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# PTFE EXPANSION JOINTS

Polytetrafluoroethylene

www.megaflexon.com



# Megaflexon

### **EXPANSION JOINTS & FLEXIBLE PRODUCTS**

#### SHARING OUR TECHNOLOGY & EXPERIENCE PROVIDING THE VERIFIED SOLUTIONS

Megaflexon has specially engaged in expansion joint industry and devoted ourselves to research, development and manufacture of high level of expansion joints in quality and reliability. Based on our accumulated technology and experience, all of our staff has an in-depth understanding of each industrial application and has done our utmost to meet customers' specific needs and requirements. As a pioneer in expansion joint industry, we never stop exploring new solutions for expansion joint applications and continuously provide high quality products and on-site service to our customers.





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· Patent of Bellows Type PTFE Expansion Joint and Process

#### Megaflexon Non-metallic type of expansion joints is

available manufactured of Teflon®. This type of expansion joint has been used with highly corrosive medial, with glass of PTFE LINED piping or in heating, ventilating and air conditioning applications.

#### A . CONSTRUCTION DETAILS

Teflon® Expansion Joints is a 1, 2, 3 or 5 convolution expansion joint consisting of a Teflon® members of FEP, PTFE or PFA, reinforced to absorb movement and vibration in a piping system.

#### **B. PERFORMANCE CHARACTERISTICS**

#### **1. Chemical Resistance**

Molded or machined Teflon® Connectors are used in corrosive applications due to the inherent resistance of Teflon® to a vast range of chemicals.

#### 2. Vibration Absorption

Teflon® Connectors are sometimes used in HVAC application to absorb vibration and attenuate noise.

#### 3. Temperature Limits

Teflon® Connectors can withstand temperatures as high as 232  $^\circ\!C$  and as low as –23  $^\circ\!C$ 

Note :

Temperatures of the system significantly affect the pressure rating of the expansion joint.

#### 4. Pressure Limits

Pressures vary widely dependiong upon system temperature. Consult each manufacturer for its specific pressure/temperature relationship.

#### C. CONSTRUCTION DETAIL

#### 1. Body

The body of the Teflon® double-ply expansion joint are manufactured of Virgin 100% FEP, PTFE or PFA Teflon® . The Teflon® may be colored or opaque/clear depending upon the manufacturer.

#### 2. Reinforcing Rings

Metal reinforcing rings of stainless steel, Monel or other metals may be used to add strength between the convolutions.

#### 3. Vacuum Rings

PTFE Tube with Stainless steel endless bar or PTFE SOLID RING used against full vacuum conditions.

#### 4. Flanges

The flanges are normally manufactured of ductile iron, coated or plated with a rust inhibiting paint. Flanges of other materials are available upon request. The flanges are normally drilled with ANSI B 16.5 150# tapped holes. Also provide drilling for glass pipe flange bolting. (Stainless steel 304, 316 or Hatstelloy C276)

#### 5. Control Rods

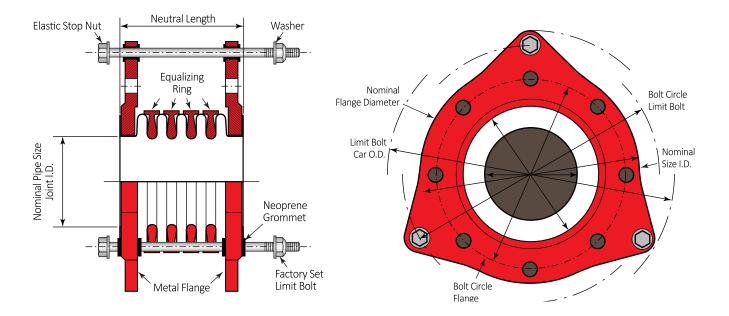
Teflon® connectors are supplied with factory set control rods. The control rods are set to prevent over extension during operation.

#### 6. Equalizing Rings

Megaflexon offer styles of expansion joint with equalizing rings to prevent squim. (For high pressure, high temperature)

#### 7. Liners

Internal sleeves of Teflon® are sometimes available for abrasive or high velocity flow rate applications.



Megaflexon 2ply's patented PTFE Bellows has an even thickness and precisely pitched and molded parts for high pressure and high temperature.

\* THE KOREAN INTELLECTUAL PROPERTY OFFICE / PATENT NUMBER (10-0665322)

#### **D. DIMENSIONS**

Teflon® Expansion Joint are available in nominal pipe sizes from 1 " to 24" diameter. The installed neutral lengths vary from manufacturer to manufacturer.

#### **E. TYPES OF CONNECTORS**

#### 1. Coupling

A two convolution connector designed for minimum movements.

#### 2. Expansion Joint

A three convolution connector designed for easy movement and ease of system installation.

#### 3. Bellows

A five convolution connector designed for maximum movements and vibration elimination.

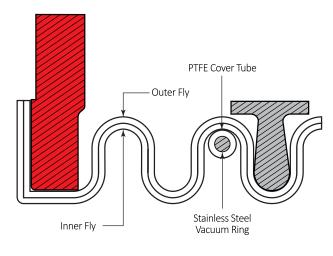
#### F. ANCHORING

Teflon® expansion joint should always be installed in piping systems

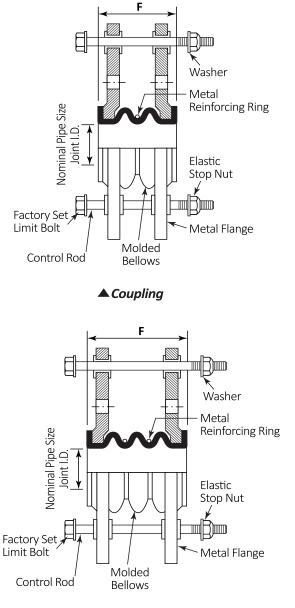
which are properly abchored and guided. The expansion joint should be protected from movements which are greater than that for which they are designed.

#### G. INSTALLATION AND MAINTENANCE

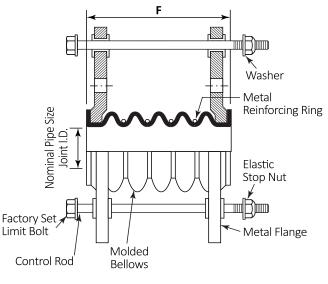
Since the connectors have a Van Stone Flange, no other sealing device, such as a gasket, is required. Remove flange covers only when ready to install. Thread the installation bolts from the mating flange side and be sure bolts do not extend beyond the bellows flange. No nuts are required. Protective Spray shields are recommended to protect personnel from splash. See PTFE SPRAY SHIELD this catalogue end of page.



A PTFE 2 Ply Bellows with Vacuum Rings



▲ Expansion joint



▲ Bellows

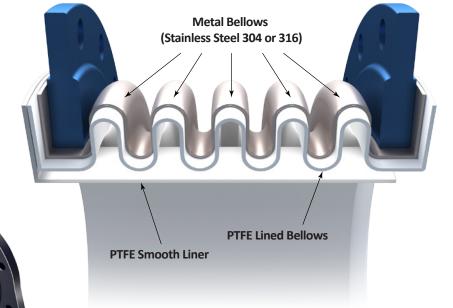
#### Megaflexon EXPANSION JOINT & FLEXIBLE PRODUCTS

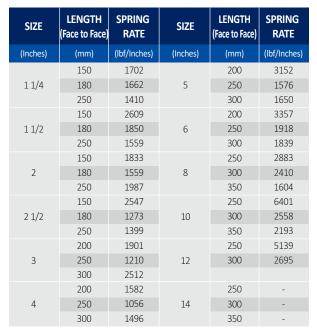
## **Metal Expansion Joints**

With PTFE Lined

#### Specification

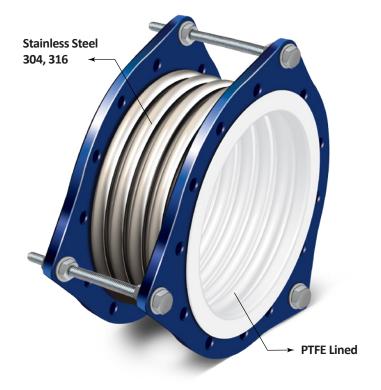
- Wetted Surfaces : PTFE
- Pressure Rating : 300 psi@300°F (max 30")
- Metal Bellows : Stainless Steel
- Flange Material : Carbon or Stainless Steel
- Tie Rods : ASTM A193-B7 / B8 / B8M
- Lock Nuts : ASTM A194-2H / 8 / 8M
- Flange Drilling : ANSI B16.5 150lb & 300lb





• For more than 14 inches, please contact Megaflaxon.

• Available Maximum Size is 30 inches.

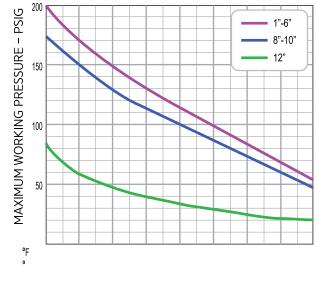




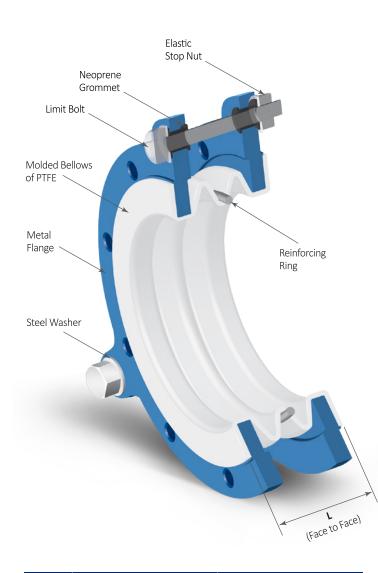
### **2- Convolute** PTFE Expansion Joints

Megaflexon 2 convolute expansion joints are curved shape molded of Teflon® PTFE by 2 PLY bellows. They are corrosion resistant, non-aging with extraordinary life and reliability and low spring rate under high temperature pressure. The flexible element is formed over sealing face of the end flanges eliminating troublesome gaskets.





TEMPERATURE



	TYPIC	AL MOVEN	IENTS						
NOMINAL PIPE SIZE	Maximum Axial Movement	Maximum Lateral Movement	Maximum Angular Movement	TYPICAL PRESSURES AT VARIOUS TEMPERATURES					
(Inches)	(Inches)	(Inches)	(Degrees)	150°F (PSI)	250°F (PSI)	350°F F(PSI)			
1	1/4	1/8	31	150	115	85			
1-1/4	1/4	1/8	24	150	115	85			
1-1/2	1/4	1/8	20	150	115	85			
2	1/4	1/8	15	150	115	85			
2-1/2	3/8	1/8	15	150	115	85			
3	3/8	3/16	15	150	115	85			
4	1/2	1/4	15	150	115	85			
5	1/2	1/4	12	150	115	85			
6	1/2	1/4	10	150	115	85			
8	1/2	1/4	7	130	100	75			
10	1/2	1/4	6	130	100	75			
12	1/2	1/4	5	45	35	30			

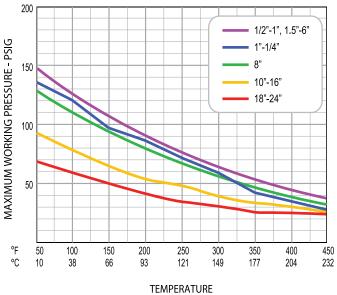
\* Size up to 24" available. Please contact Megaflexon for further details.



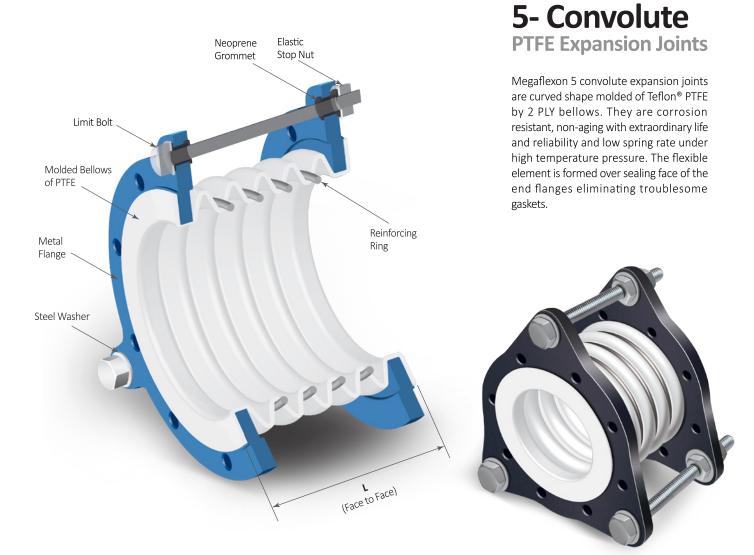


	TYPIC	AL MOVEN	VIENTS				
NOMINAL PIPE SIZE	Maximum Axial Movement	Maximum Lateral Movement	Maximum Angular Movement	TYPICAL PRESSURES AT VARIOUS TEMPERATURES			
(Inches)	(Inches)	(Inches)	(Degrees)	150°F (PSI)	250°F (PSI)	350°F F(PSI)	
1	1/2	1/4	45	105	75	55	
1-1/4	1/2	1/4	38	105	75	55	
1-1/2	1/2	1/4	33	105	75	55	
2	3/4	3/8	36	105	75	55	
2-1/2	3/4	3/8	31	105	75	55	
3	1	1/2	33	105	75	55	
4	1	1/2	26	105	75	55	
5	1-1/8	1/2	24	105	75	55	
6	1-1/8	9/16	20	105	75	55	
8	1-1/8	9/16	15	90	65	45	
10	1-1/8	3/8	12	90	65	45	
12	1-1/2	5/16	11	55	35	20	

\* Size up to 24" available. Please contact Megaflexon for further details.

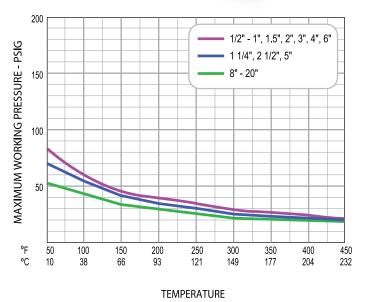




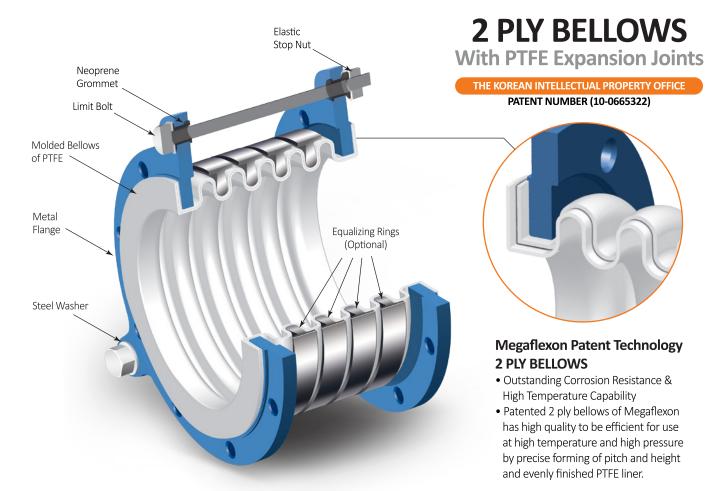


-1 m	TYPI	CAL MOVEM	ENTS						
NOMINAL PIPE SIZE	Maximum Axial Movement	Maximum Lateral Movement	Maximum Angular Movement	TYPICAL PRESSURES AT VARIOUS TEMPERATURES					
(Inches)	(Inches)	(Inches)	(Degrees)	150°F (PSI)	250°F (PSI)	350°F F(PSI)			
1	1/2	1/2	45	48	35	28			
1-1/4	3/4	1/2	45	48	35	28			
1-1/2	3/4	1/2	45	48	35	28			
2	1	1/2	45	48	35	28			
2-1/2	1	1/2	38	48	35	28			
3	1	1/2	33	48	35	28			
4	1-1/4	5/8	32	48	35	28			
5	1-1/4	5/8	26	48	35	28			
6	1-1/4	5/8	22	48	35	28			
8	1-3/4	5/8	23	30	17	10			
10	1-3/4	5/8	19	30	17	10			
12	2	5/8	18	30	17	10			

<sup>\*</sup> Size up to 24" available. Please contact Megaflexon for further details.







Max. 210  $^\circ C$  / 300 psig (20 barG)

# **VACUUM RINGS**

With PTFE Expansion Joints

The vacuum ring of a megaflexon PTFE Bellows will decrease with increasing temperature, diameter and number of convolutions. The table below gives the maximum working temperature for a megaflexon PTFE Bellows operating at full vacuum.

Vacuum Rings enable megaflexon PTFE Bellows through 24" diameter to be rated for full vacuum at temperatures. The Vacuum Ring is a metal endless Steel-Ring with PTFE Tube Covering inserted into the root fo the convolution.

Metal selection is based on the cumtom specification. Material such as Hastelloy and are commonly used.

VACUUM RING STAINLESS STEEL 316L or HATSTELLOY C276 212

PTFE TUBE



# **Rubber Expansion Joints**

With PTFE Lined

### **Teflone® Lined Expansion Joints**

#### **Construction Features**

- Sized up to 48" diameter
- Carbon Steel or Stainless Steel Split Retainer Rings
- Corrosion resistant, chemically inert and non aging Teflone® liner
- Control rods to restrict excessive extension or compression
- High temperature resistant fabric reinforcement up to 450°F
- Superior chemical resistance even at higher temperatures and pressures
- All directional movement
- No gaskets required
- Liner made of PTFE (Teflon®)
- Ideal for food, pharmaceutical, chemical and ultra pure water applications
- Multiple arches available

#### **Performance Features**

- $\bullet$  Working pressures up to 250 psi at temperature up to 232  $^{\rm C}$  in standard models. Higher pressure available
- Components are pressure cured resulting in structurally sound, long service life
- Optional exterior coat of Hypalon paint provides additional protection against ozone weathering and chemical exposure
- Anti-stick properties
- Superior Strength
- Excellent chemical resistance
- Non-aging



	TEFLON LINED TYPE RUBBER EXPANSION JOINT												
						MOVEMENT							
D	N	OAL	Comp.	Ext.	Lateral	Angular	Torsion	Effective Area	Max. Design Pressure				
Inch	mm	mm	mm	mm	mm	deg	deg	Cm <sup>2</sup>	barg				
2	50	150	45	22	25	39	4	90	24				
2 1/2	65	150	45	22	25	33	3.8	112	20				
3	80	150	45	22	25	28	3.7	137	16				
4	100	150	45	22	25	22	3.6	195	16				
5	125	150	45	22	25	18	3.4	281	16				
6	150	150	45	22	25	15	3.2	361	16				
8	200	150	45	22	25	12	3.1	569	16				
10	250	200	50	25	32	17	3	929	16				
12	300	200	50	25	32	14	2.9	1224	16				
14	350	200	60	29	32	12	2.8	1559	15				
16	400	200	60	29	32	11	2.7	2078	12				
18	450	200	60	29	32	10	2.6	2509	12				
20	500	200	60	29	32	9	2.56	2980	10				
22	550	200	60	29	32	9	2.5	3492	10				
24	600	250	65	32	35	8	2.4	4044	10				
26	650	250	65	32	35	8	2.4	4759	10				
28	700	250	65	32	35	7.5	2.3	5400	10				
30	750	250	65	32	35	7	2.3	6082	10				
32	800	250	65	32	35	7	2.3	6805	10				
34	850	250	65	32	35	6.5	2.2	7568	10				
36	900	250	65	32	35	6	2.2	8371	10				
40	1000	250	65	32	35	5	2.1	10100	10				
42	1050	300	65	32	38	4.8	2.1	10751	10				
44	1100	300	65	32	38	4.6	2.1	12186	10				
46	1150	300	65	32	38	4.4	2.1	12668	10				
48	1200	300	65	32	38	4.2	2	14255	10				

Note

1) For other sizes, consult with Megaflexon.

2) All sizes can be supplied with a filled arch reducing their movements by 50% and increasing the spring rates fourfold.

- 3) Movements are non-concurrent. For concurrent movements, contact us.
- 4) Drilling depending on customer specification and requirements

**\*\* WARNING :** Tie rods set must be used when piping is not properly anchored. Number of rods are dependent upon design pressures. Expansion joints may operate in pipelines carrying fluids at elevated temperatures and pressures, so precaution should be taken to ensure proper installation and regular inspection. Care is required to protect personnel in the event of leakage or splash. Adequate floor drains are always recommended.

# PTFE SPRAY SHIELDS

# Translucent PTFE mateial allows leak detection and protection



Using a non-ferrous, all PTFE material megaflexon Spray Shields guarantee performance against harmful spray out and leakage regardless of the severity and duration of chemical exposure Many materials used for Spray Shields, like PTFE-coated fiberglass, can be weakened by challenging industrial environments and often require monitoring.

With a Spray Shield, the body and drawstrings are all made of 100% PTFE. This ensures that worker safety will not be Jeopardized by degraded matenals in a spray shield in the event of a spray out at a flange. Since the Spray Shield will be unaffected by even the most corrosive chemical environments, chemical compatibility tables do not need to be referenced.

The translucent material used in a Spray Shield allows safe and easy detection of moisture leakage at the flange. If

leakage does occur at the flange, the spray shield can be cleaed and reused without concern for weakening due to chemial attack.

Spray Shields can be used in a pH range of 1-14 and a temperature range of  $-100^{\circ}$ F (-73°C) to 500°F (288°C). The versatility and cost-effectiveness of this type of spray shield allows it to be used in almost all industrial settings such as marine, offshore, pharmaceutical, chemical processing, FDA approved, cryogenic and clean room applications.

#### Features

- Unaffected by constant exposure to wet, chemical environments
- Rated for 550°F constant exposure
- Zero porosity
- Translucent material allows leak detection through out
- Easy to install '
- Reusable

#### And more ....

#### **Industiral Appliations Include**

- Insulation jacketing
- Non-metallic expansion joints
- Chemical processing
- Chior Alkali
- Secondary containment liners
- Tank liners

### CHEMICAL RESISTANCE DATA

CHEMICAL	PTFE	SS	PE# 1	PE# 2	РР	PVC	CHEMICAL	PTFE	SS	PE# 1	PE# 2	РР	PVC
Acetaldehyde	E	E	G	G	G	G	Cabon Disulfide	E	E	N	N	E	N
Acetamide	Е	Е	E	Е	Е	N	Cabon Tetrachloride	E	G	F	G	G	G
Acetic Acid, 5%	Е	Е	Е	Е	Е	Е	Chlorine	E	G	G	G	G	Е
Acetic Acid, 50%	E	E	Е	E	E	E	Chloracetic Acid	E	F	Е	E	Е	F
Acetone	Е	Е	Е	Е	E	Е	Chloroform	E	Е	F	G	G	N
Aluminum Hydroxide	E	Е	E	E	E	E	Chromic Acid	E	G	Е	E	Е	E
Ammonia	E	Е	E	E	E	Е	Citric Acid	E	Е	G	E	Е	G
Ammonium Hydroxide	E	Е	E	E	E	E	Cresol	E	Е	Ν	F	Е	Ν
Ammonium Oxaiate	E	Е	E	E	E	Е	Cyclohexane	E	Е	G	E	G	G
n-Amyl acetate	E	Е	G	Е	G	F	Decalin	E	-	G	Е	G	Е
Amyl Chloride	Е	-	N	F	Е	N	o-Dichlorobenzene	E	-	F	F	F	G
Aniline	E	Е	Е	E	G	N	p-Dichlorobenzene	E	-	F	G	Е	Ν
Benzaldehyde	Е	-	Е	Е	Е	N	Diethyl Benzene	Е	-	N	F	N	N
Benzene	E	Е	F	G	G	N	Diethyl ether	E	-	Ν	F	Ν	F
Benzoic Acid, Sat	Е	Е	Е	Е	Е	Е	Diethyl Ketone	E	-	G	G	G	N
Benzyl Acetate	E	-	Е	Е	Е	F	Diethyl Malonate	E	-	Е	Е	Е	G
Boric Acid	Е	F	Е	Е	Е	Е	Diethyl Formamide	E	-	Е	E	Е	F
Bromine	E	Ν	N	F	Ν	G	n-Heptane	E	Е	F	G	Е	F
Bromobenzene	E	-	N	F	Ν	F	Hexane	E	Е	N	G	Е	G
n-Butyl Acetate	Е	F	G	Е	G	Ν	Hydrochloric Acid, 1-5%	E	Ν	Е	Е	Е	Е
Sec – Butyl Alcohol	Е	-	Е	Е	Е	G	Hydrochloric Acid, 35%	Е	Ν	Е	Е	Е	G
Butyric Acid	Е	Е	N	F	Ν	G	Hydrochloric Acid, 4%	E	Ν	Е	Е	Е	G
Calcuum Hypochlorite	Е	F	Е	Е	Е	G							
Carbazole	E	-	E	E	E	N							

#### Resistance

E= Excellent

G = Good

F = Fair

N = Not recommended

#### Material

PTFE = Polyestertrafluoro ethylene Including of Teflon SS = Stainless Steel (316) PE #1 = Convenional Polyethylene PE #2 = Rigid Polyethylene PP = Polypropylene PVC = Polyvinylchloride

### CHEMICAL RESISTANCE DATA

CHEMICAL	PTFE	SS	PE# 1	PE# 2	РР	PVC	CHEMICAL	PTFE	SS	PE# 1	PE# 2	ЧЧ	PVC
Hydrochloric Acid, 48%	E	N	Е	Е	Е	G	Potassium Hydroxide	E	G	Е	Е	Е	Е
Hydrogen	E	-	Е	Е	Е	Е	Propane Gas	E	Е	N	F	Ν	Е
Hydrogen Peroxide	Е	F	Е	Е	Е	Е	Propylene Glycos	E	Е	Е	Е	Е	F
Isopropyl Acetate	Е	-	G	Е	G	N	Propylene Oxide	E	-	Е	Е	Е	F
Isopropyl Benzene	Е	-	F	G	F	N	Resorcinal	E	-	Е	Е	Е	F
Kerosene	Е	Е	F	G	G	Е	Salicylanldehyde	E	-	Е	Е	Е	F
Lactic Acid, 3%	E	G	Е	Е	Е	G	Sulfuric Acid, 1-6%	E	F	Е	E	Е	Е
Lactic Acid, 85%	E	F	Е	Е	E	G	Sulfuric Acid, 20%	E	Ν	Е	Е	Е	Е
Magnesium Salts	E	G	Е	Е	E	Е	Sulfuric Acid, 60%	E	Ν	Е	E	Е	Е
Methoxyethyl Oleate	E	-	E	Е	E	N	Sulfuric Acid, 98%	E	Ν	E	E	Е	N
Methyl Isobutyl Ketone	E	Е	Е	Е	Е	N	Sulfur dioxide, Liq.	E	Е	N	F	Ν	F
Methyl Propyl Ketone	E	Е	G	Е	G	N	Sulfur Salts	E	Е	F	G	F	N
Methyl Propyl Ketone	E	-	G	Е	G	N	Tartaric Acid	E	G	Е	E	Е	Е
Methylene Chloride	E	Е	F	G	F	N	Tetrahydrofuran	E	Е	F	G	G	N
Nitric Acid, 50%	E	G	Е	G	G	G	Thionyl Chloride	E	-	N	Ν	Ν	N
Nitric Acid, 70%	E	Ν	F	G	G	F	Toluene	E	Е	F	G	G	F
Bitrobenzene	E	Е	Е	G	F	N	Trichloroethane	E	Е	N	Ν	Ν	N
n-Octane	E	-	F	Е	Е	F	Trichloroethylene	E	Е	Ν	Ν	Ν	N
Orange Oil	E	Е	G	G	G	F	Turpentine	E	Е	F	G	G	G
Perchloric Acid	Е	-	G	G	G	G	Vinylidene Chloride	E	-	N	Ν	Ν	N
Perchloroethylene	E	Е	N	N	N	N	Xylene	E	Е	G	F	F	N
Phenol, Crystais	E	Е	G	G	G	F	Zinc Salts / Stearate	E	G	Е	Е	Е	Е
Posphoric Acid, 1-5%	E	Е	Е	Е	Е	Е							
Phosphoric Acid, 85%	E	G	Е	Е	Е	E							

#### Resistance

E= Excellent

- G = Good
- F = Fair

N = Not recommended

#### Material

PTFE = Polyestertrafluoro ethylene Including of Teflon SS = Stainless Steel (316) PE #1 = Convenional Polyethylene PE #2 = Rigid Polyethylene PP = Polypropylene PVC = Polyvinylchloride





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