

A Lined Valve Fluorine Plastic Performance



Performance	Abbreviation		PTFE	PCTFE	PVDF	FEP	PFA	GXPO	PE	PP
	Item	Code Unit	F4	F3	F2	F46	PFA	GXPO	PE	PP
Physical Performance	Specific Gravity	g/cm ³	2.1~2.2	2.1~2.2	1.76	2.1~2.2	2.1~2.2	0.92	0.92	0.92
	Water absorption	%	0.001~0.005	≤0.005	0.04	≤0.01	≤0.01	0.005	0.005	0.005
	Shrinkage rate of finished product	%	1~5	1~2.5	2.0	2~5	1~5	1~2	1~2	1~2
	Embrittlement coefficient	10 ⁻⁵ /K	10~12	4.5~7.0	8.5~15.3	8.3~10.5	8.3~12	-	-	-
	Embrittlement temperature T1	°C	-180~-195	-180~-195	-62	-260	-80~-195	-40	-40	-20
	Hot resistance T2	°C	260	120~190	150	204	260	100	100	100
	Recommend working temperature T3	°C	≤180	≤120	≤100	≤150	≤200	≤85	≤85	≤85

Mechanical Performance	Hardness	SOSIXO	D50~65	D74~78	D80	(R45)	D50~65	D40	D40	D40
	Friction coefficient f	-	0.06	0.3~0.4	0.14~0.17	0.06~0.11	0.06~0.11	-	-	-
	Tensile strength σ b	MPa	13.7~24.5	31.3~39.2	45~48.3	20.0~24.5	14~28	≥10	6.9~14	7.5~14
	Bending strength σ w	MPa	10.7~13.7	53.9~68.6	-	-	15~28	-	-	-
	Compression strength σ y	MPa	111	80.3~50.9	68.6	-	111	-	-	-
	Impact strength σ k	KJ/m ²	16	12.7~16.6	19.7	Continuous	1+	-55	45	50
	Ultimate elongation Δ λ	%	250~350	30~190	30~300	250~270	300~500	480	300~600	600~700
	Breakdown voltage ev	KV/mm	25~40	19.7	10.2	40	25~40	-	-	-

Processing Performance	Compression molding	Good	Good	Good	Good	Good	Good	Good	Good
	Injection molding	-	Good	Good	Good	Good	Good	Good	Good
	Lamination	Good	Good	Good	Good	Good	Good	Good	Good
	Layer	Good	Good	Good	Good	Good	Good	Good	Good

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Corrosion Resistance performance (only for refer)	Medium	Concentration (%)	Temperature (°C)	PTFE	PCTFE	PVDF	FEP	PFA	GXPO	PE	PP
	Sulfuric acid	10~98	Normal temperature ~100	A	A~B	A~B	A	A	Concentration ≤50%	Concentration ≤60%	A
	Nitric acid	5~98	Normal temperature ~100	A	A	A	A	A	Concentration ≤30%	Concentration ≤60%	A
	Hydrochloric acid	10~38	Normal temperature ~100	A	A	A	A	A	Concentration ≤38%	Concentration ≤60%	A~B
	Acetic acid	10~100	Normal temperature ~100	A	A~B	A~B	A	A	Concentration ≤10%	Concentration ≤60%	A
	Chromic acid	50~100	Normal temperature ~70	A	A~B	A~B	A	A	Concentration ≤30%	Concentration ≤20%	A
	Phosphoric acid	50~85	Normal temperature ~100	A~B	D	D	A~B	A~B	Concentration ≤85%	Concentration ≤80%	A
	Trichloro-methane	100	Normal temperature	C	B	B	C	C	X	X	X
	Coppersulfate	15	Normal temperature	A	C	C	A	A	Concentration ≤90%	Concentration ≤80%	A
	Diethyl ether	100	Normal temperature	B	C	C	B	B	X	X	X
	Ethyl acetate	100	Normal temperature	B	A	A	B	B	X	X	X
	Petrol	100	Normal temperature	A	A~B	A~B	A	A	X	X	X
	Hydrogen peroxide	3~30	Normal temperature	A	A	A	A	A	Concentration ≤30%	Concentration ≤60%	A
	Nitrobenzene	100	Normal temperature	A	A~B	A~B	A	A	X	X	X
	Superalkali	10~50	Normal temperature ~100	A	A	A	A	A	Concentration ≤80%	Concentration ≤60%	A
	Sodium Hypochlorite	-	70	A	B	B	A	A	Concentration ≤80%	Concentration ≤60%	A~B
	Hydroxyl acid	40~99	-10~30	A~B	B	B	A~B	A~B	Concentration ≤80%	Concentration ≤60%	A~B
	Oleum	20	Normal temperature	A	B	B	A	A	X	X	X
	Acrylonitrile	-	Normal temperature	B	C	C	B	B	-	-	-
	Aniline	100	Normal temperature	B	B	B	B	B	Concentration ≤60%	Concentration ≤20%	B
Benzene	100	Normal temperature	B	C	C	B	B	X	X	X	
Butyl acetate	100	Normal temperature	B	C	C	B	B	Concentration ≤60%	Concentration ≤20%	B	
Tetrachloro-methane	Reagent grade	Normal temperature	B	C	C	B	B	X	X	X	

The recommended temperature for valve is just a range for refer. With different types of valve and expansion of DN, the working temperature will be reduced accordingly. For reasonable choice of working temperature please consult factory.

A.B.C.D stands for Excellent, Good, OK, bad in terms of corrosion resistance performance.

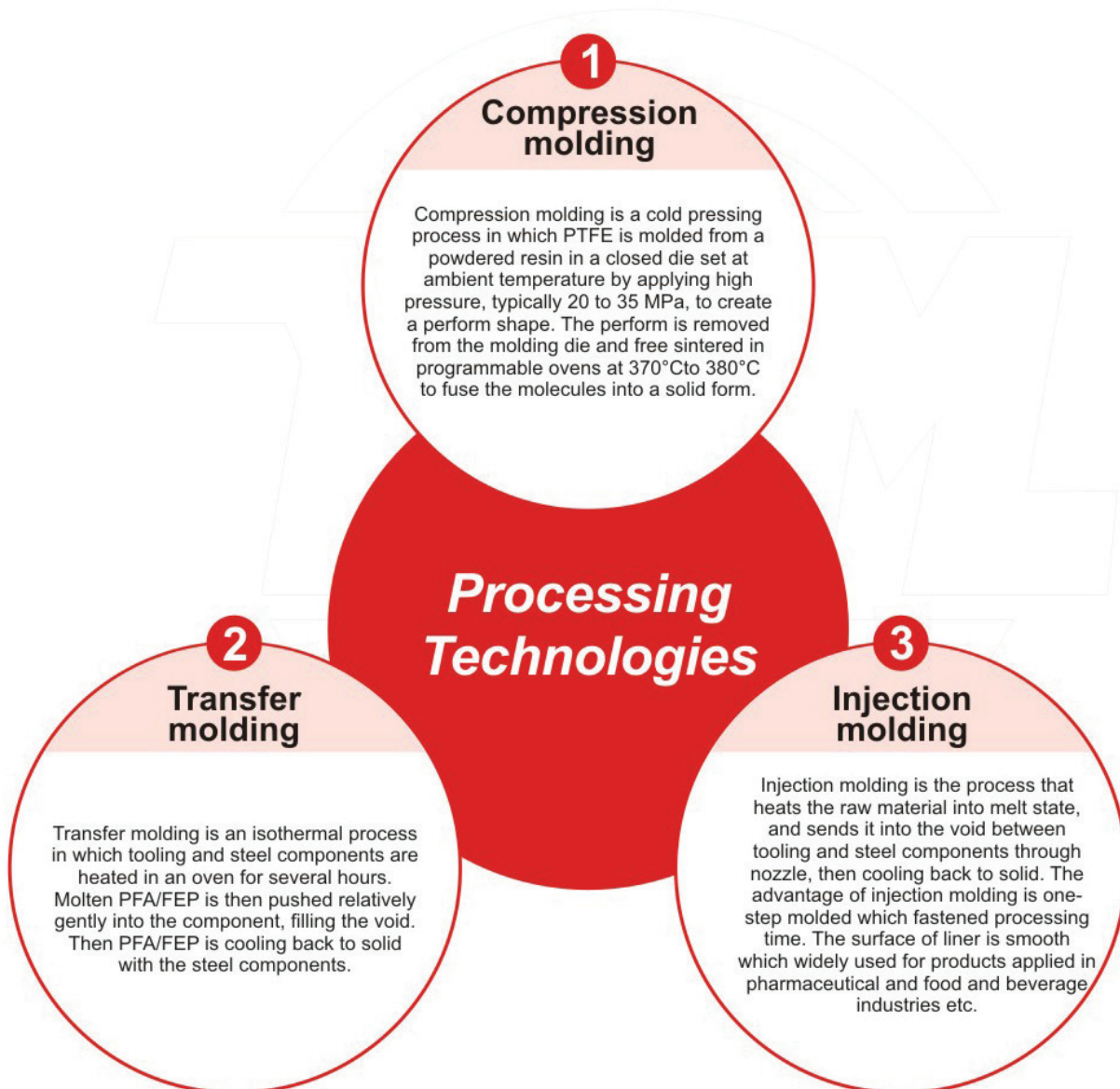
Generally, corrosion is a kind of chemical reaction, with temperature increasing every 10 degree, the corrosion speed is increased by 1-3 times. Corrosion rate aggravated with rising temperature and the corrosion rate in one certain temperature is not able to judge for corrosion rate under other temperature. All the data in anti-corrosion table is just a possible range, with change of medium concentration and temperature, the corrosion also changes. For reasonable choice of liner material for corrosion resistance, please consult factory.

Processing Technologies

- ◆ Compression molding
- ◆ Transfer molding
- ◆ Hot rotomolding

- ◆ Injection molding
- ◆ Rotational molding
- ◆ Blow molding

- ◆ Ram/Paste extrusion
- ◆ Tape winding
- ◆ Isostatic molding



◆PTFE-Polytetrafluoroethylene (F4)

PTFE, the original fluoropolymer, is characterized by enormous electrical resistance, a very low coefficient of friction and thermal stability. PTFE is excellent chemical resistance and it could not be dissolved in aggressive chemicals and solvents over a broad temperature range. The chemical inertness and non-stick are the most useful attributes for fluoropolymer equipment supplied into industries handling corrosive materials. Safe working temperature up to 180°C, with short term use possible at temperatures well above this level.

PTFE is not melt-processable, therefore usually needs to be formed into the required shape prior to sintering. YOUFUMI adopts special polymer processing like compression molding, isostatic molding, and paste extrusion etc. for FDA approved PTFE.

◆ETFE—Ethylene Tetrafluoroethylene (F40)

ETFE combines mechanical toughness with an exceptional chemical inertness and features easy processability and excellent mechanical properties. ETFE can be processed by transfer, rotational and blow molding processes because of its relatively high flow rate.

◆GXPO—modified polyolefine

GXPO is polyolefine copolymerized under high temperature up to 80°C. Under normal temperature GXPO could not be dissolved in aggressive chemicals and solvents. The advantage of GXPO is easy and economic to process. YOUFUMI processes GXPO by rotational molding, which makes GXPO liner strongly adhesive to the metal part. Therefore, in the vacuum service under its working temperature, the GXPO liners will not come off, bulking, or defaulted.

◆PFA--Perfluoroalkoxy

PFA is melt processable fluoropolymer resin that provides all of the desirable properties of PTFE. It can be considered as the melt processable alternative to PTFE in terms of its chemical service and temperature and pressure duty, and having greater permeation resistance and a better surface finish. It is FDA approved and service temperature up to 200°C. PFA is used where purity is important.

YOUFUMI uses transfer molding and injection molding techniques for PFA processing because of the high viscosity and flow characteristics of PFA resin.

◆PVDF—Polyvinylidene Fluoride (F2)

PVDF is a highly non-reactive and pure thermoplastic that maintains its useful mechanical and chemical resistance properties at temperatures up to 100°C. An additional advantage is that PVDF can be welded into tanks for acid and corrosive chemical processing in elevated temperature environments.

◆FEP--Fluorinated Ethylene Propylene (F46)

FEP is a copolymer of tetrafluoroethylene and hexafluoropropylene, which is also melt-processable fluoropolymer, and be able to form complex shapes. FEP retains excellent thermal, electrical and chemical stability. Therefore it shows high performance in electrical, chemical and medical application. The service temperature up to 150°C. Transfer molding and injection molding techniques conform best with FEP processing requirements.

◆UHMW-PE

UHMW-PE is a linear polyethylene that differs from PE standard grades in its very high degree of polymerization. It is very high chemical resistance to acids, alkalis and corrosive gases, excellent wear resistant properties and high energy absorption capacity at high stress rate. Its service temperature up to 90°C.