

PTFE diaphragms

Polytetrafluoroethylene is a synthetic fluoropolymer consisting of tetrafluoroethylene whose outstanding properties have led to its being used in a specially wide range of applications. As it consists of carbon and fluorine, two elements that bond to molecules with a high molecular weight, PTFE is a solid material. Due to the strong carbon-fluorine bonds it is especially inert, since other substances cannot break this bond. For this reason, PTFE is frequently used in tanks and pipelines for reactive and corrosive chemicals.

Properties

In view of their unusual chemical and thermal resistance and their good compatibility with hot and cold water as well as alkalis and concentrated acids, PTFE diaphragms are very well suited for use in hygienic applications. Thanks to its chemical inertness, PTFE cannot be cross-linked and therefore has no “memory” – in other words, unlike an elastomer it does not revert to its original shape following deformation. The material has a tendency towards flow distension, i.e. distortion under stress, otherwise known as “cold flow”. A small degree of flow distension means that PTFE seals can fit better to a given mating surface than most other plastic seals. However, if the PTFE is excessively deformed due to temperatures above +130 °C or frequent temperature fluctuations (heating/cooling), the sealing bead might be damaged, resulting in possible leaks of the system.

PTFE diaphragms consist of two pieces: The PTFE shield is supported by an EPDM backing.

Temperature range

PTFE/EPDM (EA) -10 to +130 °C (steam sterilisation +140°C for 60 min.)

Diaphragm size

8 (standard: DN8, 1/4”) to 100 (standard: DN100, 4”)

Approvals

FDA: CFR21 Part 177.1550 and
CFR21 Part 177.2600
EC Regulations 1935/2004 and 10/2011
USP Class VI Sections <87> and <88> at +121°C



Diaphragms made of advanced PTFE

Polytetrafluoroethylene is a synthetic fluoropolymer consisting of tetrafluoroethylene whose outstanding properties have led to its being used in a specially wide range of applications. Just like conventional PTFE, advanced PTFE consists of carbon and fluorine. However, in addition to the properties of conventional PTFE it displays a number of additional and important properties. The higher-performance variant distorts considerably less even under higher stresses, and it responds less to the effects of high temperatures and temperature fluctuations than conventional PTFE. The denser polymer structure also improves process quality which reduces the degree of permeation through the diaphragm.

Properties

In view of their unusual chemical and thermal resistance and their capacity to cope with hot and cold water as well as alkalis and concentrated acids, advanced PTFE diaphragms are very well suited for use in hygienic applications, just like diaphragms of standard PTFE.

However, what sets diaphragms made of advanced PTFE apart from the conventional PTFE diaphragms is their behaviour regarding “cold flow”. The effects of cold flow, which can be measured in terms of distortion under stress, are significantly less for advanced PTFE diaphragms. This definite difference regarding cold flow is most apparent at high temperatures and where stresses are repetitive. Therefore we can recommend the use of advanced PTFE diaphragms even where temperatures fluctuate and many sterilisation cycles are involved.

Advanced PTFE diaphragms are also supplied with a supporting EPDM backing. Reinforcing polyamide fabric distinctly improves the product’s service life and stability.

Spare parts with ID number

To provide optimal support with regard to the maintenance and servicing of your diaphragm valves, we have a broad range of spare parts as presented on the following pages. Your diaphragms are supplied to you packed individually and dust-proof.

		EPDM spare parts Code AD	GYLON® spare parts Code ER
Diaphragm size	Connector	ID number	ID number
08	Button	688421	693175
15		688422	-
20		688423	-
15	Bayonet	693163	693176
20		693166	693177
25	Thread	688424	693178
32		688425	693179
40		688426	693180
50		688427	693181
65		688428	586616
80		688429	586617
100		688430	-

		PTFE spare parts Code EA	Advanced PTFE spare parts Code EU
Diaphragm size	Connector	ID number	ID number
08	Button	677674	679540
15	Bayonet	677675	679541
20		677676	679542
25		677677	679543
32		677678	679544
40		584378	584379
50		584386	584387
65		677681	679743
80		677682	679744
100		677683	679745

The table features standard one-weir diaphragms.
For two-weir, please refer to the manual or contact us.



Practical testing – the multi-medium testing facility

When the simulations using compression and flow models (see also page 13) have been completed, the diaphragms and valves have to go through extremely severe practical testing.

The conditions required are generated in Bürkert's multi-medium testing facility (see figure below). It can subject a number of valves to alternating cold and hot water, steam, vacuum and air stresses. The tests cover a very large number of switching cycles and are fully automated. This makes it possible to mirror important processes such as CIP (Cleaning in Place) and SIP (Sterilisation in Place) just as they are carried out in the field. It is also possible to set up customer-specific, individual testing for special requirements.

