

### Introduction:

Shannon Safety Shields are a CAD designed, CNC produced, high quality custom fit protective composite jacketing. Safety Shields are designed to address potential flange rupture leaks, deflect potential affluent and contain liquid discharge, protecting the surrounding work environment. Shannon Safety Shields are weather and chemical resistant. Shannon Safety Shields are flexible and easy to install, remove and reinstall allowing quick access and easy equipment serviceability. The key benefit is “Re-Usability”.

### Engineering Standards

Shannon Safety Shields follow the ASTM D3786 Mullen Burst Test per ASTM F1138 (Spray Shields for Mechanical Joints)

### Applications and Markets

Applications include; Flanged Valves, Flanges, Equipment & Equipment Heads, Instrumentation and Complex Surfaces that otherwise are left untreated.

Markets include; Chemical and Petro Chemical Processing Plants.

### Maximum Service Temperature

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

### Product Components

The Inner Jacketing will be as follows:

1 (each) Layer - 19.0oz/yd<sup>2</sup> (645g/m<sup>2</sup>) PTFE Non-Porous Teflon® Film Laminated and Impregnated Fiberglass Cloth

Insulation Core Material is an 11lb/ft<sup>3</sup> (176.2 kg/m<sup>3</sup>) High Density Fiberglass Needled Mat – Type “E” Interwoven Fiber.

The Outer Jacketing will be as follows: 16.5oz/yd<sup>2</sup> (560g/m<sup>2</sup>) PTFE Teflon® Impregnated Fiberglass Cloth.

### Blanket Construction

Blanket construction shall be a “Double Sewn” lock stitch with a minimum 7 stitches/inch (2.8 stitches/CM). Blanket edges will have a tri-fold PTFE Teflon® Fiberglass cloth binding. No raw cut jacket edge will be exposed. Stitching will be Nylon or Pure PTFE thread. No “On-Site Fabrication” to assure high quality.

### Safety Shield Overlap

To effectively capture the total surface exposure of a potential flange leak risk, the Shannon Safety Shield will cover both the flange seam as well as the side wall of the flange, covering the bolt and nut surfaces as well. Shannon Safety Shield material will be designed to draw down and match up to the pipe/equipment surface.

### Leak Accommodations

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



**Pig Launcher - Head**

### Safety Sleeve Weight

Shannon Safety Shield for large equipment will minimize the total number of pieces and will not exceed 20 lbs (9.1 Kg) in total 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” (0.32CM) embossed lettering shows location, description, size, pressure rating and tag number sequence. Each piece will include an I.D. Plate.

### Quilting Pins

To enhance product quality and to maintain uniform sleeve thickness, stitch quilting, using Nylon/PTFE thread will prevent shifting of the fabrics.

### Minimized Air Void

Equipment is typically a multi-piece design and installed in tag number sequence. Heat exchanger heads, large vessel flanges and pump housings will be designed in half sections. Safety Shield design will conform to the equipment with minimized air void. All gate, globe and control valves will be a two piece design with a separate body and bonnet.

### Design Construction Sample

Upon bid submittal a product sample must be presented for review and product approval. A 7” x 9” (18cm x 23cm) 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 a bid rejection.

**Standard Offering – Wiretwist Fasteners:** A 20 gauge (0.5 mm<sup>2</sup>) stainless steel wire will be doubled up and spiral twisted at a minimum of 5-7 twists/Inch (2-3 twists/cm). Wiretwist length will be 16" (40 cm). Wiretwists will be secured to the lacing pin at the pin stem. Lacing pin stems will be 14 gauge (2.5 mm<sup>2</sup>). Wiretwists will be spaced 6" (15 cm) on center along closing seams with matching lacing pins.

#### **FASTENING OPTIONS**

**1.) Velcro® Flaps:** Jacketing flaps are secured closed by the utilization of Hook/Loop (Velcro®) fasteners. A 2" (5 cm) wide section of the Hook portion of the fastener will be stitched to the outer surface of the blanket. A 2" (5 cm) wide section of the Loop portion will be aligned and stitched on the mating inner surface of an extended 2" (5 cm) or 2 ½" (6.3 cm) jacketing flap.

**2.) Metal "D" Ring Strap with Velcro Tab:** A three layer fabric strap is double sewn. One strap is a 12" (30 cm) long pull-down strap, the other is a 3" (8 cm) long stationary strap. Both straps are stitched to the outer jacketing of the blanket. The stationary strap includes a metal "D" Ring measuring 1"-1.5" wide (2.5-3.8 cm). This is placed ½" (1 cm) from the closing seam edge. The pull-down strap is placed 2" (5 cm) in from the closing seam edge. Both matching straps are spaced along the closing seam edge no greater than 6" (15 cm) apart. The pull-down strap includes hook-and-loop Velcro®, measuring at least 1" (2.5 cm) wide by 5" (12.7 cm) long, and is perimeter stitched to the strap surface. All closing seams have a 1.5" (3.8 cm) extended fabric flap, which is placed along the stationary strap side of the closing seam.

**3.) Side Release Buckles:** The blanket fasteners will be 1" or 1.5" (2.5-3.8 cm) Polypropylene Side Release Buckles with 1"-1.5" (2.5-3.8 cm) wide fabric straps. A tri-fold 1'-1.5" (2.5-3.8 cm) wide 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 5" (12.7 cm) long and will be box stitched to the outer surface for a minimum of 3" (8 cm) 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 12" (30 cm) long.

#### **Project Accuracy:**

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 I.D. tags, stitch lines, cut lines for stuffing, cutting of jacketing materials and cutting of insulation through the use of State-Of-The-Art CNC cutting systems & software.

#### **Project Accuracy & 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 I.D. tags, stitch lines, cut lines for stuffing, cutting of jacketing materials and cutting of insulation through the use of State-Of-The-Art CNC cutting systems & software.

#### **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 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 treated will require a site visit prior to bid submittal. Upon receipt of project contract, each item must be field measured for "Custom Fitting" to existing field conditions. Each item must be tagged and or marked for installation reference. At the time of installation, "Shields" must have a corresponding tag on the shield and must match to an existing tag on the fitting. No standard generic designs will be accepted. This will assure a "Custom Fit" design with maximum performance.

#### **Warranty**

We guarantee that all Shannon Safety Shields 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 shield should the failure be due to premature degradation of any component utilized in the application, as well as any defects due to poor workmanship.

#### **Installation Guidelines**

Shannon Safety Shields will follow these simple guidelines:

- Once material is received, open boxes with care. DO NOT "cut" deep into container to avoid damaging shields.
- Locate the Instructions for Installation.
- Follow the Material List to determine shield part number.
- Refer to the Assembly Drawing for orientation of each shield part number and installation details of each part.
- Locate the Identification Tag on each shield for correct description and sequence.
- Material is installed in tag number sequence.
- Use leather gloves to install material.

#### **Storage**

Once shipment is received, protect Shannon Safety Shields from water damage and/or other abuses prior to installation. Shannon Safety Shields 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 Shannon Safety Shields on clean, dry surfaces and avoid trapping oils, greases 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)

- \* 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:** Standard Specification for Fiberglass Needled Fiber Felt Thermal Insulation  
 ASTM C 1086-88 Service Temperature Up to 649° C (1200° F)

**Jacketing Materials:** **Outer Layer:** PTFE Non-Porous Teflon® Film Laminated and Impregnated Fiberglass Cloth  
 Material Weight: 19.0oz/yd<sup>2</sup> (645g/m<sup>2</sup>)  
 Continuous Service Temperature 600° F (316° C) Intermittent: 700° F (371° C)  
 Tensile Strength Warp: 275 lbs/in (2475 N/50 mm) Fill: 225 lbs/in (2011 N/mm)

**Inner Layer:** PTFE Teflon® Fiberglass Composite Material weight 560g/m<sup>2</sup> (16.5 oz/yd<sup>2</sup>)  
 PTFE Teflon® & Fiberglass Respective Continuous Service Temperature 316° C (600° F)  
 Warp: 3664 N/50 mm (410 lbs/in) / Fill: 3137 N/mm (355 lbs/in)

**ASTM D3786 Mullen Burst Test (per ASTM F1138) Spray Shields for Mechanical Joints**

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

**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 Shannon Protective Enclosures. The worker should wash with soap and warm water after exposure. Since there is a likelihood of fiber exposure and the fiber may be 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 Shannon / INSULTECH® products 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.

LT 450 FJT - Spray Shield

SPECIMEN NO.	THICKNESS (in)	LOADING AREA (in <sup>2</sup> )	BURSTING STRENGTH (lbf)	BURSTING STRENGTH (psi)	RESULT (according to ASTM F1138)
1	0.600	0.785	1,810	2,300	Pass
2	0.600	0.785	2,060	2,620	Pass
3	0.600	0.785	1,860	2,370	Pass
4	0.600	0.785	2,020	2,570	Pass
5	0.600	0.785	1,910	2,430	Pass
<b>Average</b>	<b>0.600</b>	<b>0.785</b>	<b>1,932</b>	<b>2,458</b>	<b>Pass</b>

**SECTION 8  
 CONCLUSION**

The tested specimens met the performance requirements found in ASTM F1138 with burst strength greater than 800 psi.