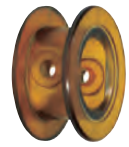
CHRYSSAFIDIS

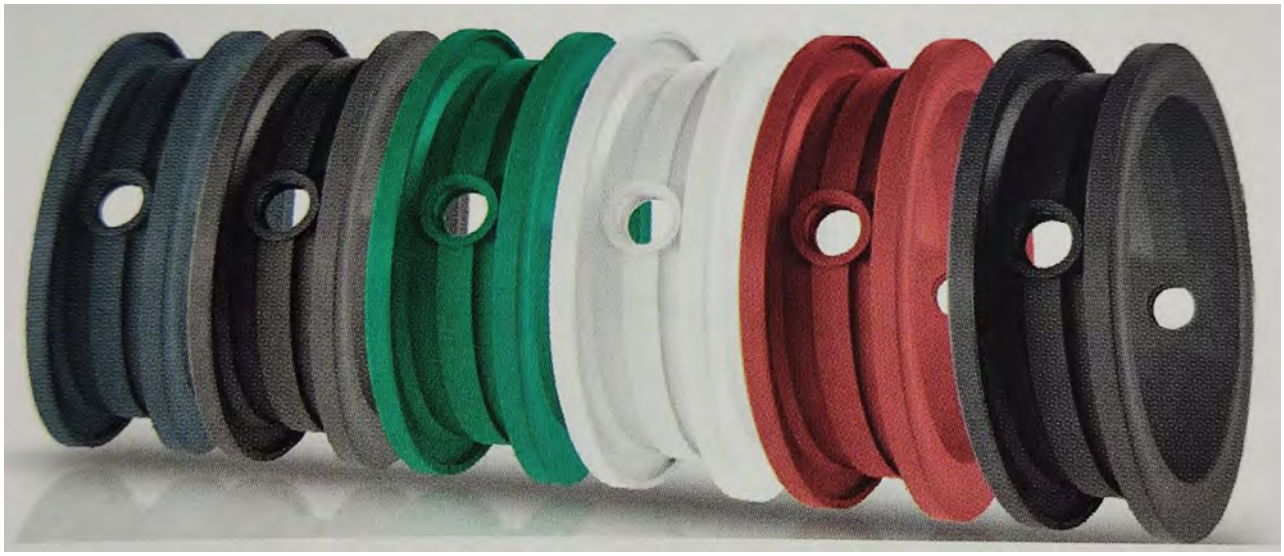
ΧΙΤΩΝΙΑ ΠΕΤΑΛΟΥΔΩΝ EBRO
LINERS for BUTTERFLY VALVES EBRO



EPDM **NBR** **VITON** **GMX**

Χιτώνιο	Θερμοκ/σία	**Καταλληλότητα Χιτωνίων**	***Material compatibility***
Liner	*Tmin/Tmax*	**Ενδεικτικές γενικές κατευθύνσεις**	***Indicative general recommendations***
EPDM	-10 ÷ 120°C	Ζεστό/κρύο νερό, Ελαφρά χημικά, Όζον Όχι ορυκτέλαια	*Hot/cold water, Alkalies, Acids, Ozone - No mineral oils*
NBR	-20 ÷ 90°C	Θαλασσινό Νερό, Ορυκτέλαια, Φ.Α., αντοχή σε τριβή - Όχι όζον	*Sea water, Mineral oils, NG, Abrasion resist -* *No ozone*
FPM/FKM VITON ®	-25 ÷ 150°C	Λάδι, Υδρογονάνθρακες, Χημικά - Όχι ζεστό νερό/ατμό	*Oil, Hydrocarbons, Chemicals, Ozone -* *No hot water-steam*
GMX	-10 ÷ 90°C	Αντοχή στην τριβή - Σκόνες - Πνευματική μεταφορά	*Abrassive resistance - Powders - Pneum.transportation*
Άλλα	Other	Σιλικόνη, Πολυουρεθάνη, Hypalon, PTFE	*Silicon, Polyurethane, Hypalon, PTFE*



Linings and seat materials

Elastomers

Elastomers are used in valves for a variety ofsealing functions. The bodies of concentric butterfly valves are mostly lined with moulded seals (sleeves, liners or seats). This construction principle includes the seat sealing, the shaft sealing and the flange sealing in a single component (Fig. 11). In addition, the valve body is totally isolated from the operating medium. It is possible to use different liner qualities for the same valve body.This opens up a large number of combinations. In vacuum applications, it is also possible to glue replaceable elastomer liners onto the valve body for better stabilisation, but gluing can be unreli able, leading to lamination and failure. Alterna tively, elastomers can be vulcanised directly onto the body. As a consequence, a high stability can be achieved even at a high flow rate and also in vacuum applications. The disadvantage of this design is that these types of liners cannot be easily exchanged or repaired.

A carrier ring design and a supporting ring design are alternatives to the fully vulcanised liner design. For these designs, the seal is vulcan ised to a metal or plastic ring and inserted into the suitably manufactured body. In some cases, the seat material is vulcanised on the disc. This rub ber ring protects the disc against different media effects. Elastomer mouldings are also used as seat seals and usually have the form of an O-ring or X-ring. They are used in grooves which are mostly incorporated into the disc or the body. There are many different elastomer quality types. It always depends on temperature requirements and the operating medium. The most popular qualities on the market are EPDM and NBR.

EPDM

EPDM (ethylene propylene diene monomer) has a favourable price and is usually used in the water supply sector. EPDM is also available in high temperature and food grades, and in white as well as in standard black colour. This elasto mer has a good chemical resistance against di luted acids, alkalis and alcohols, whereas inor ganic acids, oils and fats in higher concentration destroy the material. Furthermore, EPDM has good weather and ozone resistance. Typical ap plications for EPDM are drinking water, cleaning products, salt solution, caustic soda, caustic pot ash solutions, etc. The operating temperature of EPDM is between -10°C and +120°C (14 to 248°F) and can vary depending on the manufac turer, the individual quality and the mixture.

NBR

NBR (nitrile butadiene rubber) has a high resistance to oil- and grease-containing media, but not to oxidising media. Moreover, this ma terial has a better electrical conductivity than nonpolar elastomers such as EPDM. For highly abrasive applications, different modifications should be made to achieve a high resistance to mechanical wear. Typical applications for NBR are gases, surface water containing oil, mineral oils, fuels and fats. The operating temperature of NBR is a maximum of +90°C (194°F). NBR is also referred to as nitrile and Buna N. It is also available in white and with food grade ap provals. HNBR (hydrogenated nitrile butadiene rubber) has the same properties as NBR, but is suitable for higher temperatures up to 130°C (266°F).

MVQ

MVQ (silicone rubber) is mainly used for temperatures ranging from -40°C to +200°C (-40 to 392°F). This material has a high hot-air resistance and a good low-temperature flexibility. Furthermore, MVQ has good resistance to solvents, weather conditions and ozone. MVQ is not suitable for applications with oils, fuels and acids. Typical applications are low-concentration acids, esters, diluted alkalis and hot air. FKM (fluoro rubber, also known under the name Viton®) is swell resistant. The chemical re sistance increases with a higher fluorine content. FKM is usually used for temperatures ranging from -20°C to +180°C (-4 to 356°F). Typical applications include: oils, fuels, aliphatic compounds, aromatic compounds, chlorinated hydrocarbons, highly concentrated mineral acids and vacuum applications (vulcanised design).

FKM

FKM (flouro rubber, also known under the name Viton) is swell resistant. The chemical resistance increases with a higher fliorine content. FKM is usually used for temperatures ranging from -20 °C to +180°C (-4 tot 356°F). Typical applications include: oils, fuels, aliphatic compounds, aromatic compounds, chlorinated hydrocarbons, highly concentrated mineral acids and vacuum applications (vulcanised design).

CSM

CSM (chlorsulphonated polyethylene, also known under the name Hypalon) is very resist ant to atmospheric conditions, ozone and acids. The operating temperature of CSM is a max imum of +90°C (194°F). Typical applications are chemical environments, silicone oils, silicone fats, and water treatment such as swimming pools and brine.

PUR

PUR (polyurethane, often as solid yellow brown plastic) is usually used in applications where the mechanical stress for rubber is too high. PUR is highly resistant to mechanical stress as well as to chemical substances such as fats, oils and solvents. This material is biodegrad able and does not contain any plasticiser. The operating temperature of PUR is between -30°C
and +80°C (-22 to 176°F).

SBR

SBR (styrene butadiene rubber) is a synthetic rubber and the world's most produced elastomer. This material has a good resistance against alcohol, organic and inorganic acids. SBR is not resistant to aromatic compounds and chlorinated hydrocarbons such as mineral oil, lubricating greases and fuel. The operating temperature with a maximum of +70°C (158°F) is lower than the operating temperatures of other elastomers. Many elastomers are available in different qualities and modifications depending on the manufacturer. To distinguish between them,
liners often have different colours (Fig. 12). Forexample, white liners are used for food and pharmaceutical applications. In these fields of application, it is absolutely essential to comply with the guidelines of the FDA (Food and Drug Administration) or the BfR (Federal Institute for Risk Assessment).

A unique and clear labelling of the elastomer quality is very important for traceability. The label on the liner includes the manufacturer's identification, mixture number, date of manu facture and material number (Fig. 13).

Duroplastics and thermoplastics

Duroplastics and thermoplastics have good chemical and abrasive resistance and are also used for lined butterfly valves (Fig. 14). Compared to elastomers, these materials have lower elasticities. Due to their low elasticity, duroplastic and thermoplastic liners are used in split body designs. It is easier to mount the liner into the split body.

PTFE (polytetrafluoroethylene), PVDF (polyvinylidene fluoride), PFA (perfluoralkoxy), PUR (polyurethane) and PE (polyethylene) are the most commonly used duroplastics and thermoplastics. PTFE, PVDF and PFA are well known for their good chemical resistance in applications with high chemical stress. In comparison, PUR and PE are generally used in applications with high mechanical and abrasive stress. For harder materials, it is important to remember that a higher operational torque of the valve is usually required.

PTFE

PTFE (also known under the name Teflon®), the classic fluoropolymer (white), consists of an extremely chemically stable compound of carbon and fluorine. This material has very good chemical resistance, is physiologically harmless and has excellent weather resistance. The wide operating temperature range from -270°C to +260°C (-454 to 500°F) makes PTFE an all rounder among the plastics. In butterfly valves, PTFE is used for temperatures between -60°C and 200°C (-76 to 392°F). In chemical applications, a density of 2.16 g/cm^3 is required and can only be achieved by means of isostatic pressing (HIP) of plastic granules. Not many companies can handle this pressing technique. Disadvan tages of PTFE are the low compressive strength and the low wear resistance. PTFE is therefore not recommended for use in applications where abrasive media is present.

For specific applications, the fluoropolymers can be modified through the addition of various fillers such as glass fibres, bronze or coal in defined quantities. As a result, properties such as wear resistance, compressive strength and ther mal conductivity can be improved. Usually, PTFE is used for butterfly valves as a white material of selected quality. R-PTFE will often be used for various sealing applications in eccentric butterfly valves. This specially reinforced material is highly suitable for withstanding mechanical and chemical stress. In order to achieve a good electrical conductivity, it is necessary to add about 1% of carbon (colour of the material changes to black). The addition of carbon prevents electrostatic charging and the risk of sparking. This spe cial feature is an important property, especially in explosive media and atmospheres. The chemical resistance remains the same.

Modified PTFE (creamy white) is an advanced type for higher requirements. Moreover, this material has a higher compressive strength, a dense structure and a smooth surface after machining operations. The denser prevents monomer intercalation and the resultant breaking of the molecular structure (popcorn effect).

PFA

PFA (translucent) is a fluoropolymer that is processed thermoplastically. This material is weldable (easy to repair) and has almost the same chemical resistance and properties as PTFE.

UHMWPE

UHMWPE (ultra-high-molecular-weight polyethylene or PE-UHMW, translucent) is a special polyethylene type. This material has a high resistance against wear and is used in butterfly valves for linings (body) and coatings (disc). Wear resistance tests in accordance with EN ISO 15527 (sand slurry method) show that UHMWPE has a better wear resistance than conventional metals. UHMWPE is thermoplastically processed and is characterised by a high chemical resistance and is also approved for food and beverage applications. To distinguish it from PFA, UHMWPE is often coloured. The operating temperature of UHMWPE is a maximum of +80°C (176°F).

Because of their stiffness, duroplastics and thermoplastics are usually backed with softerelastomers (Fig. 15). Due to the improved springrate, it is easier to force the liner onto the disc. The required seat tightness to leakage rate A as defined in EN 12266 is thus achieved.