

**Introduction**

INSULTECH® Thermal Blankets are a custom fit high quality pre-engineered insulation system designed to save energy, retain radiant heat, minimize insulation maintenance and improve the surrounding work environment. INSULTECH® is also capable of withstanding weather conditions and chemical environments. INSULTECH® is flexible and easy to install, easy to remove and reinstall allowing quick access and easy equipment serviceability.

**Common Applications and Markets Served**

INSULTECH® Thermal Blanket Applications include; Steam Process Piping, Gate Valves, Ball Valves, Centrifugal Pumps, Globe Valves, Condensate Pumps, Expansion Joints, Steam Traps, Pressure Reducing Valves, Heat Exchangers, Strainers, Control Valves, Steam & Mud Drums and Boiler Heads.

INSULTECH® Thermal Blanket Markets include; Institutional and Industrial Boiler Rooms and District Heating and Cogeneration Power Plants. Any steam utility user.

**Maximum Service Temperature**

This design is to act as a Thermal Barrier with a maximum service temperature of 450°F (232°C).

**Product Components**

The Outer and Inner Jacketing is a 17 oz/sq. yd. Silicone Impregnated Fiberglass Cloth. The Insulation Material is an 11PCF Fiberglass Needled Mat-Type “E” Fiber. The Mat is encapsulated by the Silicone Cloth and sewn together, producing a self contained blanket system. The INSULTECH® Blanket system includes fasteners for easy install and removal.

**Blanket Construction**

Blanket construction shall be double sewn lock stitch with a minimum 7 stitches per inch. All raw jacket edges will have a tri-fold Silicone Cloth binding. No raw cut jacket edge will be exposed. Stitching will be done with PTFE Teflon® coated fiberglass thread or PTFE Teflon® coated Nomex® thread.

**Blanket Overlap**

To minimize heat loss from fittings, the blanket will extend beyond mating flanges unto existing insulation for a minimum of 2”. Where blanket cannot fit over existing oversized insulation, blanket will butt up to existing insulation with a friction fit closing seam. All sections of pipes will be insulated and open gaps are not acceptable. Blanket diameters which are 2” or larger than existing insulation must be end capped to eliminate open air void.



8” 250# Gate Valve – 150 psi Steam Header

**Leak Accommodations**

To accommodate a leak and detect its origin, blankets will have a low point stainless steel or brass drain grommet or the design will incorporate a mating seam at the lowest point of the blanket.

**Blanket Insulation Weight**

When designing blanket insulation for large equipment where a multi-piece construction is necessary, the total number of pieces will be minimized. Any one piece will not exceed 40 lbs. in weight.

**I.D. Plate**

For easy identification and location, a stainless steel or aluminum name plate tag is riveted to each blanket piece. 1/8” embossed lettering will show location, description, size, pressure rating and tag number sequence. Each blanket will include an I.D. Plate.

**Quilting Pins**

To enhance blanket quality and to maintain uniform thickness, 14 gauge type 304 stainless steel quilting pins will be placed at random locations no greater than 18 inches apart. Quilting Pins will prevent shifting of the insulation. 14 gauge type 304 Stainless Steel speed washers will secure the quilting pin stem in place.

**Minimized Air Void**

Equipment and equipment heads are typically a multi-piece blanket design and are installed in tag number sequence. Heat exchanger heads, large vessel flanges and pump housings will be designed in two half sections. Blanket design will conform to the equipment with minimized air void. All valve covers will be a two piece design with a separate body and bonnet.

### **STANDARD FASTENER (Wiretwists)**

A 21 gauge type 304 stainless steel wire will be doubled up and twisted in a spiral fashion, with a minimum of 4 to 5 twists per inch. Wiretwist length will be 16" or longer. The Wiretwist will be secured to the lacing pin at the pin stem. Lacing pin stems will be 14 gauge type 304 stainless steel. Pins will be held in place with 1" diameter type 304 stainless steel speed washers. Wiretwists will be spaced 6" on center along closing seams with matching lacing pins to lace and secure to.

### **FASTENING OPTIONS**

#### **1) Lacing Pins**

12 or 14 gauge Type 304 Stainless Steel lacing pins will be utilized. Location of pins on the blanket will be 2" or more from blanket edge and 8" or less from centerline to centerline along a closing seam. The lacing pins will be held in place with 1" diameter 14 gauge type 304 stainless steel speed washers.

#### **2) Metal "D" Ring Strap with Velcro® Tab**

A three layer Silicone Cloth strap is double sewn. One strap is a 16" long pull-down strap, the other is a 6" long stationary strap. Both straps are stitched to the outer jacketing of the blanket. The stationary strap includes a metal "D" Ring measuring 1.125" to 1.25" in width. This is placed ½" from the closing seam edge. The pull-down strap is placed 3" in from the closing seam edge. Both matching straps are spaced along the closing seam edge no greater than 8" apart. The pull-down strap includes hook-and-loop Velcro®, measuring at least 1" wide by 6" long, and is perimeter stitched to the strap surface. All closing seams have a 1.5" extended fabric flap, which is placed along the stationary strap side of the closing seam.

#### **3) Velcro® Flaps**

Jacketing flaps are secured closed by the utilization of Hook and Loop (Velcro®) fasteners. A 2" wide section of the Hook portion of the fastener will be stitched to the outer surface of the blanket. A 2" wide section of the Loop portion will be aligned and stitched on the mating inner surface of an extended jacketing flap.

#### **4) Side Release Buckles**

The blanket fasteners will be 1 1/2" Polypropylene Side Release Buckles with 1.5" wide Fabric Straps. A tri-fold 1.5" (finished width) belt will be sewn together utilizing PTFE 3 ply thread. A row of stitching, along each side of the belt will be parallel for the entire length. The Buckle strap will be a minimum of 7" long and will be box stitched to the outer surface for a minimum of 5" in length. A matching pull strap will be box stitched on the outer jacket surface and will match up to the Buckle Strap. The pull strap will be a minimum of 16" long.

### **Assembly Drawing Requirements**

Each INSULTECH® project will include an instruction package shipped with the blanket material.

This package will include Assembly Drawings identifying piece location, a Material List of all pieces and Instructions for Installation on how INSULTECH® will be installed. Accurate CAD files & project records must be kept by the manufacturer. For a minimum of ten years these records will assure accuracy in re-ordering and individual parts replacement.

### **Production Drawing Record Keeping**

The correlating Project Production Drawings will also be kept on file with the blanket manufacturer. The latest revisions, if any after installation, will be recorded on the CAD drawing system. This file will also be kept for a minimum of ten years to assure accuracy in re-orders of replacement parts.

### **Project Qualifications**

All items to be insulated will require a field takeoff prior to bid submittal, and must be reviewed for proper cost estimation. Upon receipt of project contract, each and every item must be field measured for retrofitting to existing field conditions and tagged with an aluminum or stainless steel identification tag showing an item number for installation reference. At the time of installation, blankets must have corresponding item number shown on the blanket tag and must match to existing tagging on fitting. No standard blanket designs will be accepted. This will assure a "Custom Fit" design with maximum thermal efficiency.

### **Project Accuracy and Effectiveness**

Demonstrate the efficacy of precision through the use of State-of-the-Art CAD Design. The efficacy of precision markings, with the ability to maintain a high degree of repetitiveness and control of manufacturing tolerances for locations of identification tags, stitch lines, Hook and Loop (Velcro®), cut lines for after stuffing, cutting of the outer and inner layer of fabrics, septum (Acoustic Blankets only) and insulation through the use of State-of-the-Art CNC cutters.

### **Warranty**

We guarantee that all custom manufactured blankets will accommodate vibration probes, gauges, tubing, piping, brackets, etc. and fit correctly for optimum performance as per the design specification provided in the quotation process. In addition, for 18 months we will cover the cost of replacing the blanket should the failure be due to premature degradation of any component utilized in the blanket construction, as well as any defects due to poor workmanship.

### **Design Construction Sample**

Upon bid submittal a blanket design sample must be presented for review and product approval. A 7"x 9" or a 2 piece 2" Gate Valve Sample will be required and must identify all characteristics mentioned in the above fabrication requirements. Any deviations from the above stated requirements may result in rejection.

# INSULTECH® THERMAL BLANKET LT450SS

## Installation Guidelines

INSULTECH® will follow these simple guidelines:

- Once material is received, open boxes with care. DO NOT “cut” deep into container to avoid damaging blankets.
- Locate the Instructions for Installation.
- Follow the Material List to determine blanket part number.
- Refer to the Assembly Drawing for orientation of each blanket part number and installation details of each part.
- Locate the Identification Tag on each blanket, for correct description and sequence of blankets.
- Material is installed in tag number sequence.
- Use leather gloves to install material.
- A physical effort is required for proper placement and fit.

## Storage

Once shipment is received, protect INSULTECH® Blanket Insulation from water damage and/or other abuses prior to installation. INSULTECH® Blanket Insulation will be shipped in cardboard boxes or crated for export shipping. Packaging is not designed for outdoor storage, thus a tarp or covering of some type is necessary if stored outdoors until installation is completed.

## Preparation

Apply INSULTECH® Blanket Insulation on clean, dry surfaces and avoid trapping oils, greases or combustible materials.

## Thermal Conductivity Data.....

Observed Test Data (temperature in °F)					
Data Point	Hot Surface	Cold Surface	Temp. Difference	Temp. Mean	Measured Cond.*
1	273.3	93.3	180	183.3	0.434
2	341.7	99.8	241.9	220.7	0.463
3	472	114.2	357.8	293.1	0.521
4	599.3	131.6	467.7	365.4	0.582

Thermal Conductivity Calculated Using ASTM C1045	
$k = 3.016E-01 + 6.8100E-04 (\text{mean}) + 2.0972E-07 (\text{mean}^2)$	
Mean Temp. °F (°C)	Apparent Cond. * (**)
	*BTU•in/hr•ft <sup>2</sup> •°F    **W/mK
100 (38)	0.372 (0.054) *
200 (93)	0.446 (0.064)
300 (149)	0.525 (0.076)
400 (204)	0.608 (0.088)
500 (260)	0.695 (0.100)
600 (316)	0.786 (0.113) *

This calculated value extends beyond that recommended for the observed data. \*

## Typical Product Properties Specifications

Core Blanket	ASTM C 1086-88	Standard Specification for Glass Fiber Felt Thermal Insulation Service Temperature Up to 1200°F (649°C)
Jacketing Material	---	Silicone Impregnated Fiberglass Composite - Material Weight 17 oz/yd <sup>2</sup> (577g/m <sup>2</sup> ) Silicone & Fiberglass Respective Continuous Service Temperature 480°F (249°C) 1000°F (538°C) - Tensile Strength of Silicone Jacketing Warp: 350 lbs/in (3128 N/50 mm) Fill: 300 lbs/in (2681 N/mm)

ASTM C 335 Standard Test Method for Steady-State Heat Transfer Properties of Pipe Insulation.

ASTM E 1222 – 90 Standard Test Method for The Laboratory Measurement of the Insertion Loss of Pipe Lagging Systems.

ASTM C 1045 - 07 Standard Practice for Calculating Thermal Transmission Properties Under Steady-State Conditions

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## Caution

Typical industry handling practices should be exercised for the protection of the worker. The field mechanic should wear long-sleeve loose-fit clothing, wear proper head covering, leather gloves, wear proper fitted eye protection and use appropriate respiratory protection when handling, inspecting, installing and removing INSULTECH®. The worker should wash with soap and warm water after exposure. Since there is a likelihood of fiberglass exposure and the fiberglass is considered a nuisance fiber, it is recommended that you wash and rinse work clothes separately. For specific handling practices, refer to the component product MSDS sheets.

## Notes

The chemical and physical properties of INSULTECH® Thermal Blanket represent typical average values determined in accordance with accepted test methods. The data is subject to normal manufacturing variations and is supplied as a technical service subject to change without notice. In addition, test data are average results of tests conducted under standard procedures and are subject to variation. Results should not be used for specification purposes. Design Guidelines are as follows: To access the true limitations of this recommended design, refer to the technical data for each product component. Following these guidelines will produce the highest achievable service life. Blanket design quality can be reduced or enhanced by changing any one component. If a question arises regarding deviations from those stated guidelines, or to insure the information is most current please contact your regional representative or call Shannon Enterprises direct.

