor barrier lap cement on butt joints and seal the joints with a three (3") inch wide vapor barrier tape or band. Pipe hangers and supports shall be installed outside of the vapor seal.
7. **Removable Items:** Install removable insulation sections on the following:
 - a. Devices that require access for maintenance of equipment.
 - b. Items that can be removed, such as unions, screwed joints, flanges, strainers, etc.

C. Jacketing: Provide PVC jacketing over all insulated piping systems. Install jacketing in accordance with the manufacturer's recommendations and approved shop drawings.

D. Pipe exposed to weather:

1. Pipe hangers and supports shall be on the outside of the stainless steel jackets, and shall not penetrate the jacketing.
2. Do not install thermal hanger shields on pipelines using cellular glass insulation. At each such location, a preformed galvanized steel insulation shield shall be provided. The

insulation shield shall envelope at least the lower half of the insulated pipe and shall limit the compressive load on the insulation to 33 psi or less.

- E. All jacket openings – such as at overlaps of jackets with thermal hanger shields, around valve stems and similar projections – shall be sealed with non-hardening, waterproof, clear or white sealing compound so that upon completion the insulation is essentially watertight.

3.03 Existing Insulation Repair

- A. Repair sections of existing piping insulation that are damaged during construction. Use insulation of same thickness as the existing insulation. Install a new jacket lapping and sealer over the existing insulation. If existing insulation is painted, paint new insulation to match the existing surface color. If existing insulation is jacketed, replace damaged jacketing with new jacket.

3.04 Protection and Replacement

- A. Protection: Insulation shall be protected against dirt, water, chemical or mechanical damage before, during and after installation. Follow methods which are required for protection of the insulation work during the remainder of construction period, to avoid damage and deterioration.
- B. Replacement: Any insulation or covering damaged prior to final acceptance of the work shall be satisfactorily repaired or replaced, including units with vapor barrier damage and moisture saturated units.

3.05 Painting and Cleaning

- A. Where required piping insulation shall be painted in accordance with Manufacturers recommendations referenced in Paragraph 2.04.B.4..
- B. The Contractor shall remove all debris, waste materials and loose foreign matter resulting from installation.

3.06 General Contract Piping System Insulation Schedule

- A. General: In addition to the requirements above, the Contractor shall provide piping insulation on the following mechanical piping systems and as indicated in the Specifications.
- B. Thickness: Where not indicated otherwise, the Contractor shall provide the following minimum insulation thicknesses:
 - 1. Insulation shall be one (1") inch thick for pipe sizes up to and including six (6") inches.
 - 2. Insulation shall be 1-1/2 inch thick for pipe over six (6") inches.
- C. Cold Piping Systems
 - 1. Style: Insulation shall be Style A.
 - 2. Install on the following for the purpose of eliminating sweating:
 - a. City water systems
 - b. Service water systems
- D. Hot Piping Systems (to 250 Degrees F)

1. Style:
 - a. Insulation shall be Style A for pipe sizes up to and including 30-inch.
 - b. Insulation shall be Style D for pipe sizes greater than 30-inch.
 2. Thickness: The Contractor shall provide the following minimum thicknesses for the purpose of reducing heat loss and preventing injury to workers:
 - a. Insulation shall be 1-1/2 inch thick for pipe sizes up to and including two (2") inch.
 - b. Insulation shall be two (2") inch thick for pipe sizes 2-1/2 inch through six (6") inches.
 - c. Insulation shall be 2-1/2 inch thick for pipe sizes eight (8") inch through thirty (30") inch.
 - d. Insulation shall be three (3") inch thick for pipe sizes greater than thirty (30") inch.
 3. Install on the following:
 - a. Heated sludge piping systems.
 - b. Hot water piping systems.
 - c. Hot air piping systems.
 - d. Digester gas piping systems.
 - e. Interior heat-traced piping systems.
- E. Steam and condensate piping systems shall be insulated as specified below in Articles 3.07D "Hot Low Pressure (to 250 degrees F) HVAC Piping Systems" and 3.07E, "Hot Fluids (251 degrees F to 350 degrees F) HVAC Piping Systems".
- F. Exterior Piping Systems
1. Style: Insulation shall be Style C.
 2. Thickness: Insulation shall be a minimum two (2") inches thick.
 3. Install on the following:
 - a. Exterior piping systems that are heat-traced for freeze protection.

3.07 HVAC Piping System Insulation Schedule

- A. General: In addition to the requirements above, the Contractor shall provide piping insulation on HVAC piping systems as indicated below and as indicated in the Specifications.
- B. Sub-Freezing Piping (0 to 39 degrees F) HVAC Piping Systems
1. Style: Insulation shall be Style B.
 2. Thickness:
 - a. Insulation shall be one (1") inch thick for pipe sizes up to and including one (1") inch.
 - b. Insulation shall be 1-1/2 inch thick for pipe sizes over one (1") inch.

3. Install on the following for the purpose of eliminating sweating:
 - a. Refrigerant suction lines systems between evaporators and compressors.
- C. Cold Piping (40 degrees F to ambient) HVAC Piping Systems.
 1. Style: Insulation shall be Style A.
 2. Thickness:
 - a. Insulation shall be one (1") inch thick for pipe sizes up to and including four (4") inches.
 - b. Insulation shall be 1-1/2 inch thick for pipe sizes over four (4") inches.
 3. Install on the following for the purpose of eliminating sweating:
 - a. HVAC chilled water supply and return piping systems.
 - b. HVAC make-up water piping systems.
 - c. Air conditioner condensate drain piping systems.
- D. Hot Low Pressure (to 250 degrees F) HVAC Piping Systems
 1. Style: Insulation shall be Style A
 2. Thickness:
 - a. Insulation shall be 1-1/2 inches thick for pipe sizes up to and including two (2") inches.
 - b. Insulation shall be two (2") inches thick for pipe sizes 2-1/2 inches through six (6") inches.
 - c. Insulation shall be 12-1/2 inches thick for pipe sizes eight (8") inches and greater.
 3. Install on the following for the purpose of reducing heat loss and preventing injury to workers:
 - a. HVAC hot water (glycol solution) supply and return piping systems.
 - b. Hot gas refrigerant piping systems.
 - c. Low pressure steam and condensate piping systems.
- E. Hot Fluids (251 degrees F to 350 degrees F) HVAC Piping Systems
 1. Style: Insulation shall be Style A.
 2. Thickness:
 - a. Insulation shall be two (2") inches thick for pipe sizes up to and including one (1") inch.
 - b. Insulation shall be 2-1/2 inches thick for pipe sizes 1-1/4 inch through four (4") inches.

c. Insulation shall be 3-1/2 inches thick for pipe sizes over four (4") inches.

3. Install on the following for the purpose of reducing heat loss and preventing injury to workers:

a. High pressure steam and condensate piping systems.

F. Exterior Piping Systems

1. Style: Insulation shall be Style C.

2. Thickness: Insulation shall be a minimum two (2") inches thick.

3. Install on the following:

a. Exterior piping systems that are heat-traced for freeze protection.

G. Insulation Omitted: Omit insulation on hot piping within radiation enclosures or unit cabinets, on cold piping within unit cabinets provided that the piping is located over a drain pan and on heating piping beyond a control valve, located within heated space.

3.08 Plumbing Piping System Insulation Schedule

A. General: In addition to the requirements above, the Contractor shall provide insulation for plumbing piping systems as indicated below and as indicated in the Specifications.

B. Cold Plumbing Piping Systems

1. Style: Insulation shall be Style A.

2. Thickness: Insulation shall be one (1") inch thick.

3. Install on the following for the purpose of eliminating sweating:

a. Potable cold water piping systems

b. Interior above-ground storm water piping systems

c. Plumbing vents within six (6) lineal feet of a roof opening.

d. Drain piping systems from drip pans

C. Hot Plumbing Piping Systems

1. Style: Insulation shall be Style A.

2. Thickness:

e. Insulation shall be one (1") inch thick for pipe sizes less than or equal to six (6") inches.

f. Insulation shall be 1-1/2 inches thick for pipe sizes greater than six (6") inches.

3. Install on the following for the purpose of reducing heat loss and preventing injury to workers:

a. Potable hot water piping systems.

- b. Potable hot water recirculating piping systems.
 - c. Hot drain piping systems.
 - d. Tempered water piping systems.
- D. Insulation Omitted: Omit the insulation on chrome-plated exposed piping (except for handicapped fixtures), air chambers, unions, strainers, check valves, balance cocks, flow regulators, drain lines from water coolers, drainage piping located in crawl spaces or tunnels, buried piping, fire protection piping, and pre-insulated equipment.

3.09 HVAC Insulation Installation

A. General

1. The HVAC insulation shall be applied on clean dry surfaces only. It shall be continuous through wall and ceiling openings and sleeves. All removable or openable parts such as casing and access doors shall be insulated so that the item can be opened or removed without damage to the insulation or finish.
2. Insulation on all cold surfaces shall be applied with a continuous, unbroken vapor seal.
3. On make-up water piping, galvanized steel shields shall be installed between the hanger or support and the pipe insulation jacket. If the insulation cannot support the weight of the pipe and its contents without being crushed, rigid pipe insulation of the thickness equal to the adjoining insulation shall be installed. The rigid insulation shall be provided with a vapor barrier and shall have sufficient strength to support the weight of the pipe and its contents without being crushed.
4. On hot water supply and return lines, and steam lines, pipe covering protection saddles shall be installed between the hanger or support and the piping. Rigid pipe insulation of thickness equal to the adjoining insulation shall be installed in the space between the saddle and the pipe. Pipe insulations shall be continuous through interior walls and floor openings, except where walls or floors are required to be firestopped, required to have a fire resisting rating or required to be gastight. Firestopping material shall conform to Specification Section 07841.
5. The insulation shall pass through the hanger uninterrupted.
 - a. All piping insulation shall be continuous through the hanger without interruption, and a protection system shall be used. The system shall consist of a block of molded calcium silicate or cellular glass insulation whose thickness and temperature rating shall be compatible with the insulation requirements of the piping system served and a metal shield. The blocking shall be a minimum of twelve (12") inches long, cover the bottom half of the pipe and be secured to the piping to prevent shifting.
6. The metal shield shall be 300 series stainless steel matching the curvature and covering the blocking. The metal gauge shall be as follows:

<u>Nominal Pipe Size</u>	<u>Metal Gauge</u>
Up to 6 inches	16
6 to 10 inches	14
12 inches and over	12

7. The length of the metal shield shall be twelve (12") inches or match the length of blocking used. The shield shall cover the bottom half of the pipe.

B. Testing

1. All tests shall be performed in accordance with the requirements of Division 1.
2. The insulation, composite and accessories shall be tested in accordance with ASTM E84, NFPA 255 or UL723.

15082: INSULATION OF CRYOGENIC AND LOW TEMPERATURE OXYGEN PIPING

1.01 Scope

This specification outlines minimum acceptable requirements, acceptable materials and methods of application for external thermal insulation on oxygen piping operating between -320°F and -50°F.

1.02 General

- A. Any evidence of moisture in the insulation or its accessories, either before or after application, shall be sufficient cause for rejection.
- B. All insulation shall be stored in a dry place and shall be protected from contact with water from the time it is received until it is installed.
- C. All pressure testing shall be satisfactorily completed prior to the application of any insulation materials.
- D. Before any insulation is applied, all surfaces shall be cleaned of dirt, rust and any foreign matter.
- E. Insulation and accessory materials shall be applied only to surfaces that are clean, dry and frost-free.
- F. No insulation, vapor barrier materials, sealers or adhesives should be applied when ambient temperatures are below 35°F.
- G. All exposed edges and sharp corners on insulation shall be rounded to present a smooth contour.
- H. All mating surfaces between adjacent pieces of all insulation are to be tightly butted together so that no voids or gaps occur at any joints except where specifically indicated.
- I. In his quotation, the Contractor shall list all materials he intends to use by trade name.

1.03 Type of Insulation to be Used

A. Cellular Glass Insulation

Cellular glass insulation is the only material to be used in the following areas:

1. At flange, valve, relief valve, and/or pump locations as well as any other locations where oxygen process leakage may occur in normal operation.
2. For a minimum horizontal distance of four (4') feet on either side of the locations listed in 1.03-A.1 above.
3. For a minimum vertical distance of ten (10') feet from the locations defined in 1.03-A.1 above.

B. Urethane Insulation

1. With the exception of the areas defined in 1.03, A above, where it is mandatory that cellular glass insulation be used, urethane insulation is acceptable on oxygen piping.
2. In any areas where there is a question as to the proper material to use (cellular glass or urethane), the decision of the Engineer shall be final.

1.04 Materials

A. Insulation – Only the following materials are acceptable and no substitutes will be permitted:

1. Cellular Glass: Pittsburgh Corning Corp., Pittsburgh, PA – Foamglas
2. Urethane: Owens Corning Fiberglass Corp., Toledo, OH – 250; CPR Division, The Upjohn Co., Torrance, CA – Trymer CPR 9545

B. Accessory Materials – Shall be the following with no substitutions permitted without first obtaining a written approval for the material from the Engineer.

1. Cellular Glass Insulation Adhesive: Keene's Cement
2. Cellular Glass Bore Coating: Epolux Mfg. Corp, Long Island, NY - Cad-A-Seal 780B
3. Insulation Sealer: Foster Division, H.B. Fuller Co., Spring House, PA – 30-45; Insul-Coustic Corporation, Sayreville, NJ – I-C 405
4. Insulation Adhesive (Urethane only): Foster Division, H.B. Fuller Co., Spring House, PA – 81-33; Epolux Mfg. Corp., Long Island, NY – Cad-O-Prene 400
5. Contraction Joint Insulation – 1 lb/ft³ fibrous glass blanket: Owens Corning Fiberglass Corp., Toledo, OH – PF-336; Johns-Manville, Denver, CO – Microlite; or equal
6. Vapor Barrier Laminate: St. Regis Paper Company, NY, NY – Pyro-Kure 626; Ludlow Corporation, Needham Hts., Mass. – Fire-Ban 266; Owens Corning Fiberglass Corp., Toledo, OH – ASJ
7. Vapor Barrier Adhesive: Foster Division, H.B. Fuller Co., Spring House, PA – 85-75; Epolux Mfg. Corp., Long Island, NY – Cad-A-Seal 745
8. Weather Resistant Vapor-Barrier Mastic: Foster Division, H.B. Fuller Co., Spring House, PA – 60-36; Insul-Coustic Corp., Sayreville, NJ – I-C 571; Epolux Mfg. Corp., Long Island, NY – Cadalar 600.

Reinforcement shall be a 20 x 20 mesh (1.5 oz./S.Y.) glass cloth: J.P. Stevens, Waterboro, SC – Style 2000; Childers Produces Co., Bristol, PA – Chilglas #20; or approved equal.

9. Metal Jacketing- .016" thick aluminum with 3/16" corrugations (no moisture barrier required): Insul-Coustic Corp., Sayreville, NJ; Childers Manufacturing Co., Bristol, PA; or approved equal.
10. Neoprene Covers – 1/16" thick neoprene rubber sheet stock: B.F. Goodrich Co., Akron, OH - (40 durometer neoprene); Groendyk Mfg. Co., Buchanan, VA – (40 durometer neoprene); or approved equal.
11. Adhesive for Neoprene Covers: Foster Division, H.B. Fuller Co., Spring House, PA – 85-75; Insul-Coustic Corp., Sayreville, NJ – I-C 204; or approved equal.

12. Insulation Banding Tape – $\frac{3}{4}$ " wide reinforced fiberglass: Permacel, New Brunswick, NJ – 162; 3M Company, St. Paul, Minn. – Scotch Brand Filament Tape #898; or approved equal.
13. Metal Bands $\frac{1}{2}$ " wide x .020" thick stainless steel with matching seals: Childers Manufacturing Co., Bristol, PA; Insul-Coustic Corp., Sayreville, NJ; Signode Company, Chicago, IL; or approved equal.
14. Insulation Tie Wire – Where specified, the wire for securing the inner layer of insulation shall be 16 BWG gage dead soft annealed type 304 or 430 stainless steel.

1.05 Insulation Material Construction

A. General

The dimensions and tolerances of all pipe covering and fitting and valve covers shall be in accordance with ASTM Recommended Practice C 450-657.

B. Cellular Glass

1. General

- a. All insulation shall be pre-fabricated using a minimum number of pieces and using butt-joint construction.
- b. The maximum thickness of any layer shall be three (3") inches.

2. Piping

- a. Insulation shall be supplied in minimum lengths of two (2') feet with all ends of butt-joint (square) construction.
- b. Insulation shall be supplied in sectional (2 piece) form up to and including 12-3/4 inch O.D. Above this size, sectional insulation is preferred but segmented (multi-piece) form is acceptable providing the number of segments is kept to a minimum.
- c. Insulation shall be supplied in multi-layer construction without a vapor barrier. Each layer shall be approximately the same thickness.

3. Fitting and Valve Insulation

- a. Insulation covers for fittings and valves shall be pre-fabricated in two halves. Mitered segments are permissible in each of the halves, but each of the segments are to be joined with cellular glass insulation adhesive. See Section 1.04, B.1.
- b. With the exception of the joints between half-sections, straight through joints between layers are to be avoided wherever possible.

C. Urethane

1. Piping Insulation

- a. Insulation shall be supplied in minimum lengths of three (3') feet with all ends of butt-joint (square) construction.
- b. Insulation shall be supplied in sectional (2 piece) form up to and including 12-3/4 inch O.D. Above this size, sectional insulation is preferred, but segmented (multi-piece) form is acceptable providing the number of segments is kept to a minimum.

- c. Insulation shall be supplied in double-layer construction. The first layer shall be plain (no jacket), but the second layer shall be supplied with a factory applied fire-retardant vapor barrier jacket of the type specified in these specifications under Accessory Materials. Each layer shall be of approximately the same thickness, but in no case shall their thicknesses differ by more than ½ inch. When the thicknesses of each layer are different, the thicker piece is to be used for the first layer.

2. Fitting and Valve Insulation

- a. All fitting and valve insulation shall be supplied in single layer sectional (two piece) form. Each half-section shall be of one piece construction up to and including 12-3/4 inch O.D. Above this size, one piece construction of each half is preferred, but factory fabricated mitered half-sections are acceptable, provided the mitered segments are fabricated with keyed-construction which eliminates any straight-thru joints and these keyed joints are joined with insulation adhesive.
- b. Longitudinal seams on all fitting and valve insulation shall be of keyed-joint construction.
- c. Circumferential ends of all fitting and valve insulation shall be of socket construction. The depth of socket shall be a minimum of ¾ inch and the inside diameter of the socket shall be such that it will nest over the first layer of adjacent piping insulation. The outside diameter of the fitting or valve insulation shall be equal to or greater than the outside diameter of the second layer of adjacent piping insulation.
- d. All fitting and valve insulation shall be preformed in a manner that will insure that the minimum thickness of this insulation shall be at least equal to the required total thickness of insulation used on the adjacent piping.
- e. No jacket is to be provided on valve or fitting insulation.

Recommended fabricators of fitting and valve insulation are: Atlas Industries, Ayer, Mass.; Styro-Fabricators, Kansas City, Kansas; Penns-Valley Insulation Co., Aston, PA.

1.06 Insulation Thickness

The total thickness of insulation to be used on each piping system is to be as specified on the insulation schedule which is supplied by APCI.

1.07 Application of Insulation Systems (Refer to Appendix 3 for Figures 1 through 16)

A. Cellular Glass

1. Straight Piping (See Figure 1)

- a. The first layer of the insulation shall have its inner surface coated with bore-coating material which is allowed to dry completely prior to application. See Section 1.04.B.2.
- b. The inner layer(s) of double or multi-layer applications are to be installed dry with no sealer or adhesive. They are to be secured by installing tie wires as indicated in Figure 1. Ends of these wires are to be twisted together, bent over and carefully embedded into the surface of the insulation.
- c. All joints in the outer layer of double or multi-layer insulation shall be buttered with insulation sealer for the full depth of the thickness of that layer by applying a thin layer of sealer to one of the mating surfaces of insulation. The joint sealer need not be applied to the mating butt-ends of the succeeding adjacent section of insulation

provided that proper precautions are taken to insure that a thin continuous seal is provided for the full length and depth of each joint and that the open cells of the cellular glass are completely filled with sealer. If this method proves unsatisfactory, it should be considered mandatory that both surfaces of mating insulation have sealer applied to them prior to installation.

- d. Secure the outer layer of insulation with metal bands as indicated in Figure 1.
- e. Circumferential joints between layers are to be staggered a minimum of six (6") inches and longitudinal joints between layers are to be staggered midway from one another. Longitudinal joints in the outer layer are not to be located on the vertical centerline of horizontal piping.
- f. All joints in the insulation shall be tightly butted together.
- g. Support rings for the cellular glass insulation are required on vertical piping at maximum spacings of twelve (12') feet where not interrupted by flanges, fittings or valves. At flanges, fittings or valve locations, support rings are to be installed as close as is practical above these locations. These support rings are to be insulated as indicated in Figure 3.

2. Contraction Joints (See Figure 4)

Contraction joints are to be installed in the insulation in accordance with Figure 4 when required by the following rules:

- a. Straight section of piping up to 6'-0" in length – no contraction joint required.
- b. Straight sections of piping from 6'-0" to 12'-0" in length – one contraction joint required.
- c. Straight sections of piping 12'-0" and longer – one contraction joint required for 12'-0" of length. In addition, one contraction joint is required for any remaining portion of the line which is from 6'-0" to 12'-0" in length.
- d. Flange locations which are insulated in accordance with Figure 5 may be considered as fulfilling the requirement of a contraction joint.
- e. Support ring locations on vertical piping which are insulated in accordance with Figure 3 may be considered as fulfilling the requirement of a contraction joint.

3. Fittings and Valves

- a. For fittings, the two halves in each layer are to be joined with cellular glass insulation adhesive; and for valves, the two halves in each layer are to be joined with insulation sealer.
- b. During installation, inner layers are to be secured with tie wires and the outer layers are to be secured with metal bands. Although a minimum of three wires or bands is mandatory, it is the Contractor's responsibility to use as many more wires or bands as is required to insure that the insulation is adequately secured.

4. Flanges (See Figure 5)

- a. All flange insulation shall be the same thickness as is used on the mating piping insulation.
- b. The same methods used on the pipe shall be used when insulating flanges.

- c. Flanges shall be insulated in such a manner that the insulation can be removed from the flanges and the flanges opened without disturbing the adjacent pipe insulation.
 - d. The flange insulation shall overlap the adjacent pipe insulation a minimum of six (6") inches.
 - e. The void areas between the flanges and the cellular glass insulation shall be packed tightly with contraction joint insulation.
 - f. A heavy coating of insulation sealer shall be used between mating surfaces of the flange insulation and the adjacent piping insulation.
5. Termination of Insulation and Small Metal Projections (See Figures 6 and 7)
- a. At locations where insulation terminates on a pipeline, this insulation shall be installed as detailed in Figure 6.
 - b. Small metal projections from insulated piping shall be insulated in general accordance with Figure 7.
 - c. For triple layer construction, the same methods of application are to be used as is shown for double layer construction in the attached figures.

6. Weather Resistant Vapor Barrier Mastic

The weather resistant vapor barrier mastic shall be installed over the outer layer of all cellular glass insulation and then examined in the following manner:

- a. Apply a tack coat of the mastic at a minimum rate of two (2) gallons/100 square feet.
 - b. Embed the 20 x 20 glass cloth into the wet tack coat and overlap all seams a minimum of three (3") inches. This cloth shall be free of wrinkles.
 - c. Apply a second coat of the mastic at a minimum rate of four (4) gallons/100 square feet. The glass cloth shall be completely covered so that the texture will not show through after the mastic has dried.
 - d. The coating shall be carefully examined after drying to insure that no cracks, holes, thin spots or open joints of any sort exist. If any defects of this type are noted, an additional coating of the mastic is to be applied at these locations.
7. Method of Joining Urethane and Cellular Glass Insulation (See Figure 2)

At locations where a transition is made between urethane and cellular glass, these insulations are to be installed in accordance with the applicable method shown in Figure 2.

B. Urethane

1. Straight Piping (See Figure 8)

- a. All insulation shall be applied using double layer construction.
- b. The first layer of insulation shall be applied dry without adhesive or dealer. All joints, longitudinal and circumferential, shall be tightly butted together. Circumferential butt-ends are not to be staggered relative to one another. When sectional insulation is used on horizontal pipe, the longitudinal joints in the first layer shall be in a vertical plane. The insulation is to be secured by installing tie wires as indicated in Figure 8.

Ends of these wires are to be twisted together, bent over, and carefully embedded into the surface of the insulation.

- c. The second layer of insulation shall be applied with the longitudinal and circumferential joints staggered relative to the first layer. Longitudinal joints are to be staggered midway between longitudinal joints in the first layer and circumferential joints are to be staggered approximately midway between circumferential joints in the first layer, but in no case are to be closer than six (6") inches from the first layer circumferential joints. The circumferential butt-ends in the second layer are not to be staggered relative to one another. All joints in the insulation shall be tightly butted together.
- d. Prior to application, sealer is to be applied in all joints of the outer layer of urethane insulation for the full depth of the thickness of that layer by applying a thin layer of sealer to one of the mating surfaces of insulation. The joint sealer need not be applied to the mating butt-ends of the succeeding adjacent section of insulation provided that proper precautions are taken to insure that a thin continuous seal is provided for the full length and depth of each joint. If this method proves unsatisfactory, it shall be considered mandatory that both surfaces of mating insulation have sealer applied to them prior to installation.
- e. The longitudinal flaps of the vapor barrier laminate on the outer layer of insulation are to be sealed with vapor barrier adhesive. Circumferential joints are to be sealed with a three (3") inch wide strip of the same vapor barrier laminate centered over the joint using the vapor barrier adhesive.
- f. Secure the outer layer of insulation with insulation banding tape as indicated in Figure 8. When installing these bands, care is to be exercised in order that the vapor barrier is not damaged or punctured. Any damaged or punctured areas are to be repaired with pieces of vapor barrier laminate and vapor barrier adhesive.
- g. Insulation shall be covered with an additional protective metal jacket. The jacketing shall be applied with minimum longitudinal circumferential laps of two (2") inches. Longitudinal laps shall be located at the horizontal centerline of the pipe with the lap installed to shed water. Adjacent sections of jacketing shall have the longitudinal laps at 180° from one another to eliminate double circumferential lap areas. These jackets are to be secured over the insulation with metal bands and seals as indicated in Figure 8.
- h. Support rings for the insulation are required on vertical piping at maximum spacings of 15 feet where not interrupted by flanges, fittings or valves. These support ring locations to be insulated as indicated in Figure 10.

2. Contraction Joints (See Figure 9)

Contraction joints are to be installed in the insulation in accordance with Figure 9 where required by the following rules:

- a. Straight section of piping up to 8'-0" in length. No contraction joint required.
- b. Straight sections of piping from 8'-0" to 15'-0" in length – one contraction joint required.
- c. Straight sections of piping 15'-0" and longer – one contraction joint required for each 15'-0" of length. In addition, one contraction joint is required for any remaining portion of the line which is from 8'-0" to 15'-0" in length.
- d. Flange locations which are insulated in accordance with Figure 14 may be considered as fulfilling the requirement of a contraction joint.

- e. Support ring locations on vertical piping which are insulated in accordance with Figure 10 may be considered as fulfilling the requirement of a contraction joint.

3. Fittings and Valves (See Figures 11, 12 & 13)

- a. All insulation for fittings and valves shall be installed in single layer construction.
- b. The minimum thickness of insulation on fittings and valves shall be at least equal to the total required thickness of insulation used on the adjacent piping with the exception of the extended stems on cryogenic valves.
- c. Extended stems of cryogenic valves re to be insulated with a two (2") inch thickness of single layer piping insulation for a minimum distance from the top packing gland of the valve of six (6") inches on valves up to and including 1-1/2 NPS and ten (10") inches on valves larger than 1-1/2 inches NPS. The insulation on this stem is to extend into the socket of the valve body insulation, and insulation sealer is to be applied to this socket joint. The same methods used in applying insulation on straight piping is to be used when insulating these extended stems.
- d. The valve insulation need not fit the exact contour of the valve, but all void areas between the valve and its urethane insulation shall be packed tightly with contraction joint insulation.
- e. Insulation adhesive is to be applied to the longitudinal joints of one of the half-sections of all f fitting covers, and insulation sealer is to be applied to one of the half-sections of all valve cover.
- f. The sockets of the fitting or valve insulation that lap the first layer of adjacent piping insulation are to be installed dry with no sealer or adhesive, but the butt-ends of the fitting or valve insulation that mate with the second layer of adjacent piping insulation are to be coated with a thin layer of insulation sealer.
- g. The two half-sections of fitting or valve insulation are to be secured with insulation banding tape. Although a minimum of three (3) bands on each fitting is mandatory, it is the Contractor's responsibility to use as many bands as is required to insure that the insulation is adequately secured.
- h. The weather resistant vapor-barrier mastic shall be installed over all valve and fitting insulation and is to extend a minimum of three (3") inches under the metal jacket weather barrier on the adjacent piping insulation. The mastic vapor-barrier system shall be installed as described in Section 1.07.A.6.a. through d.

4. Flanges (See Figure 14)

- a. All flange insulation shall be applied in double layer construction using the same thickness as is used on the mating pipe insulation.
- b. The same methods used on the pipe shall be used when insulating flanges.
- c. Flanges shall be insulated in such a manner that the insulation can be removed from the flanges and the flanges opened without disturbing the adjacent pipe insulation.
- d. The flange insulation shall overlap the adjacent pipe insulation a minimum of six (6") inches.
- e. The void areas between the flanges and the insulation shall be packed tightly with contraction joint insulation.

- f. A heavy coating of insulation sealer shall be used between mating surfaces of the flange insulation and the adjacent piping insulation.
 - g. The weather resistant vapor barrier mastic is to be installed over the ends of the flange insulation as detailed in Section 1.07.A.6.a through d.
 - h. A metal jacket weather barrier shall be installed over the flange insulation.
- 5. Termination of Insulation and Small Metal Projections (See Figures 15 & 16)
 - a. At locations where insulation terminates on a pipe line, this insulation shall be installed as detailed in Figure 15.
 - b. Small metal projections from insulated piping shall be insulated in general accordance with Figure 16.

END OF SECTION

APPENDIX

APPENDIX 1

State of New Jersey Division of Purchase and Property Two-Year
Chapter 51/Executive Order 117 Vendor Certification and Disclosure of
Political Contributions (CH51.1 R1/21/2009)

APPENDIX 2

Plant Site Plan

APPENDIX 3

Insulation of Cryogenic and Low Temperature Oxygen Piping Standard
Plants (details pipe, fittings, joints and valves – Figures 1-16)

APPENDIX 4

Prevailing Wages



State of New Jersey
Division of Purchase and Property
Two-Year Chapter 51 / Executive Order 117 Vendor Certification and
Disclosure of Political Contributions

CHAPT 51/EO 117-1

For AGENCY USE ONLY

General Information

Solicitation, RFP or Contract No. _____ Award Amount _____
Description of Services _____

Agency Contact Information

Agency _____ Contact Person _____
Phone Number _____ Agency Email _____

Part 1: Vendor Information

Full Legal Business Name _____
(Including trade name if applicable)

Business Type

☐ Corporation ☐ Limited Partnership ☐ Professional Corporation ☐ General Partnership
☐ Limited Liability Company ☐ Sole Proprietorship ☐ Limited Liability Partnership

Address 1 _____ Address 2 _____
City _____ State _____ Zip _____ Phone _____
Vendor Email _____ Vendor FEIN _____

Part 2: Public Law 2005, Chapter 51/ Executive Order 117 (2008) Certification

I hereby certify as follows:

1. On or after October 15, 2004, neither the below-named entity nor any individual whose contributions are attributable to the entity pursuant to Executive Order 117 (2008) has solicited or made any contribution of money, pledge of contribution, including in-kind contributions, company or organization contributions, as set forth below that would bar the award of a contract to the vendor, pursuant to the terms of Executive Order 117 (2008).
 - a) Within the preceding 18 months, the below-named person or organization has not made a contribution to:
 - (i) Any candidate committee and/or election fund of any candidate for or holder of the public office of Governor or *Lieutenant Governor*;
 - (ii) Any State, county, *municipal* political party committee; OR
 - (iii) Any *legislative leadership committee*.
 - b) During the term of office of the current Governor(s), the below-named person or organization has not made a contribution to:
 - (i) Any candidate, committee and/or election fund of the Governor or *Lieutenant Governor*; OR
 - (ii) Any State, county or *municipal* political party committee nominating such Governor in the election preceding the commencement of said Governor's term.
 - c) Within the 18 months immediately prior to the first day of the term of office of the Governor(s), the below-named person or organization has not made a contribution to:
 - (i) Any candidate, committee and/or election fund of the Governor or *Lieutenant Governor*; OR
 - Any State, county, *municipal* political party committee of the political party nominating the successful gubernatorial candidate(s) in the last gubernatorial election.

PLEASE NOTE: Prior to November 15, 2008, the only disqualifying contributions include those made by the vendor or a principal owning or controlling more than 10 percent of the profits or assets of a business entity (or 10 percent of the stock in the case of a business entity that is a corporation for profit) to any candidate committee and/or election fund of the Governor or to any state or county political party within the preceding 18 months, during the term of office of the current Governor or within the 18 months immediately prior to the first day of the term of Office of Governor.

Part 3: Disclosure of Contributions Made

CHAP 51/EXO 117-2

☐ Check this box if no reportable contributions have been made by the above-named business entity or individual.

Name of Recipient _____	Address of Recipient _____
Date of Contribution _____	Amount of Contribution _____
Type of Contribution (i.e. currency, check, loan, in-kind) _____	
Contributor Name _____	
Relationship of Contributor to the Vendor _____	
Contributor Address _____	
City _____	State _____ Zip _____

Add a Contribution

If this form is not being completed electronically, please attach pages for additional contributions as necessary. Otherwise click "Add a Contribution" to enter additional contributions.

Part 4: Certification

CHAPT 51/EO 117-3

I have read the instructions accompanying this form prior to completing this certification on behalf of the above-named business entity. I certify that, to the best of my knowledge and belief, the foregoing statements by me are true. I am aware that if any of the statements are willfully false, I am subject to punishment.

I understand that this certification will be in effect for two (2) years from the date of approval, provided the ownership status does not change and/or additional contributions are not made. If there are any changes in the ownership of the entity or additional contributions are made, a new full set of documents are required to be completed and submitted. By submitting this Certification and Disclosure, the person or entity named herein acknowledges this continuing reporting responsibility and certifies that it will adhere to it.

(CHECK ONE BOX A, B or C)

(A) ☐ I am certifying on behalf of the above-named business entity and all individuals and/or entities whose contributions are attributable to the entity pursuant to Executive Order 117 (2008).

(B) ☐ I am certifying on behalf of the above-named business entity only.

(C) ☐ I am certifying on behalf of an individual and/or entity whose contributions are attributable to the vendor.

Signed Name _____ Print Name _____

Phone Number _____ Date _____

Title/Position _____

Agency Submission of Forms

The agency should submit the completed and signed Two-Year Vendor Certification and Disclosure forms, together with a completed Ownership Disclosure form, either electronically to cd134@treas.state.nj.us, or regular mail at Chapter 51 Review Unit, P.O. Box 039, 33 West State Street, 9th Floor, Trenton, NJ 08625. The agency should save the forms locally and keep the original forms on file, and submit copies to the Chapter 51 Review Unit.

APPENDIX 2

Plant Site Plan

APPENDIX 3

**Insulation of Cryogenic and Low Temperature Oxygen Piping Standard
Plants (details pipe, fittings, joints and valves – Figures 1-16)**

NOTES:

1. REDRAWN FROM AIR PRODUCTS SPECIFICATION #80144A "INSULATION OF CRYOGENIC & LOW TEMPERATURE OXYGEN PIPING ON STANDARD PLANTS" BY A.T. MCCARRICKR. GIFFORD JULY 19th 1976.



**PASSAIC VALLEY
SEWERAGE COMMISSION**

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STRAIGHT PIPING - CELLULAR
FIGURE 1

INSULATION OF CRYOGENIC
& LOW TEMPERATURE OXYGEN
PIPING ON STANDARD PLANTS

DRAWN BY	JT/DMD	DATE	7/12/13
CHECKED BY	KBL	DATE	7/12/13
SCALE	NONE	SHEET	1 OF 1
Cust. Contract No. FIGURE 1			
A Plot Scale			
DWG No.	FIGURE 1		
			REV.

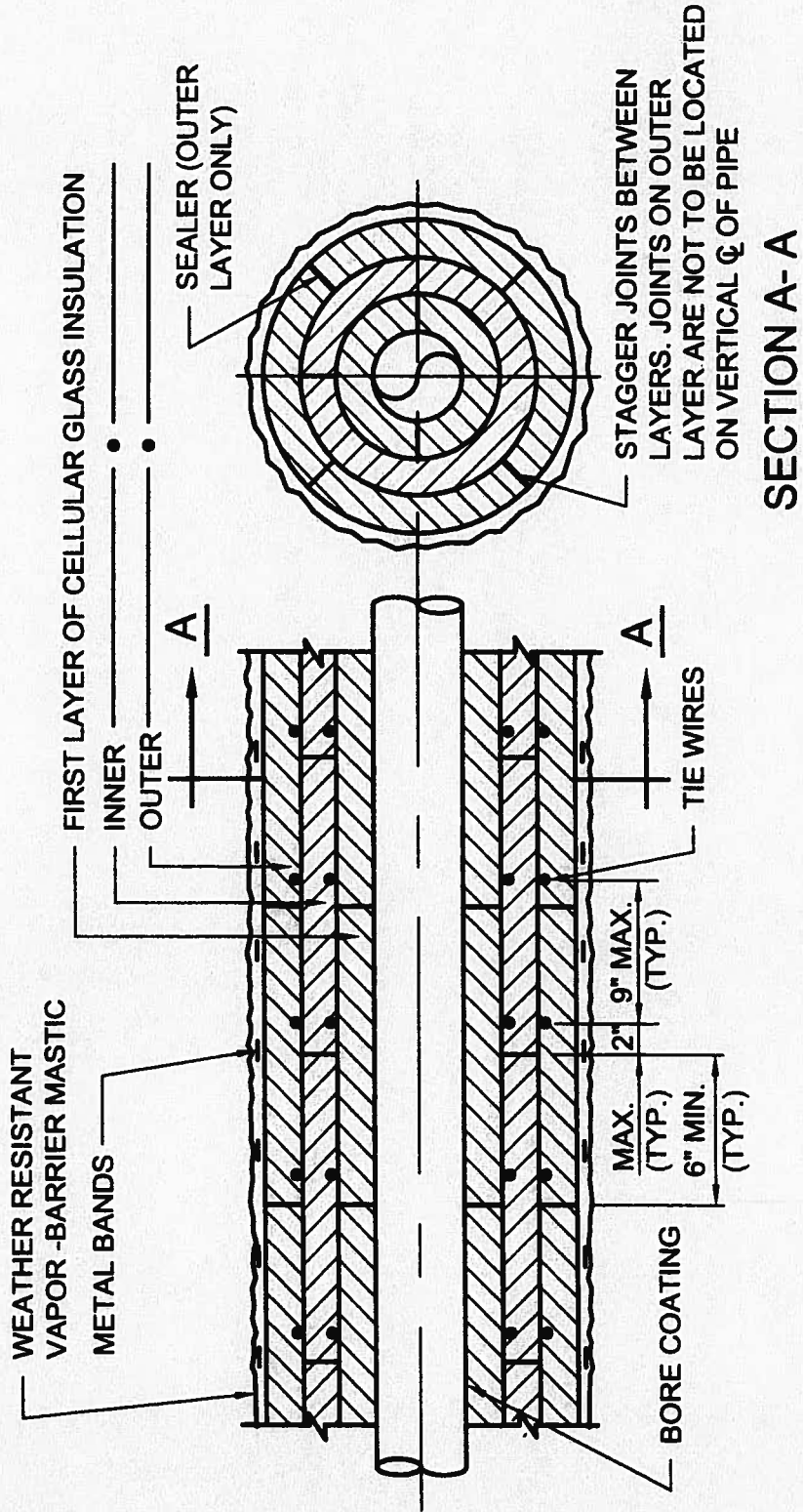


FIGURE 1
STRAIGHT PIPING
MULTI-LAYER CELLULAR GLASS INSULATION

NOTES:

1. REDRAWN FROM AIR PRODUCTS SPECIFICATION #90144A "INSULATION OF CRYOGENIC & LOW TEMPERATURE OXYGEN PIPING ON STANDARD PLANTS" BY A.T. MCCARRICK/R. GIFFORD JULY 19th 1976.



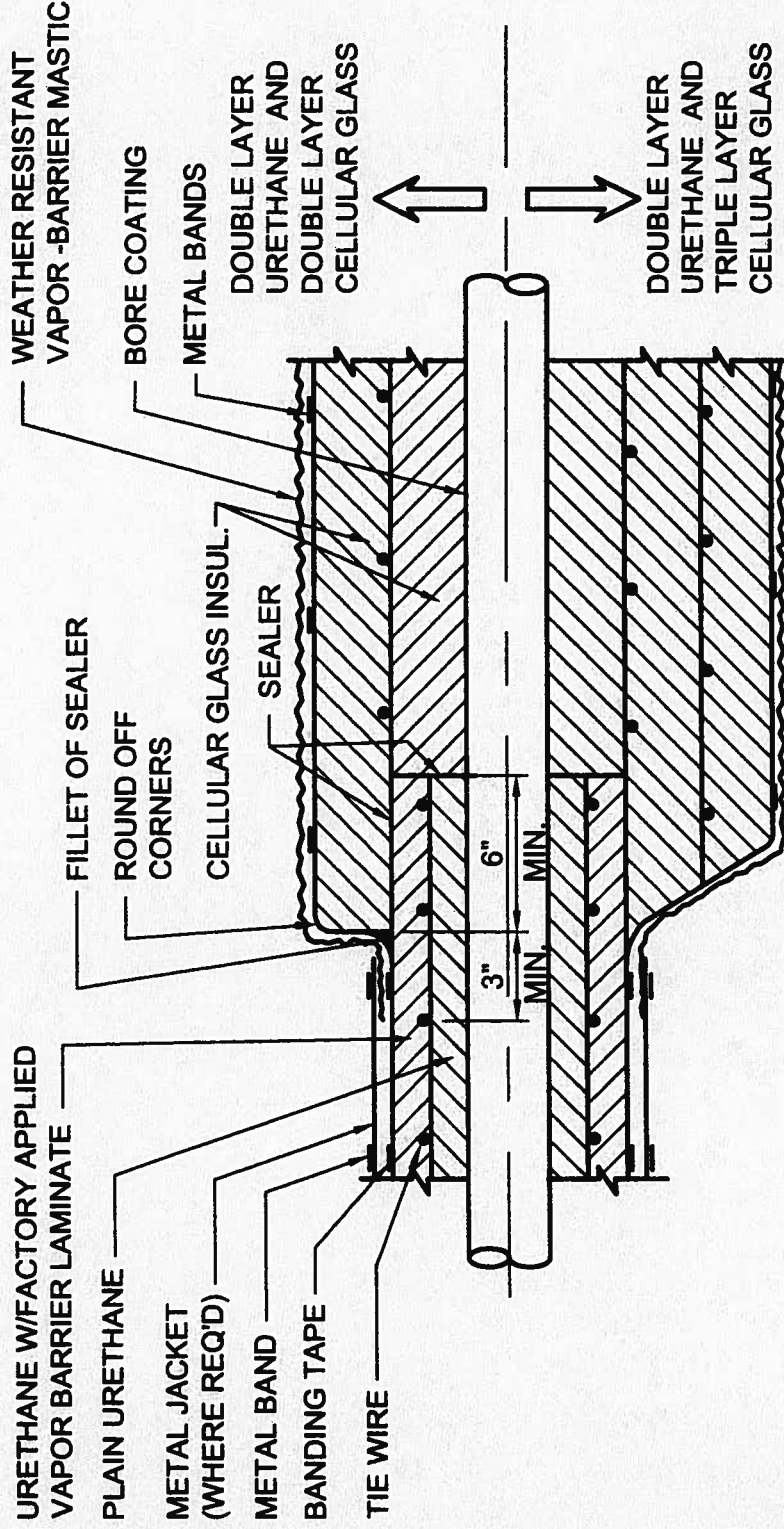
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JOINTS URETHANE/CELLULAR
FIGURE 2

INSULATION OF CRYOGENIC
& LOW TEMPERATURE OXYGEN
PIPING ON STANDARD PLANTS

DRWN BY:	JT/DMD	DATE:	7/12/13
CHKD BY:	KBL	DATE:	7/12/13
SCALE:	NONE	SHEET	1 OF 1
Cust Control No: FIGURE 2			
A Plot Scale			
DRWG No:	FIGURE 2		
REV.			



NOTE: ALL MATERIALS AND METHOD OF INSTALLATION ARE TYPICAL ABOVE AND BELOW CENTERLINE WHERE APPLICABLE.

FIGURE 2
TYPICAL METHOD OF JOINING URETHANE
AND CELLULAR GLASS INSULATION

NOTES:

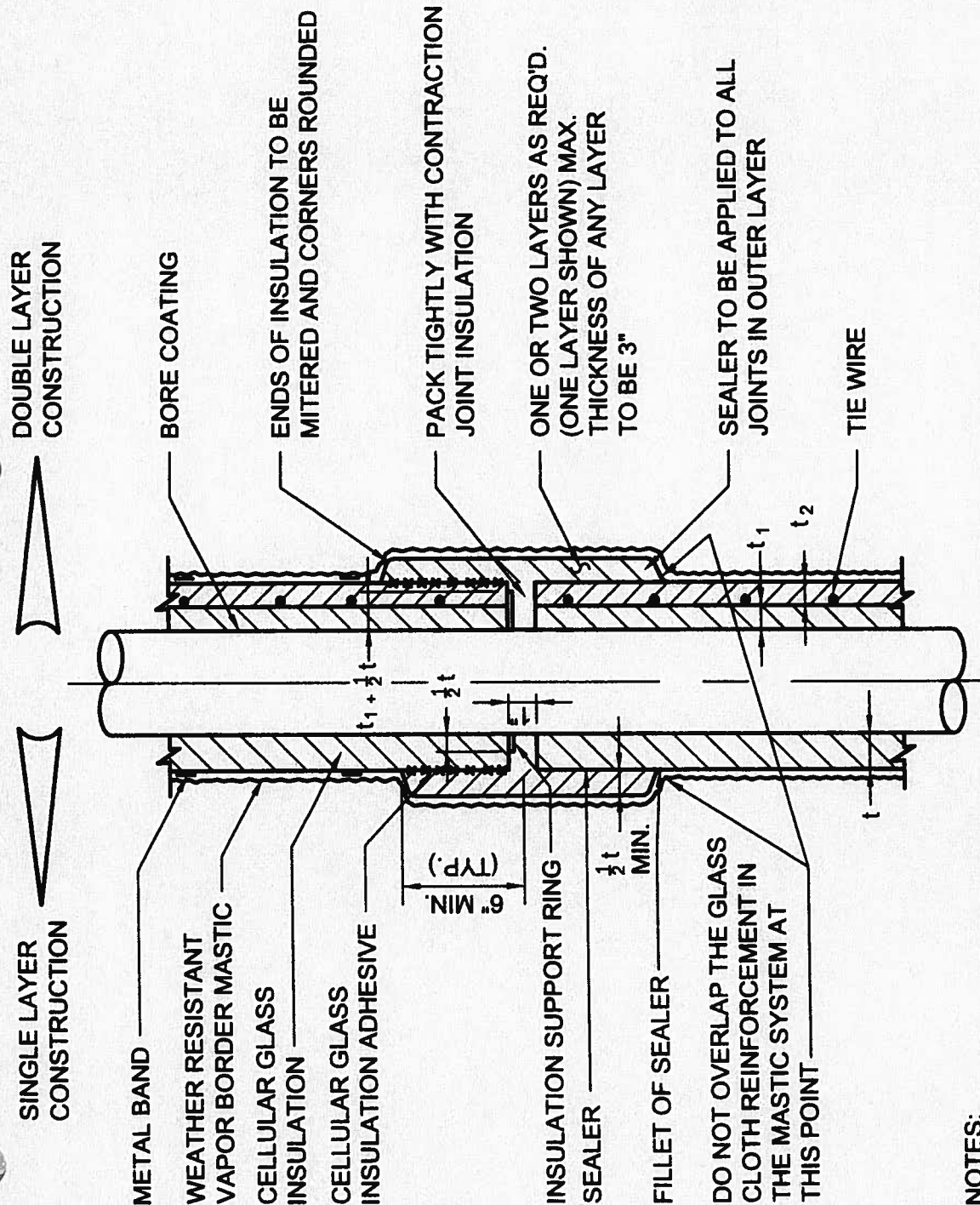
1. REDRAWN FROM AIR PRODUCTS SPECIFICATION #90144A "INSULATION OF CRYOGENIC & LOW TEMPERATURE OXYGEN PIPING ON STANDARD PLANTS" BY A.T. MCCARRICK/R. GIFFORD JULY 19th 1976.

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SUPPORT RING - CELLULAR
FIGURE 3

INSULATION OF CRYOGENIC
& LOW TEMPERATURE OXYGEN
PIPING ON STANDARD PLANTS

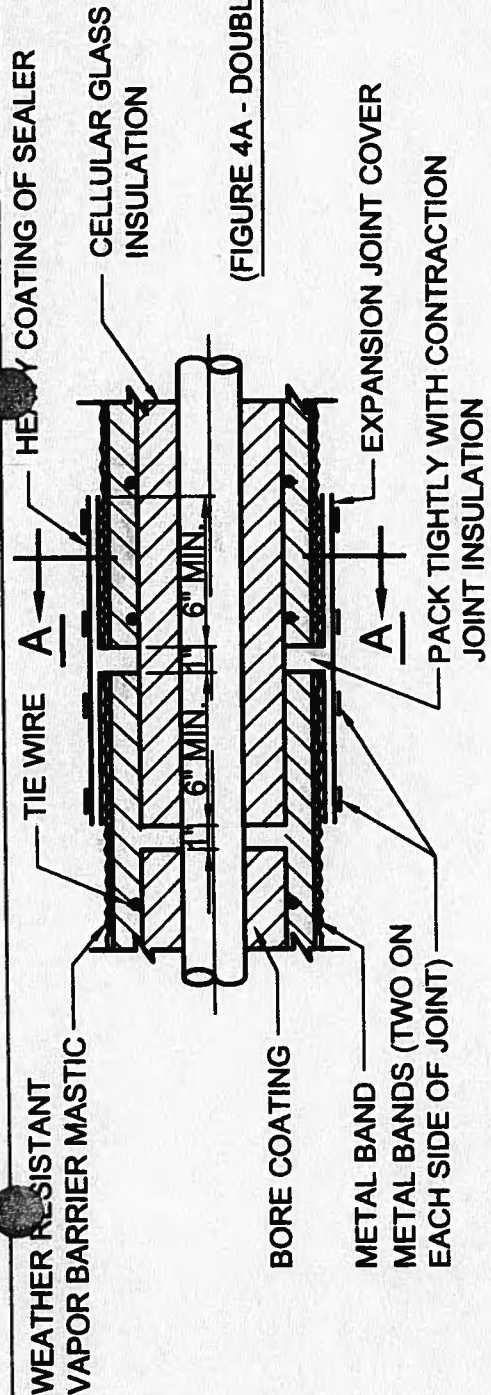
DRAWN BY:	JT/DMD	DATE	7/12/13
CHECK BY:	KBL	DATE	7/12/13
SCALE	NONE	SHEET 1 OF 1	
Cust Control No		FIGURE 3	
A Plot Scale			
DWG No		FIGURE 3	
		REV.	



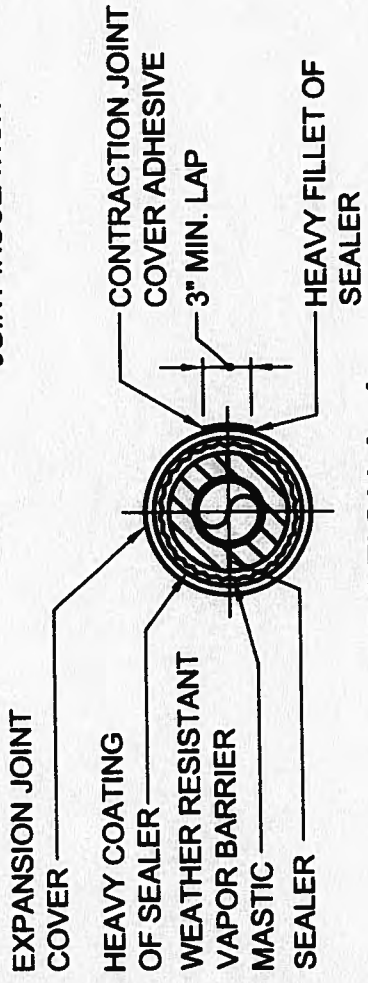
NOTES:

1. ALL MATERIALS AND METHOD OF INSTALLATION ARE TYPICAL ON BOTH SIDES OF CENTERLINE WHERE APPLICABLE.
2. FOR TRIPLE LAYER CONSTRUCTION THE MIDDLE LAYER IS TO BE APPLIED IN THE SAME MANNER AS THE INNER LAYER EXCEPT THAT BORE COATING MATERIAL IS NOT REQUIRED.

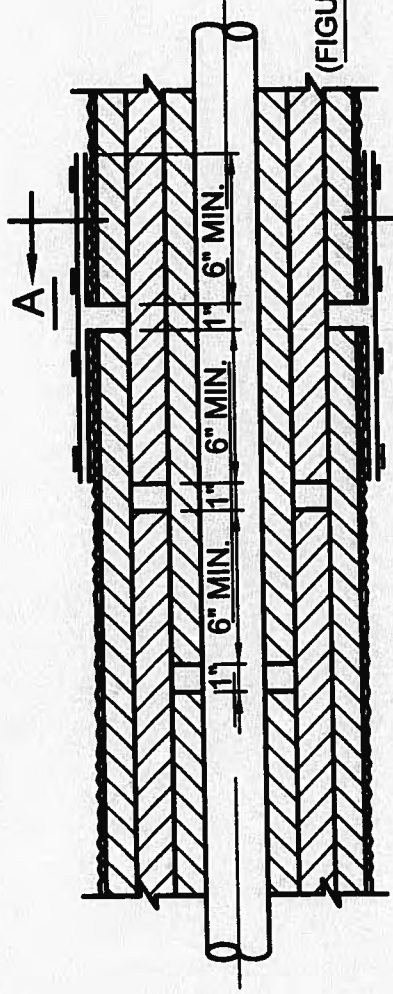
**FIGURE 3
INSULATION SUPPORT RING**



(FIGURE 4A - DOUBLE LAYER)



SECTION A-A



(FIGURE 4B - MULTI-LAYER)

FIGURE 4
CONTRACTION JOINT

NOTE:
ALL MATERIAL AND METHOD OF APPLICATION FOR DOUBLE AND TRIPLE LAYERS ARE SIMILAR TO THAT SHOWN FOR SINGLE LAYER.

NOTES:

1. REDRAWN FROM AIR PRODUCTS SPECIFICATION #90144A "INSULATION OF CRYOGENIC & LOW TEMPERATURE OXYGEN PIPING ON STANDARD PLANTS" BY A.T. MCCARRICKR. GIFFORD JULY 19th 1976.



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CONTRACTION JOINT - CELLULAR
FIGURE 4

INSULATION OF CRYOGENIC
& LOW TEMPERATURE OXYGEN
PIPING ON STANDARD PLANTS

DRAWN BY:	JT/DMD	DATE:	7/12/13
CHECK BY:	KBL	DATE:	7/12/13
SCALE:	NONE	SHEET 1 OF 1	
Cad Control No:		FIGURE 4	
A		Plot Scale:	
DWG No:		FIGURE 4	
		REV.	

DO NOT OVERLAP THE GLASS CLOTH REINFORCEMENT IN THE MASTIC SYSTEM AT THIS POINT (TYP.)

LONGITUDINAL JOINTS IN OUTER LAYER OF FLG. INSUL. ARE NOT TO BE LOCATED AT THE VERTICAL ϕ OF THE PIPING

WEATHER RESISTANT VAPOR BARRIER MASTIC

FLANGE INSULATION

METAL BAND

BORE COATING

TIE WIRE

1" TYP.

6" MIN.

FILLET OF SEALER

PACK TIGHTLY WITH CONTR. JOINT INSUL.

CELLULAR GLASS INSULATION

ROUND OFF CORNERS
SEALER

NOTES:

1. THE INSULATION ON THE PIPING ADJACENT TO FLANGES IS TO BE STOPPED SHORT OF THE FLANGE BOLTS IN ORDER THAT THE BOLTS MAY BE REMOVED WITHOUT DAMAGE TO THE ADJACENT INSULATION.
2. FOR TRIPLE LAYER CONSTRUCTION THE SAME METHODS OF APPLICATION ARE TO BE USED AS IS SHOWN FOR DOUBLE LAYER CONSTRUCTION.

NOTES:

1. REDRAWN FROM AIR PRODUCTS SPECIFICATION #90144A "INSULATION OF CRYOGENIC & LOW TEMPERATURE OXYGEN PIPING ON STANDARD PLANTS" BY A.T. MCCARRICK/R. GIFFORD JULY 19th 1976.



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FLANGES - CELLULAR
FIGURE 5

INSULATION OF CRYOGENIC
& LOW TEMPERATURE OXYGEN
PIPING ON STANDARD PLANTS

DRAWN BY:	JT/DND	DATE:	7/12/13
CHECK BY:	KBL	DATE:	7/12/13
SCALE:	NONE	SHEET 1 OF 1	
Cad Control No		FIGURE 5	
A	Plot Scale		
DWG No		FIGURE 5	
		REV.	

**FIGURE 5
FLANGES**

NOTES:

1. REDRAWN FROM AIR PRODUCTS SPECIFICATION #80144A "INSULATION OF CRYOGENIC & LOW TEMPERATURE OXYGEN PIPING ON STANDARD PLANTS" BY A.T. MCCARRICKR. GIFFORD JULY 19th 1976.

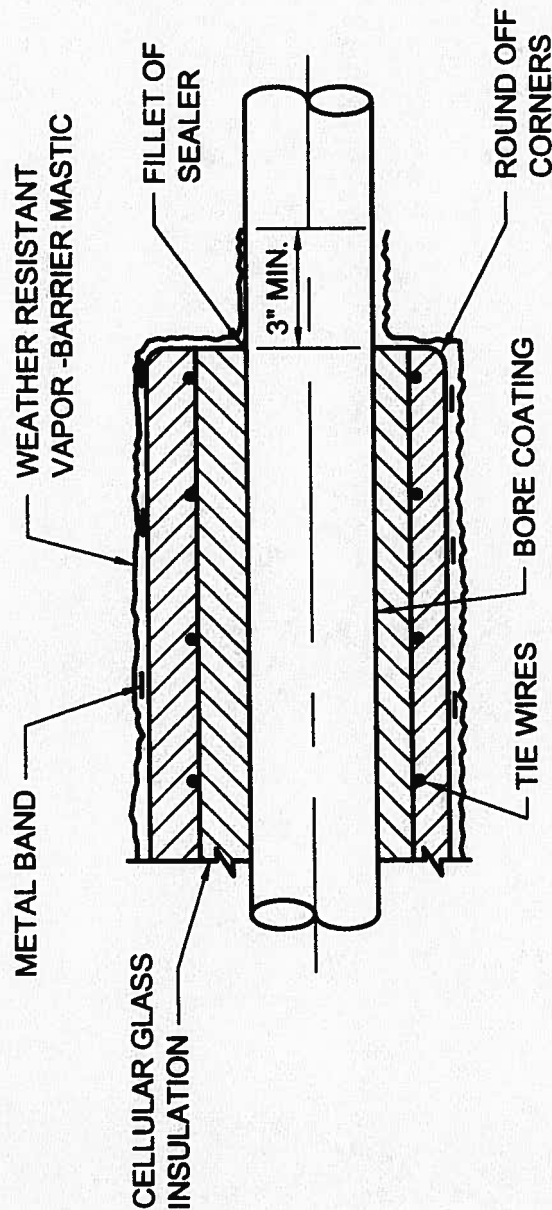


FIGURE 6
TERMINATION OF INSULATION



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TERMINATIONS - CELLULAR
FIGURE 6

INSULATION OF CRYOGENIC
& LOW TEMPERATURE OXYGEN
PIPING ON STANDARD PLANTS

DRWN BY	JT/DMD	DATE	7/12/13
CHKD BY	KBL	DATE	7/12/13
SCALE	NONE	SHEET	1 OF 1
Cust Control No. FIGURE 6			
A Plot Scale			
FIG No	FIGURE 6		
REV.			

NOTES:

1. REDRAWN FROM AIR PRODUCTS SPECIFICATION #90144A "INSULATION OF CRYOGENIC & LOW TEMPERATURE OXYGEN PIPING ON STANDARD PLANTS" BY A.T. MCCARRICKR. GIFFORD JULY 19th 1976.



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SMALL METAL PROJECTIONS
CELLULAR - FIGURE 7

INSULATION OF CRYOGENIC
& LOW TEMPERATURE OXYGEN
PIPING ON STANDARD PLANTS

DRWN BY	JT/DMD	DATE	7/12/13
CHKD BY	KBL	DATE	7/12/13
SCALE	NONE	SHEET	OF 1
Cust Control No. FIGURE 7			
A Plot Scale			
DWG No.	FIGURE 7		
REV.			

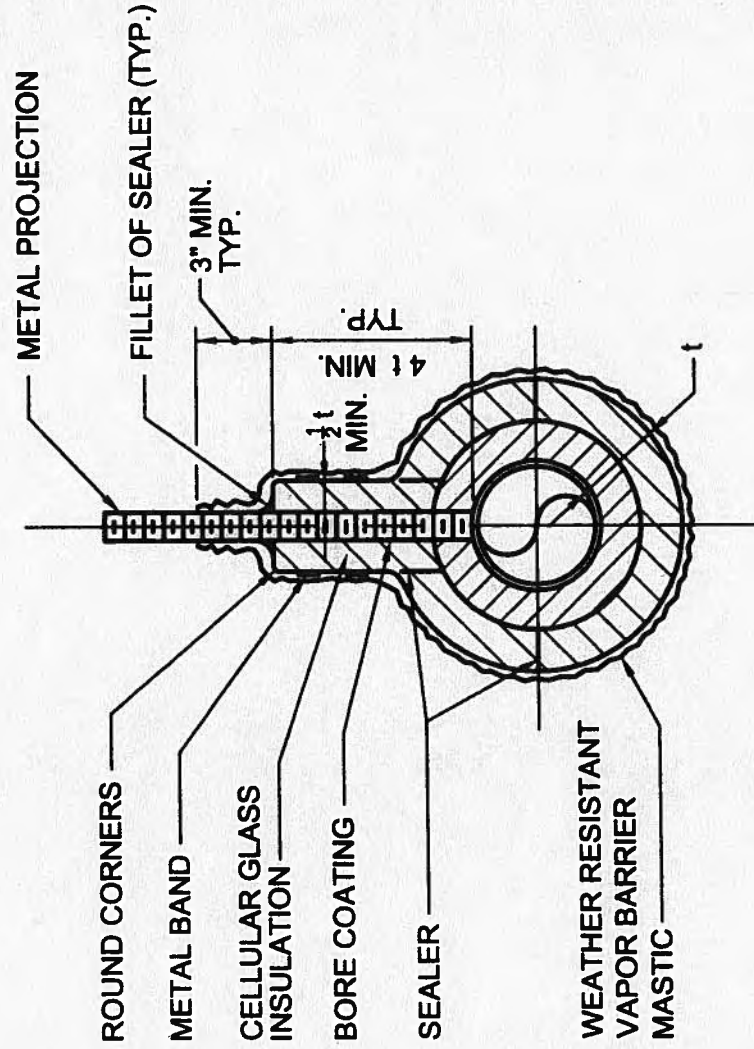


FIGURE 7
SMALL METAL PROJECTIONS

NOTES:

1. REDRAWN FROM AIR PRODUCTS SPECIFICATION #80144A "INSULATION OF CRYOGENIC & LOW TEMPERATURE OXYGEN PIPING ON STANDARD PLANTS" BY A.T. MCCARRICKR. GIFFORD JULY 19th 1976.



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CONTRACTION JOINT - URETHANE
FIGURE 9

INSULATION OF CRYOGENIC
& LOW TEMPERATURE OXYGEN
PIPING ON STANDARD PLANTS

DRAWN BY:	JT/DMD	DATE:	7/12/13
CHECK BY:	KBL	DATE:	7/12/13
SCALE:	NONE	SHEET	1 OF 1
Cust Control No:		FIGURE 9	
A		Plot Scale	
DWG No:		FIGURE 9	
		REV.	

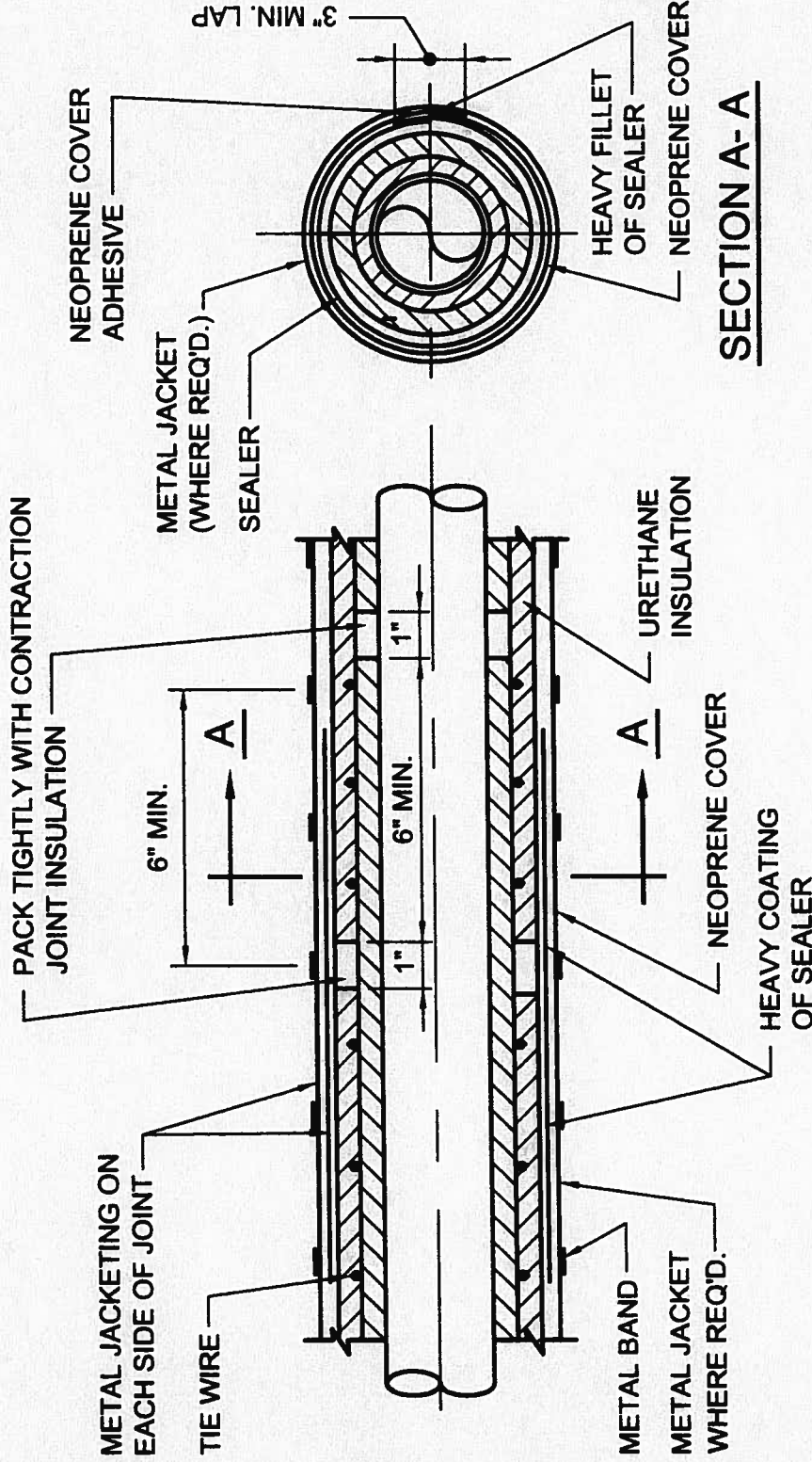


FIGURE 9
CONTRACTION JOINT

1. REDRAWN FROM AIR PRODUCTS
SPECIFICATION #80144A "INSULATION
OF CRYOGENIC & LOW TEMPERATURE
OXYGEN PIPING ON STANDARD PLANTS"
BY A.T. MCCARRICK/R. GIFFORD
JULY 19th 1976.



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SUPPORT RING - URETHANE
FIGURE 10

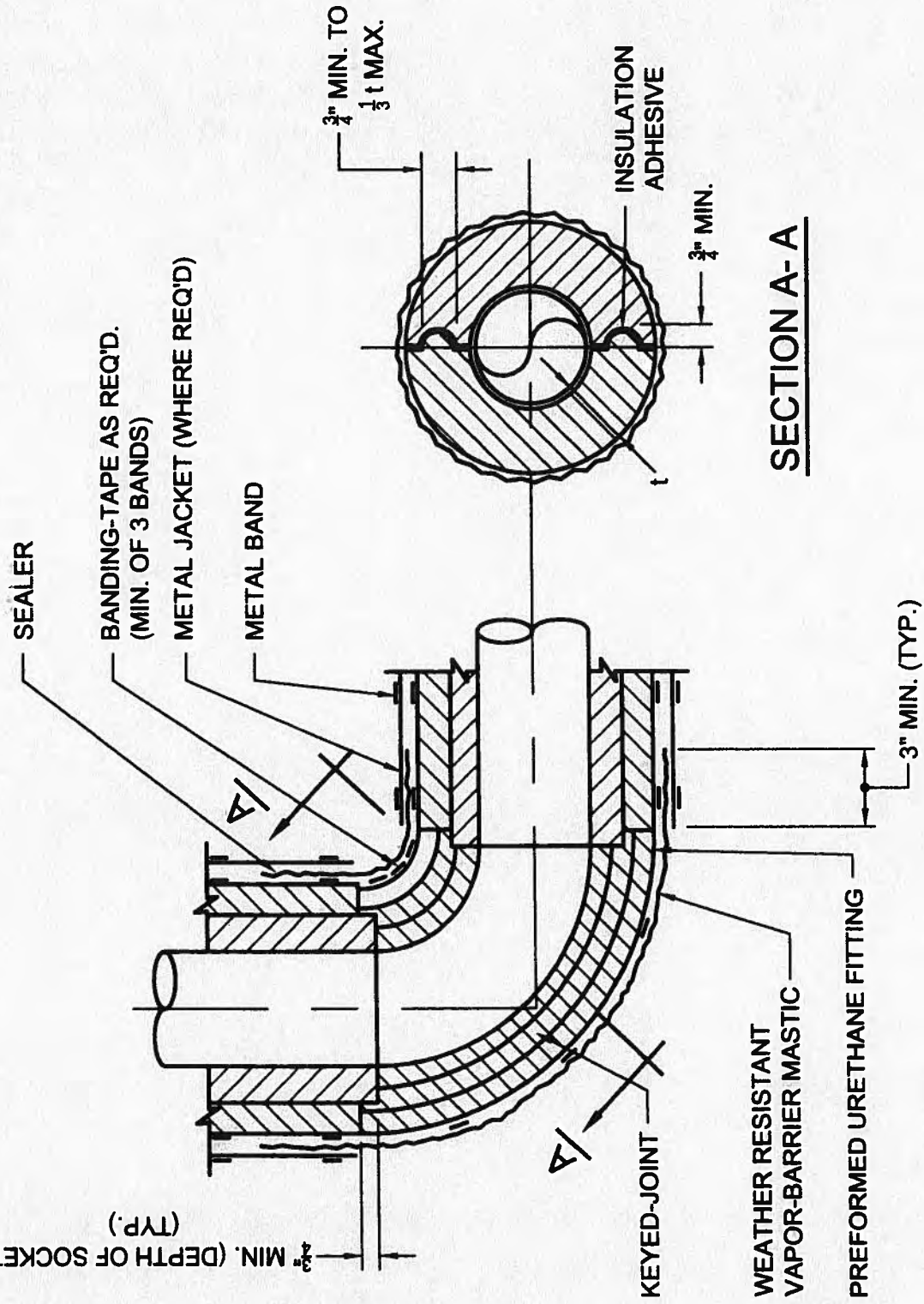
**INSULATION OF CRYOGENIC
& LOW TEMPERATURE OXYGEN
PIPING ON STANDARD PLANTS**

IRVN BY:	JT/DMD	DATE	7/12/13
CHKD BY:	KBL	DATE	7/12/13
SCALE	NONE	SHEET	1 OF 1
Cad Control No.		FIGURE 10	
A Plot Scale			
DWG No.		FIGURE 10	
		REV.	

FIGURE 10
INSULATION SUPPORT RING

4" MIN. (DEPTH OF SOCKET)
(TYP.)

NOTE: TYP. FOR 45° ELBOWS



SECTION A-A

NOTES:

1. REDRAWN FROM AIR PRODUCTS SPECIFICATION #90144A "INSULATION OF CRYOGENIC & LOW TEMPERATURE OXYGEN PIPING ON STANDARD PLANTS" BY A.T. MCCARRICK/R. GIFFORD JULY 19th 1976.



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TYPICAL ELBOW - URETHANE
FIGURE 11

INSULATION OF CRYOGENIC
& LOW TEMPERATURE OXYGEN
PIPING ON STANDARD PLANTS

DRAWN BY:	JT/DMD	DATE	7/12/13
CHECK BY:	KBL	DATE	7/12/13
SCALE	NONE	SHEET	1 OF 1
Cust Contract No.		FIGURE 11	
A		Plot Scale	
DWG No.		FIGURE 11	
		REV.	

FIGURE 11
TYPICAL ELBOW

NOTES:

1. REDRAWN FROM AIR PRODUCTS SPECIFICATION #90144A "INSULATION OF CRYOGENIC & LOW TEMPERATURE OXYGEN PIPING ON STANDARD PLANTS" BY A.T. MCCARRICKR. GIFFORD JULY 19th 1976.



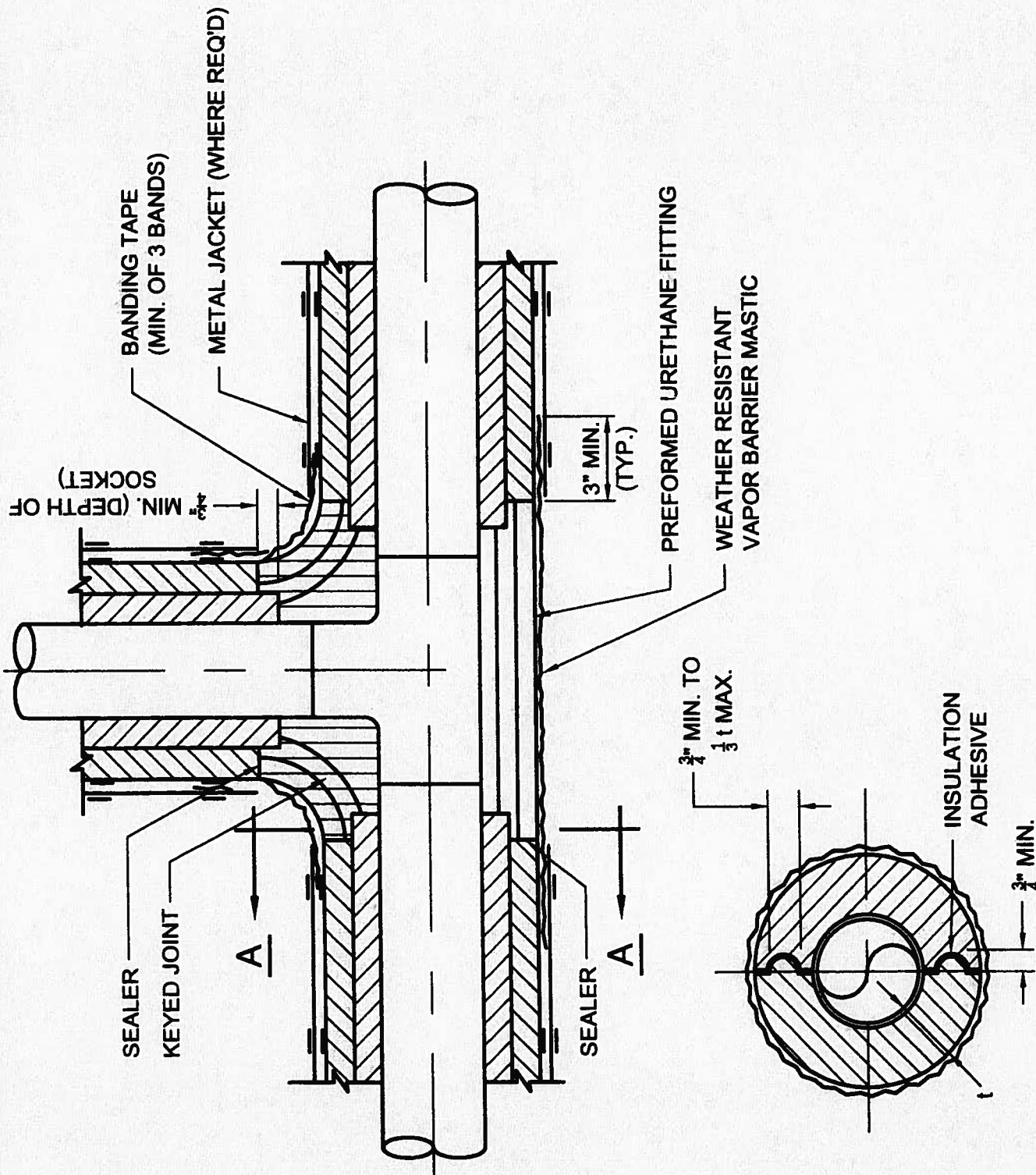
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TYPICAL TEE - URETHANE
FIGURE 12

INSULATION OF CRYOGENIC
& LOW TEMPERATURE OXYGEN
PIPING ON STANDARD PLANTS

DRAWN BY	JT/DMD	DATE	7/12/13
CHECK BY	KBL	DATE	7/12/13
SCALE	NONE	SHEET	1 OF 1
Cust Control No.		FIGURE 12	
A		Plot Scale	
DWG No.		REV.	



**FIGURE 12
TYPICAL TEE**

SECTION A-A

NOTES:

1. REDRAWN FROM AIR PRODUCTS SPECIFICATION #90144A "INSULATION OF CRYOGENIC & LOW TEMPERATURE OXYGEN PIPING ON STANDARD PLANTS" BY A.T. MCCARRICKR. GIFFORD JULY 19th 1976.



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EXTENDED STEM VALVE
FIGURE 13

INSULATION OF CRYOGENIC
& LOW TEMPERATURE OXYGEN
PIPING ON STANDARD PLANTS

DRAWN BY:	JT/DMD	DATE	7/12/13
CHECK BY:	KBL	DATE	7/12/13
SCALE	NONE	SHEET	1 OF 1
Cust Control No:		FIGURE 13	
A		Plot Scale	
DWG No		FIGURE 13	
REV.			

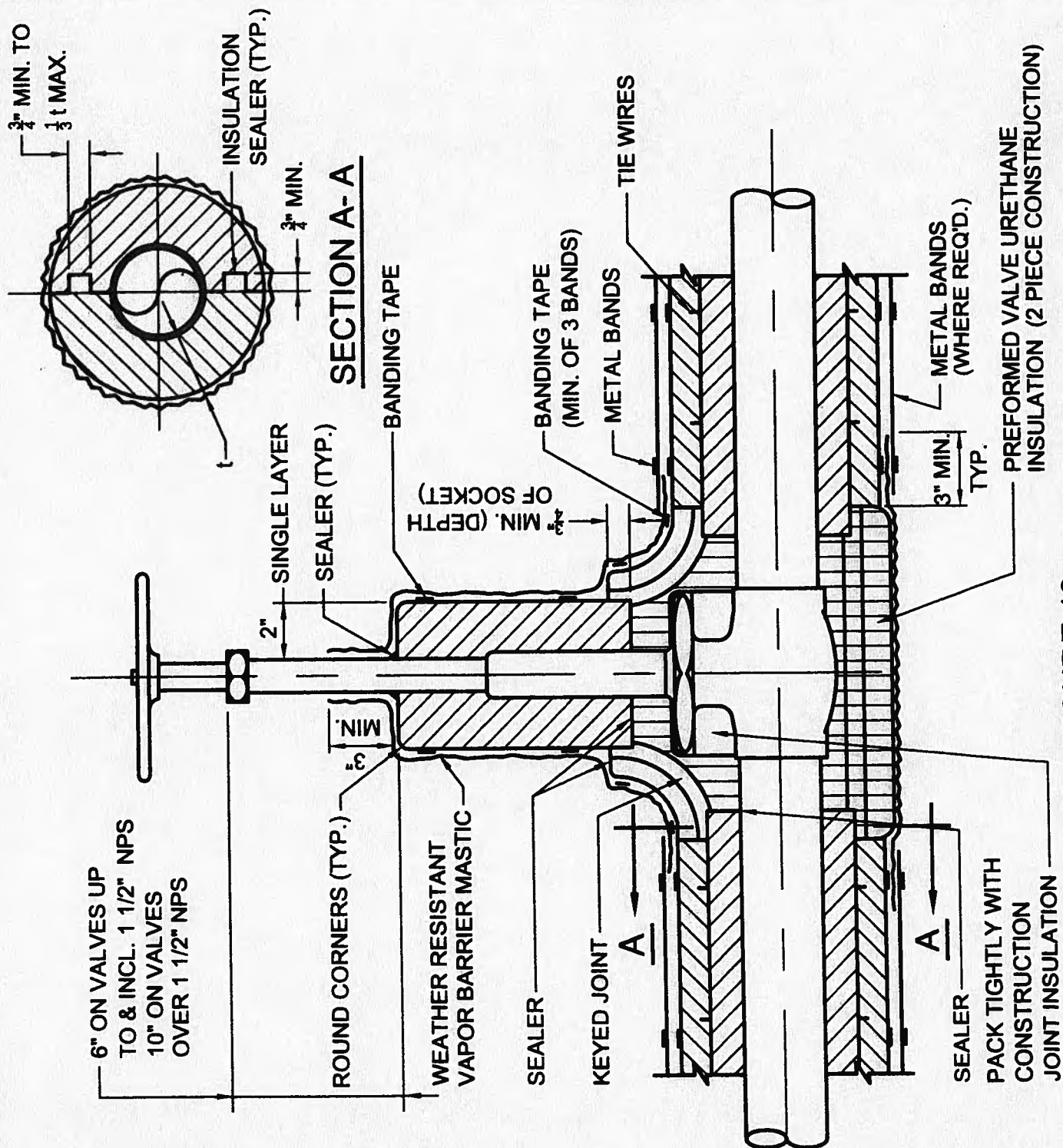
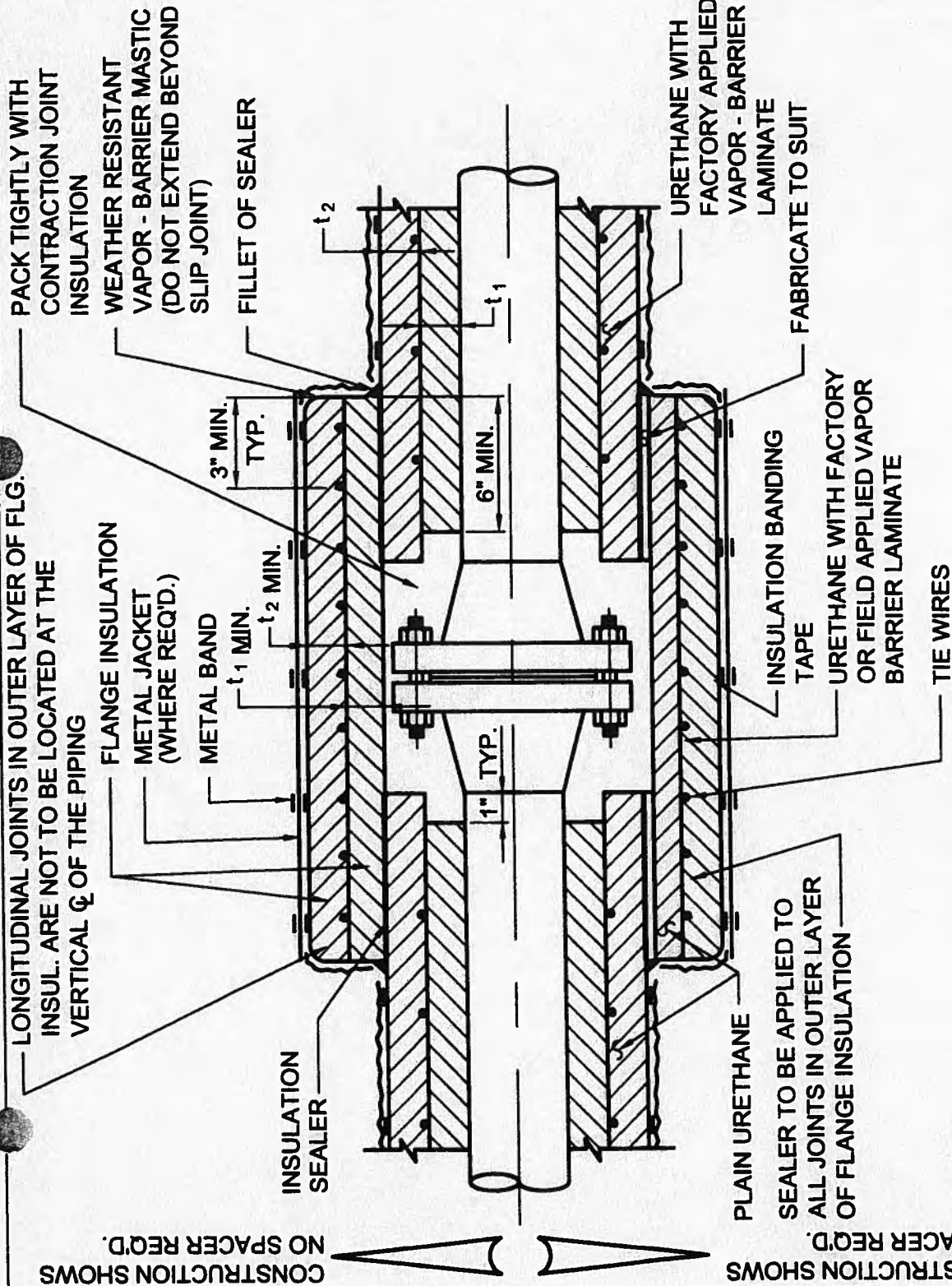


FIGURE 13
EXTENDED STEM VALVE



- NOTES:
1. ALL MATERIALS AND METHOD OF INSTALLATION ARE TYPICAL ABOVE AND BELOW CENTER LINE WHERE APPLICABLE.
 2. THE INSULATION ON THE PIPING ADJACENT TO FLANGES IS TO BE STOPPED SHORT OF THE FLANGE BOLTS IN ORDER THAT THE BOLTS MAY BE REMOVED WITHOUT DAMAGE TO THE ADJACENT INSULATION.

FIGURE 14
FLANGES

NOTES:
1. REDRAWN FROM AIR PRODUCTS SPECIFICATION #80144A "INSULATION OF CRYOGENIC & LOW TEMPERATURE OXYGEN PIPING ON STANDARD PLANTS" BY A.T. MCCARRICK/R. GIFFORD JULY 19th 1976.



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FLANGES - URETHANE
FIGURE 14

INSULATION OF CRYOGENIC
& LOW TEMPERATURE OXYGEN
PIPING ON STANDARD PLANTS

DRWN BY:	JT/DMD	DATE:	7/12/13
CHECK BY:	KBL	DATE:	7/12/13
SCALE:	NONE	SHEET 1 OF 1	
Cust Control No:		FIGURE 14	
A		Plot Scale	
DWG No		FIGURE 14	
REV.			

NOTES:

1. REDRAWN FROM AIR PRODUCTS SPECIFICATION #90144A "INSULATION OF CRYOGENIC & LOW TEMPERATURE OXYGEN PIPING ON STANDARD PLANTS" BY A.T. MCCARRICK/R. GIFFORD JULY 19th 1976.

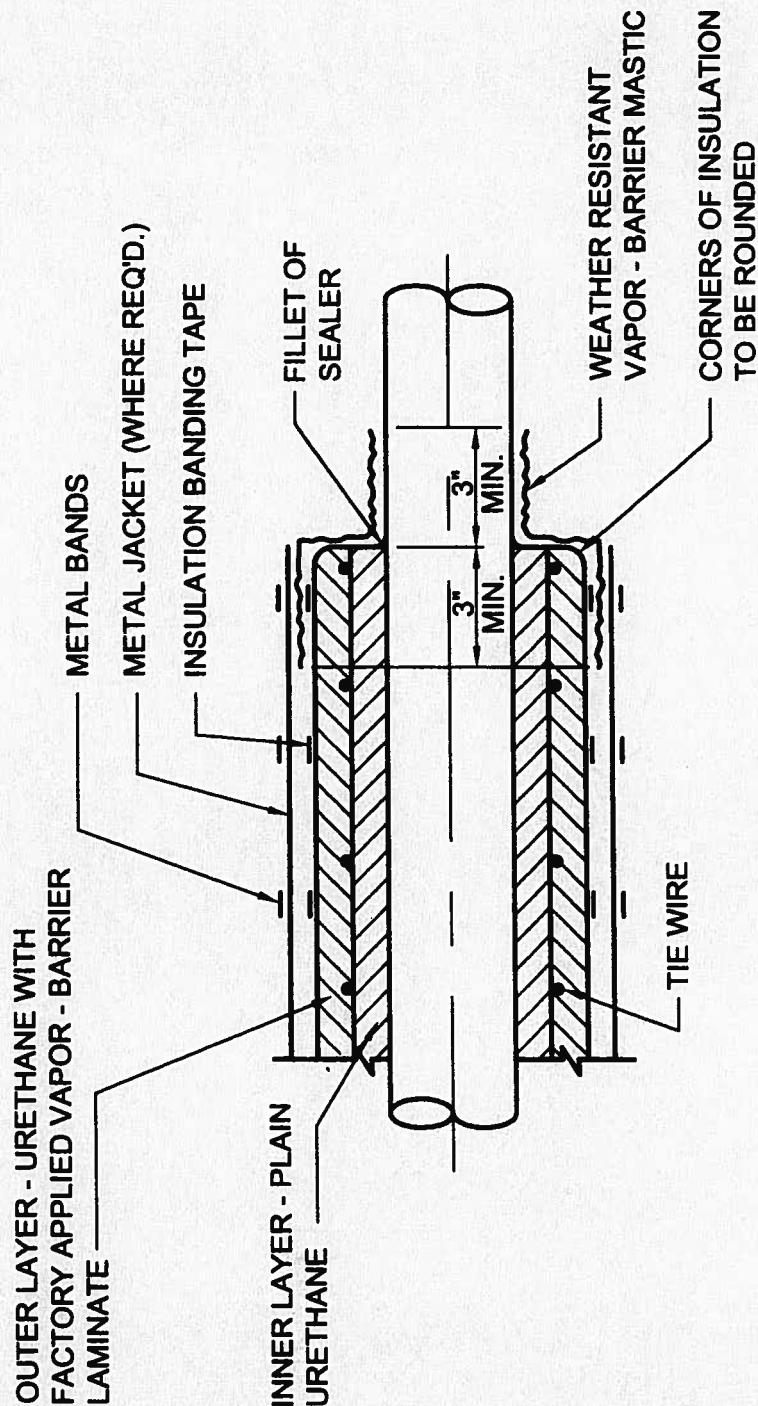


FIGURE 15
TERMINATION OF INSULATION



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TERMINATIONS - URETHANE
FIGURE 15

INSULATION OF CRYOGENIC
& LOW TEMPERATURE OXYGEN
PIPING ON STANDARD PLANTS

DRWN BY:	JT/DMD	DATE:	7/12/13	
CHKD BY:	KBL	DATE:	7/12/13	
SCALE:	NONE	SHEET	1 OF 1	
Cust Control No:		FIGURE 15		
A Plot Scale				
DWG No:				FIGURE 15
REV.				

NOTES:

1. REDRAWN FROM AIR PRODUCTS SPECIFICATION #80144A "INSULATION OF CRYOGENIC & LOW TEMPERATURE OXYGEN PIPING ON STANDARD PLANTS" BY A.T. MCCARRICK/R. GIFFORD JULY 19th 1976.



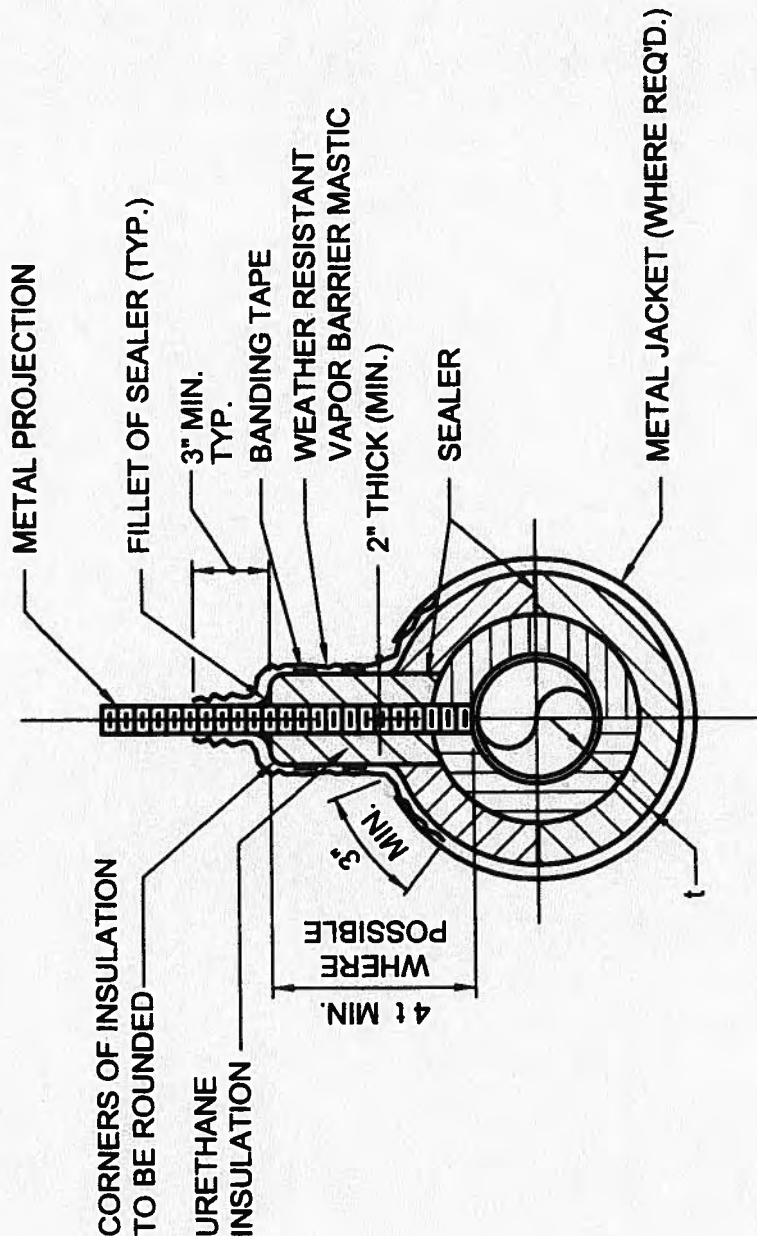
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SMALL METAL PROJECTIONS
FIGURE 16

INSULATION OF CRYOGENIC
& LOW TEMPERATURE OXYGEN
PIPING ON STANDARD PLANTS

DRAWN BY:	JT/DMD	DATE:	7/12/13
CHECKED BY:	KBL	DATE:	7/12/13
SCALE:	NONE	SHEET	1 OF 1
Cust Control No:		FIGURE 16	
A		Plot Scale	
DWG No:		FIGURE 16	
		REV.	



**FIGURE 16
SMALL METAL PROJECTIONS**

APPENDIX 4

Prevailing Wages

THE PARTICULAR PREVAILING WAGE SCHEDULES
INCLUDED IN THIS CONTRACT ARE NOT REPRINTED HERE
DUE TO SIZE.