

FLANGED FLUSH FACE DIAPHRAGM SEALS

REOTEMP's Flanged Flush-Face Diaphragm Seals are useful in applications where a continuous flow of process across the diaphragm is required to prevent solids buildup and a one-piece, all-welded construction is desired.



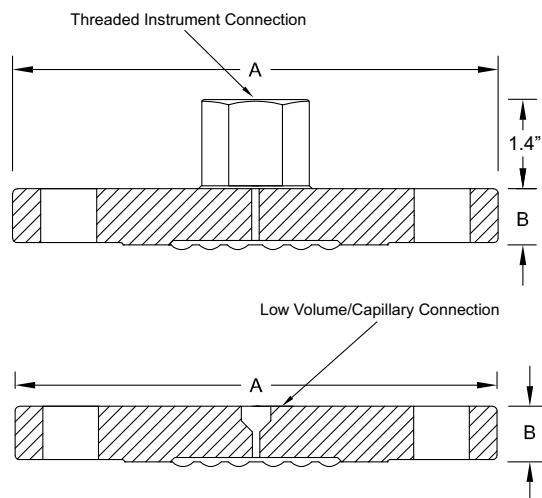
W9FF
Wetted Flange



W9FR
Integral Face Non-wetted Flange

FEATURES / BENEFITS

- One-piece Seal Design Bolts Directly to Process Flange
- Center Instrument Exit
- Commonly Supplied with Flush/Calibration Ring
- Ideal for Gauge or Differential Pressure Transmitters



SPECIFICATIONS

Wetted Materials Flange: 316SS, 304SS, Monel, Alloy 20, or Hast C-276.
Diaphragm: 316SS, Hast C-276, Tantalum, Monel, or others

Process Temperature Limits -110° to 750°F

Ambient Temperature Limits Determined by the pressure instrument.

Minimum Recommended Span	Diaphragm Size			
	1.8"	2.2"	3.5"	4.1"
2.5" & 3.5" Gauges	30 psi	15 psi	10 psi	30" H ₂ O
4", 4.5", & 6" Gauges	N/A	60 psi	10 psi	30" H ₂ O
Transmitter (Gauge Pressure)	10 psi	100" H ₂ O	30" H ₂ O	15" H ₂ O
Transmitter (Differential Pressure)	N/A	150" H ₂ O _d	30" H ₂ O _d	15" H ₂ O _d
Differential Pressure Gauge	N/A	N/A	N/A	100" H ₂ O _d

Available Diaphragm Sizes

	Diaphragm Size			
	1.8"	2.2"	3.5"	4.1"
1-1/2" Flange	STD	N/A	N/A	N/A
2" Flange	-D5	STD	N/A	N/A
3" Flange	-D5	-D6	STD	N/A
4" Flange	-D5	-D6	STD	-D9

Optional Diaphragm sizes are only available in W9FF, standard diaphragm sizes are the same for W9FF and W9FR.

Weights and Dimensions:

	Flange Rating	A	B	# of Bolts	Weight (Lbs.)
1 1/2"	150#	5"	.69"	4	4
2"		6"	.75"	4	5
3"		7.5"	.94"	4	9
4"		9"	.94"	8	17
1 1/2"	300#	6.13"	.81"	4	6
2"		6.5"	.88"	8	8
3"		8.25"	1.13"	8	16

NOTE: Weights and dimensions are for raised face flanges only. Other flange sizes and sealing face info can be found in ANSI B16.5 standards.

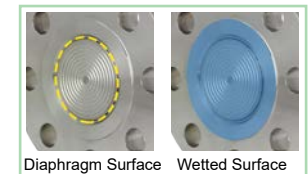
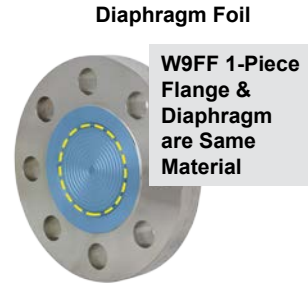
Maximum Working Pressures at 100°F:

Determined by ANSI B16.5 flange ratings.

FLANGED FLUSH FACE DIAPHRAGM SEALS

HOW TO ORDER: Choose options to build a part number. For example: **W9FFWR21S-W10-AS-TS // DXFR241S**

SEAL TYPE	INSTRUMENT CONNECTION	SEALING FACE	PIPE SIZE	PRESSURE RATING	DIAPHRAGM/ FLANGE MATERIAL
W9FF Selections for W9FF > W9FF = Flanged Flush Face (Wetted Flange) 2 = 1/2" Female NPT 4 = 1/4" Female NPT W = Low-Volume Connection for Smart Transmitters	W 2 = 1/2" Female NPT 4 = 1/4" Female NPT W = Low-Volume Connection for Smart Transmitters	R R = Raised-Face J = Ring-Type Joint F = Flat Face	2 H = 1-1/2" ANSI 2 = 2" ANSI 3 = 3" ANSI 4 = 4" ANSI 6 = 6" ANSI	1 1 = 150# 3 = 300# 6 = 600# 9 = 900/1500# 7 = 900# ¹ 8 = 1500# ¹ ¹ For 3" pipe size or larger.	S S = 316L/316L M = Monel/Monel* F = 304/304L* H = Hast C-276/Hast C-276* *Non-standard configuration.
Selections for W9FR > W9FR = Flanged Flush Face, Integral Face (Non-Wetted Flange)	2 = 1/2" Female NPT 4 = 1/4" Female NPT W = Low-Volume Connection for Smart Transmitters	R = Raised-Face J = Ring-Type Joint	H = 1-1/2" ANSI 2 = 2" ANSI 3 = 3" ANSI 4 = 4" ANSI	1 = 150# 3 = 300# 6 = 600# 9 = 900/1500# 7 = 900# ¹ 8 = 1500# ¹ ¹ For 3" pipe size or larger.	Wetted Insert & Diaphragm H = Hast C-276 U = Tantalum 2 = Duplex 2205 J = Titanium I = Inconel Z = Zirconium M = Monel A400 Note: Non-wetted 316SS flange.



DIAPHRAGM SEALS

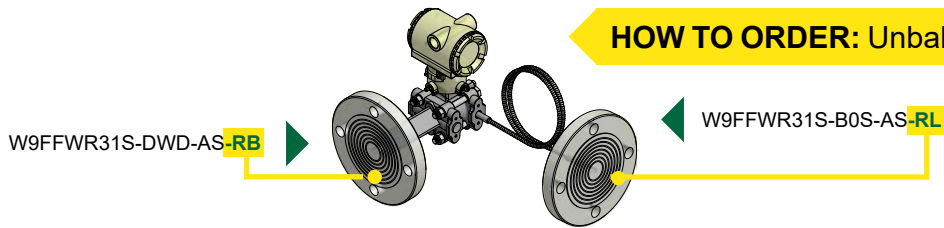
INSTRUMENT MOUNT	SYSTEM FILL FLUID	OPTIONS	FLUSH/CALIBRATION RINGS (OPTIONAL)
-W10 Selections for Both W9FF & W9FR > -DTD = Direct Mount, Threaded -DWD = Direct Mount, Welded -RTR = 6" Cooling Tower -STW = 3" Cooling Tower -A?? = Armored Capillary, Threaded -B?? = Armored Capillary, Welded -P?? = PVC Coated Armor, Threaded -W?? = PVC Coated Armor, Welded Note: ?? = Length in Feet (e.g. 05 = 5 feet) See 57 for Complete Mounting Guide -YYY = Dry Seal, No Instrument	-AS Common Fills -AS = Silicone DC200 -AG = Glycerin USP -BH = Silicone DC704 -C1 = Fomblin Y06 -C2 = Halocarbon 6.3 See 58 for Complete Fill Guide -XX = No Fill Fluid	-TS -OX = Cleaned for Oxygen Service -AU = Gold-Plated Diaphragm (20 Microns) -NC = NACE Certification MRO-175 -TC = Teflon-Coated Diaphragm -TS = SS Tag (9 Character Max.) -D9 = 4.1" Diaphragm (W9FF 4" Only) -D6 = 2.2" Diaphragm (Optional on W9FF 3" and 4")	// DXFR241S DXFR241S = 2" Pipe, Single 1/4" Port, 316SS DXFR242S = 2" Pipe, Dual 1/4" Port, 316SS DXFR221S = 2" Pipe, Single 1/2" Port, 316SS DXFR222S = 2" Pipe, Dual 1/2" Port, 316SS DXFR341S = 3" Pipe, Single 1/4" Port, 316SS DXFR342S = 3" Pipe, Dual 1/4" Port, 316SS DXFR321S = 3" Pipe, Single 1/2" Port, 316SS DXFR322S = 3" Pipe, Dual 1/2" Port, 316SS See Page 81 for Complete Offering Wetted



Diaphragm Seals

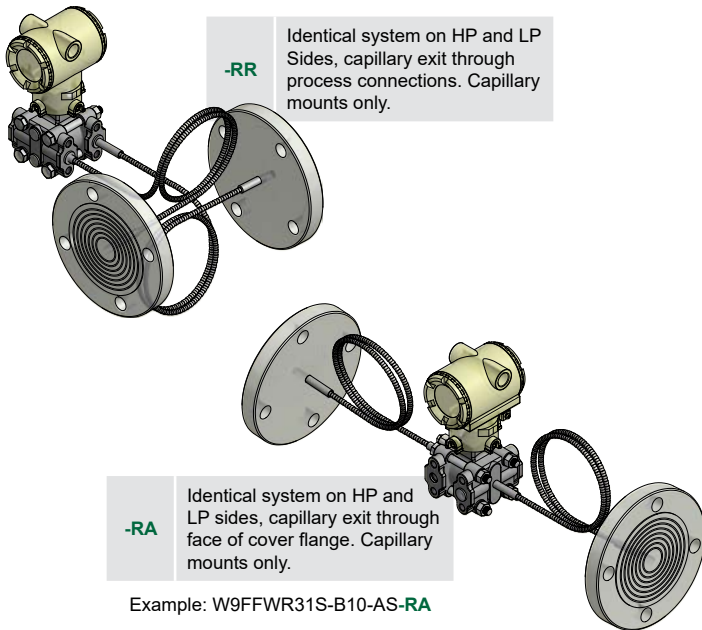
SMART TRANSMITTER ATTACHMENT

HOW TO ORDER: Unbalanced System Example

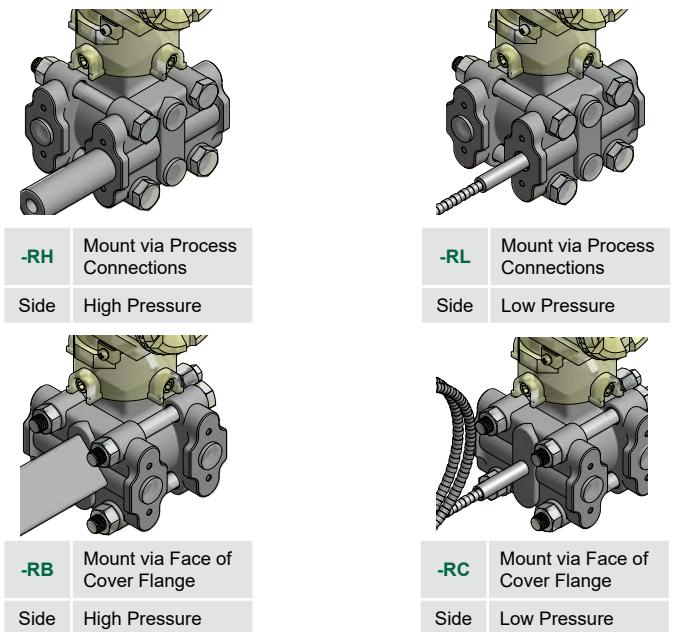


DIFFERENTIAL PRESSURE ASSEMBLY

Balanced System A complete assembly with one part number that includes two diaphragm seals, two capillaries, two fills, and one complete assembly calibration certificate.

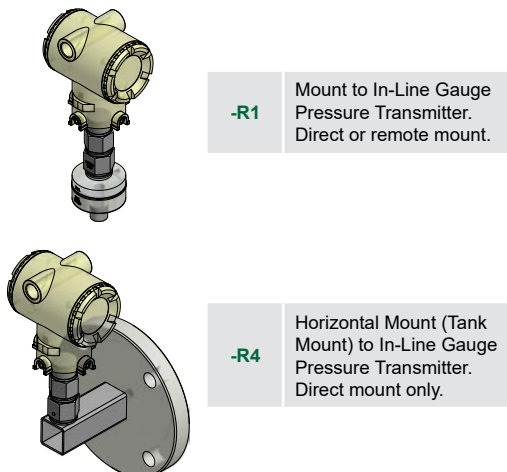


Unbalanced DP System Where seal, mount, capillary, or fill is not identical. A complete assembly includes one diaphragm seal on the HP side AND one diaphragm seal on the LP side.

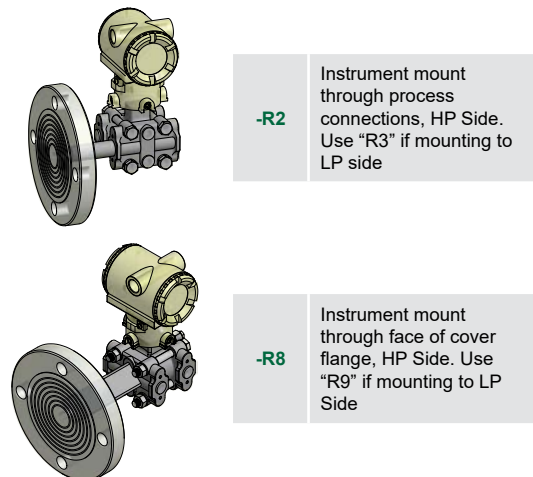


GAUGE PRESSURE ASSEMBLY

In Line Pressure Transmitter



Traditional Mount for Gauge Pressure Seal mount on one side only, other side is vented.

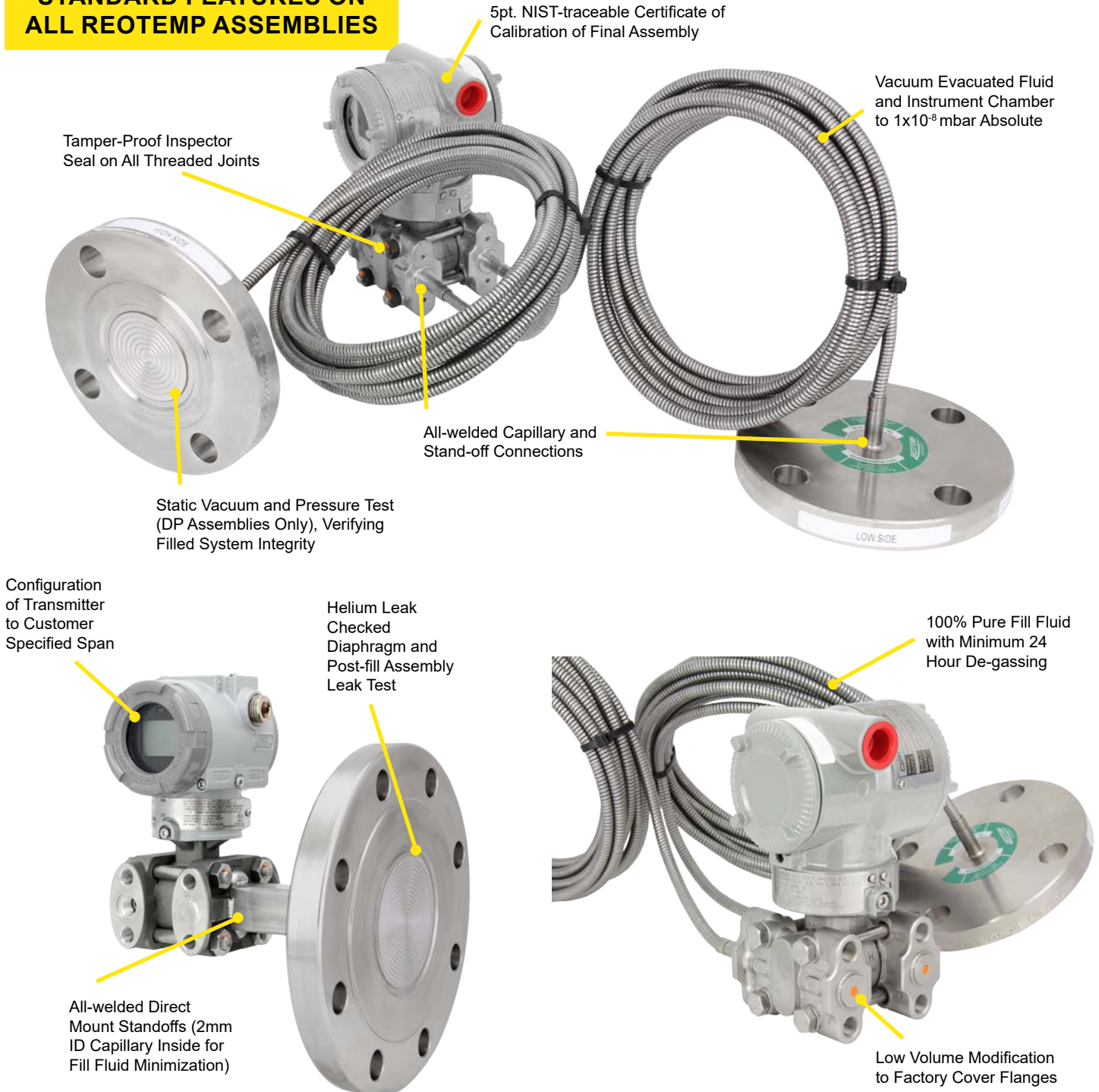


Diaphragm Seals

DIAPHRAGM SEAL ASSEMBLY TO SMART TRANSMITTERS

REOTEMP specializes in the unique craft of assembling diaphragm seals to field transmitters for the purpose of measuring pressure, differential pressure, level, and flow. As a trusted supplier to many of the world's leading transmitter manufacturers, REOTEMP can assemble a diaphragm seal system to virtually any make or model transmitter. Every transmitter mount includes the features below to ensure superior performance and durability for every assembly. REOTEMP also offers repair, refurbishment or replacement of used transmitters with remote seals.

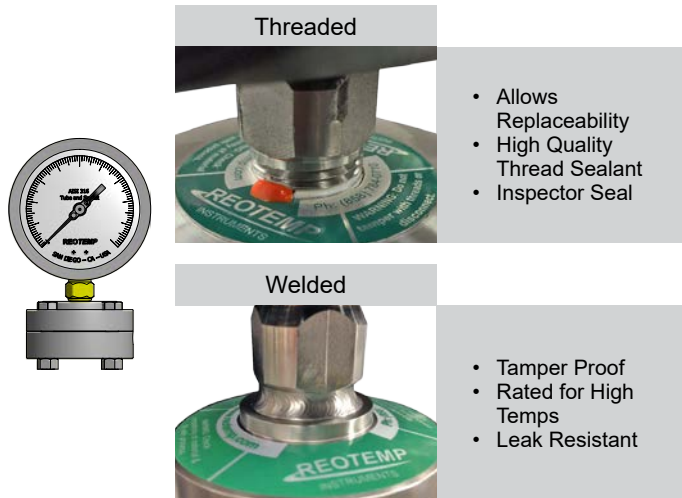
STANDARD FEATURES ON ALL REOTEMP ASSEMBLIES



INSTRUMENT MOUNTING CONFIGURATIONS

DIRECT MOUNT

Direct Mounting a pressure gauge, switch, or transmitter is the most common diaphragm seal assembly.

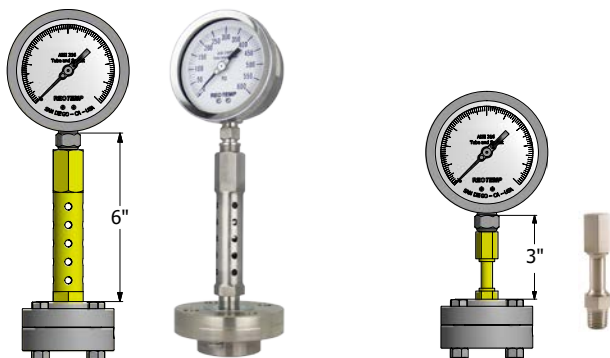


Code	Description	Max. Temp
-DTD	Threaded Instrument Connection	400°F
-DWD	Welded Instrument Connection	600°F

Assembly Notes: Welded connection recommended for pressure exceeding 1,500 psi for purposes of leak prevention.

COOLING ELEMENTS

Used in either high temp or cold temp applications, Cooling Elements mounted above diaphragm seals quickly normalize fluid temperature toward ambient. This protects the pressure instrument while still maintaining the convenience of a direct mount.

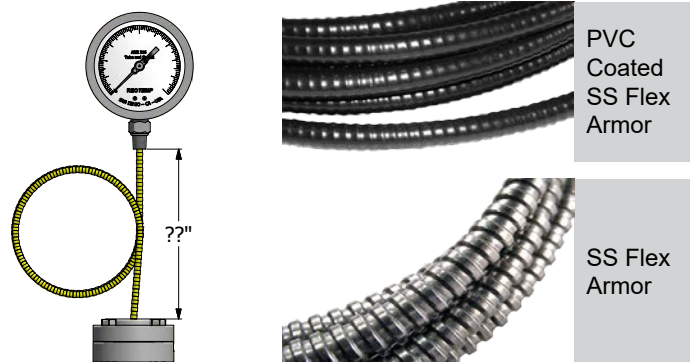


Code	Description	Max. Temp
-RTR	6" Cooling Tower	750°F
-STW	3" Cooling Standoff	600°F

Assembly Notes: Cooling elements are welded to diaphragm seal. Instruments are threaded to cooling element unless specified. All lengths are nominal.

REMOTE MOUNT

Remote Mounting a pressure instrument using flexible capillary is a common mounting method when the point of measurement is in a hazardous or inconvenient location.



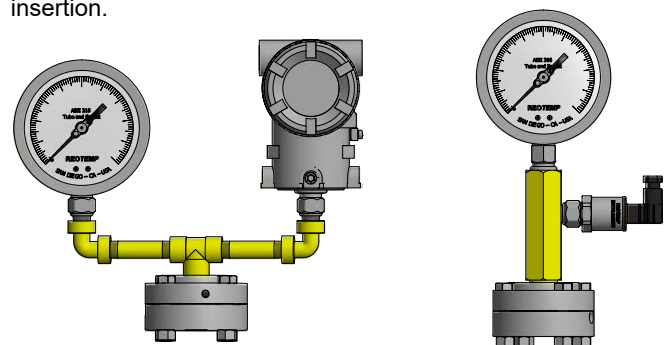
Code	Description	Max. Temp
-P??	PVC Coated SS Armor, Threaded to Seal	400°F
-W??	PVC Coated SS Armor, Welded to Seal	600°F
-A??	SS Flexible Armor, Threaded to Seal	400°F
-B??	SS Flexible Armor, Welded to Seal	750°F

Note: ?? = Length in feet (e.g. 05 = 5 feet)

Assembly Notes: Capillary has a 2mm inner diameter unless specified differently by customer. Ambient temp limit of PVC coated armor is 250°F. Standard instrument connection is threaded (Smart Transmitters are welded), unless specified by customer.

TREE ASSEMBLIES

Tree Assemblies offer the ability to mount two pressure instruments onto one diaphragm seal, allowing the user to gain both a local indication and a remote signal without adding an additional pipe insertion.



Code	Description	Max. Temp
-TRE	Goal Post, Low Pressure Assembly (Max. 150 psi)	400°F
-TRX	Goal Post, Heavy Duty (Max. 3,000 psi)	600°F
-TRM	Compact Tree Assembly (Max. 3,000 psi)	600°F

Assembly Notes: Threaded joints are fully welded for consistent instrument orientation. Instrument connections are threaded unless specified by customer. Diaphragm seal must displace enough fluid to drive both instruments.

FILL GUIDE

Diaphragm seals are designed to protect pressure instruments from hot process media and corrosive chemicals while minimizing any negative effect on instrument accuracy and durability. A well-made diaphragm seal can achieve this goal only if it is properly assembled, filled, and tested. REOTEMP's highly trained technicians use state-of-the-art equipment so that every diaphragm seal assembly is filled and tested to assure optimal instrument performance:

- ✓ 24-hour Minimum Fluid De-gassing
- ✓ Evacuated Instrument Chamber Up to 10⁻⁸ mbar Absolute
- ✓ Complete Fill Integrity Check
- ✓ Fill-port Leak Test
- ✓ Post-fill Static Test
- ✓ Verification of Instrument Calibration
- ✓ High-temp Pipe Sealant Used on All Threaded Joints (Welded Joints Upon Request)
- ✓ Tamper-proof (Inspection Seal) Lacquer used on All Threaded Joints
- ✓ Sturdy Diaphragm Packaging Protection



Part Number Code	Name	Description	Temperature Range (Vacuum Service <5psia)	Pulse+™	Viscosity cst @ ~77°F	Specific Gravity @ ~77°F	Thermal Expansion cc/cc/°C
STANDARD FILL FLUID							
AS	Silicone DC200 ¹	This is the standard fill fluid for most diaphragm seal applications.	-40°F to 400°F (-40°F to 250°F)	Yes	20	0.94	.00104
HIGH TEMP SILICONE							
BH	Silicone DC704 ¹	Standard for Smart Transmitters and capillary systems. Performs well in applications with high temperature and a deep vacuum.	0°F to 650°F (0°F to 450°F)	No	44	1.07	.00077
B1	Silicone DC710 ¹	Highest temperature rating; ideal for gauge seal assemblies. Too thick for capillary assemblies. Response time can become very slow in cold conditions.	50°F to 750°F (50°F to 400°F)	Yes	500	1.11	.00043
C8	Syltherm 800 ²	Low viscosity allows it to perform well in both low and high temperatures. Not recommended for vacuum service or at high temperatures when under low static pressure.	-40°F to 750°F (-40°F to 150°F)	No	9.5	0.93	.00136
B5	Silicone DC705 ¹	Performs very well in high temperatures when under vacuum. The high viscosity and freezing point of this fluid makes it a poor choice for cold or outdoor installations without heat tracing.	50°F to 675°F (50°F to 550°F)	Yes	175	1.09	.00096
B2	Silicone DC550 ¹	Similar high temperature performance as DC705, however it performs better at lower temperatures.	-40°F to 575°F (-40°F to 400°F)	No	125	1.07	.00076
FOOD GRADE							
AG	Glycerin USP	This is the standard fill fluid for most gauge seal assemblies for food, beverage, and pharmaceutical applications. Its high viscosity will cause very slow response at times in low temperature and outdoor installations.	60°F to 450°F (Not Suitable)	Yes	1100	1.26	.00061
BN	NEOBEE M20 ⁷	Low viscosity and a wide temperature range makes this the standard sanitary fill fluid for Smart Transmitters and capillary systems.	-10°F to 400°F (-10°F to 200°F)	No	10	0.92	.00101
BS	Food Grade Silicone	Highest temperature limit for food grade fluids. Because of its high viscosity it does not perform well in low temperatures.	20°F to 550°F (20°F to 250°F)	Yes	350	0.97	.00096
BP	Propylene Glycol	This is the fill fluid used when Glycol is called for on the customer specification. It has a very narrow temperature range.	0°F to 200°F (Not Suitable)	No	2.85	1.03	.00073
INERT (TYPICALLY FOR CHLORINE AND OXYGEN APPLICATIONS OR IN SILICONE-FREE ENVIRONMENTS)							
C1	Fomblin Y06 ⁴	Ideal inert fluid for transmitter applications. Relatively high vapor pressure above 200°F. Not recommended for use in high temperature situations with low static pressure.	-40°F to 450°F (0°F to 250°F)	No	71	1.88	.00086
C2	Halocarbon 6.3 ³	Standard inert fluid used in gauge seal assemblies.	-40°F to 400°F (-40°F to 200°F)	Yes	6.3	1.97	.00084
C3	Halocarbon 1.8 ³	Typically used in low temperature applications because of its low viscosity.	-110°F to 220°F (-100°F to 100°F)	No	1.8	1.82	.00084
C4	Fluorolube FS-5 ⁵	Similar performance to Halocarbon 6.3, however not suitable for vacuum service.	-40°F to 450°F (Not Suitable)	No	5	1.86	.00087
SPECIALTY							
CK	Krytox 1506 ⁶	Specialty fill fluid, inert.	-40°F to 350°F (-40°F to 300°F)	No	62	1.88	.00095
BE	Ethylene Glycol	Occasionally used in annular (O-ring) seal assemblies.	-25°F to 320°F (Not Suitable)	No	30	1.10	.00062

1 Trademark Dow Corning

2 Trademark The Dow Chemical Company

3 Trademark Halocarbon Product Corporation

4 Trademark AUSIMONT S.P.A

5 Trademark Hooker Chemical Company

6 Trademark The Chemours Company FC, LLC

7 Trademark Stepan Specialty Products

Note: PulsePlus™ fill fluids may have different physical properties than specified. Chemical composition and temperature ranges do not vary.

DIAPHRAGM SEAL ACCESSORIES

DRY CAPILLARY



- Used When Pressure Instrument Needs to be Removed from Direct Contact of Installation Point
- All-welded 316SS Construction
- Available up to 100 ft. in Length (Max 40 ft. in diaphragm seal assembly)
- Max Working Pressure of 10,000 psig
- 2mm ID Standard
- Note: if capillary is part of a filled diaphragm seal system use 3 digit mounting code per p57 (Example: "A25" = 25' of armored capillary, threaded to seal)

HOW TO ORDER: Choose options to build a part number. For example: **DXC4M4M10A-TS**

DXC

4M

4M

10

A

-TS

MODEL	INSTRUMENT CONNECTION	PROCESS CONNECTION	LENGTH IN FEET	PROTECTION	OPTIONS
DXC = Capillary	4M = 1/4" Male NPT 4F = 1/4" Female NPT 2M = 1/2" Male NPT 2F = 1/2" Female NPT	4M = 1/4" Male NPT 4F = 1/4" Female NPT 2M = 1/2" Male NPT 2F = 1/2" Female NPT	05 = 5 ft. 10 = 10 ft. 20 = 20 ft. ?? = Specify, Length in feet	A = Stainless Steel Armor P = PVC Coated Stainless Steel Armor B = Bare Capillary Tubing (Rare)	-3M = 3mm ID (10 ft. Max) -TS = Stainless Steel Tag (1-10 Characters)

FLUSH RINGS



- Used to Flush Process Fluid or Provide Access for Field Calibrations
- Machined from Solid Bar Stock
- Pressure Ratings Up to ANSI Class 2500
- For Use with W9FF and W9FR Diaphragm Seals (Raised Face)

HOW TO ORDER: Choose options to build a part number. For example: **DXFR322S-PM**

DXFR

3

2

2

S

-PM

MODEL	PIPE SIZE	PORT SIZE	NUMBER OF PORTS	MATERIAL	OPTIONS
DXFR = Flush Ring	H = 1-1/2" ANSI 2 = 2" ANSI 3 = 3" ANSI 4 = 4" ANSI	4 = 1/4" NPT 2 = 1/2" NPT	1 = One Port 2 = Two Ports (180° Opposed) 4 = Four Ports (90° Apart)	S = 316SS H = Hast-C276 M = Monel J = Titanium 2 = Duplex 2205 D = Alloy 20	-MR = Mill Certification -PM = Positive Material Identification Certification -GS = 1/4" NPT SS Plug -G2 = 1/2" NPT SS Plug

DIAPHRAGM SEAL OPTIONS



Visit reotemp.com

✓ Check Stock

✓ Get Price

✓ Configure Part #

✓ Download PDF Data Sheets

DIAPHRAGM SEALS

		MS4 MS6 MS8	W5 W6 W7	T5 T6 V5	W9FF W9FR	W9XT	W9FP	DSTC75	DSTC15 AND LARGER	DSTF05	DSTF75 AND LARGER	OR	DXFR
PULSATION PROTECTION (ONLY AVAILABLE WITH REOTEMP PRESSURE GAUGE MOUNTED TO SEAL)													
-PP	Pulse Plus™	✓	✓	✓	✓	✓	N/A	N/A	✓	N/A	✓	✓	N/A
DIAPHRAGM COATING													
-AU	Gold Plated Diaphragm	N/A	✓	N/A	✓	✓	✓	✓	✓	✓	✓	N/A	N/A
-TC	Teflon Coated Diaphragm PTFE	N/A	✓	N/A	✓	✓	✓	N/A	✓	N/A	✓	N/A	N/A
-EP	Electropolished Diaphragm	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓	✓	✓	N/A	N/A
FILL													
-FW	Fill Port Welded Closed	STD¹	✓	✓	✓	✓	✓	✓	✓	✓	✓	N/A	N/A
-VF	Fill for Vacuum Service	N/A	✓	N/A	✓	✓	✓	N/A	✓	N/A	✓	N/A	N/A
CLEANING AND FINISH													
-DG	Degreased, Shipped in Sealed Bag	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	N/A	✓
-OX	Cleaned for Oxygen Service per ASME B40.1	✓	✓	N/A	✓	✓	✓	✓	✓	✓	✓	N/A	✓
-OY	Cleaned for Oxygen Service per MIL-STD-1330D	✓	✓	N/A	✓	✓	✓	✓	✓	✓	✓	N/A	✓
PLUG FOR FLUSH PORT													
-GS	1/4" SS Plug Installed	STD	STD	STD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓
-JS	1/2" SS Plug Installed	N/A	STD	STD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓
-GH	1/4" Hast C Plug Installed	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓
-JH	1/2" Hast C Plug Installed	N/A	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓
-GM	1/4" Monel Plug Installed	N/A	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓
-JM	1/2" Monel Plug Installed	N/A	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓
TAG OPTION													
-TS	Stainless Steel Tag (1-10 Characters)								✓				
-TM	Stainless Steel Tag (11-80 Characters)								✓				
-TP	Paper Tag								✓				
CERTIFICATION OPTIONS													
-NC	Certificate of NACE Compliance	✓	✓	N/A	✓	✓	✓	N/A	N/A	✓	✓	N/A	✓
-CM	General Material Conformance	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
-MR	MTR - Mill Test Report Certificate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	N/A	✓
-PM	PMI - Positive Material Identification Certificate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	N/A	✓
-HT	Hydrostatic Test per ASME B31.3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	N/A	N/A
-HL	Helium Leak Test Certificate	✓	✓	N/A	✓	✓	✓	✓	✓	✓	✓	N/A	N/A

✓ Indicates that the option is available

N/A Indicates the option is not available

¹ Standard on MS8, available on MS4 & MS6.