

# BALL VALVES

# CHEMICAL APPLICATION

## CORROSION RESISTANCE

CHEMICALS	BRONZE	CARBON STEEL	316 S.S.	REINFORCED TFE SEATS
Acetaldehyde	D	C	A	A
Acetic Acid, Pure	C	C	A	A
Acetic Anhydride	C	D	B	A
Acetone	A	A	A	A
Acetylene, Dry	B	A	A	A
Acrylonitrile	A	A	A	A
Air	A	A	A	A
Alcohol	B	B	A	A
Aluminum Chloride, Dry	B	B	A	A
Aluminum Sulfate (Alums)	C	C	A	A
Alums	C	C	A	A
Amines	A	A	A	A
Ammonia, Anhydrous	D	A	A	A
Ammonia, Aqueous	D	A	A	A
Ammonia Solutions	D	B	A	A
Ammonium Bicarbonate	B	C	B	A
Ammonium Carbonate	B	B	B	A
Ammonium Chloride	D	D	C	A
Ammonium Hydroxide 28%	D	C	B	C
Ammonium Hydroxide (conc.)	D	C	B	A
Ammonium Monophosphate	D	D	B	A
Ammonium Nitrate	D	D	A	A
Ammonium Phosphate	D	D	B	A
Ammonium Phosphate, Di-Basic	C	D	B	A
Ammonium Phosphate, Tri-Basic	C	D	B	A
Ammonium Sulfate	B	C	B	A
Ammonium Sulfide	D	D	B	A
Ammonium Sulfite	B	C	B	A
Amyl Acetate	B	C	B	A
Aniline	D	A	B	A

CHEMICALS	BRONZE	CARBON STEEL	316 S.S.	REINFORCED TFE SEATS
Aniline Dyes	C	C	A	A
Apple Juice	C	D	B	A
Aqua Regina	C	D	B	A
Aromatic Solvents	A	C	A	A
Arsenic Acid	D	D	B	A
Asphalt Emulsion	A	A	A	A
Asphalt Liquid	A	A	A	A
Barium Carbonate	B	B	B	A
Barium Chloride	B	C	C	A
Barium Hydroxide	B	C	B	A
Barium Sulfate	C	B	B	A
Barium Sulfide	C	B	B	A
Beer (Alcohol Industry)	B	C	A	A
Beer (Beverage Industry)	B	C	A	A
Beet Sugar Liquors	A	B	A	A
Benzaldehyde	A	A	A	A
Benzene (Benzol)	B	B	A	A
Benzoic Acid	B	D	B	A
Black Sulfate Liquor	B	A	A	A
Borax (Sodium Borate)	D	C	A	A
Borax Liquors	A	C	B	A
Boric Acid	B	D	B	A
Brake Fluid	B	O	B	A
Brines	B	C	B	A
Bromine, Dry	A	D	D	A
Bromine, Wet	B	D	D	A
Bunker Oils (Fuel Oils)	B	B	A	A
Butadiene	C	B	A	A
Butane	A	A	A	A
Butter	O	O	A	A

(A) Excellent      (B) Good      (C) Fair - Probably Unsuitable      (D) Not Recommended      (O) No Information

CHEMICALS	BRONZE	CARBON STEEL	316 S.S.	REINFORCED TFE SEATS
Buttermilk	D	D	A	A
Butylene	A	A	A	A
Butyric Acid	C	D	B	A
Calcium Bisulfate	B	D	B	A
Calcium Carbonate	C	D	B	A
Calcium Chloride	B	C	B	A
Calcium Hydroxide 20%	A	C	B	A
Calcium Hypochlorite	D	D	C	A
Calcium Phosphate	C	O	B	A
Calcium Silicate	C	O	B	A
Calcium Sulfate	C	C	B	A
Cane Sugar Liquors	B	O	A	A
Carbolic Acids	B	D	B	A
Carbolic Acid (Phenol)	B	D	B	A
Carbonated Beverage	B	D	B	A
Carbonated Water	B	B	A	A
Carbon Bisulfide	C	B	B	A
Carbon Dioxide, Dry	A	A	A	A
Carbonic Acid	D	D	B	A
Carbon Monoxide	A	O	A	A
Carbon Tetrachloride (Dry)	C	B	A	A
Carbon Tetrachloride (Wet)	D	D	B	A
Casein	C	O	B	A
Castor Oil	A	B	A	A
China Wood Oil (Tung)	C	C	A	A
Chlorinated Solvents (Dry)	C	C	B	A
Chlorinated Water	O	O	C	A
Chlorine Gas (Dry)	C	B	B	A
Chlorine (Wet)	D	D	D	A
Chloroacetic Acid	C	D	C	A
Chlorobenzene (Dry)	B	B	A	A
Chloroform (Dry)	B	B	A	A
Chlorophyll, Dry	B	O	B	A
Chlorosulphonic Acid (Dry)	B	B	B	A
Chlorosulphonic Acid (Wet)	D	D	D	A
Chrome Alum	C	B	A	A
Chromic Acid 50%	D	D	C	A
Chromium Sulfate	C	O	B	A
Cider	O	O	A	A
Citrus (Juices)	B	D	B	A
Citrus Acid	C	D	A	A
Coca Cola Syrup	O	O	A	A
Coconut Oil	B	C	B	A
Cod Liver Oil	O	O	O	A
Coffee Extract (Hot)	B	C	A	A
Coke Oven Gas	C	B	A	A
Cooking Oil	B	B	A	A
Copper Acetate 10%	D	C	B	A
Copper Carbonate	O	O	A	A
Copper Chloride	D	D	D	A

CHEMICALS	BRONZE	CARBON STEEL	316 S.S.	REINFORCED TFE SEATS
Copper Cyanide	D	O	A	A
Copper Nitrate	D	D	B	A
Copper Sulfate	D	D	C	A
Corn Oil	B	C	B	A
Cottonseed Oil	B	C	B	A
Creosote Oil	B	B	B	A
Cresylic Acid	C	B	B	A
Crude Oil, Sour	C	B	A	A
Crude Oil, Sweet	B	B	A	A
Cutting Oils, Water Emulsions	A	B	A	A
Cyanide Plating Solutions	D	O	B	A
Cyclohexane	A	A	A	A
Detergents, Synthetic	B	O	B	A
Dextrin	B	O	B	A
Diacetone Alcohol	A	A	A	A
Dichloroethane	O	O	C	A
Dichloroethyl Ether	B	O	B	A
Diesel Fuels	A	A	A	A
Diethylamine	B	O	A	A
Diethylene Glycol	B	O	B	A
Diethyl Sulfate	B	O	B	A
Dimethyl Formamide	B	O	A	A
Dipentane (Pinene)	A	O	A	A
Dowtherms	A	B	A	A
Drilling Mud	B	B	A	A
Drip Cocks, Gas	B	B	A	A
Dry Cleaning Fluids	C	B	A	A
Drying Oils	C	C	B	A
Epson Salts	B	C	B	A
Ethane	A	A	A	A
Ethers	B	B	A	O
Ethyl Acetate	C	B	B	A
Ethyl Acrylate	B	C	A	A
Ethyl Alcohol	B	B	B	A
Ethyl Bromide	A	O	B	A
Ethyl Chloride, Dry	B	B	A	A
Ethyl Chloride, Wet	C	D	B	A
Ethylene Glycol	B	B	B	A
Ethylene Oxide	D	B	B	A
Fatty Acids	B	D	A	A
Ferric Chloride	D	D	D	A
Ferric Nitrate	D	D	C	A
Ferric Sulfate	D	D	B	A
Ferrous Chloride	B	D	D	A
Ferrous Sulfate	C	D	B	A
Ferrous Sulfate (Sat.)	C	C	A	A
Fertilizer Solution	C	B	B	A
Fish Oils	B	B	A	A
Fluorine (Dry)	D	O	O	C
Fluorosilicic Acid	A	D	C	A

(A) Excellent (B) Good (C) Fair - Probably Unsuitable (D) Not Recommended (O) No Information



CHEMICALS	BRONZE	CARBON STEEL	316 S.S.	REINFORCED TFE SEATS
Formaldehyde, Cold	A	A	A	A
Formaldehyde, Hot	B	D	C	A
Formic Acid, Cold	B	D	B	A
Formic Acid, Hot	B	D	B	A
Freon, Dry	B	B	A	A
Freon, Wet	D	O	C	A
Fruit Juices	B	D	A	A
Fuel Oil	B	B	A	A
Furfural	A	A	A	A
Gallic Acid 5%	C	D	B	A
Gas, Manufactured	B	B	B	A
Gas, Natural	B	B	A	A
Gas, Oderizers	A	B	B	A
Gasoline (Leaded)	A	A	A	A
Gasoline (Unleaded)	A	A	A	A
Gasoline (Aviation)	A	A	A	A
Gasoline, Refined	B	B	A	A
Gasoline, Sour	B	B	A	A
Gelatin	A	D	A	A
Glucose	A	B	A	A
Glue	B	A	A	A
Glycerine (Glycerol)	B	B	A	A
Glycol Amine	D	O	B	A
Glycols	B	B	B	A
Graphite	B	O	B	A
Grease	B	A	A	A
Helium Gas	D	D	D	A
Heptane	A	B	A	A
Hexane	B	B	B	A
Hexanol, Tertiary	A	A	A	A
Hydraulic Oil, Pet Base	B	A	A	A
Hydrazine	D	O	B	A
Hydrobromic Acid	D	D	D	A
Hydrochloric Acid (Air Free)	D	D	D	A
Hydrocyanic Acid	D	D	B	A
Hydrofluoric Acid	D	D	D	C
Hydrofluosilicic Acid	A	D	C	A
Hydrogen Gas, Cold	B	B	A	A
Hydrogen Gas, Hot	O	B	B	A
Hydrogen Peroxide (Conc.)	D	D	B	A
Hydrogen Peroxide (Dilute)	B	D	B	A
Hydrogen Sulfide (Dry)	CONSULT FACTORY			
Hydrogen Sulfide (Wet)	CONSULT FACTORY			
Hypo (Sodium Thiosulfate)	C	D	A	A
Hypochlorites, Sodium	D	D	C	A
Illuminating Gas	A	A	A	A
Ink	C	D	A	A
Iodine (Wet)	D	D	D	A
Iodoform	B	B	B	A
Iso-Octane	A	A	A	A

CHEMICALS	BRONZE	CARBON STEEL	316 S.S.	REINFORCED TFE SEATS
Isopropyl Alcohol	B	B	B	A
Isopropyl Acetate	O	O	B	A
Isopropyl Ether	A	A	A	A
JP-4 Fuel, Jet	A	A	A	A
JP-5 Fuel, Jet	A	A	A	A
JP-6 Fuel, Jet	A	A	A	A
Kerosene	A	B	A	A
Ketchup	D	D	A	A
Ketones	A	A	A	A
Lacquer (and Solvent)	A	C	A	A
Lactic Acid	C	D	A	A
Lactic Acid (Conc. Hot)	D	D	B	A
Lactose	B	O	B	A
Lard	B	O	A	A
Lard Oil	A	C	A	A
Lead Acetate	C	D	B	A
Lead Sulfate	C	O	B	A
Lecithin	C	O	B	A
Linoleic Acid	B	B	A	A
Linseed Oil	B	A	B	A
LPG Gas	A	B	B	A
Lubricating Oil, Petro Base	B	A	A	A
Ludox	D	O	B	A
Magnesium Bisulfite 10%	B	C	A	A
Magnesium Bisulfide	D	O	B	A
Magnesium Carbonate	B	O	A	A
Magnesium Chloride	B	C	D	A
Magnesium Hydroxide	B	B	A	A
Magnesium Hydroxide (Hot)	D	B	A	A
Magnesium Nitrate	O	O	A	A
Magnesium Sulfate	B	B	B	A
Maleic Acid	B	B	C	A
Maleic Anhydride	B	O	B	A
Malic Acid	B	D	A	A
Mayonnaise	D	D	A	A
Menthol	B	O	B	A
Mercuric Chloride	D	D	D	A
Mercuric Cyanide 10%	O	D	B	A
Mercurous Nitrate	D	O	A	A
Mercury	D	A	A	A
Methane	A	A	A	A
Methyl Acetate	A	A	A	A
Methyl Acetone	A	A	A	A
Methyl Alcohol	B	B	B	A
Methylamine	D	B	A	A
Methyl Bromide 100%	C	O	B	A
Methyl Cellosolve	B	B	B	A
Methyl Chloride	A	B	A	A
Methyl Ethyl Ketone	A	A	A	A
Methyl Formate	A	B	B	A

(A) Excellent (B) Good (C) Fair - Probably Unsuitable (D) Not Recommended (O) No Information



CHEMICALS	BRONZE	CARBON STEEL	316 S.S.	REINFORCED TFE SEATS
Methylene Chloride	A	B	B	A
Milk	A	D	A	A
Mine Waters (Acid)	C	D	B	A
Mineral Oils	B	B	A	A
Mineral Spirits	B	B	B	A
Mixed Acids (Cold)	D	C	A	A
Molasses, Edible	A	A	A	A
Molasses, Crude	A	A	A	A
Muriatic Acid	D	D	D	A
Morpholine	B	O	B	A
Mustard	A	B	A	A
Naptha	B	B	A	A
Naphthalene	B	A	A	A
Nickel Ammonium Sulfate 20%	D	D	A	A
Nickel Chloride	D	D	B	A
Nickel Nitrate 30%	D	D	B	A
Nickel Sulfate	D	D	C	A
Nicotinic Acid	A	B	A	A
Nitric Acid 10%	D	D	A	A
Nitric Acid 30%	D	D	A	A
Nitric Acid 80%	D	D	A	A
Nitric Acid 100%	D	A	A	A
Nitric Acid Anyhdrous	D	A	A	A
Nitrobenzene	D	B	B	A
Nitrogen	A	A	A	A
Nitrous Acid 10%	D	D	B	A
Nitrous Gases	D	B	A	A
Nitrous Oxide	C	A	B	A
Oils, Animal	A	A	A	A
Oils, Petro Refined	B	A	A	A
Oils, Petro Sour	C	B	A	A
Oils, Water Mixture	A	B	A	A
Oils, Cottonseed	B	C	B	A
Oils, Fish	B	B	A	A
Oleic Acid	B	C	A	A
Oleum	D	B	B	A
Oleum Spirits	D	O	B	A
Olive Oil	B	B	A	A
Oxalic Acid	B	D	D	A
Oxygen	A	B	A	A
Ozone (Dry)	A	A	A	A
Ozone (Wet)	B	C	A	A
Paints and Solvents	A	A	A	A
Palmitic Acid	B	C	A	A
Palm Oil	B	C	B	A
Paper Pulp	B	O	B	A
Paraffin	A	B	A	A
Paraformaldehyde	B	B	B	A
Pentane	A	B	A	A
Perchlorethylene (Dry)	C	B	B	A

CHEMICALS	BRONZE	CARBON STEEL	316 S.S.	REINFORCED TFE SEATS
Petroleum (Vaseline)	B	C	B	A
Phenol	B	B	A	A
Phosphate Ester	D	A	A	A
Phosphoric Acid 10% Cold	D	D	B	A
Phosphoric Acid 10% Hot	D	D	D	A
Phosphoric Acid 50% Cold	D	D	B	A
Phosphoric Acid 50% Hot	D	D	D	A
Phosphoric Acid 85% Cold	D	B	A	A
Phosphoric Acid 85% Hot	D	C	A	A
Phosphorous Trichloride	D	B	A	A
Phthalic Acid	B	C	B	A
Phthalic Anhydride	B	C	B	A
Picric Acid	B	C	B	A
Pineapple Juice	C	C	A	A
Pine Oil	B	B	A	A
Potassium Bisulfite 10%	C	D	B	A
Potassium Bromide	C	D	B	A
Potassium Carbonate	D	C	A	A
Potassium Chlorate	D	B	A	A
Potassium Chloride	A	C	C	A
Potassium Chromate	B	O	B	A
Potassium Cyanide	D	B	B	A
Potassium Dichromate	B	B	A	A
Potassium Diphosphate	B	A	A	A
Potassium Ferricyanide	C	B	A	A
Potassium Ferrocyanide	B	B	A	A
Potassium Hydroxide (Dilute Cold)	D	A	A	A
Potassium Hydroxide (Dilute Hot)	D	B	A	B
Potassium Hydroxide(to 70% cold)	D	A	A	B
Potassium Hydroxide(to 70% hot)	B	A	A	B
Potassium Iodide	D	C	B	A
Potassium Nitrate	B	B	A	A
Potassium Permanganate	B	A	A	A
Potassium Sulfate	A	B	B	A
Potassium Sulfide 10%	B	C	B	A
Potassium Sulfite 10%	A	D	B	A
Producer Gas	A	B	B	A
Propane Gas	B	A	A	A
Propyl Alcohol	B	A	A	A
Propyl Bromide	B	O	B	A
Propylene Glycol	B	B	B	A
Pyrogallic Acid	B	B	B	A
Quench Oil	A	A	A	A
Quinine Sulfate	O	O	A	A
Resins & Rosins	C	C	A	A
Road Tar	B	A	A	A
Roof Pitch	B	A	A	A
Rosin Emulsions	B	C	A	A
RP-1 Fuel	D	A	A	A
Rubber Latex Emulsions	D	B	A	A

(A) Excellent (B) Good (C) Fair - Probably Unsited

(D) Not Recommended

(O) No Information



CHEMICALS	BRONZE	CARBON STEEL	316 S.S.	REINFORCED TFE SEATS
Rubber Solvents	D	A	A	A
Salad Oil	D	C	B	A
Salicylic Acid	D	D	A	A
Salt (NaCl)	D	C	B	A
Salt Brine	B	O	A	A
Sea Water	C	D	A	A
Sewage	C	C	B	A
Shellac (Bleached)	B	A	A	A
Shellac (Orange)	B	A	A	A
Silicone Oils	A	A	A	A
Silver Cyanide	D	O	A	A
Silver Nitrate	D	D	A	A
Soap Solutions	A	A	A	A
Sodium Acetate	C	B	B	A
Sodium Aluminate	C	C	A	A
Sodium Bicarbonate	B	C	B	A
Sodium Bichromate	O	O	A	A
Sodium Bisulfate (10%)	B	D	A	A
Sodium Bisulfate (10%)	B	D	A	A
Sodium Borate	B	C	D	A
Sodium Bromide (10%)	B	C	B	A
Sodium Carbonate (Soda Ash)	B	B	B	A
Sodium Chlorate	B	C	B	A
Sodium Chloride	B	C	B	A
Sodium Chlorate	C	B	A	A
Sodium Citrate	O	O	A	A
Sodium Cyanide 10%	D	A	A	A
Sodium Fluoride	C	D	B	A
Sodium Hydroxide, Cold 20%	A	A	A	A
Sodium Hydroxide, Hot 20%	A	C	B	A
Sodium Hydroxide, Cold 50%	B	B	B	C
Sodium Hydroxide, Hot 50%	B	B	B	C
Sodium Hydroxide, Cold 70%	C	C	B	C
Sodium Hydroxide, Hot 70%	C	B	B	D
Sodium Hypochloride	D	D	D	A
Sodium Metaphosphate	C	A	B	A
Sodium Metasilicate (Cold)	B	C	A	A
Sodium Metasilicate (Hot)	B	D	A	A
Sodium Nitrate	B	B	B	A
Sodium Perborate	B	B	B	A
Sodium Peroxide	D	C	B	A
Sodium Phosphate	C	C	A	A
Sodium Phosphate (Dibasic)	B	B	B	A
Sodium Phosphate (Tribasic)	B	B	B	A
Sodium Silicate	A	A	A	A
Sodium Silicate (Hot)	B	B	B	A
Sodium Silicate Na <sub>2</sub> SO <sub>4</sub>	B	B	A	A
Sodium Silicate Na <sub>2</sub> SO <sub>2</sub>	D	B	B	A
Sodium Sulfide (Hot)	D	C	B	A
Sodium Sulfite	C	O	A	A

CHEMICALS	BRONZE	CARBON STEEL	316 S.S.	REINFORCED TFE SEATS
Sodium Thiosulfate	B	B	A	A
Soybean Oil	B	C	A	A
Starch	B	A	A	A
Stannic Chloride	C	D	D	A
Stannous Chloride	D	D	C	A
Steam (212 F)	A	A	A	A
Stearic Acid	C	C	A	A
Stoddard Solvent	B	B	B	A
Styrene	A	A	A	A
Sugar Liquids	A	B	A	A
Sugar, Syrups and Jam	B	O	O	A
Sulfate, Black Liquor	C	C	B	A
Sulfate, Green Liquor	C	C	B	A
Sulfate, White Liquor	D	D	B	A
Sulfonic Acid	B	O	B	A
Sulfur	D	C	B	A
Sulfur Chlorides	B	D	D	A
Sulfur Dioxide, Dry	B	B	A	A
Sulfur Dioxide, Wet	D	O	A	A
Sulfur Hexafluoride	B	O	A	A
Sulfur, Molten	D	C	B	A
Sulfur Trioxide, Dry	B	B	A	A
Sulfuric Acid (0-7%)	C	D	B	A
Sulfuric Acid (20%)	C	D	D	A
Sulfuric Acid (50%)	B	D	D	A
Sulfuric Acid (100%)	A	B	A	A
Sulfuric Anhydride	O	O	O	A
Sulfurous Acid	C	D	B	A
Synthesis gas	B	B	B	A
Tall Oil	B	B	B	A
Tannic Acid	B	C	B	A
Tar & Tar Oils	A	A	A	A
Tartaric Acid	A	D	B	A
Tetraethyl Lead	B	C	B	A
Toluol (Toluene)	A	A	A	A
Tomato Juice	C	C	A	A
Transformer Oil	B	A	A	A
Tributyl Phosphate	A	A	A	A
Trichloroethylene	B	B	B	A
Tung Oil	B	B	A	A
Turpentine	B	B	B	A
Urea	B	C	B	A
Uric Acid	O	O	A	A
Varnish	A	C	A	A
Vegetable Oils	B	B	A	A
Vinegar	B	D	A	A
Vinyl Acetate	B	O	B	A
Water, Distilled	A	D	A	A
Water, Fresh	A	C	A	A
Water, Acid Mine	D	D	B	A

(A) Excellent (B) Good (C) Fair - Probably Unsuitable (D) Not Recommended (O) No Information



## BALL VALVES CHEMICAL APPLICATION CORROSION RESISTANCE

CHEMICALS	BRONZE	CARBON STEEL	316 S.S.	REINFORCED TFE SEATS
Water, Sea	B	D	A	A
Wax Emulsions	A	A	A	A
Waxes	A	A	A	A
Whiskey & Wines	A	D	A	A
Xylene (Dry)	A	B	A	A

CHEMICALS	BRONZE	CARBON STEEL	316 S.S.	REINFORCED TFE SEATS
Zinc Bromide	B	O	B	A
Zinc Chloride	D	D	D	A
Zinc Hydrosulfite	C	A	A	A
Zinc Sulfate	B	D	B	A

This chemical resistance guide has been compiled to assist in selecting chemical resistant materials. The information given is intended as a **guide only**. Many conditions can affect the material choices. Careful consideration must be given to temperature, pressure and chemical concentrations before a final material can be selected.