



CIVIL/MECHANICAL ENGINEERING

Steam Distribution Engineering
Consolidated Edison Company of New York, Inc.
4 Irving Place, New York, N.Y. 10003

SPECIFICATION S-9021-6

THERMAL INSULATION OF STEAM LINES AND METER STATIONS INSIDE BUILDINGS

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1.0 SCOPE

- 1.1 This specification covers thermal insulation on steam service lines and steam meter stations inside customer premises. Insulation on straight pipe shall be pre-formed pipe insulation as described in Section 3.0. Valves, strainers and flanges shall use insulating blankets as described in Section 4.0.
- 1.2 Steam Environmental Health & Safety (EH&S) has reviewed this procedure and it is in compliance with all Company, State and Federal environmental regulations.

2.0 GENERAL

- 2.1 All steam equipment, except indicated otherwise, within customer premises shall be thermally insulated. All surfaces open to touch under normal operating conditions shall maintain a maximum of 100 degree F for permanent pipe insulation and 130 degree F for reusable insulating blankets/jackets.
- 2.2 All insulation shall be free of asbestos and ceramic fibers and shall retain its insulating efficiency while continuously exposed to temperatures of up to 450 degree F without cracking, discoloring, disintegrating or losing its compressive strength.
- 2.3 All proposals shall contain material safety data sheets on all insulating material.
- 2.4 All insulation materials other than the ones specified herein must be approved by the Company Industrial Hygiene and Safety Department (IH&S), prior to use.
- 2.5 Insulation/jacketing for piping and equipment shall be water and oil resistant and shall be able to withstand potential steam leaks on high-pressure steam systems without experiencing any physical deterioration or reduction in thermal efficiency.
- 2.6 Flanges and welded joints shall not be covered until the piping has been hydrostatically tested as per ASME B31.1, latest edition.
- 2.7 Mechanical type steam meters, meter regulating valves and orifice plate flanges shall not be insulated. Their mating flanges shall be left exposed with sufficient clearance for the removal and installation of nuts and bolts. Steam traps shall not be insulated.
- 2.8 Electrical type steam meters and motorized type meter regulating valve shall be insulated with removable insulating jackets/blankets as described in Section 4.0. The insulation shall be installed over the meter and valve body but not the electrical compartment.
- 2.9 When steam service is insulated with new insulation and activated for the first time adequate ventilation, natural or forced, must be provided. If irritating odors are detected, avoid prolonged exposure and ventilate the area.

3.0 PIPE INSULATION

- 3.1 Pipe insulation shall be of a molded sectional material of a rigid type.
- 3.2 Thermal insulation shall be installed in accordance with thickness shown in Table A. Thickness are based on computations using accepted conductivity factors and are the most economic for the operating conditions.

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TABLE A

<u>NOMINAL PIPE SIZE (inch)</u>	<u>INSULATION THICKNESS (inch)</u>
1 to 2	2
3 to 4	2-1/2
6 to 8	3
10 to 12	3-1/2
14 to 30	4

3.3 The approved insulation for straight pipe is fiberglass and shall conform to ASTM C-547, Type I, entitled "Standard Specification for Mineral Fiber Preformed Pipe Insulation".

3.3.1 Partial listing of acceptable products.

Product	Manufacturer
Fiberglass ASJ-SSC	Owens Corning (Schuller) Manville, Knauf

3.4 Insulation shall be installed in accordance with the manufacturer's standard application specification.

3.5 All insulation for straight pipe shall consist of single layer thickness. Multi-layered and or multi-sectional insulation is unacceptable.

3.6 All insulation for straight pipe shall be supplied in a pre jacketed form. The jacket shall consist of a Kraft reinforced foil vapor retarding jacket with two factory applied pressure sensitive, heat resistant adhesives that provide positive closure and vapor sealing of the longitudinal joint. The jacket shall comply with ASTM E96, entitled "Test Method For Water Vapor Transmission of Materials".

4.0 REMOVABLE AND REUSABLE INSULATING BLANKETS

4.1 The following materials (or their approved equals) shall be used to fabricate the removable and reusable blanket insulation. These materials can be used on piping and equipment whose skin temperature does not exceed 450 degree F. The inner and outer covering shall be completely water and oil resistant and suitable for harsh environments in steam meter rooms.

4.2 Physical Properties:

- Insulation covering: Silicone impregnated fiberglass cloth, 17 oz/sq. yd. minimum
 - Alpha Matrix Style 3259-2-SS, by Alpha Assoc. Inc.
 - Lewco 1750S, by Lewco Industries, Inc.
 - Siljac 1750, by Textile Coated Inc.
- Covering thickness: 0.018-in. nominal
- Insulation: Glass mat, type E needled fiber. 1/4", 1/2" @ 9 LB/CF & 1" @ 11.3 LB/CF
 - Techmat by BFG, Burlington.
 - Tempmat by J.P. Stevens.
- Fastening: 1 1/2" wide belts fabricated from the outer jacket material with naval brass D-rings (12 gage) and Velcro tabs to secure belts.
- Identification Tags: 304 stainless steel with embossed lettering.

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- Sewing Thread: Pure Teflon thread.
 - Closure Cord: Teflon impregnated Nomex draw cord or Aramid Kevlar.
 - Tensile Strength: 180 LB/in x 150 LB/in
- 4.3 Blanket construction shall be double sewn lock stitch with a minimum of 6 –8 stitches per inch. Blankets shall be sewn with two (2) parallel rows of stitching using pure Teflon thread. The thread must be able to withstand the skin temperatures without degradation. All raw jacket edges will have a tri-fold Teflon coated Nomex cloth binder. No raw jacket edge shall be exposed. Hog rings or stapled edges are not acceptable methods of seam closure.
- 4.4 The insulation shall be designed to minimize the convection current in the space between the hot metal surface and the inner layer of insulation. To this end, during blanket fabrication, the layers of tempmat shall be placed in an overlapping pattern.
- 4.5 All blanket pieces which match mating seams must include an extended 2" flap constructed from the exterior fabric. This flap will cover the exposed seam and will minimize any potential hot spot. Wherever possible, belts with Velcro closure shall be utilized to maintain a seamless appearance.
- 4.6 Blanket design will encase the piece of equipment or valve. A minimum overlap flap beyond the mating flanges is listed as follows, 4" for 1" & 2", 5" for 3" & 4" and 6" for 6" or larger sizes. If overlapping is not possible, pipe covering insulation will butt up to the adjoining surface.
- 4.7 To accommodate leaks and detect their origin, blanket pieces shall be designed to incorporate a mating seam at the gravitational low point and or a low point drain grommet.
- 4.8 For ease of identification and location, each blanket shall have a self sticking acrylic vinyl plastic label that contours around the shape onto the outer jacketing. The label shall be durable enough to withstand harsh industrial environments and contain the vital information such as the pipe size, component, covering and insulation material and locations with part number to identify each individual blanket.

NON-ASBESTOS MATERIAL	
PIPE SIZE: _____	COMPONENT: _____ (valve, strainer & flange)
JACKET MAT'L: _____	INSULATION MAT'L: _____
LOCATION: _____	

Note: Dimensions are approximately 2.0" x 3.5". Lettering shall be 0.125", embossed. The label shall be attached to the outer insulation jacket material.

- 4.9 To enhance blanket quality and durability, stainless steel (304SS) quilting pins shall be placed at random locations no greater than 12" apart to prevent shifting of the insulation. No piercing of the outer insulation jacket will be permitted. Cinch belts shall be used to hold the cover in place. Velcro hook and loop fasteners shall be used to secure the end of the belts to cover after cinching.

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- 4.10 Valve blankets shall be manufactured as one (1) piece body and bonnet unless otherwise approved.
- 4.11 Blankets shall be fastened using 1¹/₂" wide Teflon belts fabricated from the outer jacket material, tri-folded and straight stitched. 1¹/₂" inch wide naval brass D-ring fasteners will be sewn onto the belt. 1¹/₂" inch wide Velcro tabs shall be sewn onto the belt and mating outer jacket. Belting will be sewn onto the outer jacket fabric with a minimum of 3" stitched to the outer jacket. Belting will be spaced a minimum of 6" at centerline between belts or blanket edges. At the interface between the blankets and surrounding insulation, a flap with Teflon impregnated Nomex draw cord shall be provided.
- 4.12 The color of the outer face blanket shall be white/gray for all piping and equipment.
- 4.13 Individual insulation blankets, or piece thereof, shall not weigh more than 25 lbs.

5.0 WARRANTIES

- 5.1 The "Warranties" article of the Standard Terms and Conditions shall apply, provided the warranty period is two (2) years after completion and acceptance of all work.

6.0 STATEMENT OF EXCEPTIONS

- 6.1 The Contractor is reminded that insulation quantities have not been estimated by the Company or its Field Representative. It is the responsibility of the Contractor to determine the quantity of insulation to be installed for each specific project task. Each specific location shall be tagged for delivery.
- 6.2 The Contractor shall allow inspection of its fabrication facilities by a Company or its Field Representative prior to award of any contract and at any time during the execution of any contract.
- 6.3 Unless specifically identified in a separate section within the Contractor's proposal, it is assumed that the Contractor will comply with all of the requirements included within this Specification. Within the Statement of Exceptions, the section of the Contractor's proposal, the Contractor must specifically identify the paragraph of this Specification, which is being taken exception to.