WIKA
Diaphragm Seals

Agenda

Purpose:

Diaphragm seal overview

Topics:

- Why use a diaphragm seal
- Operating principle of a diaphragm seal
- Diaphragm seal failure
- How to select a diaphragm seal
- WIKA Solutions
- Competition
- Why WIKA

Outcome:

Leave with a basic understanding of diaphragm seal operating principle, applications, and selection.



Why Use a Diaphragm Seal

A diaphragm seal has two primary tasks:

1. **Separation of the measuring instrument (pressure gauge, pressure transmitter, pressure switch) from the process media.**
   - Corrosive
   - Highly viscous and fibrous
   - Crystallization or polymerization
   - High temperature
   - Elimination of dead space (Food & Pharma)
   - Toxic or harmful (dual containment)
2. **Transfer of the pressure to the measuring instrument**

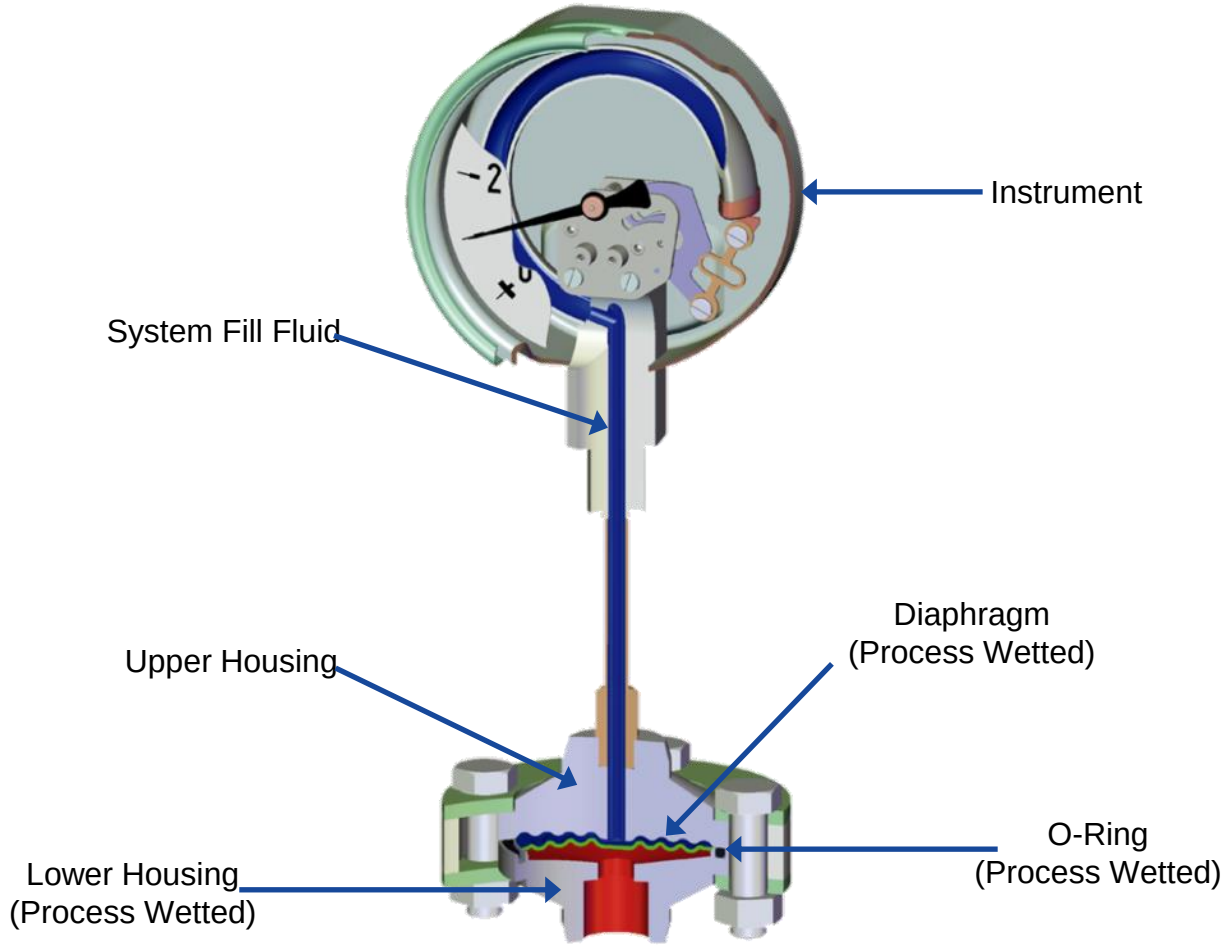


Operating Principle - Diaphragm

- A diaphragm is a flat disc with convoluted or unique pattern formed in it.
- A diaphragm can be encased within seal body or assembled on external surface.
- The diaphragm is normally welded to a seal body, but it can also be metal bonded or seam welded to the upper housing, or clamped between an upper and lower housing.

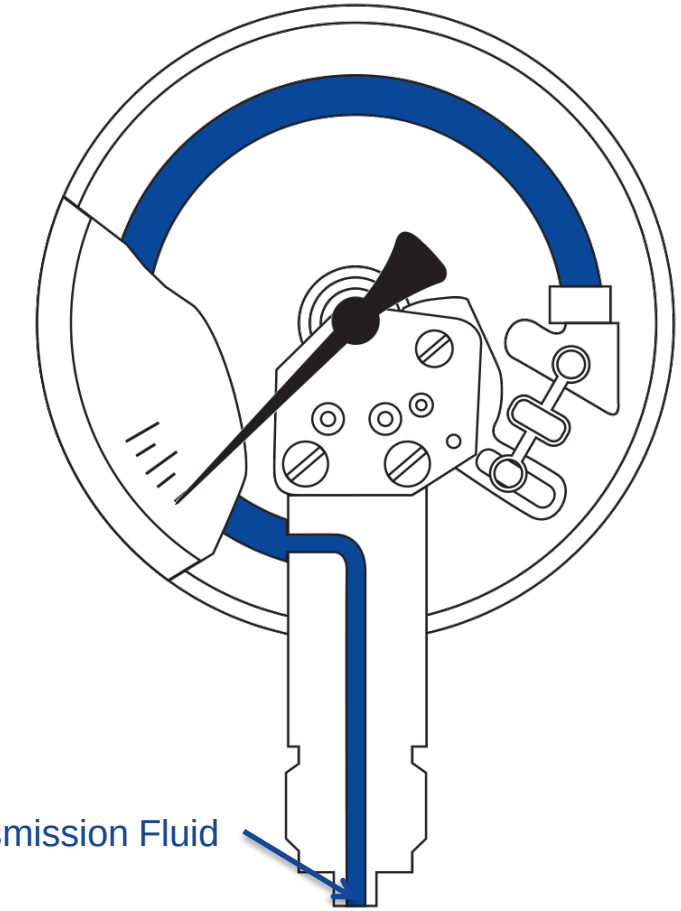


Operating Principle - Components

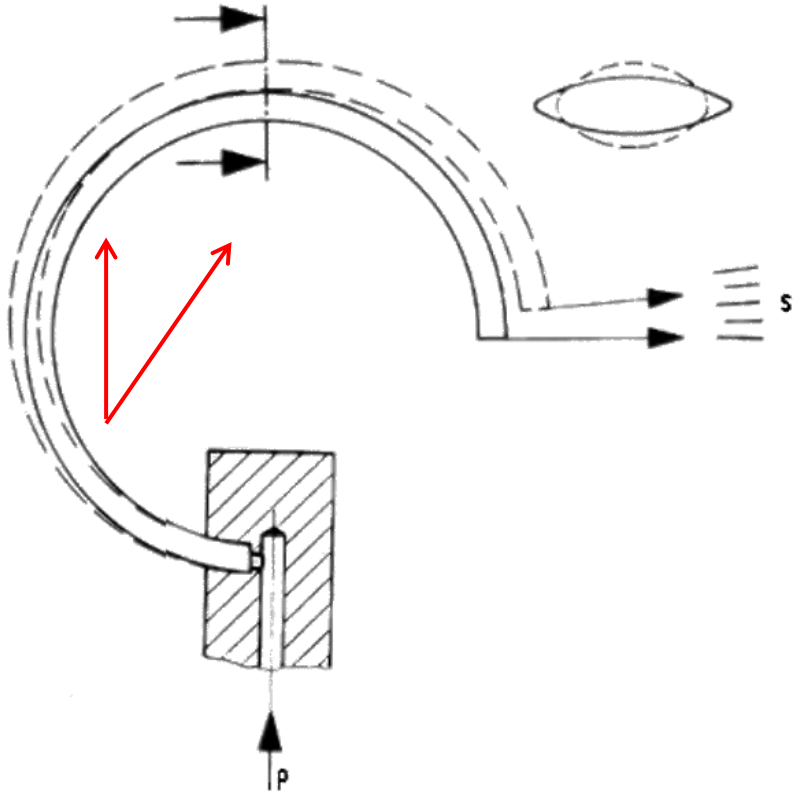




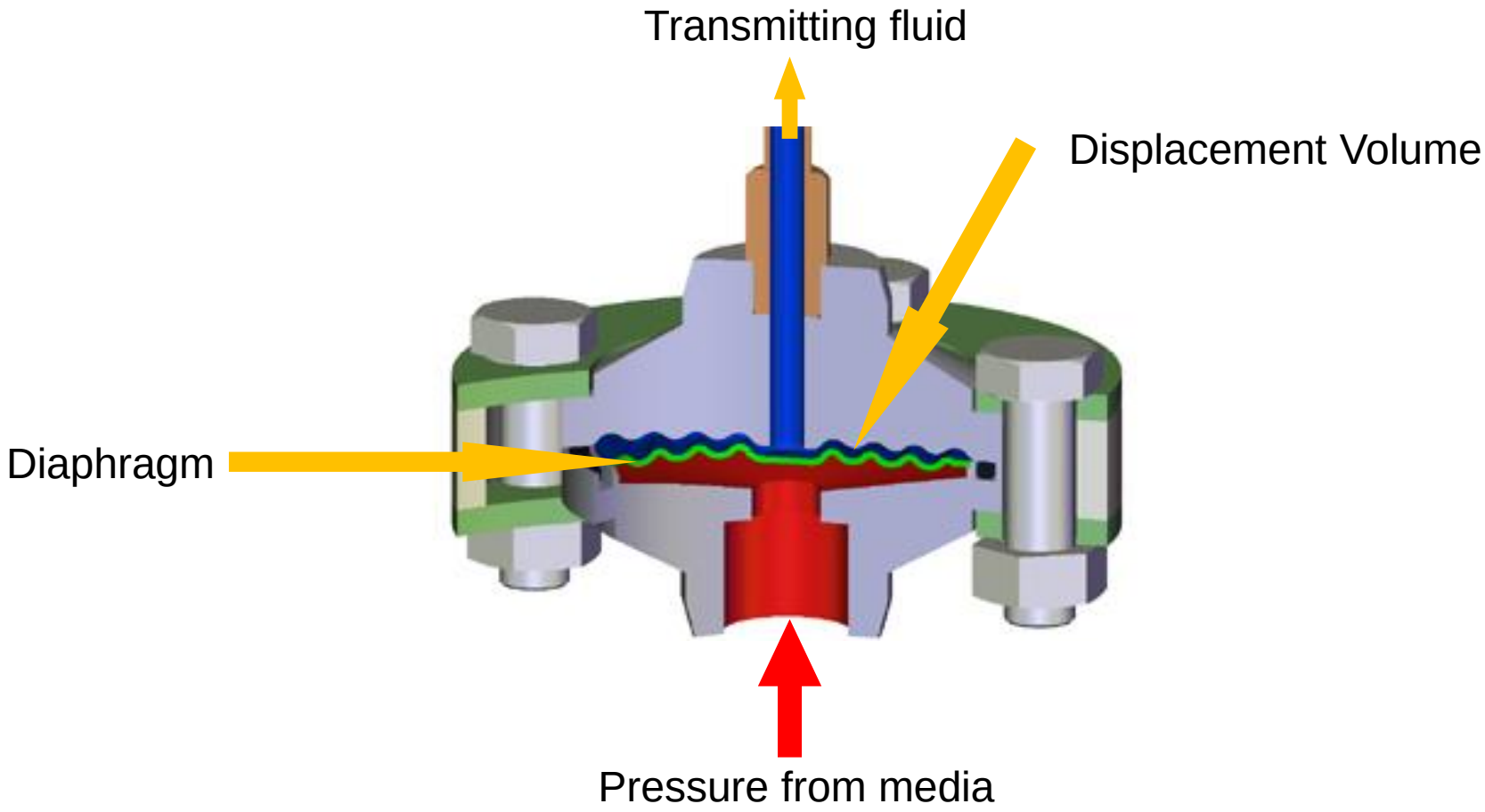
Operating Principle



Control Volume



Operating Principle



Operating Principles – Assembly Options

Instrument

- Pressure Gauge
- Pressure Transmitter
- Pressure Switch

Assembly

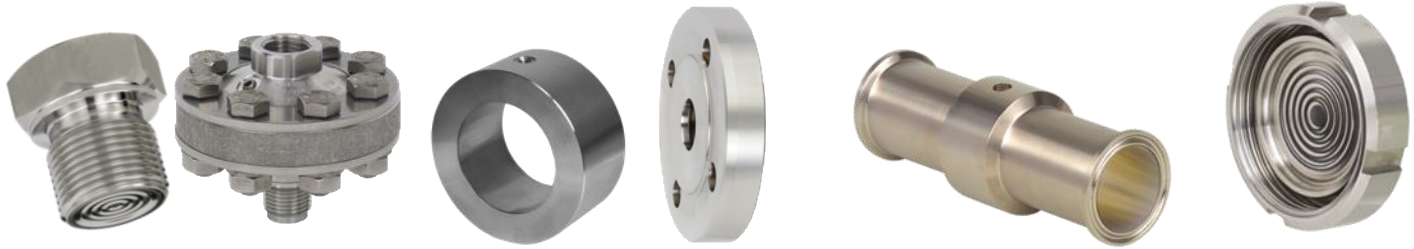
- Direct Assembly
- Cooling Element
- Capillary

Diaphragm Seal

- Threaded Connection
- Flange Connection
- Sterile Connection



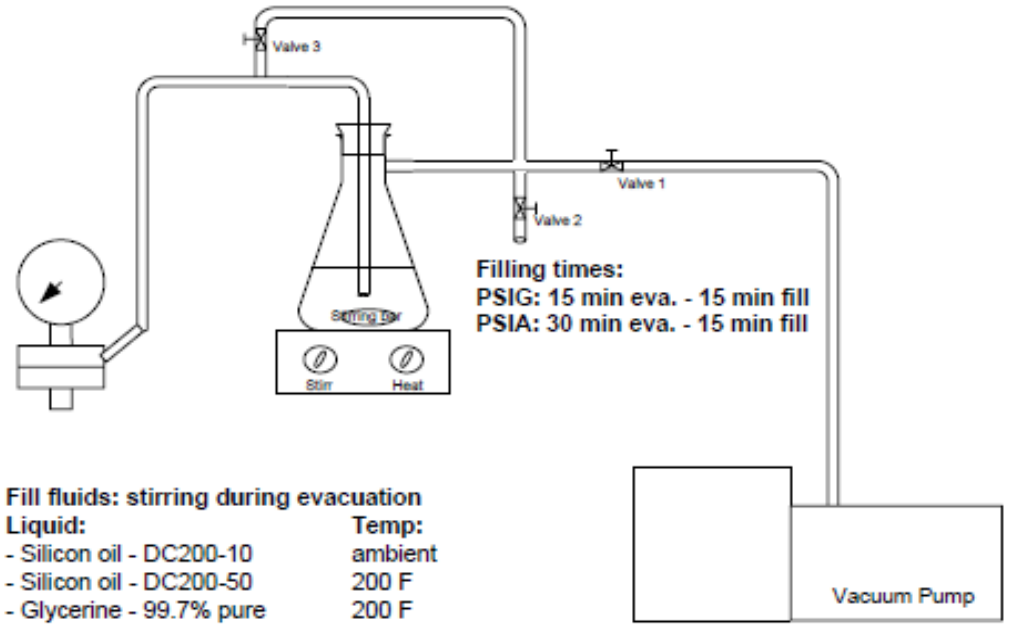




Operating Principles – System Fill

Diaphragm Seal Filling procedure

Set up sketch



Filling times:
PSIG: 15 min eva. - 15 min fill
PSIA: 30 min eva. - 15 min fill

Fill fluids: stirring during evacuation

Liquid:	**Temp:**
- Silicon oil - DC200-10	ambient
- Silicon oil - DC200-50	200 F
- Glycerine - 99.7% pure	200 F
- Neobee M20	150 F
- Halocabon 6.3	ambient
- Fluorolube FS5	ambient

Evacuation:
- Fill jar to about 500 ml
- Open: Valve 1 & Valve 3
- Set stirrer to turn the fluid
- Set temp to about 160F

Optional:
- in case needed connect process to full vacuum (counter vacuum)

Filling:
- Fill jar to about 500 ml
- Close: Valve 1 & Valve 3
- Shut down stirrer
- Shut down temp
- Open: Valve 2 to vent the jar; fluid should push into the system,
- fill untill pointer goes back to ZERO
- remove fill fixture and close fill port

Diaphragm Seal Failure

Damage to the diaphragm is usually the reason a diaphragm seal fails. Diaphragm damaged can be caused by:

- Chemical corrosion
- Over-pressure / pressure spikes
- Clogging / freezing
- Mishandling
- Loss of fill fluid



Diaphragm Seal Selection

Basic information needed to select the correct diaphragm seal:

1. Process composition
2. Temperature
3. Pressure range
4. Pressure instrument
5. Process connection
6. System fill fluid
7. Mounting position
8. Response time
9. Seal and gauge matches

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Documentation

- Certificate of Compliance 2.2
- Calibration Certificate 2.2 & 3.1
- Outline Dimensional Drawings
- Installation/Operating Manual
- Data Sheets
- Material Certification, 3.1
- Hydro Static test 3.1
- NACE MR-0175 and 0103 Compliance 2.2
- Others upon request available


certificate of calibration

(list is not inclusive, standard items shown in Blue)

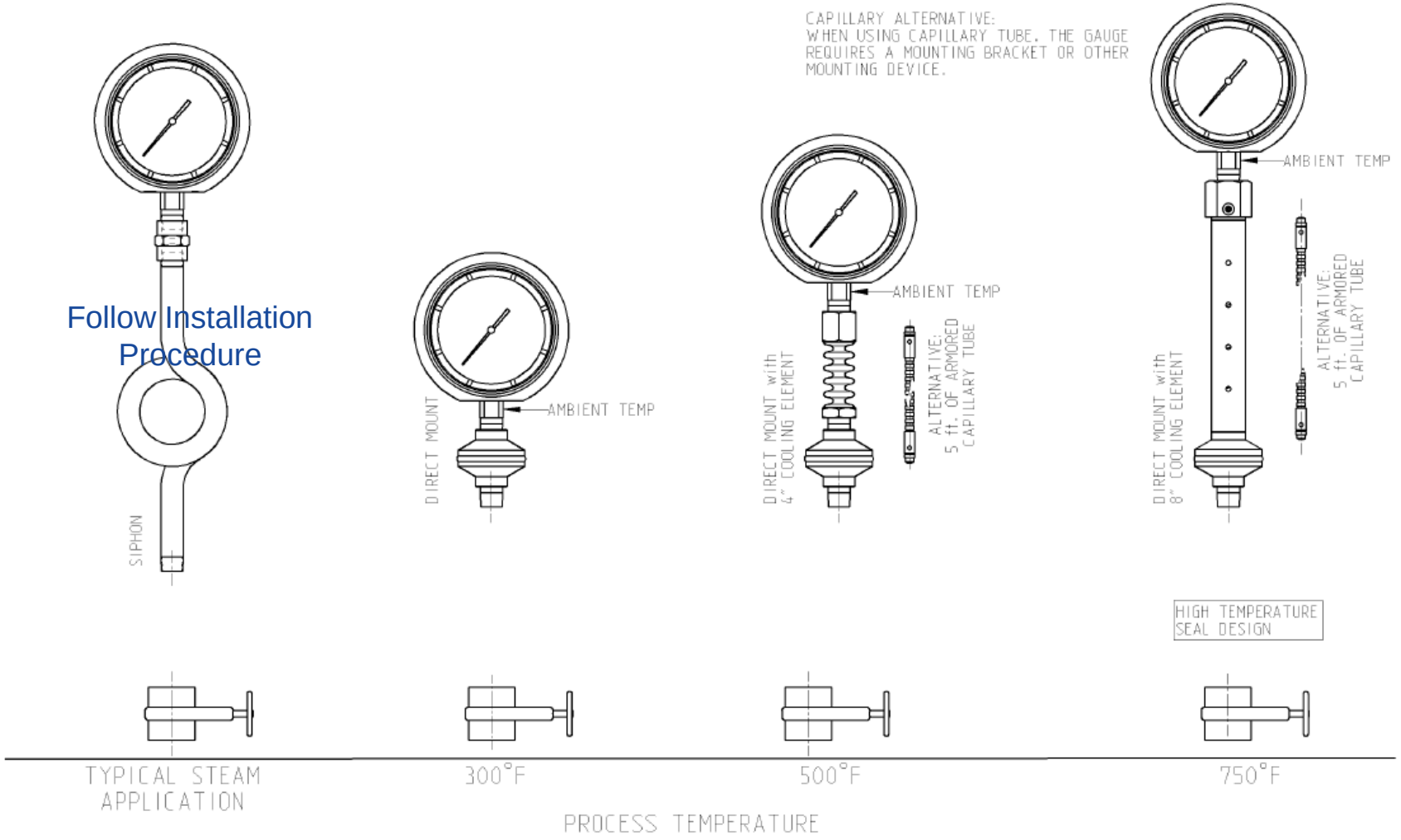
Solutions – All Welded Systems

- **Leak proof**
- **Tamper proof**
- **Dual containment**





Solutions – High Temperature



Why Use a Diaphragm Seal

- Extends the operative life of the pressure measuring instrument
- Allows remote mounting from the pressure port
- Eliminates clogging from high viscosity process media or crystallization
- Prevents excessive corrosion
- Protects from damaging temperatures by dissipating and/or conducting heat
- Installation of numerous process connections meets various industry standards (flanged, threaded, sanitary)
- Application of additional accessories (flushing connections, saddle and block flanges, etc.)
- Application of seals to numerous instruments and for retrofitting



Competition

Competition Summary:

- Multiple companies selling diaphragm seals to protect their instruments
- Hyett to high end industrial competition such as PIC
- Most competitors have full line of standard diaphragms
- Market size difficult to define
- WIKA meets mostly Ashcroft, Ametek (Mansfield & Green) and Reotemp

Note: PIC services 100% Rosemount needs

HYETT INSTRUMENT COMPANY

ASHCROFT Trust the shield.

BADOTHERM

AMETEK SENSORS, TEST & CALIBRATION

REOTEMP INSTRUMENTS

Conoflow

PIC

WINTERS Since 1953 We're There.

ZAVODA MANUFACTURING CO., INC.

Why WIKA

- Global company with US Manufacturing in Texas.
- Complete offering of Standards and specials.
- Highly innovative.
- One stop shopping of instrument and diaphragm seal
- WIKA sets market standards in quality and safety.





- Monitoring system
- AWS Standard
- AWS HF
- Inline diaphragm seal
- Sanitary agencies



Our production locations:
Germany (HQ), Australia, Brazil, China, India, Italy, Canada, Korea, Malaysia, Poland, Russia, Switzerland, Singapore, South Africa, USA

Thank You!