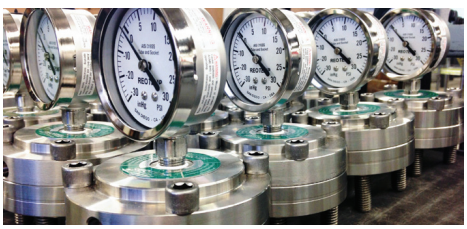
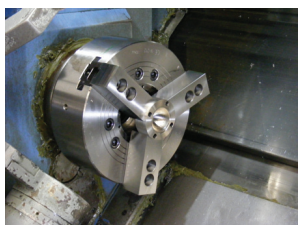
REOTEMP

INSTRUMENTS

Diaphragm Seal Brochure





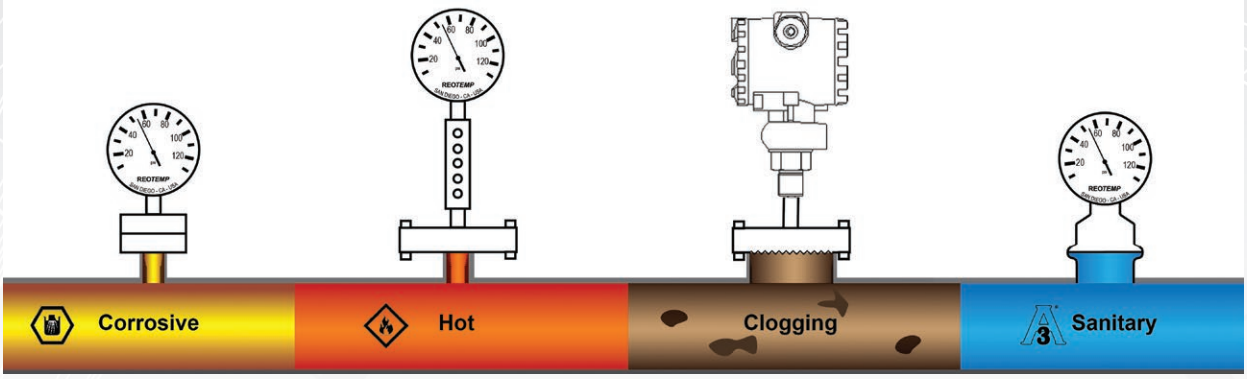
Made in the USA

Measuring your world since 1965

REOTEMP DIAPHRAGM SEALS

WHY A DIAPHRAGM SEAL?

Diaphragm seals are used in applications where the pressure sensor requires isolation from the process media. These applications may be corrosive, high temp, clogging, or require a sanitary fluid to remain captured in the piping or vessel. Rather than the process fluid interfacing with the pressure sensor, the pressure is exerted onto the flexible diaphragm and transmitted hydraulically to the instrument through the fill fluid. When properly mounted and filled a diaphragm seal assembly will have minimal effect on the instrument's performance.



APPLICATION CONSIDERATIONS

REOTEMP Diaphragm Seal Assemblies are carefully designed, built, and tested to maximize performance, increase instrument lifespan, and assure operator safety. The following should be considered when specifying a diaphragm seal:

1 **INSTRUMENT CONSIDERATIONS:**
- Is there sufficient displacement to drive through its full range?
- Is the diaphragm sensitive enough for the measuring range and accuracy grade of the instrument?

2 **DIAPHRAGM SEAL MOUNTING:**
- How will the diaphragm seal mount to the process? Threaded? Flanged? Clamped?
- How will the instrument mount to the diaphragm seal? Threaded? Welded?
- Will the instrument be mounted directly to the seal or with capillary?

3 **PROCESS CHARACTERISTICS:**
- What are the pressure and temperature limits?
- Are there issues with clogging or high viscosity?
- Is there severe shock and pulsation?
- Is the process fluid compatible with the wetted material and gasket?

4 **AMBIENT CHARACTERISTICS:**
- Are there extreme or fluctuating ambient temperatures?
- Is the outside environment corrosive?

5 **VACUUM CONSIDERATIONS:**
- Will the assembly be operating in deep vacuum (< 5psia)?

If yes, contact the factory with process specifications.

SEAL TYPES

Mini Seals

The most economical seal type, mini seals are used in various industries for simple instrument isolation. Mini seals are only available in threaded connections.

Offline (Clean-Out)

The most versatile of seal types, offline seals are offered with both flanged and threaded connection. Their bolted assembly allows for the seal to be removed from the process for cleaning and/or calibration without losing fill.

Sanitary

Most commonly available in tri-clamp connections, sanitary diaphragm seals allow pressure measurement in applications where the process fluid must remain captive in the piping system and the diaphragm must be cleaned regularly.

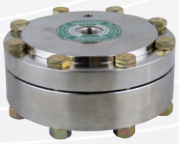
Flanged Transmitter Seals

Designed specifically for Smart Transmitter mounting, Flanged Transmitter Seals are mounted flush to the customer's vessel. They are most commonly used for level and flow measurement.

Annular (O-Ring)

Primarily used in the wastewater applications where there is a high solids content, Annular seals allow the process to flow through the diaphragm seal eliminating the possibility of clogging.

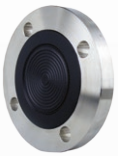
High Displacement



High Displacement seals are used with pressure instruments that require a high fluid displacement in order to acuate the instrument (e.g. Mechanical DP Gauges). The extra large diaphragm also makes these seals useful for low pressure gauges and high accuracy transmitter assemblies.

Made in the USA

	SAFETY LINE	MINI SEALS			SANITARY	
	All-Welded Process Seal	**Small Mini Seal**	**Medium Mini Seal**	**Threaded Flush Face**	**Sanitary Mini Seal**	**Standard Sanitary Tri-Clamp**
						
	MS8	**MS4G**	**MS6G**	**DSFF**	**DSTC75**	**DSTC15/20**
Standard Instrument Pairing	**Pressure Gauges (PR & PT) General Purpose Transmitters Smart Transmitters Pressure Switches**	**Pressure Gauges (PR25, PR35) General Purpose Transmitters Solid-State Pressure Switch**	**Pressure Gauges (PR & PT) General Purpose Transmitters Solid State Pressure Switch**	**Pressure Gauges (PR25, PR35, PR40) General Purpose Transmitters Solid State Pressure Switch**	**Pressure Gauges (PD20, PR25, PR35) General Purpose Transmitters Solid-State Pressure Switch**	**Pressure Gauges (PD20, PR25, PR35, PR40) General Purpose Transmitters Smart Transmitters Solid-State Pressure Switch**
Available Process Connection	**Female NPT: 1/4", 1/2" Male NPT: 1/4", 1/2", 3/4", 1"**	**Female NPT : 1/4", 1/2" Male NPT 1/4"**	**Male NPT: 1/4", 1/2" Female NPT: 1/4", 1/2"**	**Male NPT: 1/2", 3/4", 1", 1.5"**	**3/4" Tri-Clamp**	**1.5", 2", 2.5", 3" Tri-Clamp**
Max. Working Pressure @ 70°F	**5,000 PSI**	**5,000 PSI**	**1,000 PSI**	**Based on Process Connection**	**1,000 PSI**	**1,000 PSI**
Max. Temperature	**750°F**	**300°F**	**300°F**	**Based on Process Connection**	**200°F**	**400°F**
Available Wetted Material	**316SS Hastelloy C-276**	**316SS Monel Hastelloy C-276**	**316SS**	**316SS**	**316SS (Optional Electropolish)**	**316SS Hastelloy C-276 (Optional Electropolish)**
Available Gasket Material	**No Gasket, All Welded**	**No Gasket, All Welded**	**No Gasket, All Welded**	**No Gasket, All Welded**	**User Supplied**	**User Supplied**
Standard Delivery	**3-5 Days**	**3-5 Days**			**3-5 Days**	

	FLANGED TRANSMITTER SEALS				ANNULAR SEALS (O-RING)	
	Standard Flanged Flush Face	**Integral-Face/ Flanged Flush Face**	**Extended Flanged**	**Pancake Wafer**	**Wafer**	**Bolt-Thru**
						
	M9BF	M9BRF	M9EXT	M9BC/M9BRC	ORR	ORB
Standard Instrument Pairing	**Smart Transmitters (Differential & Gauge Pressure)**				**Pressure Gauges (PR & PT) General Purpose Transmitters Smart Transmitters Pressure Switches**	
Available Process Connection	**ANSI Flange (2", 3", 4") (150# - 1500#)**	**ANSI Flange (2", 3", 4") (150# - 1500#)**	**ANSI Flange (2", 3", 4") (150# - 1500#)**	**ANSI Flange (2", 3", 4")**	**2" - 48" Pipe Sizes**	
Max. Working Pressure @ 70°F	**Per Flange Rating**	**Per Flange Rating**	**Per Flange Rating**	**Based on Backing Flange**	**275 PSI**	**720 PSI**
Max. Temperature	**750°F**	**750°F**	**750°F**	**750°F**	**400°F**	**400°F**
Available Wetted Material	**316L SS**	**PTFE Coated 316SS Hastelloy C-276 Tantalum Hastelloy B2 Duplex SS Monel 400**	**316L SS Hastelloy C-276 Monel 400**	**316L SS Hastelloy C-276 Monel 400 Tantalum Titanium**	**Carbon Steel 316SS Teflon Coated Carbon Steel PVC**	
Available Gasket Material	**User Supplied**	**User Supplied**	**User Supplied**	**User Supplied**	**Buna, Teflon, Viton, Natural Rubber, and more**	
Standard Delivery*	**5-7 Days**	**5-7 Days**	**4-5 Weeks**	**3-5 Days**	**6-10 Weeks**	

***Standard delivery represents the average expected lead time for low quantities of standard configurations. Contact customer service for specific product deliveries.**

WELDED DIAPHRAGM OFFLINE SEALS

	Standard Threaded	Large Threaded	Standard Flanged	Large Flanged	Threaded Flow-Thru	Socket/Saddle Weld
	 W51	 W61	 W52/W53	 W62/W63	 W535	 W54
Standard Instrument Pairing	Pressure Gauges (PR & PT) General Purpose Transmitters Solid-State & Mechanical Pressure Switch	Pressure Gauges (PR & PT) General Purpose Transmitters SMART Transmitters Solid-State & Mechanical Pressure Switch	Pressure Gauges (PR & PT) General Purpose Transmitters Solid State & Mechanical Pressure Switch	Pressure Gauges (PR & PT) General Purpose Transmitters Smart Transmitters Solid State & Mechanical Pressure Switch	Pressure Gauges (PR & PT) General Purpose Transmitters Solid-State & Mechanical Pressure Switch	Pressure Gauges (PR & PT) General Purpose Transmitters Solid-State & Mechanical Pressure Switch
Available Process Connection	Female NPT: 1/4", 1/2", 3/4", 1"		ANSI Flange: 1/2" - 3"		Pipe Size: 1/4" - 1" NPT	Pipe Size: 1/4" - 8"
Max. Working Pressure @ 70°F	2,500 PSI (Available up to 10,000 PSI)		Per Flange Rating		600 PSI	600 PSI
Max. Temperature	750°F					
Available Wetted Material	316LSS, 304SS, Hastelloy C-276, Titanium, Tantalum, Monel, Nickel, Carbon Steel, Inconel, Alloy 20 and more					
Available Gasket Material	Teflon, Grafoil, and more					
Standard Delivery*	3-5 Days		10-15 Days		3-4 Weeks	

NON-METALLIC DIAPHRAGM OFFLINE SEALS

HIGH DISPLACEMENT SEALS

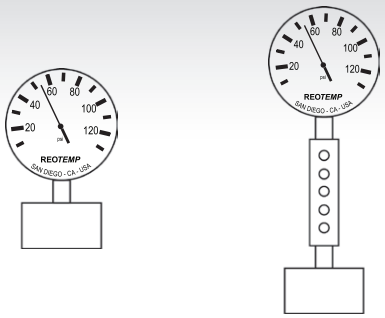
	Standard Threaded	Standard Flanged	Economy Plastic Seal	HD Threaded Offline	HD Flanged Offline	HD Plastic Offline
	 T51/V51	 T52/T53 or V52/V53	 PLS	 W71	 W72/W73	 T6/V6
Standard Instrument Pairing	Pressure Gauges (PR & PT) General Purpose Transmitters SMART Transmitters Solid-State & Mechanical Pressure Switch	Pressure Gauges (PR & PT) General Purpose Transmitters SMART Transmitters Solid-State & Mechanical Pressure Switch	Pressure Gauges (PR) General Purpose Transmitters	Mechanical Differential Pressure Gauges Pressure Gauges (PC Low Pressure Gauges) Mechanical Pressure Switches		
Available Process Connection	Female NPT: 1/4", 1/2", 3/4", 1"	ANSI Flange 1/2" - 3"	Female NPT: 1/4", 1/2"	Female NPT: 1/4", 1/2", 3/4", 1"	ANSI Flange 1/2" - 3"	Female NPT: 1/4", 1/2", 3/4", 1" ANSI Flange: 1/2" - 3"
Max. Working Pressure @ 70°F	2,500 PSI	Per Flange Rating	150 PSI	1,000 PSI	Per Flange Rating	Based on Material & Process Connection
Max. Temperature	450°F	450°F	140°F	750°F	750°F	450°F
Available Wetted Material	PTFE Teflon Viton Polypropelene PVC/CPVC Kynar & std. metallic materials	Teflon-Lined 316SS PTFE Teflon Viton Polypropelene PVC/CPVC Kynar & std. metallic materials	PTFE Teflon Polypropelene PVC/CPVC Kynar	316L SS Hastelloy C-276 Monel 400 Tantalum Titanium	Carbon Steel 316SS Teflon Coated Carbon Steel PVC	Teflon-Lined 316SS PTFE Teflon Polypropelene PVC/CPVC Kynar
Available Gasket Material	No Gasket, Bonded			Teflon, Grafoil, Klinger, and more	Teflon, Grafoil, Klinger, and more	Bonded
Standard Delivery*	5-15 Days			2-4 Weeks		

*Note: Product information contained in this brochure is for reference only. Please refer to product data sheets for specific seal data.

STANDARD INSTRUMENT ASSEMBLIES

For Diaphragm Seals mounted to Pressure Gauges, General Purpose Transmitters, and Pressure Switches

Direct Mount

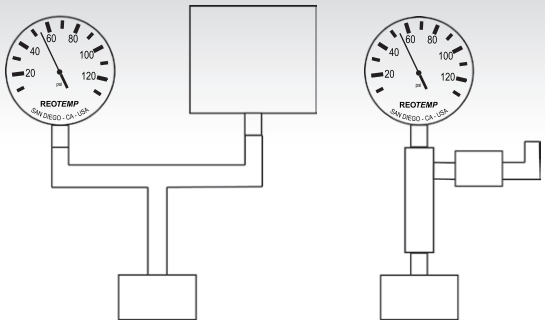


Cooling Tower

Remote Mount

Capillary

Tree Mount



Goal Post | Mini Tree

HOW TO ORDER

- INSTRUMENT PART # → SEAL PART #
- INSTRUMENT PART # → COOLING TOWER PART # → SEAL PART #
- INSTRUMENT PART # → CAPILLARY PART # → SEAL PART #
- DXTREE-G → INSTRUMENT PART # → INSTRUMENT PART # → SEAL PART #
- DXTREE-M → INSTRUMENT PART # → INSTRUMENT PART # → SEAL PART #

MOUNTING CUSTOMER SUPPLIED INSTRUMENTS

REOTEMP can mount and fill other manufacturers' instruments and diaphragm seals. Use the following part number designators and contact the factory for pricing.

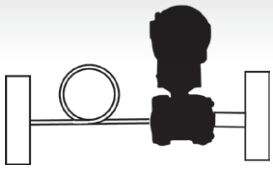
Customer Supplied Pressure Instrument	Customer Supplied Diaphragm Seal
DSXMCI	DSXMCDS

SMART TRANSMITTER AND DP GAUGE ASSEMBLIES

DUAL REMOTE

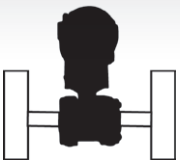
- DXCTRANS-RR
- HP SEAL PART #
- HP CAPILLARY PART #
- LP SEAL PART #
- LP CAPILLARY PART #

REMOTE/DIRECT



- DXCTRANS-RD
- HP SEAL PART #
- LP SEAL PART #
- LP CAPILLARY PART #

DIRECT/DIRECT

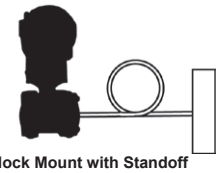


- DXCTRANS-DD
- HP SEAL PART #
- LP SEAL PART #

SINGLE REMOTE

Single-Port

- DXCTRANS-R1
- SEAL PART #
- CAPILLARY PART #



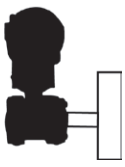
Block Mount with Standoff

- DXCTRANS-R2
- SEAL PART #
- CAPILLARY PART #

SINGLE DIRECT

Single-Port

- DXCTRANS-D1
- SEAL PART #



Block Mount with Standoff

- DXCTRANS-D2
- SEAL PART #

WHY A REOTEMP DIAPHRAGM SEAL?

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.

When purchasing a diaphragm seal assembly from Reotemp Instruments, we take the following measures to build quality into every assembly:

REO-GAUGE FILL

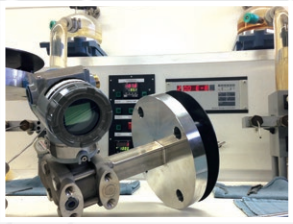
Standard with Pressure Gauges, Switches, and General Purpose Transmitters.

- 100% pure fill fluid, specified by customer
- A 24-hour minimum fluid de-gassing before filling
- Evacuated instrument chamber to .08 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

REO-TRANS FILL

Standard with Smart Transmitters (GP and DP) and upon customer request for other instruments.

Includes all of the same items as the REO-GAUGE FILL Plus:



- Evacuated fill fluid and instrument chamber to 1 x 10^{-8} mbar
- All-welded capillary and stand-off connections (unless specified)
- Static vacuum and pressure test (for DP assemblies only)
- Configuration of transmitter to specified range span
- 5 pt. NIST-traceable Calibration Certificate of final assembly

Diaphragm Seal Fill Fluid Guide

Part Number Code	Name	Temp. Range	Vacuum Service <5psia	Viscosity cst @ 77°F	Specific Gravity @ 77°F	Thermal Expansion cc/cc/°C	Pulse+ Availability	Notes
Standard Fill Fluid								
AS	Silicone DC200 [1]	-40°F to 400°F	-40°F to 250°F	20	0.94	0.00104	Pulse+	This is standard fill fluid for most diaphragm seal applications.
High Temp. Silicone								
BH	Silicone DC704 [1]	0°F to 650°F	0°F to 450°F	44	1.07	0.00077	NO	Standard for Smart Transmitters and capillary systems. Performs well in applications with high temperature and deep vacuum.
B1	Silicone DC710 [1]	50°F to 750°F	50°F to 400°F	500	1.11	0.00043	Pulse+	Highest temperature rating; ideal for gauge seal assemblies. Too thick for capillary assemblies. Response time can become very slow in cold conditions.
C8	Syltherm 800 [2]	-40°F to 750°F	-40°F to 150°F	9.5	0.93	0.00136	NO	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.
B5	Silicone DC705 [1]	50°F to 675°F	50°F to 550°F	175	1.09	0.00096	Pulse+	High viscosity and freezing point of this fluid makes it a poor choice for cold or outdoor installations without heat tracing. Performs very well in high temperatures when under vacuum.
B2	Silicone DC550 [1]	-40°F to 575°F	-40°F to 400°F	125	1.07	0.00076	NO	Similar high temperature performance to DC705, but performs better in lower temperatures.
Food Grade								
AG	Glycerine USP	60°F to 450°F	Not Suitable	1100	1.26	0.00061	Pulse+	This is the standard fill fluid for most gauge seal assemblies for food, beverage, and pharmeceutical applications. Its high viscosity will cause very slow response times in low temperature and outdoor installations.
BN	NEOBEE M20 [7]	-10°F to 400°F	-10°F to 200°F	10	0.92	0.00101	NO	Low viscosity and wide temperature range make this the standard sanitary fill fluid for Smart Transmitters and capillary systems.
BF	DUOprime Mineral Oil [8]	20°F to 600°F	Not Suitable	350	0.97	0.00096	NO	Highest temperature limit for food grade fluids. Beacause of its high viscosity it does not perform well in low temperatures.
BP	Propylene Glycol	0°F to 200°F	Not Suitable	2.85	1.03	0.00073	NO	This is the fill fluid used when Glycol is called for on the customer specification. Has a very narrow temperature range.
Inert (typically used for chlorine and oxygen applications or in silicone-free environments)								
C1	Fomblin Y06 [4]	-40°F to 450°F	0°F to 250°F	71	1.88	0.00086	NO	Ideal inert fluid for transmitter applications. Relatively high vapor pressure above 200°F, not recommended for use in high temperature when under low static presure.
C2	Halocarbon 6.3 [3]	-40°F to 400°F	-40°F to 200°F	6.3	1.97	0.00084	Pulse+	Standard inert fluid used in gauge seal assemblies.
C3	Halocarbon 1.8 [3]	-110°F to 220°F	-100°F to 100°F	1.8	1.82	0.00084	NO	Typically used in low temperature applications because of its low viscosity.
C4	Fluorolube FS-5 [5]	-40°F to 450°F	Not Suitable	5	1.86	0.00087	NO	Similar performance to Halocarbon 6.3, however not suitable for vacuum service.
Specialty								
CK	Krytox 1506 [6]	-40°F to 350°F	-40°F to 300°F	62	1.88	0.00095	NO	Specialty Fill Fluid, Inert.
BE	Ethylene Glycol	-25°F to 320°F	Not Suitable	30	1.1	0.00062	NO	Typically used in annular (O-Ring) seal assemblies.

1 - Trademark Dow Corning
2 - Trademark The Dow Chemical Company
3 - Trademark Halocarbon Product Corporation
4 - AUSIMONT S.P.A.
5 - Hooker Chemical Co.
6 - E.I. du Pont de Nemours and Company
7 - Stepan Specialty Products
8 - LYONDELL-CITGO REFINING LP

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

REOTEMP INSTRUMENTS

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