

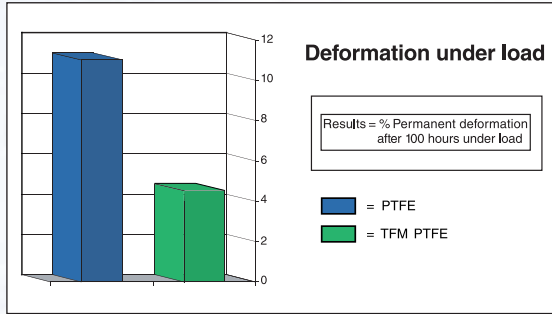


Diaphragm Direct range of diaphragms has been designed to meet the highest standards of reliability and quality. Full traceability is available for EPDM #7, and TFM backed EPDM diaphragms. Each diaphragm carries a molded identification number and is available with a certificate of FDA conformity for your regulatory requirements.

EPDM #7 and TFM backed EPDM diaphragms have been designed specifically to improve performance in applications requiring frequent steam cycles. Innovative formulations in EPDM and PTFE technology mean that Diaphragm Direct's FDA diaphragms can stay in service significantly longer than conventional diaphragms.

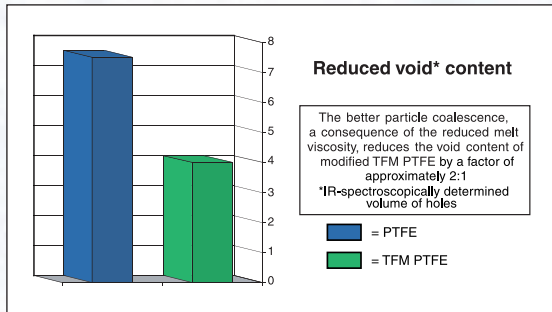
EPDM #7 compound complies with 21 CFR 177.2600 and conforms to USP Class VI. TFM backed EPDM conforms with 21 CFR 177.1550, and conforms to USP Class VI. All diaphragm testing was undertaken by an independent accredited laboratory. A complete validation package is available for trouble-free validation and a quality guarantee. All finished diaphragms are sealed in individual packages to prevent damage from handling and transit.

 **DIAPHRAGM[™]
DIRECT**



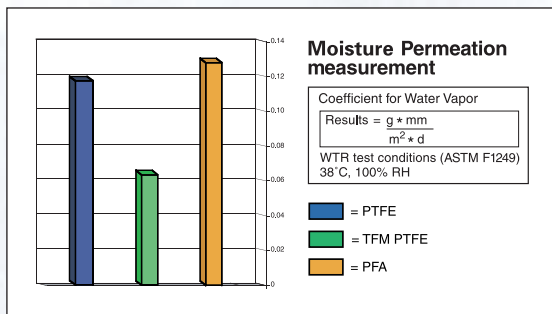
TFM™ 1600 PTFE Diaphragms

PTFE is one of the purest fluoropolymers available today with virtually zero extractables or leachables. TFM 1600 PTFE is a modified polytetrafluoroethylene (PTFE) that maintains the exceptional chemical and heat resistance properties of conventional PTFE, but has a significantly lower viscosity giving better fusion during sintering resultant smoother surfaces.

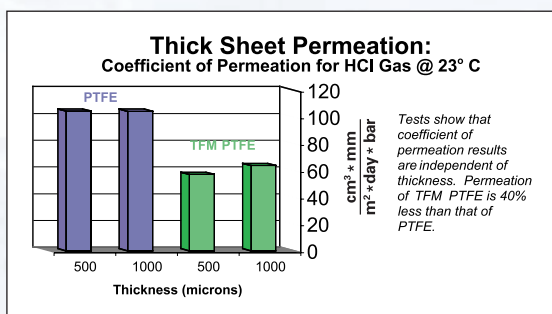
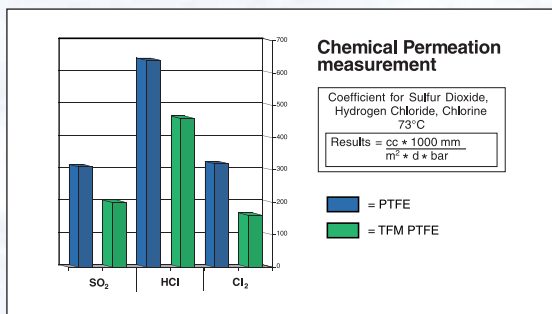


BENEFITS

- Substantially lower deformation under load – reduced cold flow
- Lower permeability
- Denser polymer structure – reduces the risk of trapped contaminants
- Smooth, pore free surface – allows for easier cleaning during CIP cycles
- Lower melt viscosity and better fusion during sintering
- Higher tensile strength
- Excellent for diaphragms in process applications involving frequent steam sterilization (SIP)



This innovative formulation allows diaphragms to stay in service substantially longer than conventional diaphragms without deformation.



TFM is a registered trademark of Dyneon.



EPDM Diaphragm Characteristics

- Peroxide cured, non-sulfur based for improved heat, chemical resistance
- Compound complies to 21 CFR 177.2600
- Compound conforms to test requirements as outlined in USP 23 Class VI Biological Reactivity Tests section #87 and #88
- Raw materials consisting of chemically pure grade ingredients
- Raw materials conform to stringent quality control standards

TEMPERATURE PERFORMANCE:
Normal: -40° to 250°F (-40° to 140°C)
Short Steam Cycles: up to 302°F (150°C)

Diaphragm Direct's diaphragms are manufactured from the highest grade of FDA conforming lead-free ingredients. Each diaphragm is fully traceable using date/batch identification numbers molded onto the diaphragm.

Quality Assurance

Diaphragm Direct compounds and molded TFM diaphragm with #7 EPDM backing complies to 21 CFR 177.1550 (a), and test requirements as outlined in USP XXIV Class VI Biological Reactivity Tests section #87 and #88. Diaphragm Direct compounds and molded peroxide cured #7 EPDM complies to 21 CFR 177.2600, and test requirements as outlined in USP XXIV Class VI Biological Reactivity Tests section #87 and #88.

Testing was undertaken by the independent accredited laboratory, NAMSA. The diaphragm is fully traceable to European specification: EN10204.31B. A physical properties certificate is available upon request.

Further information regarding the qualitative identification will be available upon written request under supplier/customer confidentiality agreement.

Validation Package For

DIAPHRAGM DIRECT

Premium Replacement Diaphragms

GENERAL TESTS AND ASSAYS OBTAINED FROM:
North American Science Associates, Inc. (NAMSA)

Quality Control

Diaphragm Directs' diaphragms are manufactured under strict adherence to ISO 9001 Quality Control standards. All raw materials are carefully selected and are repeatedly checked to assure compliance to FDA and USP norms. Identification numbers are molded onto the edge tab of the finished diaphragm allowing the manufacturing history to be traced back to the raw material blend. All finished diaphragms are sealed in individual packages to maintain cleanliness and to prevent damage from shipping and handling.



In order to assure consistent quality control and performance, stringent tests are conducted periodically to determine diaphragm life and performance ratings.

Diaphragms are an integral part of the valve being used in the biopharmaceutical environment. No changes to polymer formulations will be made without consultation and prior notice.

Diaphragm Selection

Diaphragm Direct offers a wide variety of diaphragms for all application levels.

| Code | Diaphragm Material | Color | Temperature | | Approvals | |
|-------|-----------------------------|---------------------------|-------------|------------|-----------|-----|
| | | | °F | °C | FDA | USP |
| D | Butyl Rubber | Black | -20 to 250 | -29 to 121 | Yes | Yes |
| P | Buna N | Black | 10 to 180 | -12 to 82 | Yes | Yes |
| #7 | EPDM - Peroxide Cured | Black | -30 to 300 | -34 to 156 | Yes | Yes |
| TFM/V | Steam Grade TFM Viton Back | White Face, Black Backing | 23 to 347 | -5 to 175 | No | No |
| TFM/7 | Steam Grade TFM EPDM Backed | White Face, Black Backing | -30 to 350 | -34 to 176 | Yes | Yes |

Avoid using diaphragms in applications that exceed the recommended temperature and pressure limits. Please see product warranty limitation and disclaimer terms.

Diaphragm Direct offers a wide range of other diaphragm materials for industrial applications, please call for a complete listing and size availability.





TFM/EPDM diaphragm backing seen with bayonet method of attachment.

TFM™ 1600 PTFE with EPDM Rubber Backing

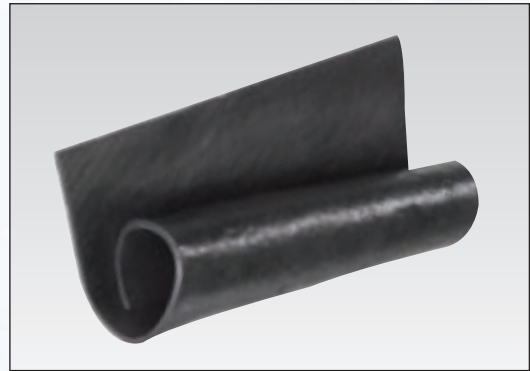
- Excellent creep and compression resistance
- Superior thermo-mechanical performance
- Lower porosity
- Longer flex life
- Tensile Strength = 32N/mm^2
- Elongation at break = 650%
- Max. Intermittent Steam Temp. Recommended = 330°F (165°C)
- Max. Continuous Steam Temp. Recommended = 294°F (145°C)



EPDM Diaphragm

EPDM (ethylene, propylene terpolymer, organic peroxide cured) compound is comprised of high molecular weight terpolymer, which provides increased mechanical properties while reducing compression set.

Ethylene-propylene compounds have excellent resistance to water, acids, alkalis, salt solutions, ketones, alcohols, glycols and phosphate esters. In addition it has excellent ozone and steam resistance up to 390°F .



This un-cured or un-vulcanized material is then calendered into continuous sheets (as seen above). These sheets are then used with a high performance nylon reinforcement fabric, and molded into finished diaphragms.



Selection of Your Replacement Diaphragms

The diaphragm is a critical component in the complete valve assembly. Selection of a diaphragm material is contingent upon: pressures, temperatures, process media, FDA approval, USP Class VI approval, traceability of material for system validation.

**Valve Manufacturer/
Diaphragm Type**

- Saunders® style EPDM
- Saunders® style Teflon backed EPDM
- Saunders® style Teflon backed Viton
- ITT® style EPDM
- ITT® style Teflon backed EPDM
- Gemu® style EPDM
- Gemu® style Teflon backed EPDM

| DIAPHRAGM DIRECT™ REPLACEMENT DIAPHRAGMS (by size and part number) | | | | | |
|---|----------------------|-----------------------|-----------------------|---------------------|-----------------------|
| Size Inch DN | 1/2" DN 8 | 1/2" DN 15 | 3/4" DN 20 | 1" DN 25 | 1.5" DN 40 |
| | DD03-SE7 | DD05-SE7 | DD07-SE7 | DD10-SE7 | DD15-SE7 |
| | DD03-STFM | DD05-STFM | DD07-STFM | DD10-STFM | DD15-STFM |
| | DD03-STFMV | DD05-STFMV | DD07-STFMV | DD10-STFMV | DD15-STFMV |
| | DD03-IE7 | DD05-IE7 | DD07-IE7 | DD10-IE7 | DD15-IE7 |
| | DD03-ITFM | DD05-ITFM | DD07-ITFM | DD10-ITFM | DD15-ITFM |
| | DD03-GE7 | NA | DD07-GE7 | DD10-SE7 | DD15-SE7 |
| | DD03-GTFM | DD05-GTFM | DD07-GTFM | DD10-GTFM | DD15-GTFM |

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- Gemu® style Teflon backed EPDM

| DIAPHRAGM DIRECT™ REPLACEMENT DIAPHRAGMS (by size and part number) | | | | |
|---|---------------------|-----------------------|---------------------|----------------------|
| Size Inch DN | 2" DN 50 | 2.5" DN 65 | 3" DN 80 | 4" DN 100 |
| | DD20-SE7 | DD25-SE7 | DD30-SE7 | DD40-SE7 |
| | DD20-STFM | DD25-STFM | DD30-STFM | DD40-STFM |
| | DD20-STFMV | DD25-STFMV | DD30-STFMV | DD40-STFMV |
| | DD20-IE7 | DD25-IE7 | DD30-IE7 | DD40-IE7 |
| | DD20-ITFM | DD25-ITFM | DD30-ITFM | DD40-ITFM |
| | DD20-SE7 | DD25-SE7 | DD30-SE7 | DD40-SE7 |
| | DD20-GTFM | DD25-GTFM | DD30-GTFM | DD40-GTFM |

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