

Introduction:

Shannon Thermal Blankets are a CAD designed, CNC produced, high quality, engineered insulation system designed to save energy, retain heat, minimize insulation maintenance and improve the surrounding work environment. Shannon Thermal Blankets are weather and chemical resistant. They are light weight, flexible and easy to install, remove and reinstall, allowing quick access. The key benefit is a user friendly experience on “Re-Usability”.

Applications and Markets:

Valves, Flanges, Pumps, Expansion Joints, Drip Legs, Piping, Equipment and Complex Surfaces that otherwise are left untreated. “Confined Space” applications with high temperature, steam vapor & flooding. Blanket design is CUI: Corrosion Under Insulation Compliant, Hydrophobic, Water Resistant & Corrosion Resistant.

Service Temperature/Condition:

This design is to act as a Thermal Barrier with a maximum service temperature of 288°C (550°F).

Product Components:

The Outer and Inner Non-Porous Jacketing is a 459 g/m² (13.5 oz/ yd²) 100 percent PTFE Laminate The Insulation Core consists of Hydrophobic Supermat™ @ 9 pcf (176.2 kg/m³) Type “E” Fiber, encapsulated by the inner and outer jacketing, with a double sewn construction, producing a “Self-Contained system”. The Shannon Blanket System includes Integral Fasteners for install & removal.

Blanket Construction:

Blanket construction shall be a “Double Sewn” lock stitch with a minimum 5 stitches per inch (2 stitches per CM). All raw jacket edges will have a tri-fold PTFE Teflon® Laminate binding. No raw cut jacket edge will be exposed. Stitching will be pure Teflon® 3-Ply thread. No “On-Site Fabrication” to assure high quality. Made in the U.S.A.

Blanket Design Overlap:

To minimize heat loss, the blanket will extend beyond mating flanges unto existing insulation for a minimum of 2” (5CM). 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 1” (2.5CM) or larger than existing insulation must be end capped to eliminate open air void.

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



**10” Piping / Expansion Joint
 District Heating - Manhole (Confined Space)**

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 (18 KG) in weight.

ID Plate: For easy identification and location, a stainless steel or aluminum name plate tag is riveted to each blanket piece. 1/8” (0.32CM) embossed lettering shows 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, stainless steel quilting pins @ 2.5 mm² (14 Gauge) will be placed at random locations no greater than 12” (30CM) apart. Quilting Pins will prevent shifting of the insulation. Stainless Steel speed washers will secure the quilting pin stem in place.

Minimized Air Void: Equipment and equipment heads are typically a multi-piece design, 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. Valves are a 2 piece, body bonnet design.

Design Construction: Sample: Submit a blanket sample for review and approval. A 10”x12” (25CM x 30CM) Sample is required and must identify all characteristics mentioned in the above requirements. Deviations will result in a bid rejection.

STANDARD FASTENER “WIRETWISTS”: A type 304 stainless steel wire 0.50 mm2 (20 Gauge) will be doubled up and twisted in a spiral fashion, with a minimum of 5-7 twists/inch (3-4 twists/CM). Wiretwist length will be 16” (40CM) or longer. The Wiretwist will be secured to the lacing pin at the pin stem. Pin stems will be 2.5 mm2 (14 gauge). Lacing pins will be held in place with 1” diameter type 304 stainless steel speed washers. Wiretwists will be spaced 6” (15CM) on center along closing seams with matching lacing pins to lace and secure to.

FASTENING OPTIONS:

Stainless Steel Double “D” Ring Strap

A 1.5” (3.8CM) wide LFP composite 20 mil thick Strap 4-3/4” (12CM) overall long stationary strap is folded with two 1.5” (3.8CM) in width stainless steel “D” rings heat sealed to the outer surface of the jacket. This is placed ½” (1CM) from the closing seam edge. The pull-down strap, minimally 14” (36CM) long, of the same material is heat sealed to the outer jacket 3” (4.8CM) in from the closing seam edge. Both matching straps are spaced along the closing seam edge no greater than 8” (20CM) apart. All closing seams have a 1.5” (3.8CM) extended LFP flap, which is placed along the stationary strap side of the closing seam.

Non-Metallic Side Release Buckle and Strap

The blanket fasteners will be 1 1/2” Delrin Side Release Buckles with 1.5” wide LFP composite 20 mil thick Straps. The Buckle strap will be a minimum of 5-1/2” long and will be heat sealed to the outer surface for a minimum of 5” in length. A matching pull strap will also be heat sealed on the outer jacket surface and will match up to the Buckle Strap. The pull strap will be a minimum of 14”.

Assembly Drawing Requirements: Each blanket insulation 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. 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 part replacement. All blankets are to be CAD designed / CNC produced to assure the highest quality and precise fit.

Storage: Once shipment is received, protect Shannon Blanket Insulation from water damage and/or other abuses prior to installation. Shannon Blanket Insulation will be shipped in cardboard

Project Accuracy & Effectiveness

Must demonstrate the efficacy of precision, through use of 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 I.D. tags, stitch lines, cut lines for stuffing, cutting of jacketing & insulation materials through use of CNC cutting systems & software.

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 and filed 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 insulated will require a site visit prior to bid submittal. Upon receipt of project contract, each item must be field measured for “Custom Fitting” to match existing field conditions. Each item must be tagged and or marked for reference. At the time of installation, blankets must have a corresponding tag on the blanket and must match to an existing tag in the field. No standard blanket designs will be accepted to assure a “Custom Fit” design with high efficiency.

Warranty

Guarantee that all blankets accommodate field conditions, gauges, tubing, piping, brackets, etc. and fit correct, for optimum performance as per the design specification. In addition, for 18 months, cover the cost of replacing the blanket should the failure be due to premature degradation of any component in the blanket construction, as well as any defects due to poor workmanship.

Installation Guidelines:

- Once received, open boxes with care, DO NOT “cut” deep into container to avoid damaging blankets.
- Locate the Instructions for Installation.
- Follow the Material List & 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.

Site Preparation:

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

Blanket Thickness Surface Temperature Reference:

Operating Temp	Thickness	Surface Temp	Thickness	Surface Temp	Thickness	Surface Temp
121° C (250° F)	25 mm(1")	37.9° C (100.2° F)	40 mm(1.5")	33.3° C (92.0° F)	50 mm (2")	30.8° C (87.4° F)
149° C (300° F)	25 mm(1")	42.6° C (108.6° F)	40 mm (1.5")	36.8° C (98.2° F)	50 mm (2")	33.5° C (92.3° F)
177° C (350° F)	25 mm(1")	47.3° C (117.2° F)	40 mm (1.5")	40.3° C (104.6° F)	50 mm (2")	36.3° C (97.4° F)
204° C (400° F)	25 mm(1")	52.2° C (126.0° F)	40 mm (1.5")	44.0° C (111.2° F)	50 mm (2")	39.3° C (102.7° F)
232° C (450° F)	25 mm(1")	57.2° C (135.1° F)	40 mm (1.5")	47.8° C (118.0° F)	50 mm (2")	42.3° C (108.2° F)
260° C (500° F)	25 mm(1")	62.5° C (144.5° F)	40 mm (1.5")	51.7° C (125.1° F)	50 mm (2")	45.5° C (113.9° F)
287.8° C (550° F)	25 mm(1")	67.9° C (154.2° F)	40 mm (1.5")	55.8° C (132.4° F)	50 mm (2")	48.9° C (119.9° F)

- * The above referenced Cold Face Surface Temperatures should be used as guidelines for blanket insulation thickness design.
- * The Cold Face Surface Temperature of the blanket should approach surrounding ambient temperature conditions.
- * The economic thickness of the blanket should consider blanket cost, thermal performance and blanket design constraints.
- * Heat Loss Calculations are based on a 21.1° C (70° F) ambient temperature using a flat surface condition.

Product Properties Specifications:

Insulation Core: Supermat® Fiberglass Needled Mat Type “E” Needled Fiber Felt Thermal Insulation
 Continuous Service to 315°C (600°F) - ASTM C 1086-88

Hydrophobic Testing ASTM C356, ASTM C795, ASTM C1338, ASTM C1763, ASTM C1511, ASTM E84

Jacketing Materials: Perfluorocarbon Resins
 21 CFR 177.1550 Articles Intended to Contact Food per Applications Regulated by the Food and Drug Administration (FDA)
 PTFE Cross Film Laminate Fiberglass Reinforced - 237 g/m² (7.0oz/yd²)
 Continuous Service Temperature 550°F (288°C)
 Tensile Strength of Jacketing - 75 lbs/in (657 N/50 mm)
 Trapezoidal Tear Strength of Jacketing - 12 lbs (53 N)

INSULTECH® Blanket Design Testing:

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 Insulation.
 ASTM C 1045 – 07 Standard Practice for Calculating Thermal Transmission Properties under steady state conditions
 UL 1709 Standard Fire Test of Protection Materials for MOV / Structural Steel
 ASTM E-84-17 Surface Burning Characteristics of Building Materials (Flame Spread & Smoke)
 ASTM E-136 Combustion Characteristics of Building Materials / Fire Test Response
 ASTM D3787 Burst Strength Evaluation for ASTM F1138 – Spray Shield Compliance

Caution: Typical industry handling practices should be exercised for the protection of the worker. Worker should wear long-sleeved, loose-fitted clothing, head covering, leather gloves, eye protection and appropriate respiratory protection (as required) when handling and applying INSULTECH® material. Wash with soap and cold water after handling INSULTECH® material. Wash work clothes separately and rinse washer. For specific handling practices, refer to the product MSDS sheets for the Thermal Blanket System.

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.

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

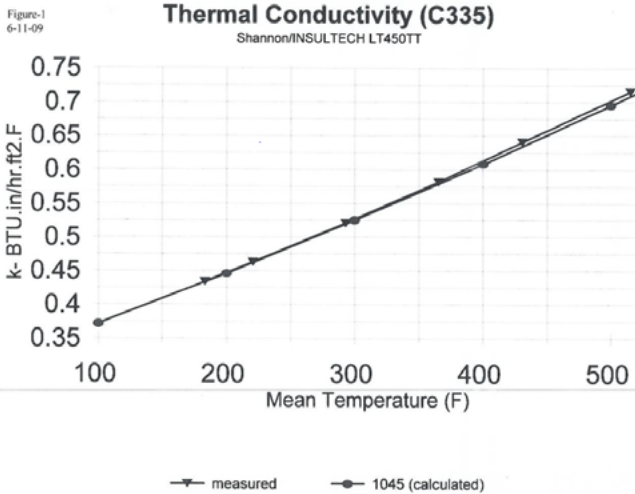
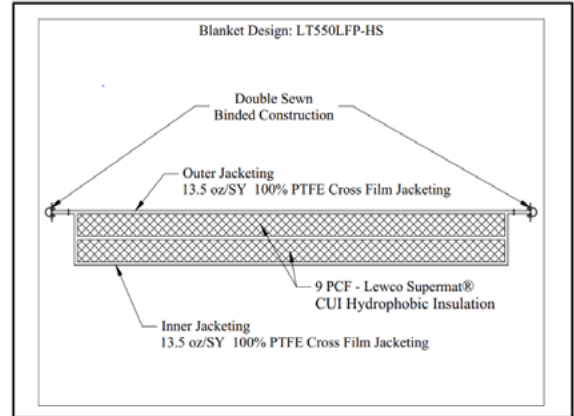
Thermal Conductivity Calculated Using ASTM C1045 - See Figure 1

$$k = 3.016E-01 + 6.8100E-04(\text{mean}) + 2.0972E-07(\text{mean}^2)$$

Mean Temp., F (C)	Apparent Cond., * (**)
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.

* BTU·in/hr·ft²·°F ** W/mK



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