INDUMART CHEMICAL SEALS

Chemical seals are used when the process medium is corrosive, viscous, solidifying or contains solid particles. They might also be applied to prevent entrance of hygiene or food products into the process to safeguard bacteria growth.

This section of our catalogue is designed to categorize all Indumart chemical seals to explain the limitations for selecting the required seals which suits your process. For a careful selection of the right chemical seal, the following specifications must be stated:

- Material of Construction
- Process Connection & Capillary Length
- Pressure Rating
- Process and Ambient Temperatures

Material of Construction

Choosing the right diaphragm seal whose materials of construction is chemically compatible with the process fluid is very important. Selecting an unsuitable diaphragm material may result in excessive wear and render the system inaccurate or inoperable.

As a standard practice, Indumart chemical seals are manufactured from 316L stainless steel, but other materials such as 321 stainless steel, Monel, Hastelloy, Tantalum and Nickle can be ordered for special processes. Several types of lining such as, PVC, PTFE or Polypropylene may also be applied to the system for protection. Gold-coating of 40 micron is also a very good choice for withstanding extremely corrosive acids.

Process Connection and Capillary Length

The process side of Indumart diaphragm seals are offered with either flanged or threaded connection. The other end of the diaphragm seal may be attached directly through the threaded connection, or remotely by the means of a filled capillary, to the pressure instrument.

Diaphragm size of the pressure seals varies according to the minimum and maximum pressure values of the process. Large diaphragms are more sensitive to the pressure input, resulting in more accurate systems. They contribute less to the system spring rate and are less sensitive to ambient and process temperature changes.

Capillaries used have an internal diameter of 2 mm through which the fill fluid transmits the pressure of the process to the measuring instrument. An inside diameter of 1 mm is also possible to reduce the temperature effect, but it negatively influences the response time. For reliable measurement performance a limit to the length of capillary is set for each chemical seal application.

Pressure Rating

The process side of Indumart diaphragm seals come with either flanged or threaded connection. The instrument end of the seal may be attached directly or remotely, by means of a filled capillary, to the pressure instrument. The minimum and maximum process pressure values are important determinants of the diaphragm size and process connection. The minimum span specified is the minimum pressure which results in reliable measurement performance. In most cases, a lower pressure than mentioned is possible, but it reduces the accuracy of the measurement.

Process and Ambient Temperatures

The specific characteristics of any material will change when its temperature is altered. In the diaphragm seal cases, characteristics of both the diaphragm and the filled liquid are affected by changes in temperature, which will result in temperature induced errors. This is the primary cause of inaccurate pressure measurements occurring at a temperature other than the calibration temperature of 20°C.

Expansion or contraction of the fill fluid directly affects the pressure measurement. Therefore, temperature changes should be noted at the time of ordering for selection of correct fill fluid, as well as, safeguarding or reducing temperature induced errors by using proper accessories.

Effects of temperature on the accuracy of pressure measurements with 2" flange size diaphragm seals are shown in the following tables. Calibration temperature is 20°C.

Pressure error in kPa per 10°C temperature for 2" flange diaphragm seal system.

Transmitter Type			Seal	Capillary (m)
GP	AP	DP		
0.5	0.5		0.5	1.04
		0.005	0.12	0.23

Pressure (kPa)	Pressure Gauge (mm)			Seal	Capillary (m)
	Φ63	Φ100	Φ160		
≤6000	1.3	5.2	9	0.72	1.5
>6000	0.6	2.9	3.5	0.72	1.5

Indumart Standard Diaphragm Seals - Quick Selection

Model: S11

- Stainless steel body and diaphragm; Other materials & coating as option
- ¼", ½", ¾" and 1" threaded process connection, Other threads as option
- ¼" and ½" threaded instrument connection; Welded or capillary as option
- Minimum pressure span of various models from 15 psi (1 bar) to 1500 psi (100 bar)
- Maximum pressure of various models from 900 psi (60 bar) to 6000 psi (400 bar)
- Maximum temperature 200°C with PTFE ring; 345°C with graphite ring as option

Model: S21

- Stainless steel body and diaphragm; Other materials & coating as option
- ¼", ½", ¾" and 1" threaded or ½" up to 1½" flange process connection
- ¼" and ½" threaded instrument connection; Welded or capillary as option
- Minimum pressure span for pressure gauges from 7.5 psi (500 mbar)
- Minimum pressure span for gauge pressure transmitters from 1.1 psi (80 mbar)
- Minimum pressure span for differential pressure transmitters from 0.15 psi (10 mbar)
- Maximum pressure of various models from 1500 psi (100 bar) to 4500 psi (300 bar)
- Maximum temperature 200°C with PTFE ring; 345°C with graphite ring as option

Model: S31

- Stainless steel body and diaphragm; Other materials & coating as option
- Process connection hygienic type; 3A® connection clamp or female connection
- 1½", 2" & 3" female coupling or ¾", 1½", 2" & 3" tri clover clamp (3A) process conn.
- ¼" and ½" threaded instrument connection; capillary tube as option
- Minimum pressure span for pressure gauges from 7.5 psi (0.5 bar)
- Minimum pressure span for gauge pressure transmitters from 3 psi (0.2 bar)
- Minimum pressure span for differential pressure transmitters from 0.3 psi (0.02 bar)
- Maximum pressure of various models from 150 psi (10 bar) to 600 psi (40 bar)

Above are Indumart standard executions. Custom seal designs may also be ordered.