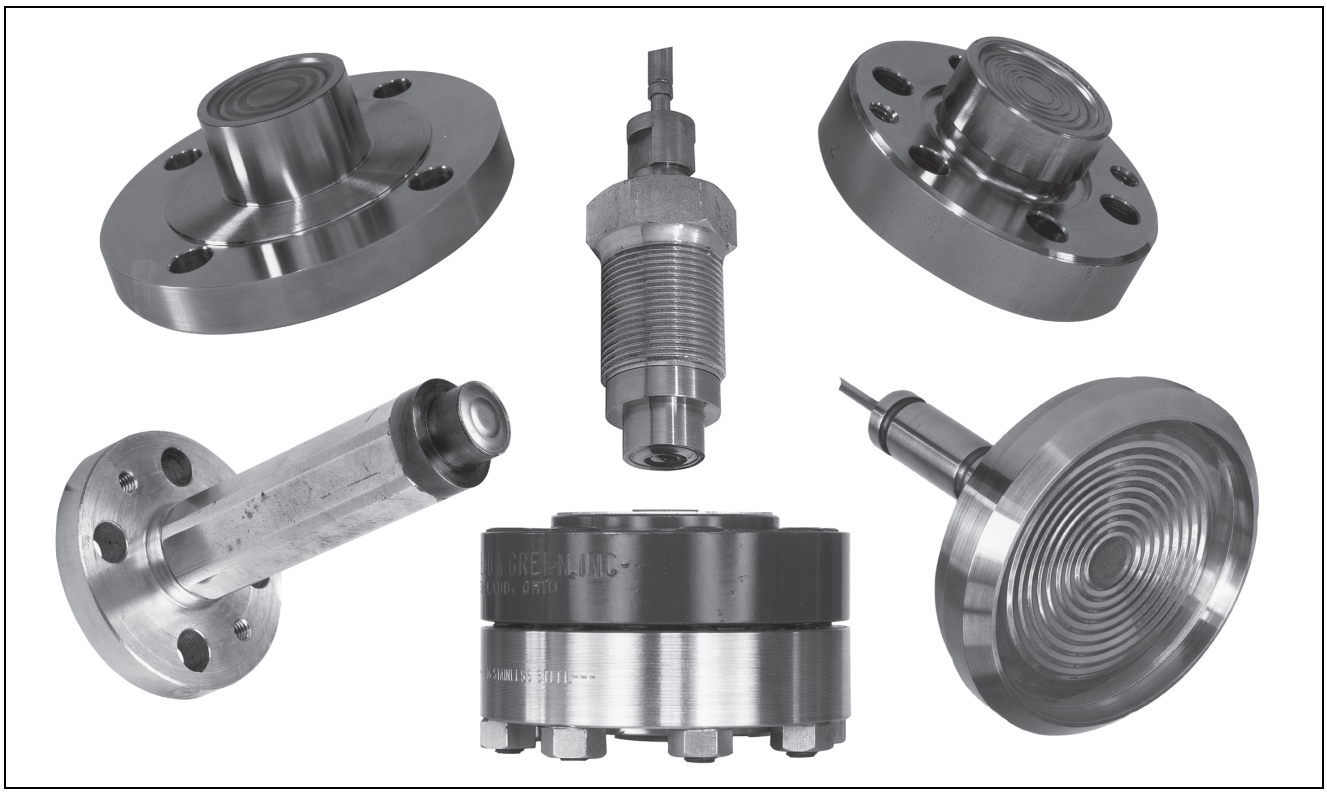
Foxboro®
by Schneider Electric

Pressure Seals



Pressure seals are used with pressure measuring instruments indicators, recorders, and transmitters when it is necessary to keep the instrument isolated from the process. A sealed system is used for a process that may be corrosive, viscous, subject to temperature extremes, toxic, sanitary, or those that tend to collect and solidify.

INTRODUCTION

Sealed measurement systems (element, seal, and connecting tubing) are evacuated and filled with an appropriate fill fluid that transmit pressure changes. Pressure seal assemblies are connected to the pressure element by means of tubing for remote recording, indicating, transmitting or control.

NO PROCESS BUILDUP OR CLOGGING

One-piece flanged seals are flush-mounted in the process line or vessel wall to effectively eliminate pockets in which process material might collect and build up.

WIDE CHOICE OF LOCATION - EASY TO INSTALL

Compact and lightweight seals are easily installed in vessels and pipes. The instrument can be mounted up to 7.5 mm (25 ft) from the seal to avoid vibration and for ease of adjustment.

AISI TYPE 316 STAINLESS STEEL (316 ss)

316 ss provides excellent corrosion resistance for all process-wetted components.

FILLING

Seal, tubing, and pressure element are completely filled with the appropriate fill fluid for the process pressure and temperature conditions specified.

HIGH TEMPERATURE STABILITY

The seals utilize a low spring rate diaphragm. This, coupled with a fill fluid having a low coefficient of thermal expansion, minimizes temperature effects.

HIGH PRESSURE

Designed for polymer extruder applications and can be used with Foxboro pressure instruments having stainless steel helicals and various Pressure Transmitters.

SANITARY SERVICE

Designed for food and dairy product applications and meets FDA and United States Public Health Service, Dairy Industry Committee requirements. It is designed for mounting in a standard 2-inch or 3-inch sanitary fitting.

RECESS WELDED DIAPHRAGM SEALS

Can be used with Foxboro helical and spiral elements and various pressure transmitters. All require factory mounting.

WELDED DIAPHRAGM SEALS

Comprised of a thin circular corrugated metal diaphragm, made from AISI Type 316 low carbon stainless steel (316L ss) and welded to its periphery onto a backup plate with matching corrugations. Optional diaphragm materials are available.

STANDARD SPECIFICATIONS

Pressure Seal Application

Seal Type	Capillary Connected To:
PES-FE PES-FV	Pressure Elements (spiral or helical) or Transmitters (11GM and 11GH)
PES-FG-F PES-FG-T	Pressure Element (helical) or Transmitter (11GM, 11GH, IGP10, and IGP20)
PES-SB, -SG, -SX PES-SC, -SJ, -SD PES-SK, -SM PES-CSA to -CSQ	Pressure Elements (spiral or helical) or Transmitters (11GM, 11GH, IGP10, IGP20, IDP10, and IAP10)

Seal Types

Refer to Table 1 on Page 5.

Seal Description

Refer to Table 1 on Page 5.

Diaphragm Material

Refer to Table 1 on Page 5.

Gasket Material

Refer to Table 1 on Page 5.

Recommended Tubing Length

Up to 7.5 m (25 ft) maximum.

Connecting Tubing

1.5 m (5 ft) of 3 x 1 mm or 0.125 in 316 ss capillary, standard with all instruments except when seals are directly connected to the Transmitter.

Elevation Difference

Maximum recommended elevation difference between seal and instrument is 7.5 m (25 ft). Static head correction must be made by the user upon installation.

Fill Fluid

Refer to Table 1 on Page 5.

Process Connection

Refer to Table 1 on Page 5.

Process Temperature Limits at Seal

Refer to Table 1 on Page 5.

Span Limits

Refer to Table 1 on Page 5.

Table 1. Pressure Seal Standard Specifications

Seal Type	Seal Description	Fill Fluid(a)	Diaphragm Material	Other Process-Wetted Parts	Gasket Material	Process Temperature Limits at Seals(b)	Process Connection	Span Limits(c)
PES-FE	High Range	Silicone Oil	316L ss	316 ss	316 ss (P0104TC)	-40 and +205°C (-40 and +400°F)	Flange	200 and 7500 psi
PES-FV	Low Range	Silicone Oil	316L ss	316 ss	User Supplied	-40 and +205°C (-40 and +400°F)	Flange; 3-in ANSI Class 150 Flange; 3-in ANSI Class 600	50 and 150 psi 50 and 1000 psi
PES-FG-F	Flanged High Pressure	Silicone Oil	Co-Ni-Cr	316L ss	Aluminum (P0119PB)	0 and 315°C (32 and 600°F)	Flange; 3-5 in outside diameter	100 and 10 000 psi
PES-FG-T	Threaded High Pressure	Silicone Oil	Co-Ni-Cr	316L ss	Aluminum (P0119PB)	0 and 315°C (32 and 600°F)	Threaded; 1 1/2-12 NF	100 and 7500 psi
PES-SB or -SG	Thread Attached Recessed Diaphragm	Silicone Oil	316L ss(e)	Available in cs, 304 ss, 316 ss, Carpenter 20, Monel, Nickel, Titanium, Hastelloy B, or C, and Inconel. Also available in PVC, ptfe, and polypropylene (all suitable for 100 psi max. at 140°F max.)	Standard is Aramid fiber. (B0187VY) Optional gaskets are ptfe, ptfe-coated, stainless steel, or ptfe-filled spiratallic 316 ss at 175°C (350°F).	-40 and +205°C (-40 and +400°F)	Threaded; SB: 1/4, 1/2, 3/4, 1 1/4, or 1 1/2 NPT SG: 1/4, 1/2, 3/4, or 1 NPT and 1/4 in flushing connection	50 and 2500 psi (2500 psi @ 100°F)
PES-SC or -SD	Flange Attached Recessed Diaphragm	Silicone Oil	316L ss(e)			-40 and +205°C (-40 and +400°F)	Flange; 1/2, 3/4, 1, 1 1/2, or 3-in ANSI Class 150, 300, 600, or 1500. 4-in Class 150 or 300. Type SD also has 1/4 in flushing connection.	50 and FPR(f)
PES-SJ	In Line Flow Through Recessed Diaphragm	Silicone Oil	316L ss(e)	cs, 304 ss, 316 ss, Carpenter 20, Monel, and Hastelloy B and C		-40 and +205°C (-40 and +400°F)	In-line flow-through type. Welded to process line.	50 and 1500 psi at 100°F
PES-SK	In Line Flow Through Recessed Diaphragm	Silicone Oil	316L ss(e)	cs, 304 ss, 316 ss, and Monel		-40 and +205°C (-40 and +400°F)	In-line flow-through type. 1/4 or 1/2 NPT internal thread.	50 and 1500 psi at 100°F
PES-SM	In Line Flow Through Recessed Diaphragm	Silicone Oil	316L ss(e)	cs, 304 ss, and 316 ss		-40 and +205°C (-40 and +400°F)	In-line flow-through type. Welded to process line.	50 and 1000 psi at 100°F
PES-SX	Thread Attached Recessed Diaphragm	Silicone Oil	316L ss(e)	cs, 304 ss, 316 ss and Monel		-40 and +205°C (-40 and +400°F)	Threaded, 1/4,1/2, 3/4 or 1 NPT	50 and 10 000 psi

Table 1. Pressure Seal Standard Specifications

Seal Type	Seal Description	Fill Fluid(a)	Diaphragm Material	Other Process-Wetted Parts	Gasket Material	Process Temperature Limits at Seals(b)	Process Connection	Span Limits(c)
PES-CSA(d)	Sanitary Recessed Diaphragm	Pure Mineral Oil	316L ss	316 ss	User Supplied	-18 and +150°C (0 and 300°F)	3-in Ladish Tri-Clover bevel seat Seal replaces 16AT hose clamp.	50 and 300 psi
PES-CSB(d)							3-in Ladish Tri-Clover bevel seat Seal replaces 16A plain cap.	
PES-CSG(d)							3-in Ladish Tri-Clover gasket seat Seal replaces 16AG cap.	
PES-CTG(d)							3-in gasket seat with ACME thread	
PES-CST(d)							2- or 3-in Ladish Tri-Clover Fast Clamp, or Cherry-Burrell S clamp. Seal replaces 16A cap.	
PES-CSI(d)							2-in Cherry Burrell I Line Clean-in-Place (CIP) Seal replaces 16AL cap.	
PES-CSQ(d)							2-in Cherry Burrell A Line Quick Clamp. Seal replaces 16AQ solid cap.	

(a) FDA approved NEOBEE M20 is optionally available.
(b) Process temperature of 150°C (300°F) with seals directly connected to transmitter.
(c) The values listed are also the minimum and maximum upper range values for zero-based ranges. To convert psi to kPa , multiply the psi value by 6.895.
(d) These pressure seals are certified for 3–A sanitary applications.
(e) Optional diaphragm materials available: Carpenter 20, Hastelloy B, Hastelloy C, Inconel, Monel, nickel, titanium, 347 ss, and 304 ss.
(f) FPR = Flange Pressure Rating. The maximum span and maximum upper range value must not exceed the flange pressure rating.

OPTIONAL FEATURES

Tubing

PVC coated 316 ss, AISI 304 stainless steel (304 ss) armor over 316 ss and plain 316 ss, 3 mm (0.125 in) outside diameter.

Low Temperature Operation (With PES–S Series Seals Only)

Limits of -75 and +150°C (-100 and +300°F) with secondary butylbenzene fill; -35 and +45°C (-30 and +110°F) with ethyl alcohol fill for food industry applications.

High Temperature Operation (With PES–S Series Seals Only)

-12 and +315°C (10 and 600°F) with DC 704 or equivalent fill. Standard construction on PES-FG Series.

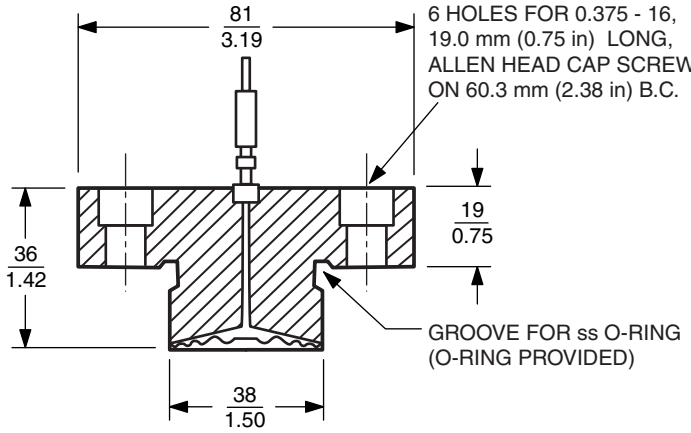
Spare Gaskets

Aluminum (Part Number B0119PB) for use with PES-FG-F and PES-FG-T seals. Stainless steel (Part Number P0104TC) for use with PES-FE seals. Aramid fiber (Part Number B0187VY) for use with PES-S Series seals.

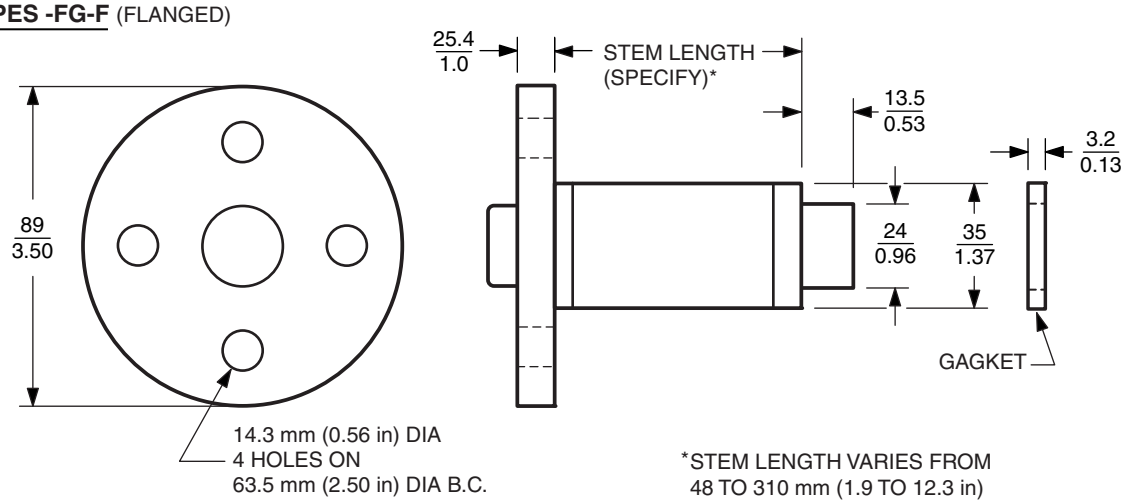
DIMENSIONS – NOMINAL

mm
in

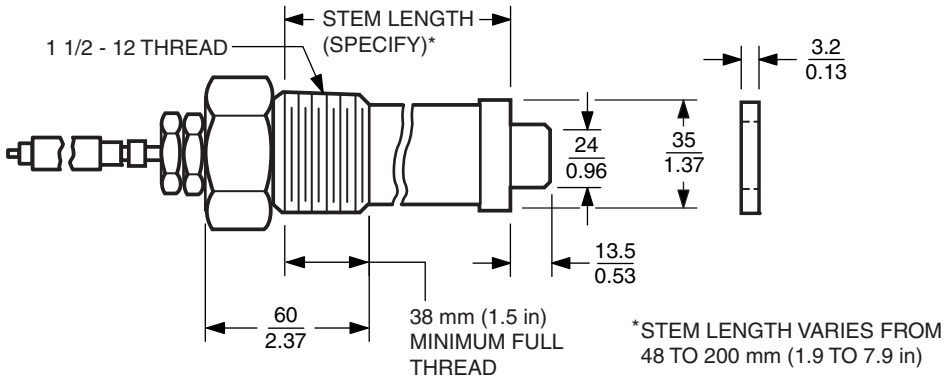
TYPE PES -FE



TYPE PES -FG-F (FLANGED)

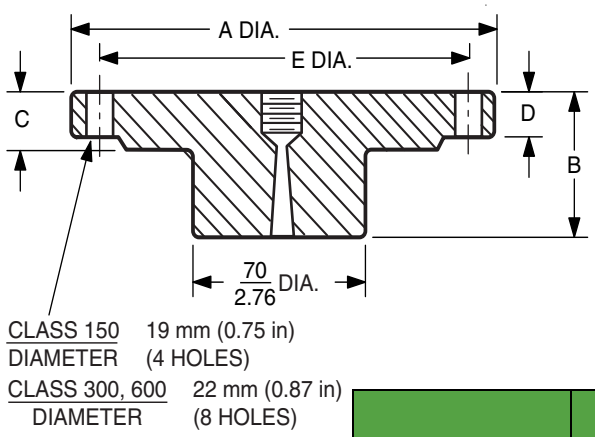


TYPE PES -FG-T (THREADED)



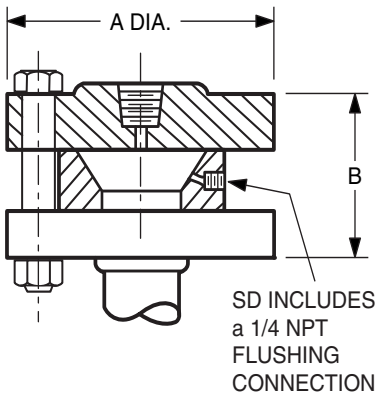
TYPE PES -FV

mm / in



Size	Dimension									
	A		B		C		D		E	
	mm	in	mm	in	mm	in	mm	in	mm	in
3 in ANSI Class 150 Flange	191	7.50	66	2.59	27	1.06	25	1.00	1.50	6.00
3 in ANSI Class 300 and 600 Flanges	210	8.25	68	2.75	38	1.50	31	1.25	168	6.62

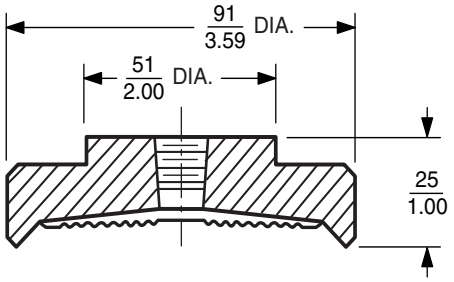
PES -SC, -SD



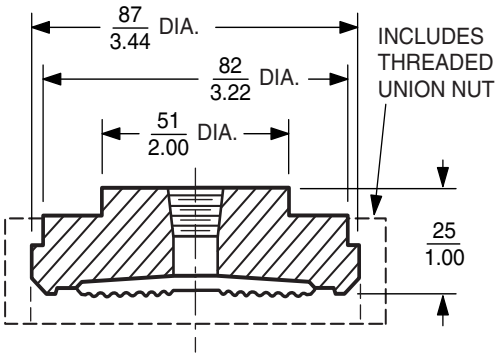
Type and Flange Size	Class	A		B	
		mm	in	mm	in
PES-SC, -SD DN 15 or 1/2 in	150 300 600 1500	89 95 121 133	3.50 3.75 4.75 5.25	52 52 57 76	2.06 2.06 2.25 3.00
PES-SC, -SD DN 20 or 3/4 in	150 300 600 1500	98 118 118 121	3.87 4.63 4.63 4.75	52 49 56 56	2.06 1.94 2.19 2.22
PES-SC, -SD DN 25 or 1 in	150 300 600 1500	108 124 124 149	4.25 4.87 4.87 5.87	75 75 54 64	1.88 1.88 2.13 2.50
PES-SC, -SD DN 40 or 1 1/2 in	150 300 600 1500	127 155 155 178	5.00 6.12 6.12 7.00	75 51 56 65	1.88 2.00 2.88 2.57
PES-SC, -SD DN 50 or 2 in	150 300 600	152 165 165	6.00 6.50 6.50	75 54 59	1.88 2.13 2.31
PES-SC, -SD DN 80 or 3 in	150 300 600 1500	191 210 210 267	7.50 8.25 8.25 10.50	52 60 65 81	2.06 2.38 2.57 3.19

DIMENSIONS – NOMINAL

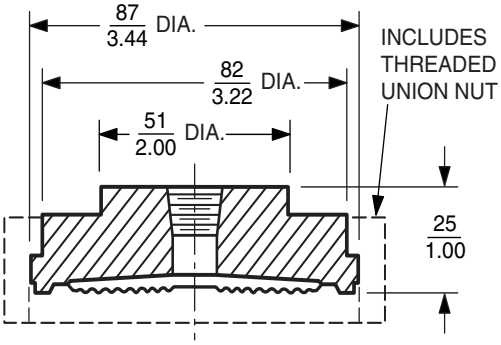
PES -CSA



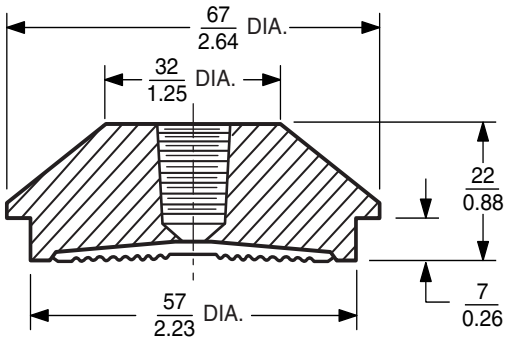
PES -CSB



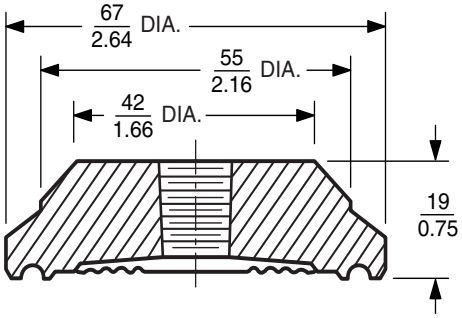
PES -CSG 3 in



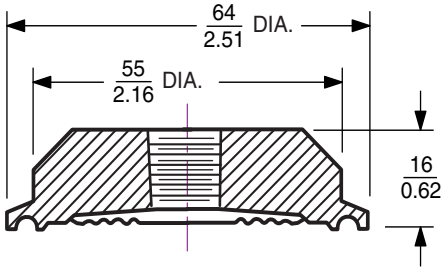
PES -CSI



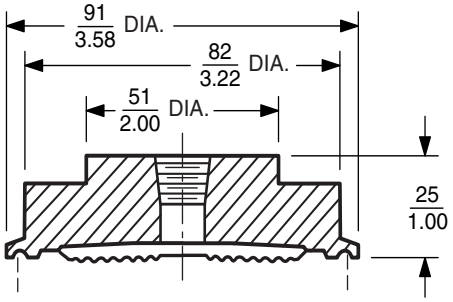
PES -CSQ

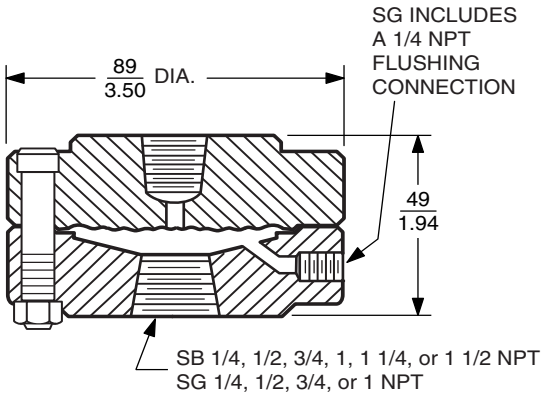


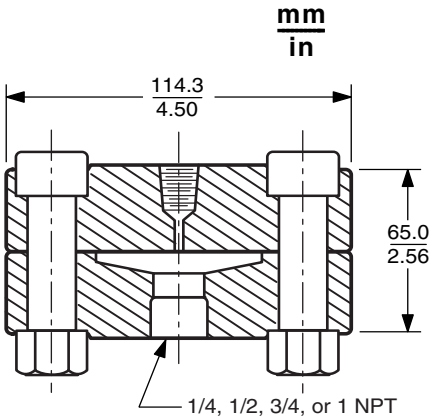
PES -CST 2 in



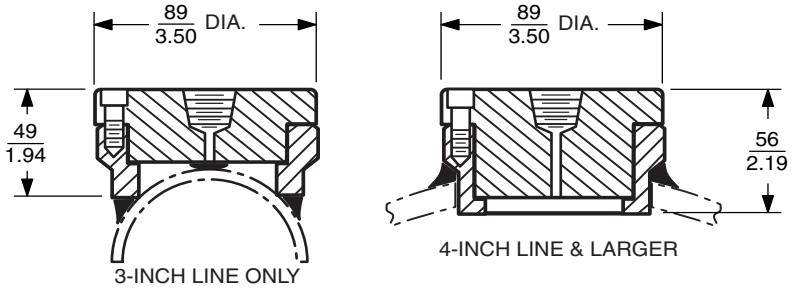
PES -CST 3 in



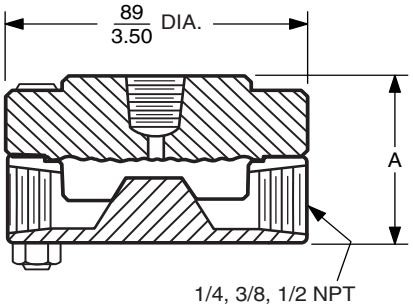




PES -SJ

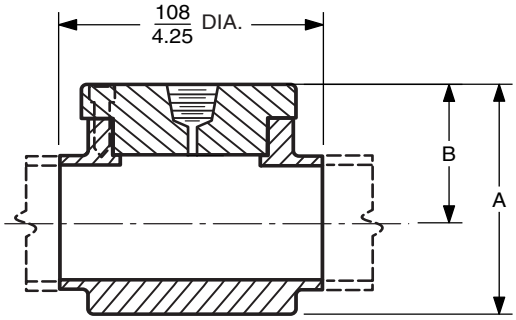


PES -SK



Process Conn.	A	
	mm	in
1/4	48	1.90
3/8	52	2.06
1/2	52	2.06

PES -SM



Pipe Size	A		B	
	mm	in	mm	in
DN 25 or 1 in	68	2.69	50	1.97
DN 40 or 1 1/2 in	83	3.25	54	2.14
DN 50 or 2 in	94	3.71	63	2.47
DN 80 or 3 in	122	4.81	76	2.98

NOTES

ORDERING INSTRUCTIONS (SPECIFY)

1. Seal and Tubing
   a. Seal Type.
   b. Process Connection
   c. Exposed Surface Material(s)
   d. Diaphragm Material
   e. Tubing Type and Length (Not required when seals are directly connected to the Transmitter.)
2. Operating Temperature
3. Ambient Temperature at Case and tubing
4. Optional Features

OTHER FOXBORO PRODUCTS

The Foxboro product lines offer a broad range of measurement and instrument products, including solutions for pressure, flow, analytical, temperature, positioning, controlling, and recording. For a list of these offerings, visit our web site at:

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