



## Standard Specification for Spray Shields for Mechanical Joints<sup>1</sup>

This standard is issued under the fixed designation F 1138; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

*This standard has been approved for use by agencies of the Department of Defense.*

### 1. Scope

1.1 This specification describes the manufacturing requirements for spray shield stock and the fabrication and installation requirements for spray shields made from that stock.

1.1.1 Sections 2-14 address the manufacturing requirements for the spray shield stock. Annex A1 addresses the fabrication and installation requirements for the spray shields.

1.1.2 Fig. 1 shows the typical construction of a spray shield. Figs. 2-6 show methods of installation of a spray shield on various mechanical joints.

1.2 The shields are intended for use around mechanical joints (flanged, bolted unions, and so forth) in liquid piping systems to prevent the impingement of flammable liquid on hot surfaces or fluids onto electrical switchboards and components resulting from a leak in the mechanical joint.

1.3 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

### 2. Referenced Documents

#### 2.1 ASTM Standards:

- A 176 Specification for Stainless and Heat-Resisting Chromium Steel Plate, Sheet, and Strip<sup>2</sup>
- A 276 Specification for Stainless Steel Bars and Shapes<sup>3</sup>
- A 580 Specification for Stainless Steel Wire<sup>2</sup>
- B 134 Specification for Brass Wire<sup>4</sup>
- B 164 Specification for Nickel-Copper Alloy Rod, Bar, and Wire<sup>5</sup>
- B 166 Specification for Nickel-Chromium-Iron Alloys (UNS N 06600, N 06601, and N 06690) and Nickel-Chromium-Cobalt-Molybdenum Alloy (UNS N 06617) Rod, Bar, and Wire<sup>5</sup>
- D 1388 Test Method for Stiffness of Fabrics<sup>6</sup>
- D 1424 Test Method for Tearing Strength of Fabrics by

- Falling-Pendulum Type (Elmendorf) Apparatus<sup>6</sup>
- D 1682 Test Methods for Breaking Load and Elongation of Textile Fabrics<sup>7</sup>
- D 1777 Method for Measuring Thickness of Textile Materials<sup>6</sup>
- D 3389 Test Method for Coated Fabrics Abrasion Resistance (Rotary Platform, Double-Head Abrader)<sup>8</sup>
- D 3776 Test Methods for Mass Per Unit Area (Weight) of Fabric<sup>9</sup>
- D 3786 Test Method for Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics: Diaphragm Bursting Strength Tester Method<sup>9</sup>
- D 3951 Practice for Commercial Packaging<sup>10</sup>
- F 501 Test Method for Aerospace Materials Response to Flame, With Vertical Test Specimen (For Aerospace Vehicles Standard Conditions)<sup>11</sup>
- 2.2 *American Association of Textile Chemists and Colorists Standards:*
  - AATCC-22 Water Repellency, Spray Test<sup>12</sup>
  - AATCC-35 Water Resistance, Rain Test<sup>12</sup>
  - AATCC-127 Water Resistance, Hydrostatic Pressure Test<sup>12</sup>
- 2.3 *Military Standards:*
  - MIL-C-20079 Cloth, Glass, Tape, Textile Glass and Thread, Glass<sup>13</sup>
  - MIL-C-20696 Cloth, Coated, Nylon Waterproof<sup>13</sup>
- 2.4 *Federal Standard:*
  - WW-C-440 Clamps, Hose (Low Pressure)<sup>13</sup>

### 3. Ordering Information

- 3.1 ASTM designation and year of issue,
- 3.2 Length and width required (see 7.1), and
- 3.3 Type of stainless steel (see 4.1).
- 3.4 Type of lacing hardware required (see 4.1.1).

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee F25 on Ships and Marine Technology and is the direct responsibility of Subcommittee F25.07 on General Requirements.

Current edition approved April 10, 1998. Published October 1998. Originally published as F 1138 – 88. Last previous edition F 1138 – 92 (1997).

<sup>2</sup> *Annual Book of ASTM Standards*, Vol 01.03.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 01.05.

<sup>4</sup> *Annual Book of ASTM Standards*, Vol 02.01.

<sup>5</sup> *Annual Book of ASTM Standards*, Vol 02.04.

<sup>6</sup> *Annual Book of ASTM Standards*, Vol 07.01.

<sup>7</sup> Discontinued—Replaced by D 5034 and D 5035, *Annual Book of ASTM Standards*, Vol 07.02.

<sup>8</sup> *Annual Book of ASTM Standards*, Vol 09.02.

<sup>9</sup> *Annual Book of ASTM Standards*, Vol 07.02.

<sup>10</sup> *Annual Book of ASTM Standards*, Vol 15.09.

<sup>11</sup> *Annual Book of ASTM Standards*, Vol 15.03.

<sup>12</sup> Available from American Association of Textile Chemists and Colorists, PO Box 12215, Research Triangle Park, NC 27709.

<sup>13</sup> Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

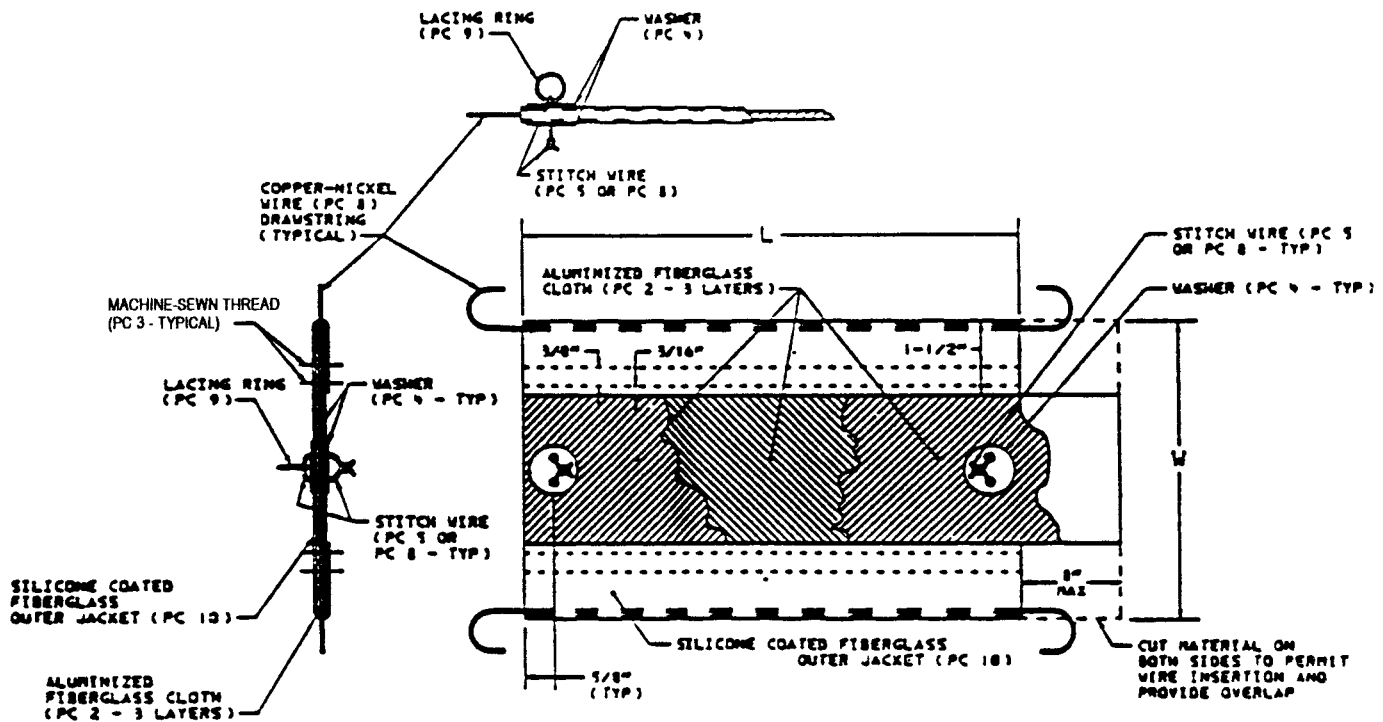


FIG. 1 Spray Shield Construction (Typical)

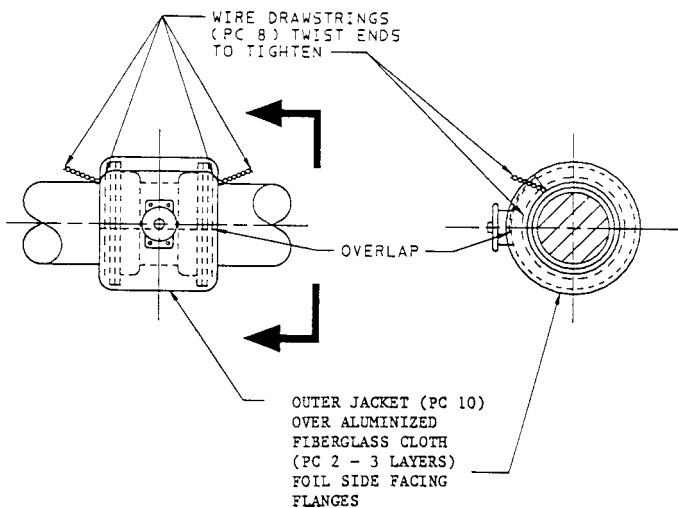


FIG. 2 Installation of Butterfly Valve Shield

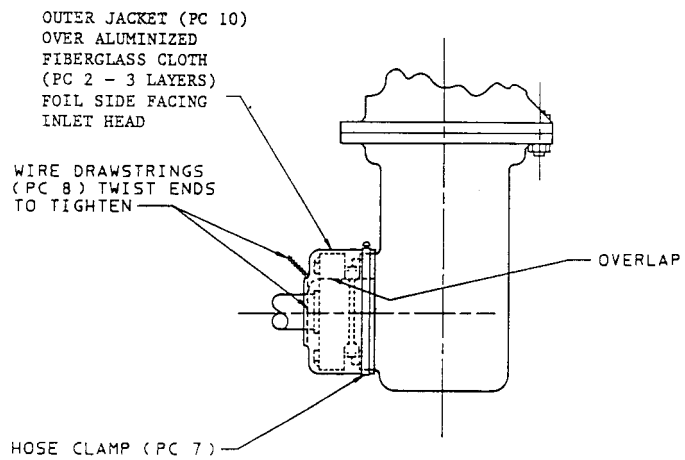


FIG. 3 Spray Shield for Pump Inlet Head

#### 4. Materials and Manufacture

4.1 Lacing hooks, lacing rings, and lacing washers (see Fig. 7) shall be constructed of stainless steel in accordance with Specifications A 176, A 276, or A 580.

4.1.1 Lacing rings may be used instead of lacing hooks where practicable or preferable (see 3.3).

4.1.2 Lacing washers for fastening hooks or rings shall be two-hole washers.

4.2 Stitch wire (Piece 5 in Table 1) shall be constructed of stainless steel in accordance with Specification A 580.

4.3 The aluminum-coated glass cloth, thread, and the protective outer jacket shall be constructed of material as specified in Table 1 and Table 2.

#### 5. Physical and Mechanical Properties

5.1 The physical and mechanical properties for the aluminum-coated glass cloth, thread, and protective outer jacket shall be as specified in Table 1 and Table 2.

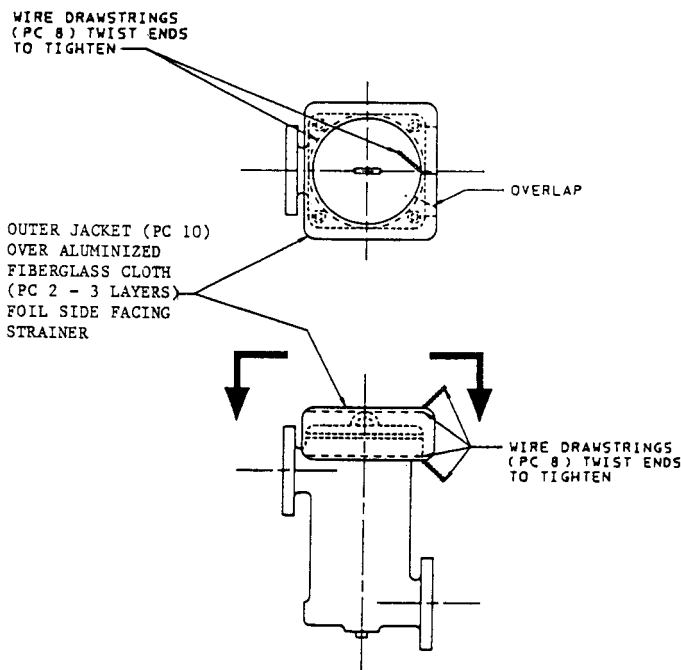
#### 6. Requirements

6.1 If lacing hooks or rings are of the type that fasten by stitching, the hooks or rings shall be attached to the backup washers using a wire stitch machine and wire (Pieces 5 or 8 in Table 1).

6.2 Lacing anchor/self-locking washer-type systems shall not be used on spray shields.

#### 7. Dimensions and Permissible Variations

7.1 The material for shields shall be standardized as given in Table 3 tolerances to be +1/4 in. (6 mm) and -0 in. for width.



**FIG. 4 Spray Shield for Simplex Strainer**

## 8. Workmanship, Finish, and Appearance

8.1 The seam on both sides of the spray shield shall be intact.

8.1.1 On drawstring-type shields, there shall be ample overlap in the seam to allow wire to be run through the entire length of the shield.

8.2 There shall be no tears in the uncovered aluminum portion of the shield where contact is made with the mechanical joint (see Fig. 1).

8.3 There shall be no tears in the protective outer jacket such that the aluminized glass cloth underneath is exposed.

8.4 There shall be no holes or openings of any kind in the shields other than those made by sewing or the attachment of lacing hooks or rings.

## 9. Sampling, Selection, and Number of Specimens

9.1 Unless otherwise specified, the sampling of, selection of, and number of specimens for the aluminized glass cloth,

thread, and protective outer jacket shall be as specified in the applicable test methods listed in Table 1 and Table 2.

## 10. Test Methods

10.1 The methods for testing the aluminized glass cloth, thread, and protective outer jacket shall be as specified in Table 1 and Table 2.

## 11. Inspection

11.1 Unless otherwise specified in the contract or purchase order, the contractor is responsible for performing inspections to determine conformance to the requirements specified in Section 8 of this specification.

## 12. Rejection and Rehearing

12.1 Material that fails to conform to the requirements of this specification may be rejected. Rejection should be reported to the producer or supplier promptly and in writing. In case of dissatisfaction with the results of the test, the producer or supplier may make claim for a rehearing.

## 13. Product Marking

13.1 Indelible stamp denoting the width of the shield shall be placed at 24-in. (610-mm) intervals on the visible foil side of the shield so that it will be visible when the shield is rolled and packaged.

## 14. Packaging and Package Marking

14.1 The packaging, packing, and marking of containers shall be in accordance with Practice D 3951, with the exceptions noted in 14.1.1 and 14.1.2.

14.1.1 Each container used for spray shield packaging shall contain installation instructions as shown in Annex A2.

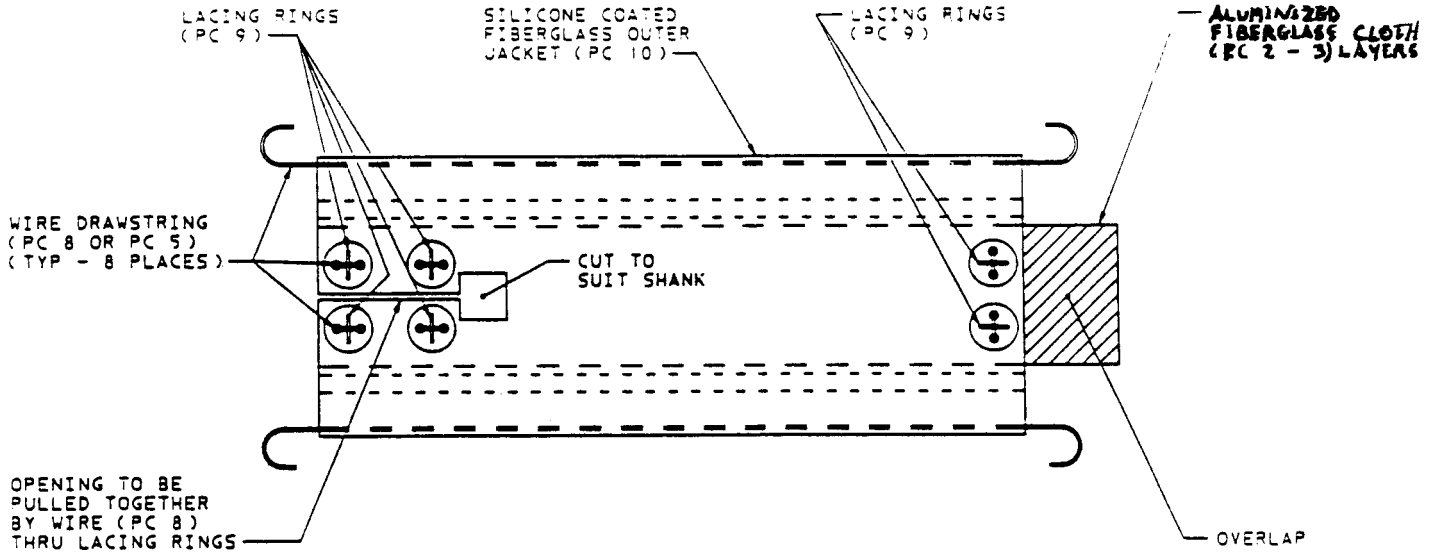
14.1.2 Metal strapping shall not be used for container closure and reinforcement.

14.2 Installed lacing hooks and aluminized cloth shall be so packaged that there shall be no damage to the cloth during shipment.

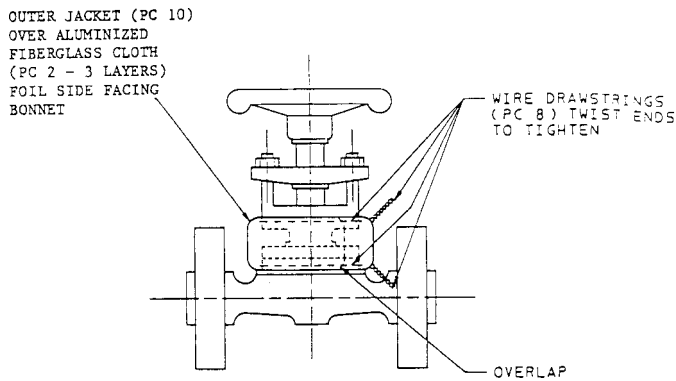
## 15. Keywords

15.1 lacing; mechanical joints; shield; spray shield

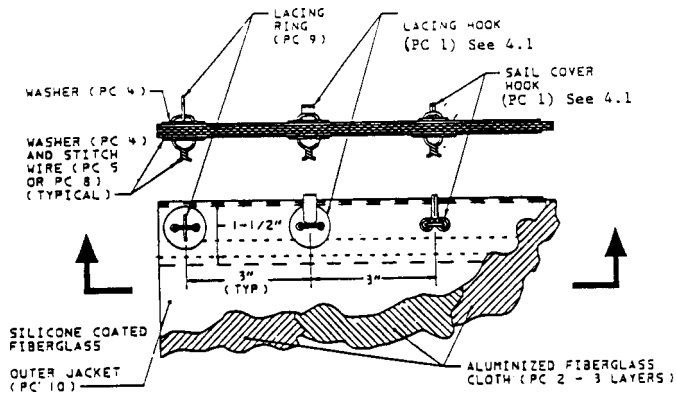
**ASTM F 1138**



**FIG. 5 Spray Shield for Butterfly Valve**



**FIG. 6 Spray Shield for Valve Bonnet**



**FIG. 7 Optional Lacing Hardware**



**TABLE 1 List of Material**

Piece Number	Description	Quality	Material	Specification	Remarks
1	Hook, lacing	as required	stainless steel 302, 304 or 316	ASTM A 176, A 276, A 580	see 4.1
2	Cloth, aluminum foil, glass	as required	glass/aluminum	MIL-C-20079	Type I, Class 10
3	Thread	as required	glass  nylon	MIL-C-20079	Type III, Class 3 (for machine sewing) white, Size 5 Z-twist, three-ply
4	Washer, blank	as required	stainless steel 304 or 316	ASTM A 176, A 276	3/4-in. diameter × 0.030 in. thick
5	Wire, stitch	as required	stainless steel 301, 304 or 316	ASTM A 580	see 6.1
6	Label, identification	as required			see 13
7	Clamp, hose	as required	Cres 201	WW-C-440	Type F
8	Wire	as required	brass Cr-Ni-alloy Cu-Ni-alloy stainless steel 304 or 316	ASTM B 134 ASTM B 166 ASTM B 164 ASTM A 580	17 or 18 gage 17 or 18 gage 17 or 18 gage 17 or 18 gage
9	Rings, lacing	as required	stainless steel 302, 304 or 316	ASTM A 276, A 580	see 4.1.1
10	Fabric, protective outer jacket	as required	fiberglass cloth/silicone coated fiberglass		see Table 2

**TABLE 2 Material Data—Protective Outer Jacket**

Typical Properties	Silicone Coated Fiber-glass Cloth Data	
Style	Satin	
Weight, oz/yd <sup>2</sup>	16.10	
Thickness, in.	0.018	
Count, W × F	54 × 48	
Breaking strength, lb/in. W × F	625 × 625	
Weave	8 harness	
Width, in.	50 or 60	
Coated Properties	Test Methods	Product Specification
Coating	...	Balanced, cured
Color	per standard	Silver
Thickness	Test Method D 1777	0.019
Weight, oz/yd <sup>2</sup>	Test Method D 3776	20.00
Flame resistance	Test Method F 501	0' flame (self-extinguishing)
Breaking strength, lb/in. W × F	Test Methods D 1682	470 × 410
Tear strength, lb/in. W × F	Test Methods D 1424	35 × 31
Abrasion resistance	Test Method D 3389 (CS-10, 500 GMS)	200 × 300 min
Mullen hydrostatic, psi	AATCC-127	20 min
Water resistance, rain test	AATCC-35	Pass 0 GMS ± 5 ft Pass 0.10 GMD ± 8 ft
Water repellancy, spray test	AATCC-22	Pass 100 rating
Mullen burst, psi	Test Method D 3786	800 min
Clark stiffness, CM	Test Method D 1388	18.0 max
Oil resistance	MIL-C-20696	Pass
Aromatic hydrocarbon fluid resistance	MIL-C-20696	Pass



**TABLE 3 Shield Material Dimensions**

Length, ft (m)	Width, in. (mm)
30 (9)	5 (127)
30 (9)	6 (152)
30 (9)	7 (178)
30 (9)	8 (203)
20 (6)	9 (229)
20 (6)	10 (254)
20 (6)	11 (279)
20 (6)	12 (305)

**ANNEXES**

**(Mandatory Information)**

The requirements of this section apply only to the fabrication and installation of the spray shields.

**A1. FABRICATION OF SPRAY SHIELDS**

A1.1 To determine spray shield length and width, the flange that is to be shielded shall be measured as follows:

**A1.1.1 Shield length:**

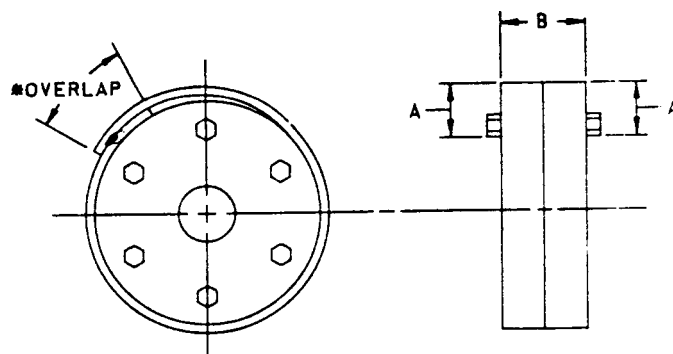
Measure the circumference of the flange. Add an overlap of ¼ of the circumference measurement, with the maximum being 8 in. (203 mm) and the minimum being 1 in. (25 mm).

A1.1.1.1 To prevent dirt accumulation, the overlap shall be pointed downward (see Fig. A1.1).

**A1.1.2 Shield width:**

Measure from the inside edge of the bolt to the edge of the flange (A). Measure the combined flange thickness (B). In the following illustration, this would be “A + B + A” as a minimum requirement.

A1.1.2.1 If the measured width contains a fraction, the next wider shield stock shall be used (see 7.1). For example, if the measured width is 5½ in. (140 mm), 6-in. (152-mm) wide shield stock shall be used.



NOTE 1—Maximum overlap is 8 in. (203 mm).

NOTE 2—Minimum overlap is 1 in. (25 mm).

**FIG. A1.1 Shield Length**

**A2. INSTALLATION OF SPRAY SHIELDS**

**A2.1 General Installation:**

A2.1.1 The shield shall be centered on the joint, wrapped snugly around the sides of the joint, and laced tightly with wire.

A2.1.1.1 Clamps or wire, or both, are to be obtained by the user and are not to be supplied on the shield as manufactured.

**A2.2 Standard Installation:**

A2.2.1 Cut two lengths of lacing wire 6 in. (152 mm) longer than the length of the shield.

A2.2.2 Cut away seam material on each side of overlap and insert lengths of wire into seams on both sides of shield until the wire emerges at the other end.

A2.2.3 Wrap shield around flange with aluminized cloth on the inside.

A2.2.4 Fold shield edges down over flange bolts.

A2.2.5 Twist ends of wire together sufficiently to maintain

tightness, cut excessive wire, and fold down to be flat on shield. If additional tightness is required, use the lacing hooks shown in Fig. 7.

**A2.3 Optional Installation (Lacing Hooks or Rings):**

A2.3.1 Cut away seam material on each side of overlap. There shall be a ⅝-in. (16-mm) space between the end of shield overlap and the first pair of lacing hooks.

A2.3.1.1 Remove lacing hooks that would be under the overlap.

A2.3.2 Wrap shield around flange with aluminized glass cloth on the inside.

A2.3.3 Fold shield edges down over flange bolts.

A2.3.4 String wire through hooks on both sides and pull tight to secure shield in place.

A2.3.5 Twist end of wire together sufficiently to maintain



tightness, cut excessive wire, and fold down to be flat on shield.

*ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.*

*This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.*

*This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or [service@astm.org](mailto:service@astm.org) (e-mail); or through the ASTM website ([www.astm.org](http://www.astm.org)).*