

## INTRODUCTION

The material selection guide can be used as an aid in selecting the most cost-effective butterfly and ball valve resilient sealing materials. The information given here is based upon valve usage, experience, data from raw material manufacturers, data from customers and data from standard technical publications.

Though FNW believes these material recommendations to be valuable in selecting

appropriate materials, one must recognize there are a variety of factors which exists for specific field application. Some of the factors which must be considered are temperature, concentration, velocity, aeration, pressure, presence of other materials in the media, operating frequency and flow conditions. Considering all these factors, FNW cannot guarantee the accuracy of this material selection guide nor assume responsibility for the use thereof.

## HOW TO USE THIS GUIDE

### Corrosive Media Column

All media is listed alphabetically. All oil, water and plating solution media have been listed under their group heading for convenience. Under each column grouping, the primary materials offered have been graded for their suitability to the media and the conditions stated.

The grading system is as follows:

Legend		
A	EXCELLENT	Recommended and should be selected as top priority.
B	GOOD	May sometimes be used depending upon the conditions of application .
C	FAIR	May sometimes be used in case of non suitability of A or B. Testing is strongly recommended before full-scale usage.
D	UNSATISFACTORY	Not recommended for use.
BLANK	NO DATA	Insufficient data available.

### Soft Seat/Polymer Description

The following is a general description of Polymers/Thermoplastics. Refer to technical data sheets for more information on seat materials.

- **PTFE:** Polytetrafluoroethylene
- **RPTFE:** Reinforced Polytetrafluoroethylene
- **HYPERSEAT™:** Engineered fluorocarbon polymer
- **UHMWPE:** Ultra-High-Molecular-Weight Polyethylene.
- **PEEK:** Polyether ether ketone
- **DEVLON®:** Engineered thermoplastic
- **FKM:** Fluorocarbon elastomer
- **FFKM:** Perfluoroelastmer
- **HNBR:** Hydrogenated Nitrile Butadiene Rubber

#### NOTE:

This Material Selection Guide has been developed from information supplied by raw material manufacturers and technical publications. It is provided as a basis for the selection of suitable valve materials for general and specific applications. None of this information is to be interpreted as a guarantee or warranty that the materials will be suitable for a particular application.

CORROSIVE MEDIA	PTFE	RPTFE	HYPERSEAT™	UHMWPE	PEEK	DEVLON®	FKM	FFKM	HNBR
Acetaldehyde	A	A	A	C	A <sup>4</sup>	B	D	A	D
Acetic Acid	A	A	A	A <sup>2</sup>	A	C	B	A	C <sup>3</sup>
Acetic Acid - Anhydride	A	A	A	D	A		D	A	D
Acetic Acid - Glacial	A	A	A <sup>3</sup>	A <sup>2</sup>	A <sup>4</sup>		D	A	C
Acetone	A	A	A <sup>3</sup>	B <sup>1</sup>	A <sup>4</sup>	A	D	A	D
Acetyl Chloride (Dry)	A	A	A	D	A <sup>4</sup>		A	A	D
Acetylene	A	A	A	A	A <sup>4</sup>		A	A	B
Acrylonitrile	A	A	A	A	A		D		D
Air (Dry)	A	A	A	A	A			A	
Alcohol - Amyl	A	A	A	B <sup>2</sup>	A	A	B	A	B
Alcohol - Butyl	A	A	A	A	A <sup>1</sup>		A	A	A
Alcohol - Ethyl	A	A	A	B	A <sup>4</sup>	B	A	A	C
Alcohol - Methyl	A	A	A	A <sup>1</sup>	A <sup>4</sup>	B	D	A	A
Aluminum Chloride Dry	A	A	A	A	A <sup>4</sup>		A	A	A
Aluminum Fluoride	A	A	A	A <sup>2</sup>			A	A	A
Aluminum Hydroxide	A	A	A	A <sup>2</sup>	D		A	A	A
Aluminum Oxochloride	A	A	A						
Aluminum Sulfate	A	A	A <sup>1</sup>	A <sup>2</sup>	A <sup>4</sup>		A	A	A
Amines	A	A	A	C <sup>1</sup>		A	D		D
Ammonia Anhydrous	A	A	A	A <sup>1</sup>	A <sup>5</sup>	B	C		B
Ammonia (10%)	A	A	A	A	A	A	D	A	A
Ammonia Solutions	A	A	A	A <sup>1</sup>	A <sup>5</sup>		C	A	C
Amyl Acetate	A	A	A	A <sup>1</sup>	A <sup>4</sup>	A	D	A	D
Amyl Alcohol	A	A	A	B <sup>2</sup>	A	A	B	A	B
Amyl Chloride	A	A	A				B <sup>1</sup>	A	
Aniline	A	A	A	A	B	C	C	A	D
Aniline Hydrochloride (10%)	A	A	A				B	A	B
Antimony Trichloride	A	A	A	A <sup>1</sup>	A <sup>4</sup>	C	A <sup>2</sup>	A	
Arsenic Acid	A	A	A	A <sup>2</sup>			A <sup>2</sup>	A	A <sup>2</sup>
Asphalt	A	A	A	A <sup>1</sup>			A	A	B
Ammonium Chloride	A	A	A	A <sup>2</sup>	A		A	A	B
Barium Carbonate	A	A	A	A <sup>2</sup>			A	A	A <sup>2</sup>
Barium Chloride	A	A	A	A <sup>1</sup>	A <sup>1</sup>	A	A	A	A
Barium Cyanide	A	A	A	B			A	A	C
Barium Hydroxide	A	B	B	B <sup>2</sup>			A	A	A
Barium Nitrate	A <sup>1</sup>	A	A	B <sup>2</sup>			A	A	A <sup>2</sup>
Barium Sulfate	A	A	A	B <sup>2</sup>		A	A	A	A
Barium Sulfide	A	A	A	B <sup>2</sup>	A		A	A	A

1-Satisfactory to 72°F (23°C), 2-Satisfactory to 120°F (49°C), 3-Satisfactory to 275°F (135°C), 4-Satisfactory to 212°F (100°C), 5-Satisfactory to 392°F (200°C)

CORROSIVE MEDIA	PTFE	RPTFE	HYPERSEAT™	UHMWPE	PEEK	DEVLON®	FKM	FFKM	HNBR
Beer (Beverage)	A	A	A	A <sup>1</sup>	A <sup>4</sup>	B	A	A	A
Benzaldehyde Aqueous	A	A	A	D	A <sup>1</sup>	B	A	A	D
Benzene	A	A	A	D	A <sup>4</sup>	A	D	A	D
Black Liquor	A	B	B						
Boric Acid	A	A	A	A <sup>2</sup>	A <sup>4</sup>	A	A	A	A
Brine	A	A	A	A	A <sup>4</sup>			A	
Bromic Acid	A	A	A	D				A	
Bromine	A	A	A	D	D		A	A	D
Bromine Water (10%)	A	A	A						
Butadiene	A	A	A	D	A		B	A	D
Butane	A	A	A	A <sup>1</sup>	A <sup>1</sup>		A	A	A
Butter	A	A	A		A <sup>1</sup>		A		A
Butter Milk	A	A	A	A <sup>1</sup>			A		A
Butyl Acetate	A	A	A	A <sup>1</sup>	A <sup>1</sup>	B	D	A	D
Butyl Alcohol	A <sup>2</sup>	A	A	A <sup>1</sup>	A <sup>1</sup>		A	A	D
Butyl Bromide	A	A	A						
Butyl Chloride	A	A	A					A	
Butylene	A	A	A	A <sup>1</sup>	A		A	A	B
Calcium Carbonate	A	A	A	A	A		A	A	A
Calcium Chlorate	A	A	A	A	A		A	A	C
Carbon Dioxide - Gas, Dry	A	A	A	A	A		B	A	A
Carbon Dioxide - Liquid, Wet	A	A	A		A		B		A
Carbon Tetrachloride	A	A	A	B <sup>1</sup>	A <sup>4</sup>	A	A	A	C
Carbon Monoxide	A	A	A	A	A		A	A	A
Carbonic Acid	A	A	A <sup>1</sup>	A	A <sup>4</sup>		A	A	B
Castor Oil	A	A	A	A	A		A	A	A
Caustic Soda (See Sodium Hydroxide)	A	A	A	A	A			A	
Chlorine Gas	A	A	A	B <sup>1</sup>	D	C	A	A	D
Chlorine Water	A	A	A	B <sup>1</sup>		C	A	B	D
Chlorobenzene (Mono)	A	A	A	C <sup>1</sup>	A <sup>4</sup>	A	A	A	D
Chloroform	A	A	A <sup>1</sup>	C <sup>1</sup>	A <sup>4</sup>	C	A	A	D
Chocolate Syrup	A	A	A		A		A		A
Chromic Acid	A	A	A	D	D	B	B	A	D
Citric Acid	A	A	A	A <sup>1</sup>	A <sup>4</sup>	B	A	A	A
Cider	A	A	A	A	A		A		A
Coffee (Dry or Wet )	A	A	A		A		A		A
Coke Oven Gas	A	A	A	D	D			A	

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CORROSIVE MEDIA	PTFE	RPTFE	HYPERSEAT™	UHMWPE	PEEK	DEVLON®	FKM	FFKM	HNBR
Copper Sulfate	A	A	A	A	A <sup>4</sup>		A	A	A
Crude Oil	A	A	A		A <sup>1</sup>		A	A	A
Cyclohexane	A	A	A	A	A <sup>4</sup>	A	A	A	A
Detergents	A	A	A	A <sup>1</sup>	A <sup>4</sup>		A	A	A
Calcium Chloride	A	A	A	A	A <sup>4</sup>	A	A	A	A
Diesel Fuels	A	A	A	A	A <sup>4</sup>	A	A	A	A
Diethyl Amine	A	A	A	D	A		D		C
Diethylene Glycol	A <sup>2</sup>	A	A	B	A	A	A	A	A
Dimethylaniline	A	A	A		A			A	
Dimethyl Sulfoxide	A	A	A		C			A	
Dyes	A	A	A		A		A		
Ethane	A	A	A		A <sup>1</sup>		A	A	A
Ethers	A	A	A	D	A <sup>4</sup>		C	A	D
Ethyl Acetate	A	A	A	C <sup>1</sup>	A <sup>1</sup>	A	D	A	D
Ethyl Chloride	A	A	A	C <sup>1</sup>	A	A	A	A	A
Ethylene Glycol	A	A	A	A <sup>1</sup>	A	B	A	A	A
Glucose	A	A	A	A <sup>2</sup>	A		A	A	A
Glue/PVA	A	A	A	A <sup>1</sup>			A	A	A
Glycerine	A	A	A	A	A		A	A	A
Glycols	A	A	A <sup>3</sup>	A	A <sup>4</sup>			A	
Grease	A	A	A		A <sup>1</sup>		A		D
Hexane	A	A	A	C <sup>1</sup>	A	A	A	A	A
Heptane	A	A	A	C <sup>1</sup>	A	A	A	A	A
Hydraulic Oil (Petro)	A	A	A	B	A		A	A	A
Hydraulic Oil (Synthetic)	A	A	A	A	A		A	A	
Hydrobromic Acid 20%	A	A	A	A	D		A	A	D
Hydrogen Gas	A	A	A	A <sup>2</sup>	A		A	A	A
Hydrogen Peroxide <85%	A	A	A	A <sup>1</sup>	A <sup>4</sup>		A	A	
Hydrogen Sulfide (Dry)	A	A	A	A	A		D	A	A
Hydrogen Sulfide (Aqua)	A	A	A	A	A	B	D	A	D
Ink	A	A	A	A			A		A
Iodine Solution	A	A	A	A	C			A	
Iodoform	A	A	A					A	
Isotane	A	A	A	B	A		A		A
Isopropyl Alcohol	A	A	A	A	A <sup>1</sup>	B	A	A	D
Isopropyl Ether	A <sup>1</sup>	A <sup>1</sup>	A	B	A	A	D	A	B
Kerosene	A	A	A	B	A		A	A	A

1-Satisfactory to 72°F (23°C), 2-Satisfactory to 120°F (49°C), 3-Satisfactory to 275°F (135°C), 4-Satisfactory to 212°F (100°C), 5-Satisfactory to 392°F (200°C)

CORROSIVE MEDIA	PTFE	RPTFE	HYPERSEAT™	UHMWPE	PEEK	DEVLON®	FKM	FFKM	HNBR
Lacquers	A	A	A	B <sup>1</sup>	A <sup>1</sup>		D	A	D
Lactic Acid	A	A	A	A	A <sup>4</sup>	B	A	A	A
Latex	A	A	A				A		A
Lead Acetate	A	A	A	A <sup>2</sup>	A	B	A	A	B
Methane	A	A	A	D	A <sup>5</sup>			A	
Methyl Acetate	A	A	A	A	A	A	D	A	D
Methyl Bromide	A	A	A		B		A		B
Methyl Chloride	A	A	A	C <sup>1</sup>			A	A	D
Molasses	A	A	A	A	A <sup>4</sup>		A		A
Nickel Chloride	A	A	A	A	A <sup>4</sup>		A	A	A
Nitric Acid (Concentrate)	A	A	A	C <sup>1</sup>	D	D	A		D
Nickel Sulphate	A	A	A	B <sup>2</sup>	A <sup>4</sup>		A	A	A
Nitrous Acid	A	A	A		A <sup>1</sup>		A	A	
Octane	A	A	A		A			A	
Oil - Aniline	A	A	A				C		D
Oil - Animal	A	A	A	A	A			A	
Oil - Castor	A	A	A		A		A	A	A
Oil - Citric	A	A	A		A		A		
Oil - Coconut	A	A	A	A	A	A	A	A	A
Oil - Cod Liver	A	A	A		A		A	A	A
Oil - Corn	A	A	A	A	A		A	A	A
Oil - Cottonseed	A	A	A	A	A		A	A	A
Oil - Crude	A	A	A	A	A		A	A	A
Oil - Fuel	A	A	A	A	A		A	A	B
Oil - Ginger	A	A	A				A		A
Oil - Hydraulic	A	A	A		A			A	
Oil - Linseed	A	A	A	A	A	A	A	A	A
Oil - Lubricating (Petroleum)	A	A	A	C	A <sup>4</sup>	A		A	
Oil - Mineral	A	A	A	A	A	A	A	A	A
Oil - Olive	A	A	A	A	A <sup>4</sup>		A	A	A
Oil - Palm	A	A	A	A	A		A		A
Oil - Peanut	A	A	A		A <sup>4</sup>		A	A	A
Oil - Pine	A	A	A				A	A	B
Oil - Soybean	A	A	A	A	A		A	A	D
Oil - Transformer	A	A	A	D	A <sup>4</sup>	A		A	
Oxygen	A	A	A	A	A			A	
Ozone (<1% in Air)	A	A	A	A	A	C		A	
Paraffin	A	A	A	A	A <sup>4</sup>	A	B	A	A

1-Satisfactory to 72°F (23°C), 2-Satisfactory to 120°F (49°C), 3-Satisfactory to 275°F (135°C), 4-Satisfactory to 212°F (100°C), 5-Satisfactory to 392°F (200°C)

CORROSIVE MEDIA	PTFE	RPTFE	HYPERSEAT™	UHMWPE	PEEK	DEVLON®	FKM	FFKM	HNBR
Pentane	A	A	A	D	A		A	A	A
Perchloroethylene	A	A	A	D	A <sup>4</sup>	B	A	A	C
Perchloric Acid (72%)	A	A	A	A <sup>2</sup>		C			
Perchloric Acid (10%)	A	A	A	A					
Petroleum Ether	A	A	A	A <sup>1</sup>	A	A			
Phenol (10%)	A	A	A	A	B	D	A	A	D
Phosphoric Acid (10%)	A	A	A	A <sup>1</sup>	A	D	A	A	D
Phosphoric Acid 85%	A	A	A	A	A <sup>4</sup>				
Picric Acid	A	A	A	A	A <sup>4</sup>		A	A	B
Pineapple Juice	A	A	A		A <sup>4</sup>				
Poly Vinyl Acetate	A	A	A					A	
Poly Vinyl Alcohol	A	A	A						
Potassium Carbonate	A	A	A	A	A	A	A	A	A
Potassium Cyanide	A	A	A	A			A	A	A
Potassium Hydroxide	A	A	A <sup>1</sup>	A	A <sup>4</sup>		D	A	B
Potassium Nitrate (10% )	A	A	A	B			A	A	A
Potassium Nitrate	A	A	A	A	A <sup>4</sup>		A	A	A
Potassium Permanganate	A	A	A	A	A <sup>1</sup>	C	D	A	C
Potassium Sulfide	A	A	A	A <sup>2</sup>	A		A	A	A
Propane (Liquified)	A	A	A	C <sup>1</sup>	A		A	A	A
Propionic Acid	A	A	A	A <sup>1</sup>				A	
Propyl Alcohol	A	A	A		A <sup>1</sup>			A	
Propylene Dibromide	A	A	A						
Propylene Dichloride	A	A	A					A	
Propylene Glycol	A	A	A	A			A	A	A
Pyrogallic Acid	A	A	A				A	A	
Rosins	A	A	A	B <sup>1</sup>				A	A
Rum	A	A	A				A		A
Salicylic Acid	A	A	A		A <sup>4</sup>	A		A	
Salt Brine	A	A	A	A	A				
Sea Water	A	A	A	A	A		A		A
Sodium Bicarbonate	A	A	A	A <sup>2</sup>	A		A	A	B
Sodium Bisulfate	A	A	A	A <sup>2</sup>			A	A	B
Sodium Carbonate	A	A	A	B <sup>2</sup>	A <sup>4</sup>		A	A	A
Sodium Chlorate	A	A	A	A	A <sup>4</sup>		A	A	C
Sodium Chloride	A	A	A	A <sup>2</sup>	A <sup>4</sup>	A	A	A	A
Sodium Cyanide	A	A	A	A <sup>2</sup>			A	A	A
Sodium Fluoride	A	A	A	A <sup>2</sup>	A		A	A	A <sup>1</sup>

1-Satisfactory to 72°F (23°C), 2-Satisfactory to 120°F (49°C), 3-Satisfactory to 275°F (135°C), 4-Satisfactory to 212°F (100°C), 5-Satisfactory to 392°F (200°C)

CORROSIVE MEDIA	PTFE	RPTFE	HYPERSEAT™	UHMWPE	PEEK	DEVLON®	FKM	FFKM	HNBR
Sodium Hydroxide (10%)	A	A	A	A	A <sup>5</sup>	A	B	A	B
Sodium Hypochloride (100%)	A	A	A	A	A <sup>4</sup>		A	A	B
Sodium Metaphosphate	A	A	A	A <sup>1</sup>	A		A	A	A
Sodium Nitrate	A	A	A	A	A		A	A	B
Sodium Perborate	A	A	A	A <sup>1</sup>	A		A	A	B
Sodium Peroxide	A	A	A	A	A <sup>4</sup>		A	A	B
Sodium Phosphate	A	A	A	A	A			A	
Sodium Silicate	A	A	A	A	A	A	A	A	A
Sodium Sulfide	A	A	A	A <sup>2</sup>	A <sup>4</sup>		A	A	A
Sodium Sulfite	A	A	A	A	A <sup>4</sup>		A	A	A
Sodium Sulfate	A	A	A	A <sup>2</sup>	A <sup>4</sup>	A	A	A	A
Stannic Chloride	A	A	A	A <sup>2</sup>	A <sup>4</sup>		A	A	A
Starch	A	A	A	A	A		A		C
Steam and Hot water	A	A	A		A	D			
Stearic Acid	A	A	A	B	A	A	A	A	B
Sugar Liquids	A	A	A	A	A		A	A	A
Sulphur	A	A	A	A	A <sup>4</sup>	A		A	
Sulphur Dioxide - Dry	A	A	A	A <sup>1</sup>	A		A	A	D
Sulphur Dioxide - Wet	A	A	A	A			A	A	D
Sulphur Trioxide - Dry	A	A	A	C <sup>1</sup>	A <sup>4</sup>		A	A	D
Sulfuric Acid (10%)	A	A	A	A	A		A	A	D
Sulfuric Acid (50%)	A	A	A	A	B		A	A	D
Sulfuric Acid (100%)	A	A	A	B <sup>1</sup>	D		A	A	D
Sulfurous Acid	A	A	A	A <sup>2</sup>	A		A	A	B
Tall Oil	A	A	A		B				
Tartaric Acid	A	A	A	A	A <sup>4</sup>		A	A	A
Toluene	A	A	A	C <sup>2</sup>	B	A	A	A	D
Triethylamine	A	A	A				A	A	A
Turpentine	A	A	A	C <sup>1</sup>	A		A	A	A
Urea (50% Water)	A	A	A	A	A <sup>4</sup>	A			
Urine	A	A	A	A <sup>2</sup>	A		A <sup>1</sup>		A <sup>1</sup>
Varnish	A	A	A	C <sup>1</sup>	A		A	A	B
Vegetable Juice	A	A	A		A		A		C
Vinegar	A	A	A	A	A <sup>4</sup>		A	A	B
Water, Acid, Mine	A	A	A	A	A	A	A		A
Water - Chilled	A	A	A	A		A		A	
Water - Demineralized	A	A	A	A		A		A	
Water - Distilled	A	A	A	A	A <sup>4</sup>	A	A	A	A

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CORROSIVE MEDIA	PTFE	RPTFE	HYPERSEAT™	UHMWPE	PEEK	DEVLON®	FKM	FFKM	HNBR
Water - Fresh	A	A	A	A	A <sup>5</sup>	A	A	A	A
Water - Sewage	A	A	A	A	A <sup>4</sup>	A		B	
Wax	A	A	A		A	A			
Whiskey and Wines	A	A	A	A	A	B	A		A
White Liquor (Pulp Mill)	A	A	A	A			A		A
Xylene	A	A	A	C <sup>1</sup>	B	A	A	A	D
Zinc Acetate	A	A	A					A	
Zinc Chloride	A	A	A	A	A		A	A	A
Zinc Nitrate	A	A	A		A			A	
Zinc Sulfide	A	A	A					A	
Zinc Sulfate (10%)	A	A	A	A <sup>2</sup>	A		A	A	A

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