Chemical Resistance Charts

Chemical–Ratings

A – No effect

B – Minor effect

C – Moderate effect

D – Severe effect; not recommended

— No data available

WARNING

The information in this chart was supplied to Cole-Parmer by other reputable sources and is to be used **ONLY** as a guide in selecting equipment for chemical compatibility testing. Always test the equipment with the specific chemicals and under the specific conditions of your application.

Ratings of chemical behavior listed in this chart apply to a 48-hour exposure period. Cole-Parmer does not warrant (neither expressed nor implied) the accuracy or completeness of this chart or that any material is suitable for any purpose.

DANGER

Variations in temperature, pressure, and concentration can cause equipment to fail, even though it passed an initial test.

SERIOUS INJURY MAY RESULT.

Use suitable guards and/or personal protection when handling chemicals.

	Plastics														Elastomers										Metals										Non-metals		
CHEMICAL	ABS plastic	Acetal (Delrin®)	CPVC	Epoxy	Hytrel®	HDPE	LDPE	NORYL®	Nylon	Polycarbonate	Polypropylene	PPS (Ryton®)	PTFE (Teflon®)	PVC	PVDF (Kynar®)	Buna N (Nitrile)	EPDM	Hypalon®	PCTFE	Natural rubber	Neoprene	Santoprene®	Silicone	Tygon® (R-3603)	Viton®	304 stainless steel	316 stainless steel	Aluminum	Brass	Bronze	Carpenter 20	Cast iron	Copper	Hastelloy-C®	Titanium	Carbon graphite	Ceramic Al_2O_3	Ceramic magnet
Acetaldehyde	D	A	D	A	–	C	C	–	A	C[1]	A[1]	A	A	D	D	D	A	C	A	C	C	–	A	D	D	A	A	B	A	A	–	C	–	A	A	A	–	–
Acetamide	–	A	–	A	–	A	A	–	A	D	A[1]	A	A	D	C	A	A	B	A	D	B	–	B	D	B	B	A	A	–	D	–	D	–	–	–	A	–	–
Acetate Solvent	–	–	C	A	–	A	A	D	A	–	B[1]	A	A	D	A	C	A	C	A[1]	C	D	–	C	D	D	A	A	A	A	C	A	D	A	A	A	A	–	–
Acetic Acid	D	D	C	C	–	A	A[2]	A	D	B[1]	B	A	A	D	C	C	A	C	A	B	C	A	C	D	B	D	B	B	D	C	A	D	B	A	A	A	A	–
Acetic Acid 20%	C	C	A	A[1]	–	A	A	A	D	A[1]	A	A	A	D	A	B	A	A	A	B	A	A	B	D	B	B	A	B	D	C	A	D	B	A	A	A	A	A
Acetic Acid 80%	D	D	C	B[1]	–	A	D	A	D	B[1]	A	A	A	C	C	C	A	C	A	C	C	C	B	D	B	D	B	B	D	C	A	D	B	A	A	A	A	A
Acetic Acid, Glacial	D	D	B[1]	B[1]	A[1]	A	D	A	B	B[1]	A[1]	A	A	D	A[1]	C	B	C	A[2]	C	D	D	B	D	D	C	A	B	–	C	A	D	B	A	A	A	A	A
Acetic Acid Vapors	–	–	–	D	–	–	–	–	D	–	–	–	A	–	A	A	A	A	–	A	A	–	A	–	A	D	D	B	–	–	–	–	B	A	A	A	–	–
Acetic Anhydride	C[1]	D	D	C	C	C	D	D	A[1]	D	B[1]	A	A	D	B[1]	D	B	A	A	C	A	D	C	D	D	B	A	A[1]	D	C	B	D	B	A	A	A	A	–
Acetone, 50% water	D	–	–	–	–	–	–	D	–	–	A	A	A	D	A	D	–	A	–	D	D	–	A[2]	–	D	B	B	B	A	A	–	–	–	A	A	A	–	–
Acetone	D	A	D	B[1]	B	D	B[1]	D	A	D	A	A	A	D	D	D	A	C	A	C	C	A	D	D	D	A	A	A	A	A	A	A	A	A	A	A	A	–
Acetyl Bromide	–	–	–	–	–	–	D	–	D	–	–	–	A	D	–	–	–	–	–	–	–	–	–	D	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Acetyl Chloride (dry)	D	D	C	D	–	–	D	D	B	D	D	A	A	C	A[2]	D	D	D	A	D	D	A	C	D	A	A	A	D	D	–	B	B	A	A	–	–	–	–
Acetylene	–	A	C	A	A	–	D	–	A	D	A[1]	A	A	A[1]	A	B	A	B	A	B	B	–	B	A[1]	A	A	A	A	B	C	A	A	D	–	–	A	–	–
Acrylonitrile	D	–	A	A	–	A	A	–	A[1]	D	A[1]	–	A	B[1]	A[1]	D	D	C	–	B[1]	C	D	D	D	D	A[1]	A[1]	B[1]	A	–	A[1]	A[1]	A	B	–	B	–	–
Adipic Acid	–	–	A[2]	A	–	A	A	–	–	–	B[2]	–	A	A[2]	A[2]	C	A[2]	–	–	A[1]	C	–	–	D	A[2]	A[1]	A[2]	A	–	–	–	A	D	–	B	A[2]	–	–
Alcohols: Amyl	A[1]	A	A[2]	B[2]	A[1]	A	B[2]	C	A[1]	B[1]	B[1]	A	A	A[2]	A	B	A	A	A	B	A	A	D	D	A	A	A	B	A[1]	A	A	B	A	A	B	A	A	–
Benzyl	D	A	A	C	–	B	D	D	B[1]	–	A	A	A	D	A	D	B	C	A	D	C	D	–	D	A	B	B	B	–	A	A	B	B	A	A	–	A	–
Butyl	A[1]	A	A[2]	A	–	–	A	A	D	A[2]	A	A	A	A[2]	A	C	B	A	–	A	C	B	B	A[2]	A	A	A	B	A	A	A	B	A	A	A	A	A	–
Diacetone	–	A	–	A	–	A	B[1]	A	A	–	B[2]	–	A	B[1]	A[1]	D	A	D	B[1]	D	D	–	D	B[1]	D	A	A	A[1]	A	A	A	A	–	A	A	A	–	–
Ethyl	B[1]	A[1]	B	A[2]	–	A	B	A[1]	A[1]	B[2]	A	–	A	C	–	C	A	A	A	A	A	A	B	C	A	A	B	A	A	A	A	B	A	A	A	A	A	–
Hexyl	–	A	–	A	–	–	A	A	A	–	–	–	A	A[2]	–	A	C	B	–	A	A	–	B	A[2]	C	A	A	A	–	A	A	A	–	A	A	–	–	–
Isobutyl	B	A	–	A	–	A	A[2]	A	A[1]	–	A[1]	–	A[2]	A[1]	–	B	A	A	–	A	A	–	A	A[1]	A	A	A	B	–	A	A	C	–	A	B	A	–	–
Isopropyl	–	A	C	A	–	A	A[2]	A[1]	D	A[2]	A[2]	–	A[2]	A[1]	–	B	A	A	–	A	B	–	A	A[1]	A	B	B	B	–	A	A	A	B	A	B	A	A	A
Methyl	D	A	A	B[1]	B	A	A[1]	A	B[1]	B[1]	A[2]	A	A	A[1]	A	A	A	A	A[1]	A	A	A	A	A[1]	C	A	A	A[1]	A	A	A	A	B[1]	A	B	A	A	A
Octyl	A[1]	A	B[1]	A	–	–	A	A	A	–	–	–	–	–	–	B	A	B	–	B	B	–	B	–	B	A	A	A	–	A	A	A	A	C	A	–	–	–
Propyl	B[1]	A	A[2]	A	–	–	A[2]	A[2]	D	–	A	A	A	A[1]	A[2]	A	A	A	–	A	A	A	A	A[1]	A	A	A	A	A	A	A	A	A	A	A	A	A	–
Allyl Chloride	D	–	D	A	–	A	–	D	–	–	A	–	A	D	A	D	D	–	–	D	D	–	–	–	A[3]	B[2]	A	D	–	–	–	–	–	–	–	A	–	–
Aluminum Acetate (saturated)	–	–	A	A	–	–	–	–	–	–	A	A	A	A	A	A	A	D	–	–	D	–	D	–	A	A	A	B	–	–	–	–	A	A[3]	–	–	–	–
Aluminum Chloride	A	–	A	A[1]	C	A	B[2]	A	B[1]	A[1]	A	A	A	A[2]	A	A	A	B	A	A	A	–	B	A[2]	A	B	B	D	D	D	B[1]	D	B	A	B	A	A	–
Aluminum Chloride 20%	–	C	A	A[1]	–	A	B[2]	A	D	A[1]	A	A	A	A[1]	A	A	A	B	A	A	A	–	B	A[1]	A	D	C[1]	D	D	D	C[1]	D	–	A	B	A	A	B
Aluminum Fluoride	A	C	A	B[1]	–	A	A[2]	A[1]	A[1]	–	A	A	A	A[2]	A	A	A	A	–	B	A	–	B	A[2]	A	D	D	B[1]	–	–	C	D	D	B	A	A	–	B
Aluminum Hydroxide	B	A	A	B[1]	–	A	A[2]	A	A[1]	B[1]	A	–	A	A[2]	A	A	A	A[2]	A[1]	D	A	–	–	A[2]	A	A[1]	C[1]	B[1]	B	C	A[1]	A	D	B	B[1]	A	–	–
Aluminum Nitrate	–	B[1]	A	A[2]	–	–	A[2]	–	A[1]	A[1]	A[2]	–	A	B[2]	A[2]	A[2]	A[2]	A[2]	A[1]	A[1]	A[1]	–	B[1]	B[2]	A[2]	A	A	D	–	–	–	–	–	–	A	A[2]	–	–
Aluminum Phosphate	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	A	A	A	–	A	A	–	A	–	A	–	–	–	–	–	–	–	–	–	–	–	–	–
Aluminum Potassium Sulfate 10%	–	C	B	A[1]	–	A	A[2]	A[2]	D	A[1]	A	–	A	A[2]	B	A	A	A	A	A	A	–	A	A[2]	A	A	A	C	A	–	A	D	A[2]	C	A	A	–	–
Aluminum Potassium Sulfate 100%	–	C	B	A[1]	–	A	A[2]	A[2]	D	A[2]	A	–	A	A[2]	–	A	A	A	A	A	A	–	A	A[2]	A	D	B[2]	C	–	–	B	D	B	C	A	A	–	–
Aluminum Sulfate	A[2]	B[1]	A[2]	A[2]	B[1]	A	A[2]	A	A[2]	A	A	A	A	A[2]	A	A	A	A	A	A	A	A	A	A[2]	A	B	B[2]	B[1]	B[1]	B	B	D	A[2]	B	A	A	–	–
Alums	–	–	A	A	D	–	A	–	A	–	A	–	A	–	–	A	A[1]	–	–	A	B	–	A[1]	–	A	–	A	A	–	–	A	D	C	B	A	–	–	–
Amines	–	D	D	A[2]	A[1]	B	C[1]	D	D	D	B[2]	B	A[2]	D	–	D	B	D	A	B	B	–	B	D	D	A	A	B	B[1]	D	B	D	–	B	B	A	–	–
Ammonia 10%	–	D	A	A[2]	–	A	C[1]	A[1]	A	D	A[2]	A[1]	A	B[1]	A	A	A	D	A	D	A	–	–	B[1]	D	A	A	A[2]	–	D	A[1]	A	–	A	C	A	A	–
Ammonia Nitrate	–	C	B	A	–	–	A	A[1]	D	–	A	A	A	B	A	C	A	D	–	–	C	–	–	B	D	A	A	C	–	D	A	A	–	–	–	–	–	–
Ammonia, anhydrous	D	D	A[1]	A	D	A	B[2]	B[1]	A[1]	D	A	A[1]	A	A[2]	A	B	A	D	A	D	A	–	C	B	D	A	A[2]	A[1]	D	D	A	A	D	B	C	A	–	–
Ammonia, liquid	–	D	A	A[1]	–	A	C[1]	–	B[1]	D	A[2]	A[1]	A	A[1]	A	C	A	D	A	D	A	–	–	A[2]	D	B[2]	A[2]	A	–	D	B[2]	A	–	B	C	A	A	–
Ammonium Acetate	–	–	A	–	–	A	A	–	A	–	A	–	A	A	–	B	A	–	–	–	A	–	–	A	A	B	A	A	D	D	–	–	–	–	–	–	–	–
Ammonium Bifluoride	A[2]	D	A	A[1]	–	–	A[2]	A	–	–	A	–	A	A[2]	A	B	A[2]	–	–	–	D	–	–	A[2]	A	D	B[1]	B	–	D	B	D	–	B	–	A	–	–
Ammonium Carbonate	A[2]	D	A	A[2]	–	B	B[2]	A[2]	A[1]	–	A	A	A	A[2]	A	B	A	–	–	A	A	–	C	A[2]	A	B	B	B	D	D	B	D	–	B	A	A	A	A
Ammonium Caseinate	–	D	–	A	–	–	–	A	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	A	–	–	–	–	–	–	–	–	–	–	–
Ammonium Chloride	A[2]	B	A[2]	A[1]	A[1]	A	A[2]	A	B	A[2]	A	A	A	A[2]	A	B	A	A	A	A	B	–	C	A[2]	A	C	B[2]	B[1]	D	D	B	D	D	D	B	A	A	A
Ammonium Fluoride 25%	D	–	A	A	–	A	–	A	A	–	A[4]	–	A	A	A	A	A	–	–	A	A	–	–	–	A	D	D	D	D	D	–	–	D	A	A	A	–	–
Ammonium Hydroxide	B	C	A	A[1]	C	A	A[1]	A	A	D	A	A	A	A	A	D	A	A	A	D	A	–	A	A	B	A[1]	A[1]	B[2]	D	D	A	D	D	B	D	B	A	A	A
Ammonium Nitrate	–	A[2]	A[2]	A[2]	B[1]	A	A[1]	A	A[1]	–	A	A	A	A[2]	A	A	A	A	A[1]	C	B	–	C	A[2]	A	A[1]	A	B[1]	D	D	A	B	D	B	A	A	A	–
Ammonium Oxalate	–	B	–	A	–	A	–	–	–	A[1]	A	–	–	A	–	D	A	–	–	–	A	–	–	A	–	A	A	–	–	D	A	D	C	A	–	–	–	–
Ammonium Persulfate	A[2]	D	A	A[1]	–	A	A[2]	A[1]	D	–	A	–	A[1]	A[2]	A[1]	A	B	A	A	A	A	–	D	A[2]	A	A	B	D	D	D	B	D	D	B	A	A	A	A
Ammonium Phosphate, Dibasic	A[2]	B[2]	A	A[1]	–	–	A[2]	A	C[1]	A[2]	A	A	A[2]	A[2]	A	A	A	A	A	A	A	–	A	A[2]	A	B	C	B[1]	B[1]	D	A[1]	D	D	B	A	A	–	–
Ammonium Phosphate, Monobasic	–	B	A	A	B[1]	–	A	A	B	–	A	–	A	A	–	A	A	A	–	A	A	–	A	A	A	B	C	B	–	D	C	D	D	B	A	–	–	–
Ammonium Phosphate, Tribasic	–	B	A	A	–	–	C	A	B	–	A	–	A	A	–	A	A	A	–	A	A	–	A	A	A	B	B	B	–	C	–	D	D	B	A	–	–	–
Ammonium Sulfate	A[2]	B[1]	A	A[2]	B[1]	A	A[1]	A	A[1]	A[2]	A	A	A	A[2]	A	A	A	A	A	A	A	–	A	A[2]	A	B	B	A[1]	D	D	B	D	D	B	A	A	A	A
Ammonium Sulfite	–	D	A	–	B[1]	B	B[2]	A[2]	A[1]	–	A[2]	–	A[2]	A[2]	–	A[1]	A[1]	A[2]	A[2]	A[2]	A[1]	–	–	A[2]	D	B	B	D	–	A	A	D	D	–	–	D	–	–
Ammonium Thiosulfate	–	B	–	A	–	–	A	–	–	–	–	–	–	–	–	A	A[1]	–	–	–	A	–	–	–	–	–	A	–	D	D	–	D	D	–	A	–	–	–
Amyl Acetate	D	B[1]	D	A[2]	C[1]	–	C[1]	D	B[2]	D	B[1]	A	A	D	A[2]	D	A	D	A[1]	D	D	D	D	D	D	A[1]	A	A	A	A	A	C	A	A	A	A	A	–
Amyl Alcohol	A[1]	A	A[2]	B[2]	A[1]	A	B[2]	C	A[1]	B[1]	B[1]	A	A	A[2]	A	B	A	A	A	B	A	A	D	D	A	A	A	B	A[1]	A	A	B	A	A	B	A	A	–
Amyl Chloride	D	A	C	A[1]	–	B	D	D	C[1]	–	D	–	A	D	A	D	D	D	A	D	D	–	D	D	B[1]	A[2]	A[2]	A[1]	–	A	A[2]	A	A	A[1]	C	A	A	–
Aniline	D	A[1]	B[2]	D	D	B	C	D	A[2]	D	A[1]	A	A	C[1]	A[1]	D	B	D	A[2]	D	D	B	B	D	A	A	B	C	D	C	A	C	D	B	C	A	A	–
Aniline Chlorohydrate	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	B	–	–	–	–

Explanation of footnotes: 1. Satisfactory to 72°F (22°C) 2. Satisfactory to 120°F (48°C) 3. Satisfactory to 90°F (32°C) 4. Satisfactory to 200°F (93°C)

Delrin, Hytrel, Teflon—Reg TM E. I. DuPont de Nemours & Co.
Hypalon, Viton—Reg TM DuPont Dow Elastomers L.L.C.
Kynar—Reg TM Elf Atochem North America
Noryl—Reg TM General Electric Co.
Ryton—Reg TM Phillips Petroleum Co.
Santoprene—Reg TM Monsanto Chemical Co
Tygon—Reg TM Norton Co.
Hastelloy C—Reg TM Cabot Corp.

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Use suitable guards and/or personal protection when handling chemicals.

	Plastics															Elastomers										Metals										Non-metals		
CHEMICAL	ABS plastic	Acetal (Delrin®)	CPVC	Epoxy	Hytrel®	HDPE	LDPE	NORYL®	Nylon	Polycarbonate	Polypropylene	PPS (Ryton®)	PTFE (Teflon®)	PVC	PVDF (Kynar®)	Buna N (Nitrile)	EPDM	Hypalon®	PCTFE	Natural rubber	Neoprene	Santoprene®	Silicone	Tygon® (R-3603)	Viton®	304 stainless steel	316 stainless steel	Aluminum	Brass	Bronze	Carpenter 20	Cast Iron	Copper	Hastelloy-C®	Titanium	Carbon graphite	Ceramic Al_2O_3	Ceramic magnet
Aniline Hydrochloride	D	–	D	D	–	–	D	–	D	D	D	–	A	B[2]	A[2]	D	B	–	–	A	D	–	D	D	A	D	D	D	D	D	B	D	B	D	A	D	–	–
Antifreeze	B	D	A	A	–	–	–	A	D	–	D	–	–	A	–	A	A	–	–	A	C	–	C	B	A	–	A	A	–	A	A	A	–	–	–	–	–	–
Antimony Trichloride	A[2]	–	A[2]	D	–	B	B[2]	A[2]	D	A[2]	A	–	A	A[2]	A	B	B[1]	–	A	–	–	A	–	–	A[2]	D	D	D	D	A	B	–	–	–	B	–	B	–
Aqua Regia (80% HCl, 20% HNO_3)	D	D	C[1]	D	–	D	B[1]	D	D	D	B[1]	D	A	C[1]	A[2]	D	C	C	A	D	D	D	D	D	B	D	D	D	D	D	D	D	D	C	A[1]	D	–	C
Arochlor 1248	–	–	–	A[2]	C[1]	–	C[1]	–	A[1]	–	D	–	A	–	–	C[1]	B	D	A[1]	D	D	–	B	–	A	B	B	A	A[1]	A	–	B	–	A	A[1]	–	–	–
Aromatic Hydrocarbons	–	A	D	A	C[1]	–	C	D	–	–	D	–	–	D	–	D	D	D	–	D	D	–	D	–	A	–	C	A	–	C	–	A	–	–	–	–	–	–
Arsenic Acid	A[2]	D	A[1]	A[2]	–	B	B[2]	A[1]	C[1]	A[1]	A	A	A	A[1]	A	A[2]	A[2]	A	–	B	A	B	A	B	A[2]	A[2]	A[2]	D	D	B	A[1]	D	A	B	B	A	–	–
Arsenic Salts	–	–	–	–	B[1]	–	B	–	A	–	–	–	–	A	–	–	–	–	–	–	–	–	–	A	A	–	–	–	–	–	–	–	–	–	–	–	–	–
Asphalt	–	B[2]	A[2]	A	B[1]	–	A[1]	–	A	D	B[1]	A	A[1]	A[2]	A	B	D	D	A	D	D	–	D	–	A	B	A	A	B[1]	A[1]	A	A	A	–	–	A	–	–
Barium Carbonate	A[2]	A	A[2]	A[2]	–	–	B[2]	A[2]	A[1]	A[2]	A	A[2]	A	A[2]	A	A[2]	A	–	A	–	–	–	–	–	A	B[1]	B	D	B[1]	B	B[1]	A	A	B	A	A	A	A
Barium Chloride	A[2]	A	A[1]	A[2]	B[1]	B	A[1]	A	A	A	A	A	A	A[1]	A	A	A	A	A	A	A	–	A	B	A	A[1]	A[1]	D	B[1]	B[1]	B	C	B[1]	B	A	A	A	A
Barium Cyanide	–	B	D	A	–	–	B	–	A[1]	–	D	–	A[1]	D	–	C	A	A	–	–	C	–	–	–	A	A[1]	A[2]	C[1]	C[1]	C	A[1]	C[1]	D	A	–	–	–	–
Barium Hydroxide	A[2]	D	A[2]	A[2]	B[1]	–	B[2]	A[2]	A[1]	D	B	A	A	A[2]	A	A	A	A	A	A	A	–	A	–	A	B[1]	B	D	D	D	B[1]	D	–	B	B	A	A	A
Barium Nitrate	–	B[2]	A	A[1]	–	–	B[2]	A	A[1]	D	A	–	A[1]	A	–	A[2]	A	–	A	–	A	–	B	–	A	B[1]	B	B	D	D	B	A	B	–	A	–	–	–
Barium Sulfate	A[2]	B[2]	B[1]	A[2]	D	B	B[2]	A[1]	A[1]	D	B[1]	A	A	B[1]	A	A	A	A	A	A	A	–	A	–	A	B[1]	B[1]	B	B	C	B	B	B	A	B	A	A	A
Barium Sulfide	A[2]	A	A[2]	B[2]	–	A	B[2]	A[2]	A[1]	–	B	–	A	A[2]	A	A	A	A	–	A	A	–	A	–	A	B[1]	B[2]	D	D	D	A[1]	D	D	–	A	A	A	A
Beer	A[2]	A[1]	A[2]	A[2]	A[1]	A	A[2]	A[1]	A[1]	A[2]	A[1]	A[2]	A	A[2]	A	A	A	A	A	A	A	–	A	A	A	A	A	A	B	A[1]	A	D	B	A[1]	B	A	–	A
Beet Sugar Liquids	B	B	A[2]	A[1]	–	–	A[1]	A	A	–	A[1]	–	A[1]	A[2]	A	A	A	A	A	A	A	–	A	–	A	A	A	A	–	C	A	A	A	–	A	A	–	–
Benzaldehyde	B	A	D	D	B	B	A[1]	B	A[1]	D	D	A	A[1]	D	A[2]	D	A	D	A	D	D	D	D	D	D	B	B	B	–	A	A	A	B	A	A	A	A	A
Benzene	D	A[1]	D	C[1]	C	D	D	D	A[1]	D	D	A	A	C[1]	A[2]	D	D	D	B	D	D	D	D	D	A	B	B	B	–	A	A	A	B	B	A	A	A	A
Benzene Sulfonic Acid	–	–	D	B	B	A	A[1]	A	D	D	D	A	A	A	–	D	D	–	–	A	A	–	D	D	A	B	B	D	–	–	A	–	–	B	B	A	A	–
Benzoic Acid	–	B	A[1]	A[1]	D	A	A[1]	B	D	B[1]	B[1]	A[1]	A[2]	A	A	D	D	D	A	D	B	–	B	D	A	B	B	B	–	B	B	D	–	B[1]	A	A	A	A
Benzol	D	A	–	A[1]	C	–	C[1]	B	D	D	B	A	A	–	A	D	D	D	A	D	D	D	D	C[1]	A	A[1]	A[1]	B[1]	–	A	A	A	B	B	A	A	A	A
Benzonitrile	–	–	–	–	–	–	–	–	–	A[1]	–	–	A[2]	–	–	–	–	–	A[2]	–	–	–	A[1]	–	–	D	D	–	–	–	–	–	–	C	–	A	–	–
Benzyl Chloride	D	A	–	–	–	–	–	D	A[2]	–	C[1]	–	–	–	–	D	D	D	–	D	D	–	D	–	A[2]	C[1]	B[1]	D	–	D	–	–	D	C	–	A[1]	–	–
Bleach	B	D	A	D	–	–	–	A	A	–	D	D	A	A	A	D	B	B	D	D	B	–	–	B	A	A	A	A	–	–	D	D	–	A	–	–	–	–
Bleaching Liquors	–	–	–	D	–	–	A[1]	–	C	–	A[1]	–	A	A[1]	–	D	A	A	–	D	D	–	B	–	A	–	–	–	–	–	–	–	–	–	A	–	–	–
Borax (Sodium Borate)	–	B	A	A[1]	A[1]	A	A[2]	A[1]	A	–	B	A	A	A[1]	A	B	A	A	A	A	A	–	B	–	A	A	A	B[1]	–	B	A	A	B	B	B	A	–	A
Boric Acid	–	A	A	A[1]	A[1]	A	A[2]	A[1]	B	–	A	A	A	A[2]	A	A	A	A	A	A	D	A	A	A	A	B[2]	A[1]	D	–	B	B[2]	D	B	A	A	A	A	A
Brewery Slop	–	B	–	A	–	–	–	–	–	–	–	–	–	–	–	A	–	–	–	–	A	–	–	–	A	–	A	–	–	A	A	A	–	–	–	–	–	–
Bromine	D	D	D	D	D	D	D	A[1]	D	C[1]	D	D	A	C[1]	A	D	D	D	A	D	D	–	D	D	A	D	D	D	–	D	D	–	–	A	D	D	A	A
Butadiene	–	A	A[1]	A[1]	–	D	D	D	C[1]	D	C	A[1]	A[2]	C[1]	A	D	C	B	A	D	B	–	D	A	B	A	A[1]	A	–	C	A	–	C	C	–	A	–	–
Butane	B	A	C[1]	A[1]	–	–	C[1]	D	A[2]	D	A[1]	A	A	C[1]	A	A	D	B	A	D	A	–	D	A	A	A[2]	A[2]	A	–	C	A	–	C	A	A	A	–	–
Butanol (Butyl Alcohol)	–	A	A	D	B[1]	–	B[2]	A	B[1]	B[1]	A[1]	A	A[2]	C[1]	A	A	A	A	A[1]	A	A	A	B	D	A	A	A[1]	B	–	A	A	–	B	B	B	A	–	–
Butter	B	A	–	A	–	–	–	B	–	–	–	–	A	–	–	A	A	B	–	D	B	D	B	B	A	C	A	A	–	D	–	D	–	–	–	–	–	–
Buttermilk	B	A	A[1]	A[1]	–	–	A[1]	A	B[1]	A[1]	A[1]	–	A	A[1]	–	A	A[1]	–	A	D	D	–	A	B	A	A	A	A	–	D	–	D	–	A	–	A	–	–
Butyl Amine	–	C[1]	–	B[2]	–	–	C[1]	D	A[2]	D	B[1]	D	A[2]	D	A[1]	–	–	–	D	D	D	–	B[1]	D	D	–	A	A[2]	–	B	–	–	–	–	B[2]	B[2]	A[2]	–	–
Butyl Ether	–	D	D	A[1]	–	–	–	D	A[2]	–	D	A[2]	A[1]	A[2]	A[1]	B[2]	D	–	A[1]	D	D	–	D	A[2]	D	–	A[1]	A[1]	–	–	–	–	–	–	–	–	–	A[1]	–	–
Butyl Phthalate	–	–	D	B[2]	–	A	C[1]	A[2]	A[2]	D	B[2]	A	A[2]	–	B[1]	D	B[2]	D	A[1]	D	D	–	A[1]	–	C[1]	B[1]	B[2]	B[2]	–	–	–	–	–	–	B[2]	B	A[2]	–	–
Butylacetate	–	A	C[1]	B[1]	B	B	C[1]	B	A	D	B[1]	A	A	D	B[2]	D	B	D	A[1]	D	D	–	D	D	D	B	A	A	A	A	A	B[1]	A	A	A	A	A	A	A
Butylene	–	A	A	A[1]	–	–	B[1]	–	B[1]	D	–	A	A	A[1]	A	A	D	D	B[1]	D	D	–	D	–	A	A	A	A	–	D	A	–	–	A	–	–	–	–	–
Butyric Acid	D	A	D	A	B[1]	D	D	D	C[1]	D	B[1]	A	A[2]	B[1]	A	D	B	D	A	D	D	A	D	D	B[1]	B[2]	B[2]	B	–	D	B	D	C	A[1]	A	A	–	A
Calcium Bisulfate	–	–	–	A	–	–	–	–	–	D	–	–	–	–	–	A	A	–	–	A	A	–	C	–	–	–	A	–	–	C	–	D	–	–	–	–	–	–
Calcium Bisulfide	–	D	A[1]	A	B[1]	–	B[1]	A	A	–	A	–	A	A[2]	A	A[1]	C	–	A	D	A	–	C	–	A	B	B	C	–	C	B	–	–	A	A	–	–	A
Calcium Bisulfite	–	D	A[1]	A[1]	B	A	A[1]	A[1]	A[2]	D	A	A	A	B	A	A	D	A	A	D	A	–	A	–	A	B	A	D	–	–	B[1]	–	–	B	A	A	–	A
Calcium Bromide 38%	–	–	–	–	–	–	–	–	–	–	–	–	A	–	A	–	–	–	–	–	–	–	–	–	–	A	–	–	B	B	–	–	–	B	B	–	–	–
Calcium Carbonate	–	A	A	A[1]	–	–	B[1]	A[2]	A	C[2]	A	–	A	A[2]	A	A	A	A	–	A	A	–	A	–	A	A[1]	B	D	–	A	B[1]	–	B	B	B	A	A	–
Calcium Chlorate	–	A	A[1]	–	–	–	–	–	–	–	–	–	–	B[2]	A	A	A	B	–	A	–	–	–	–	A	–	–	–	–	–	–	–	A	–	–	–	A	–
Calcium Chloride (30% in water)	B	D	A[2]	A[1]	A[1]	A	B[2]	A	A[1]	–	A[2]	A	A	C	A	A	A	A	A	A	A	–	A	A	A	C[2]	B[2]	D	–	A	B	C	B	A	A	A	A	A
Calcium Chloride (saturated)	A	D	A	A[4]	–	A	–	A	A	–	A	A	A	A	A	A	A	A	–	A	A	–	A	–	A	B	B	B	B	B	–	–	B	A	A[2]	A	A	–
Calcium Fluoride	–	–	–	–	–	–	–	–	–	–	–	–	A	–	–	–	–	–	–	–	–	–	–	–	–	B	B	B	B	B	–	–	–	B	D	–	–	–
Calcium Hydroxide 10%	–	A	A	A	–	A	–	–	A	–	A	A	A	–	A	A	A	A	–	A	A	–	A	A	A	B	B	C[1]	–	–	–	–	B	B	A	A	A	–
Calcium Hydroxide (saturated)	A	–	A	A	–	A	–	A	A	–	A	A	A	A	A	A	A	A	A	–	A	–	A	–	A	B	B	D	B	C	–	–	B	A	A	A	A	–
Calcium Hydroxide	–	D	A[2]	A[1]	B[1]	A	A[2]	A[2]	A[2]	D	A[2]	A	A	B	A[2]	A	A	A	A	A	A	–	A	B[2]	A	B[1]	B	C[1]	–	D	B	A	–	A	A	A	A	A
Calcium Hypochlorite 30%	–	–	A	A	–	A	–	–	–	–	A	–	A	A	A	D	A	A	–	–	A	–	–	–	A	D	B	D	D	D	–	–	D	–	A	–	–	–
Calcium Hypochlorite (saturated)	A	–	A	A[2]	–	A	–	A	D	–	A	–	A	A	A	D	A	A	–	A	A	–	–	–	A	D	B	D	D	D	–	–	D	A	A	A	A	–
Calcium Hypochlorite	–	D	B[1]	A[1]	C[1]	A	A[1]	A	D	D	A[1]	A	A	B[1]	A	C[1]	B[1]	A	B[1]	A	D	–	B	A	A	C[1]	B[1]	D	–	D	C	D	–	B	A[1]	A	A	A
Calcium Nitrate	A	D	A[2]	A[2]	–	B	A[1]	A[2]	A[1]	A[2]	A[2]	A	A[2]	A[2]	A[2]	A[2]	A[2]	A[1]	A[1]	A[1]	A[2]	–	B[1]	A[2]	A[2]	C[1]	B[2]	B[1]	–	B[2]	–	B	–	B[2]	B[2]	A[2]	A	–
Calcium Oxide	D	A	A	A	A	–	B[1]	A	B	–	A	A	A	B	A	A	A	A	–	B	A	–	A	C	B	A	A	C	–	D	A	–	–	A	A	–	–	–
Calcium Sulfate	C	D	A[2]	A[2]	–	–	B[1]	A	D	A[2]	A	A	A	B[2]	A	A[2]	A	A	A	B	B	–	–	–	A	B	B	C	–	A	B[1]	A	–	B	A	A	A	A
Calcium Sulfide	–	–	A	–	–	–	–	–	–	–	A	–	A	A	A	A	A	A	–	–	A	–	–	–	A	–	–	–	–	–	–	–	–	–	–	–	–	–
Calgon	–	A	–	A	–	–	–	A	A	–	A	–	–	–	–	A	A	A	–	A	A	–	A	–	A	A	A	–	–	C	–	D	–	–	–	–	–	–
Cane Juice	–	A	A[2]	A	–	–	–	–	A	–	C[1]	–	A	A[1]	A[1]	A	A	A	–	A	A	–	A	A	A	A	A	B	–	A	A	A	–	–	–	–	–	–
Carbolic Acid (Phenol)	D	D	B[1]	C	D	–	D	D	D	D	B	A	A	D	A[1]	D	B	D	B	D	D	–	D	B	A	B	B	A	D	B	C	D	D	A	A	A	–	–
Carbon Bisulfide	–	A	D	A	C[1]	–	–	–	A	–	D	–	–	D	–	C	D	D	–	D	D	–	–	D	A	A	B	B	–	B	B	D	–	–	–	–	–	–

Explanation of footnotes: 1. Satisfactory to 72°F (22°C) 2. Satisfactory to 120°F (48°C) 3. Satisfactory to 90°F (32°C) 4. Satisfactory to 200°F (93°C)

Delrin, Hytrel, Teflon—Reg TM E. I. DuPont de Nemours & Co.
Hypalon, Viton—Reg TM DuPont Dow Elastomers L.L.C.
Kynar—Reg TM Elf Atochem North America
Noryl—Reg TM General Electric Co.
Ryton—Reg TM Phillips Petroleum Co.
Santoprene—Reg TM Monsanto Chemical Co
Tygon—Reg TM Norton Co.
Hastelloy C—Reg TM Cabot Corp.

Chemical Resistance Charts

Chemical–Ratings

A – No effect

B – Minor effect

C – Moderate effect

D – Severe effect; not recommended

— No data available

WARNING

The information in this chart was supplied to Cole-Parmer by other reputable sources and is to be used **ONLY** as a guide in selecting equipment for chemical compatibility testing. Always test the equipment with the specific chemicals and under the specific conditions of your application.

Ratings of chemical behavior listed in this chart apply to a 48-hour exposure period. Cole-Parmer does not warrant (neither expressed nor implied) the accuracy or completeness of this chart or that any material is suitable for any purpose.

⚠ DANGER

Variations in temperature, pressure, and concentration can cause equipment to fail, even though it passed an initial test.

SERIOUS INJURY MAY RESULT.

Use suitable guards and/or personal protection when handling chemicals.

	Plastics															Elastomers									Metals										Non-metals		
CHEMICAL	ABS plastic	Acetal (Delrin®)	CPVC	Epoxy	Hytrel®	HDPE	LDPE	NORYL®	Nylon	Polycarbonate	Polypropylene	PPS (Ryton®)	PTFE (Teflon®)	PVC	PVDF (Kynar®)	Buna N (Nitrile)	EPDM	Hypalon®	PCTFE	Natural rubber	Neoprene	Santoprene®	Silicone	Tygon® (R-3603)	Viton®	304 stainless steel	316 stainless steel	Aluminum	Brass	Bronze	Carpenter 20	Cast iron	Copper	Hastelloy-C®	Titanium	Carbon graphite	Ceramic Al_2O_3	Ceramic magnet
Carbon Dioxide (dry)	B	A	A	A[1]	A[1]	–	A[1]	A[1]	A[1]	–	A[2]	A	A	A[2]	A	A	B	B	A	B	B	–	B	A	B	A	A[1]	B[1]	B	A	A	D	–	A	A	A	–	–
Carbon Dioxide (wet)	B	A	A	A[1]	–	–	A[1]	A[1]	A[1]	–	A[2]	A	A	A[1]	A	A	B	B	A	B	B	–	B	A	B	A	A[1]	A[1]	–	A	A	D	–	A	A	A	A	–
Carbon Disulfide	–	A[1]	D	C[1]	–	D	C[1]	D	B[1]	D	D	A	A	D	B[2]	D	D	D	A	D	D	–	–	D	A[1]	A[1]	B	A	–	D	B	A	–	B	B	A	–	–
Carbon Monoxide	–	A	A[2]	A[1]	A	–	A[2]	A[2]	A[1]	–	A	–	A	A[2]	B	A	A	C	A[1]	D	B	–	A[2]	A	A	A	A	A	–	A	B	A	A	B	–	A	–	–
Carbon Tetrachloride	D	B[1]	D	A[1]	D	C	D	D	D	D	D	A	A	D	A[2]	D	D	D	A[1]	D	D	–	D	D	A	B	B	D	–	A[2]	B	D	A	A[1]	A	A	A	A
Carbon Tetrachloride (dry)	D	–	–	–	D	C	D	D	–	–	D	A[2]	A	–	A[2]	C[1]	B[1]	D	D	D	D	–	D	–	A[2]	B	B[2]	D	A[1]	B[2]	B	–	–	B	A[2]	A[2]	A	A
Carbon Tetrachloride (wet)	D	A[1]	D	–	–	C	–	D	–	–	D	A[2]	A	–	A[2]	D	D	D	A[1]	D	D	–	D	–	–	A[2]	A[2]	D	B[1]	A[2]	A	C	–	B	A[2]	A[2]	A	–
Carbonated Water	–	A	A	A	–	–	A	A	A	–	B	–	–	A	–	A	–	–	–	–	A	–	–	–	A	A	A	A	D	A	C	D	B	–	–	–	–	–
Carbonic Acid	–	B[1]	A	A[2]	D	B	B[2]	A[1]	A[1]	A[1]	A	A	A	A[2]	A	D	B	C	A	C	D	–	A	A	A	A[1]	A	B[1]	D	B	A	D	–	A[2]	B[1]	A	A	–
Catsup	B	B	A	A	–	–	–	A	A	–	A	–	–	A	–	A	A	–	–	–	A	–	–	–	A	A	A	D	–	A	C	D	D	–	–	–	–	–
Cellulose Acetate	–	–	D	A	–	–	–	–	–	–	A	–	A	D	D	D	A	D	–	–	A	–	–	–	D	B	B	A	B	B	–	–	B	B	B	–	–	–
Chloral Hydrate	A	–	A	–	–	D	–	–	–	–	D	–	A	A	A	–	–	A	–	–	–	–	–	–	D	D	–	–	–	–	–	–	–	–	–	A	–	–
Chloric Acid	–	D	A	–	–	–	–	D	D	–	–	–	A	A[2]	–	–	–	–	A	–	–	–	–	–	–	D	C[1]	D	D	D	A[1]	D	D	A[2]	–	D	–	–
Chlorinated Glue	–	D	–	A	–	–	–	–	–	–	–	–	–	–	–	B	B	–	–	–	D	–	–	–	A	–	A	–	–	A	A	D	–	–	–	–	–	–
Chlorine Water	–	D	A[2]	A[1]	–	C	B[1]	C[1]	C[1]	–	D	D	A	A[2]	B	D	C	C	A	C	D	–	D	–	A	C	C	D	D	B	A[2]	–	D	A[2]	A	A	A	A
Chlorine, Anhydrous Liquid	–	A[1]	D	C[1]	–	C	D	B[1]	D	C	D	D	A	D	A[1]	D	B	C	B[2]	C	D	–	D	B	A	C[1]	C	D	D	D	D	D	–	D	D	A	–	C
Chlorine (dry)	–	D	D	D	D	B	D	B[1]	D	–	D	D	A	D	A	B	A	D	D	D	C	–	D	A	A	–	B	C[1]	D	B	A	D	A	A[2]	D	A	–	–
Chloroacetic Acid	–	D	D	C[1]	D	A	D	–	D	D	C[1]	A	A	B[1]	A[1]	D	B	–	A[2]	D	D	D	D	A	D	B[1]	A[1]	D	D	C	B[1]	D	D	A[1]	A[1]	A	–	–
Chlorobenzene (Mono)	D	D	D	C[1]	D	D	C[1]	D	D	D	C[1]	A	B	D	A[1]	D	D	D	A[1]	D	D	D	D	A	A	A	B	A	B[1]	C	A	B	B	A	B	A	A	A
Chlorobromomethane	–	–	–	–	–	–	A	–	C	–	A	–	A	D	–	D	B	D	–	D	D	–	D	–	A	–	–	–	–	–	–	B	B	–	–	–	A	–
Chloroform	D	A	D	C[1]	D	D	C[1]	D	A	D	C[1]	A	A[1]	D	A	D	D	D	B[1]	D	D	D	D	D	A	A	A	B[1]	B[1]	B	A	B	A	A[1]	A[2]	A	A	A
Chlorosulfonic Acid	–	D	D	C[1]	D	D	D	D	D	C[1]	D	D	A	D	D	D	D	D	A[2]	D	D	–	D	D	D	D	B[2]	C	B	D	D	D	D	A[1]	A	A	A	–
Chocolate Syrup	–	A	–	A	–	–	–	A	A	A	A[2]	–	A	–	–	A	A	–	–	D	A	–	–	–	A	A	A	A	–	–	D	D	–	–	–	–	–	–
Chromic Acid 5%	B	D	A	D	D	A	A	A[1]	–	B	D	A	A	A[2]	A	D	A	B	A	B	D	D	C	B	A	B	A	C	D	B[1]	D	D	D	B	A	A	A	A
Chromic Acid 10%	B	D	A[2]	D	D	A	A	A[1]	–	B	D	A	A	A[2]	A	D	C	C	A	D	D	D	C	C	B	B	B	D	D	D	D	D	D	A	B	A	A	–
Chromic Acid 30%	B	D	A[1]	D	D	A	A	D	–	C	D	B	A	A[1]	A[2]	D	B	C	A	D	D	D	C	B	A	B[2]	B[2]	D	D	D	D	D	D	D	A	A	A	–
Chromic Acid 50%	D	D	D	D	D	A	A	D	–	D	D	A[1]	A	D	A[2]	D	B	C	A[2]	D	D	D	C	B	A	C	B[2]	D	D	D	D	D	D	B	A[2]	A[1]	A	A
Chromium Salts	–	–	–	–	B[1]	–	B	–	B	–	–	–	–	A	–	–	–	–	–	–	–	–	–	A	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Cider	–	A	–	A	B[1]	–	B	A	A	A	A	–	–	A	–	A	A	–	–	–	A	–	B[1]	–	A	A	A	B	–	A	A	D	–	–	–	–	A	A
Citric Acid	D	B[1]	B[2]	A[1]	A[1]	A	D	A[1]	A[1]	A[1]	A	A	A	B[2]	A	A	A	C	A[2]	A	A	A	A	–	A	B[1]	A[2]	C	D	D	B	D	D	A	A[2]	A	A	A
Citric Oils	–	B	–	A	–	B	–	A	–	–	A	–	–	–	–	A	B	–	–	–	D	–	–	–	A	A	A	C	–	A	D	D	–	–	–	–	–	–
Coffee	–	A	A	A	–	–	–	A	A	–	A	–	–	–	–	A	A	A	–	A	A	–	A	–	A	A	A	A	–	A	D	–	–	A	A	–	–	–
Copper Chloride	A	A	A	A	A[1]	–	–	A	D	–	A	A	A	A[1]	A	A	A	C	A	C	A	–	A[1]	A	A	D	D	–	–	D	D	–	–	D	–	–	A	A
Copper Cyanide	–	A	A	B[1]	–	–	B[2]	A[1]	D	D	A	A	A	A[2]	A	A	A	C	–	A	A	–	A	–	A	B	B	D	D	D	B	A	–	A[1]	B	A	A	A
Copper Fluoborate	–	B	A[1]	A	–	–	–	–	–	–	–	–	–	A	–	B	–	–	–	–	A	–	–	A	A	D	D	–	–	–	D	D	–	B	–	–	–	–
Copper Nitrate	–	A	A	A[1]	–	–	B[2]	A[1]	D	D	A	A	A	A[2]	A	B	–	–	A	C	A	–	–	B	A	A	A[2]	D	D	D	A	D	D	B[2]	B	A	A	A
Copper Sulfate 5%	–	D	A	A	A[1]	A	A[2]	A[1]	D	A[1]	A	A	A	A[2]	A	A	A	C	A	C	A	–	A	A	A	B	B	D	D	B	A	D	B	A	A	A	A	A
Copper Sulfate >5%	–	D	A	A	A[1]	A	A[2]	A[1]	D	A[1]	A	A	A	A[2]	A	A	A	C	A	C	A	–	A	–	A	B	B	D	D	D	B	D	–	A	A	A	–	A
Cream	–	A	A	A	–	–	–	A	A	–	A	–	A	–	–	A	–	–	–	–	D	–	–	–	A	A	A	A	–	A	D	D	–	–	–	–	–	–
Creosote	A	D	A	A	–	A	–	D	D	–	–	–	A	A	–	A	D	D	–	–	D	–	D	–	A	B	B	B	C	–	–	–	B	B	A	A	–	–
Cresols	D	D	D	A[1]	D	D	C[1]	D	D	D	D	A	–	D	A[2]	D	D	D	A[1]	D	D	D	D	D	A	A[2]	A	A	–	A	A[2]	C	A	B[2]	B	A	–	–
Cresylic Acid	–	D	D	D	–	–	B[1]	–	D	D	A[1]	–	A	D	B[1]	D	D	D	–	D	D	–	D	–	A	A[1]	A	B[2]	–	D	A	A	B	B[1]	A[1]	A	–	–
Cupric Acid	–	–	–	A[2]	–	–	B[1]	A[2]	D	A[1]	A[2]	A	A	A[2]	–	B[2]	A[2]	–	A[2]	B[2]	A[2]	–	A[1]	A[2]	A[2]	D	B[2]	D	–	–	–	–	–	A[1]	A[2]	A[2]	–	–
Cyanic Acid	–	D	–	A[1]	–	–	–	–	–	–	–	–	A	–	–	C	–	–	–	–	C	–	A[1]	–	A	A	A	–	–	–	D	D	–	–	–	A	–	–
Cyclohexane	–	A[1]	D	A[2]	A[1]	D	B[1]	D	A	B	D	A	A	D	A	B	D	D	A	D	D	D	D	D	A	A[1]	A	A	A	B	A[2]	B	B	B	A	A	–	A
Cyclohexanone	D	A	D	C	–	B	D	D	A	D	D	A	A	D	D	D	B	–	A[1]	D	D	–	D	D	D	A[1]	A[2]	A	–	B	–	B	B	A[1]	–	A	A	A
Detergents	B	A[1]	A	A[1]	–	A	D	A[1]	A[1]	A[1]	A	A	A	A	A	A	A	B	A	B	B	–	A	A	A	A[1]	A[1]	B	–	B	A[2]	–	–	B	A[2]	A	A	A
Dextrin	A	–	A	–	–	A	–	–	–	–	A	–	A	A	A	A	D	–	–	–	A	–	–	–	D	–	B	B	B	B	–	–	–	–	–	–	–	–
Dextrose	A	–	A	A	–	A	–	A	A	–	A	A	A	A	A	A	A	A	–	A	A	–	A	–	A	B	B	B	B	B	–	–	B	B	–	A	–	–
Diacetone Alcohol	–	–	D	A	–	A	A	–	A[1]	D	A[1]	–	A	D	D	D	A	A	B[1]	–	D	–	D	–	D	B[1]	B	A[1]	A[1]	B	–	–	A	–	–	A	–	–
Dibenzyl Ether	–	–	–	–	–	–	–	–	–	–	–	–	A	–	A	D	–	D	–	D	D	–	–	–	D	–	–	–	–	–	–	–	–	–	–	–	–	–
Dichlorobenzene	D	–	D	A	–	–	–	–	D	D	C[1]	–	A	D	A	D	D	D	–	D	D	D	D	–	C	–	B[1]	B[1]	–	B[1]	–	–	–	A[1]	–	A[2]	–	–
Dichloroethane	D	A[1]	D	D	–	C	C[1]	A[1]	A[1]	D	D	–	A[1]	D	A	D	–	C	A[2]	D	D	D	–	D	C	B	B	B[1]	B	D	–	–	A	A	B[1]	A	A	–
Diesel Fuel	–	A	A[1]	A	–	D	C[1]	D	D	A[2]	A[1]	A	A	A[1]	A	A	D	B	A[1]	D	B	B	D	D	A	A[1]	A[1]	A[1]	A[1]	A	A	A	A	B	B	A	–	–
Diethyl Ether	D	–	D	D	C	D	–	–	A[1]	D	A[1]	A	A	D	A[1]	D	D	D	C	D	D	A	D	–	D	B[1]	B[2]	B	B[1]	A[1]	–	–	A	B[1]	A[1]	A[2]	–	–
Diethylamine	D	B	D	A	–	D	D	–	A	D	A[1]	–	D	D	D	C	B	C	A	A	A	–	B	A	A	A	A	B	A	A	A	A	B	A	A	A	–	–
Diethylene Glycol	B	A[1]	A[1]	C	–	A	B[2]	A[1]	A[1]	B[1]	A[2]	–	A[2]	C[1]	A	A[2]	A[2]	C	–	A[1]	A[2]	A	B[1]	C[1]	A[2]	A[1]	A	B[1]	–	–	A	A	–	B[1]	A[1]	A[2]	–	–
Dimethyl Aniline	D	D	D	A[1]	–	B	–	D	A	D	D	A	A	D	A[1]	D	B[2]	–	A[2]	D	D	–	D	D	D	B[2]	B[2]	A[2]	–	–	–	–	–	B[2]	A[2]	A[2]	–	–
Dimethyl Ether	–	–	–	–	–	–	–	–	–	–	–	–	A	–	–	A	D	–	–	–	–	–	A	–	A	B	B	–	B	B	–	–	B	B	A	–	–	–
Dimethyl Formamide	D	D	D	D	–	A	A	D	A	D	A	A	A	D	D	D	B	D	A	C	D	A	C	D	C	A	B	A[1]	–	–	–	–	A	–	–	–	–	–
Diphenyl	–	–	–	–	–	–	–	–	–	–	D	–	A	–	–	D	D	B	B	D	B	–	D	–	A[2]	B	B	B[2]	B	B	–	–	B	B	B	–	–	–
Diphenyl Oxide	–	D	–	A	–	–	–	–	–	–	D	A	A[1]	D	B[2]	A	D	D	–	D	D	–	C	D	A	B[1]	A	B[1]	–	–	A	A	A	B[1]	A[1]	–	–	–
Disodium Phosphate	A	–	A	–	–	A	–	–	–	–	A	–	A	A	A	D	A	A	–	–	A	–	–	–	A	–	A	–	C	C	–	–	–	–	–	–	–	–
Dyes	–	C	–	A	–	–	–	A	A	–	–	–	–	B	–	–	–	–	–	–	C	–	–	C	A	A	A	B	A	–	C	–	A	–	–	–	–	–
Epsom Salts (Magnesium Sulfate)	B[2]	B	A[1]	A	–	–	A[2]	A[1]	A[1]	A[1]	A	A	A	A[1]	A	A	A	A	A	B	A	–	A	B	A	A	B	B[1]	A	A	C	A	A	B	A[1]	A	–	–

Explanation of footnotes: 1. Satisfactory to 72°F (22°C) 2. Satisfactory to 120°F (48°C) 3. Satisfactory to 90°F (32°C) 4. Satisfactory to 200°F (93°C)

Delrin, Hytrel, Teflon—Reg TM E. I. DuPont de Nemours & Co.
Hypalon, Viton—Reg TM DuPont Dow Elastomers L.L.C.
Kynar—Reg TM Elf Atochem North America
Noryl—Reg TM General Electric Co.
Ryton—Reg TM Phillips Petroleum Co.
Santoprene—Reg TM Monsanto Chemical Co
Tygon—Reg TM Norton Co.
Hastelloy C—Reg TM Cabot Corp.

Chemical Resistance Charts

Chemical–Ratings

A – No effect

B – Minor effect

C – Moderate effect

D – Severe effect; not recommended

— No data available

⚠ WARNING

The information in this chart was supplied to Cole-Parmer by other reputable sources and is to be used **ONLY** as a guide in selecting equipment for chemical compatibility testing. Always test the equipment with the specific chemicals and under the specific conditions of your application.

Ratings of chemical behavior listed in this chart apply to a 48-hour exposure period. Cole-Parmer does not warrant (neither expressed nor implied) the accuracy or completeness of this chart or that any material is suitable for any purpose.

⚠ DANGER

Variations in temperature, pressure, and concentration can cause equipment to fail, even though it passed an initial test.

SERIOUS INJURY MAY RESULT.

Use suitable guards and/or personal protection when handling chemicals.

	Plastics															Elastomers										Metals										Non-metals		
CHEMICAL	ABS plastic	Acetal (Delrin®)	CPVC	Epoxy	Hytrel®	HDPE	LDPE	NORYL®	Nylon	Polycarbonate	Polypropylene	PPS (Ryton®)	PTFE (Teflon®)	PVC	PVDF (Kynar®)	Buna N (Nitrile)	EPDM	Hypalon®	PCTFE	Natural rubber	Neoprene	Santoprene®	Silicone	Tygon® (R-3603)	Viton®	304 stainless steel	316 stainless steel	Aluminum	Brass	Bronze	Carpenter 20	Cast iron	Copper	Hastelloy-C®	Titanium	Carbon graphite	Ceramic Al_2O_3	Ceramic magnet
Esters, General	—	—	D	A	—	A	—	—	A	—	—	—	A	D	A	—	—	—	—	—	—	—	—	—	—	—	B	—	—	B	—	—	—	—	A	A	—	—
Ethane	—	A[1]	A[1]	A[1]	—	—	—	—	D	—	D	—	A	A[1]	A	A	D	B	—	D	B	—	D	A	A	A	A[1]	—	—	—	A	—	A	—	—	A	—	—
Ethanol	B[1]	A[1]	B	A[2]	—	A	B	A[1]	A[1]	B[2]	A	—	A	C	—	C	A	A	A	A	A	A	B	C	A	A	A	B	A	A	A	B	A	A	A	A	A	—
Ethanolamine	—	D	—	A[1]	—	—	—	A	A	—	D	A	A[1]	D	C[1]	B	B	C	D	B	B	—	B	—	D	A	A	B	—	A	A	—	D	B	B	A	A	—
Ether	D	A[1]	D	A[1]	—	D	D	D	A	—	D	A	A	D	B[1]	D	C	D	B[1]	D	D	—	D	D	C	A	A	B[1]	B[1]	A	A	C	A	B[1]	A[1]	A	—	—
Ethyl Acetate	D	A	D	A	B	A	A	A[1]	A[2]	D	A[1]	A	A	D	D	D	B	D	A[1]	C	D	A	B	D	D	B	B	A[2]	B	A	A	A	A	A	A[1]	A	A	—
Ethyl Acrylate	—	—	—	A	—	—	—	—	—	—	A	A	A	—	A	—	—	—	—	—	—	—	—	—	—	B	B	B	—	—	B	—	—	A	B	—	—	—
Ethyl Benzoate	D	—	D	—	—	B	C[2]	A[2]	—	D	B[1]	—	A	D	D	D	—	—	—	D	D	—	D	D	A[1]	—	—	—	—	—	—	—	A	—	—	—	—	—
Ethyl Chloride	D	A[1]	D	D	C	C	C[1]	D	A[1]	D	D	A	A	D	A	A	A	D	B	B	C	D	D	D	A	A	A	B	A	A	A	C	B	B[1]	A	A	A	—
Ethyl Ether	D	A[1]	D	A[2]	—	D	D	D	A[1]	—	D	A	A	D	A[2]	D	D	D	A[1]	D	D	—	D	D	D	B	B	B[1]	B	A	—	C	A	B[1]	A[1]	A[2]	—	—
Ethyl Sulfate	—	—	—	A[1]	—	—	—	—	—	—	—	—	A	—	—	A	—	—	A	—	—	—	—	—	A	D	D	—	—	D	A	—	B	—	—	A	—	—
Ethylene Bromide	D	—	D	—	—	—	D	—	—	D	D	—	A	D	A	D	C	C	B	C	C	—	D	D	A	A	A	B	—	B	—	—	—	B	B	A	—	—
Ethylene Chloride	D	A[1]	D	D	—	C	D	D	A	D	C[1]	A	A	D	A	D	D	D	A[1]	D	D	—	D	—	B	B	B	B	—	A	—	—	B	—	B[1]	A	—	A
Ethylene Chlorohydrin	D	D	D	D	—	—	D	—	D	D	D	—	A	D	A	D	B	C	—	C	A	D	C	D	A	B	B	B	B	B	—	—	B	B	B	A	—	—
Ethylene Diamine	D	D	D	A[1]	—	B	A	D	D	A[2]	—	A	A	D	B	A	A	B	D	B	B	—	A	—	B	B[1]	B	B[1]	D	B	—	—	D	C	A	—	—	—
Ethylene Dichloride	D	B[1]	D	D	C	D	D	D	A[1]	D	D	A	A	D	A	D	C	D	A	D	D	D	D	D	A	B	B	A[1]	B	C	C	A	—	B	B	A	A	—
Ethylene Glycol	A	B	A	A	A	A	A[2]	A	A	B[1]	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	A	B[1]	A	A	A	A	B[1]	A[1]	A	A	A
Ethylene Oxide	D	D	C[1]	D	A	B	A	A[1]	A[1]	C[1]	D	D	A	D	A	D	C	D	A	D	D	—	D	A	D	B	B	D	D	C	A	D	D	A	—	A	—	—
Fatty Acids	A	A	A	A	—	A	D	A[1]	A[1]	B[1]	A	—	A	A	A	B	D	B	A	C	C	D	C	D	A	B	A	A	C	A	C	C	D	A	B	A	A	—
Ferric Acetate	—	—	—	A	—	—	—	—	—	—	—	—	—	A	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Ferric Chloride	A	D	A	A	C	D	A[1]	A[2]	A	A[2]	A	A	A	A	A	A	A	B	A[1]	A	B	—	B	—	A	D	D	D	D	D	D	D	D	B[2]	A	A	—	—
Ferric Nitrate	A[2]	D	A	A	—	—	A[2]	A[2]	A[1]	A[1]	A	A	A	A	A	A	A	A	A	A	A	—	C	—	A	B	B	D	D	C	D	—	D	B[1]	A	A	—	—
Ferric Sulfate	A[2]	D	A	A	—	—	A[2]	A[2]	A[1]	A[1]	A	A	A	A	A	A	A	A	A	A	A	—	B	—	A	B[1]	A	D	D	C	D	D	D	A[1]	A[1]	A	A	—
Ferrous Chloride	A[2]	D	A	A	—	A	A[2]	A[2]	D	D	A	A	A	A	A	A	—	A	B[1]	A	A	—	—	—	A	D	D	D	D	C[1]	C	D	B	B[1]	A	A	—	A
Ferrous Sulfate	A[1]	D	A	A	—	—	A[2]	A[2]	D	A[1]	A	A	A	A	A	A[2]	A	B	A	B	—	—	—	—	B	B	B	B[1]	B[1]	B	D	D	B	B	A[1]	A	A	A
Fluoboric Acid	A[2]	A[1]	A[2]	D	—	A	A[2]	A[1]	D	—	A	A	A	A	A[1]	A	A[2]	A	B	A	A	—	—	—	B	B	B	D	—	B[1]	D	D	—	A[1]	D	A	C	A
Fluorine	A[1]	D	D	A[1]	—	D	D	—	D	C	D	D	D	D	A[1]	D	A[1]	—	A	C	—	D	D	D	C	C	A	A	A	C	D	D	C	B[1]	D	C	—	A
Fluosilicic Acid	A[2]	A[1]	A	C	—	B	A[2]	A[2]	D	A[1]	A	A	A	D	A[1]	A	A[2]	A	C	A	A	—	—	A	B[1]	C	B	D	B[1]	B[2]	D	D	D	B	D	A	C	A
Formaldehyde 40%	A[2]	A[2]	A[2]	A[2]	B	A	D	A	A	A[1]	A	A	A	A	A	B	A	B	A	B	B[1]	A	—	D	A	A[1]	A	B	A	A	A	B	B[2]	B	B	A	—	A
Formaldehyde 100%	B	A	A	A	—	A	B	A	D	A[2]	C	B	A	A	A	C	A	C	A	C	C	A	B	D	D	C	A	A	—	B	A	C	A[2]	A	A	—	—	A
Formic Acid	D	A[2]	A[2]	C[1]	B	A	D	A	D	A[1]	A[1]	A	A	A[1]	A	C	A	A[1]	A[1]	C	A	—	B	A	C	B[1]	A[1]	A	D	C	C	D	C	A	C[1]	A	—	A
Freon® 11	D	D	A[2]	A	A	A	C	B	D	—	A	A	A	A[2]	A	B	D	B	A	D	D	B	D	A	B	A	A	D	—	—	A	A	A	A	B	—	A	A
Freon® 12	A[1]	B	A[2]	A[2]	A	—	A[1]	D	A[1]	—	A[2]	A	A	A[2]	A	A	B	A	C	C	A	D	D	A	B	B[1]	B	B[1]	B[1]	B	A	A	A	A	B	—	—	—
Freon® 22	—	A	B	A	—	—	—	B	B	—	B	A	A	A	A	D	A	B	A	D	A	D	D	A	D	A	A	D	A	—	A	D	B	A	B	—	—	—
Freon® 113	—	A	B	A	A	—	—	D	—	B[1]	D	A	A	B	B	A	D	A	—	D	C	D	D	—	B	—	—	—	—	—	A	—	A	A	C	—	A	A
Freon® F-21	—	—	—	—	—	—	—	—	—	—	—	—	A	—	A	—	—	—	—	—	—	—	—	—	—	—	—	—	B	B	B	—	B	—	—	—	—	—
Freon® TF	—	A	B	A	A	B	—	—	D	—	D	D	A	B	B	A	D	A	—	D	A	D	D	—	B	A	A	D	—	—	A	A	A	A	B	—	A	A
Fructose	—	—	A	—	—	A	A	—	—	—	A	—	A	A	A	—	A	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Fruit Juice	B	D	A	A	—	—	A	B	A	—	B	—	A	A	A	A	—	B	A	D	A	—	—	A	A	A	A	A	D	—	C	D	A	A	A	—	A	A
Fuel Oils	D	A	—	A[1]	—	C	B	B	A[1]	B[1]	A	A	B	A[2]	B	A	D	C	A	D	B	—	D	D	A	A	A	C[1]	B	A	A	A	A	A[1]	A	A	—	—
Furan Resin	—	D	—	A[1]	—	—	D	—	—	—	D	A	A	A	D	D	C	D	A[1]	D	D	A	D	A	D	A[1]	A	A	—	—	A	—	—	B	—	—	—	—
Furfural	D	A	D	A[1]	—	A	D	D	B	D	D	A	A	D	B[2]	D	D	B	D	D	D	A	D	D	D	A	B	A[1]	—	B	A	B	A	B	A	A	—	—
Gallic Acid	—	—	C	—	—	A	A	A	A	—	A	A	B	B	A[1]	B	B	D	A	A	B	—	D	D	A	A	B	D	—	B	A	D	D	B[1]	B	B	—	—
Gasoline (high-aromatic)	D	B	C[1]	A	A	B	A	B	A	A	A	A	B	A	A	A	D	B	A	D	A	D	D	—	A	A	A	D	—	A	A	A	—	A	B	A	A	A
Gasoline, leaded, ref.	D	A	—	A[2]	A	B	—	B	A[2]	A[2]	B	A	A	B	A	A[2]	D	B	A[2]	D	B	D	D	D	A[1]	A[1]	A[2]	A	—	A[2]	—	—	B	A	A	A[2]	A	A
Gasóline, unleaded	D	A	C	A[2]	—	B	—	D	A[2]	A[2]	C[1]	A	A	C[2]	A	A[1]	D	A	A[2]	D	B	D	D	D	A[1]	A[1]	A[2]	A[2]	—	A[2]	A	A	B	A	A	A[2]	—	—
Gelatin	—	B	A[2]	B	—	A	A[2]	A[2]	A[1]	—	A	—	A	B	A	A	A	B	—	A	A	—	A	A	A	A[2]	A[2]	A	D	A	A	A	A	A	A	A	A	—
Glucose	B	A	A[2]	B	—	A	A[2]	A[2]	A	A[1]	A	B	A	A[2]	A	A	A	B	—	A	A	—	A	A	A	A[1]	A	A	A	—	A	A	A	A	A	A	—	A
Glue, P.V.A.	—	A	A	A	A	A	A[1]	—	A[1]	—	—	—	A	C	—	A	A	A	—	A	A	—	A	C	B	A[1]	A[2]	A	—	A	A	A	B	A	A	A	—	A
Glycerin	C	A	A	A	A	A	A[1]	A	A[1]	A[2]	A	A	A	A	A	A	A	A	A	A	A	D	A	A	A	A[2]	A	A	B	A	A	A	A	A	A	A	A	—
Glycolic Acid	B	A	A	A	—	—	A[2]	—	—	—	A	A	A	B	B	A	A	A	B	D	A	—	A	A	A	A	A	—	—	—	—	—	—	A	A	A	—	—
Gold Monocyanide	—	A	—	A	—	—	—	—	—	—	—	—	D	—	A	A	—	—	—	—	A	—	—	A	A	A	A	—	—	—	A	D	—	—	—	—	—	—
Grape Juice	B	A	A	A	—	—	B	—	A	—	—	—	A	A	A	A	—	—	—	D	D	—	A	B	A	A	—	—	—	A	C	D	—	—	A	—	—	—
Grease	—	D	—	A	—	—	—	—	—	—	—	—	A	A	A	A	D	—	—	D	D	—	D	A	A	—	A	—	A	A	A	A	A	A	—	—	—	—
Heptane	D	A	A	A	—	B	B[1]	B	A	B	C[2]	A	A	C[1]	A	A	D	B	A	D	B	A	D	D	A	A	A	A	A	A	A	A	A	A	A	A	—	—
Hexane	D	A	B[1]	A	A	C	D	B	B	D	B[1]	A	A	B[1]	A	A	D	B	A	D	B	A	D	D	A	A	A	A	A	A	A	A	A	A	A	A	A	—
Honey	—	A	—	A	—	—	B	—	A	A[1]	A	—	A	A	A	A	A	—	—	A	—	—	A	A	A	A	A	A	—	A	A	A	—	A	—	—	—	—
Hydraulic Oil (Petro)	—	B	—	A	—	A	C	—	A[1]	—	D	D	A	A	A	A	D	A	—	D	A	B	B	A	A	A	A	A	A	A	A	A	A	A	—	B	—	—
Hydraulic Oil (Synthetic)	—	—	—	A	—	A	A	—	A[1]	—	D	—	A	A	A	D	A	A	—	D	A	B	A	A	A	A	A	A	A	A	A	—	A	A	—	B	—	—
Hydrazine	—	B	D	A	C	D	—	—	—	D	C	—	A	—	A	B	A	B	—	C	B	—	B	D	A	A	A	—	—	—	D	D	A	—	—	—	—	—
Hydrobromic Acid 20%	—	C	A	B[1]	—	D	B[2]	B	D	—	A[2]	—	—	B[2]	A	D	A	A	A	A	D	—	D	A	A	D	D	D	D	—	C	D	D	A	A	A	—	A
Hydrobromic Acid 100%	B	D	A[2]	D	—	D	B[1]	B	D	—	C[1]	A[1]	A	A[1]	A	D	A	A	A	A	D	—	D	A	A	D	D	D	D	—	D	D	D	C	A	A	—	A
Hydrochloric Acid 20%	A	C	A[2]	A[1]	B	A	A[2]	A	D	B[1]	B[2]	D	A	A[2]	A	—	A	A	A	A	C	A	D	A[1]	A	D	D	D	—	D	D	D	D	A[1]	D	A	C	A
Hydrochloric Acid 37%	A	C	A[2]	A	C	A	B[2]	A	D	D	C	D	A	B	A	B	C	B	A	A	B	A	B	A[1]	A	D	D	D	—	D	D	D	D	B	D	A	C	A
Hydrochloric Acid 100%	A	C	A	—	—	D	—	A	D	D	B[1]	D	A	D	A	D	D	D	A	D	D	A	D	A[1]	A	D	D	D	D	D	D	D	D	A	D	A	C	A

Explanation of footnotes: 1. Satisfactory to 72°F (22°C) 2. Satisfactory to 120°F (48°C) 3. Satisfactory to 90°F (32°C) 4. Satisfactory to 200°F (93°C)

Delrin, Hytrel, Teflon—Reg TM E. I. DuPont de Nemours & Co. Kynar—Reg TM Elf Atochem North America Ryton—Reg TM Phillips Petroleum Co. Tygon—Reg TM Norton Co.

Hypalon, Viton—Reg TM DuPont Dow Elastomers L.L.C. Noryl—Reg TM General Electric Co. Santoprene—Reg TM Monsanto Chemical Co Hastelloy C—Reg TM Cabot Corp.

Chemical Resistance Charts

Chemical–Ratings

A – No effect

B – Minor effect

C – Moderate effect

D – Severe effect; not recommended

— No data available

⚠ WARNING

The information in this chart was supplied to Cole-Parmer by other reputable sources and is to be used **ONLY** as a guide in selecting equipment for chemical compatibility testing. Always test the equipment with the specific chemicals and under the specific conditions of your application.

Ratings of chemical behavior listed in this chart apply to a 48-hour exposure period. Cole-Parmer does not warrant (neither expressed nor implied) the accuracy or completeness of this chart or that any material is suitable for any purpose.

⚠ DANGER

Variations in temperature, pressure, and concentration can cause equipment to fail, even though it passed an initial test.

SERIOUS INJURY MAY RESULT.

Use suitable guards and/or personal protection when handling chemicals.

	Plastics															Elastomers									Metals									Non-metals		
CHEMICAL	ABS plastic	Acetal (Delrin®)	CPVC	Epoxy	Hytrel®	HDPE	LDPE	NORYL®	Nylon	Polycarbonate	Polypropylene	PPS (Ryton®)	PTFE (Teflon®)	PVC	PVDF (Kynar®)	Buna N (Nitrile)	EPDM	Hypalon®	PCTFE	Natural rubber	Neoprene	Santoprene®	Silicone	Tygon® (R-3603)	Viton®	304 stainless steel	316 stainless steel	Aluminum	Brass	Bronze	Carpenter 20	Cast iron	Copper	Hastelloy C®	Titanium	Carbon graphite	Ceramic Al_2O_3	Ceramic magnet
Hydrochloric Acid, Dry Gas	–	–	A	A	–	D	A[2]	A	A[1]	–	B	D	A	A[2]	A	–	–	–	A	–	–	A	–	–	–	D	D	D	D	A	D	–	D	A	C	A	–	A
Hydrocyanic Acid	B	B	A	A	C	A	A[2]	A[1]	B	–	A	B	A	B	A	B	B	A	–	B	B	A	C	A	A	B[1]	A	A	D	A	D	D	D	A	B	A	–	–
Hydrocyanic Acid (Gas 10%)	–	C	A	–	–	A	–	C	–	B[1]	A	–	A	A	–	B	A	–	–	B	A	A	D	A	A	–	–	–	–	–	D	–	–	–	A	–	–	–
Hydrofluoric Acid 20%	C	D	C[1]	A	–	A	A[2]	C[1]	C[1]	D	A[2]	A	A	B	A	D	D	B	B	B[1]	B	D	D	A	A	D	D	D	–	B[2]	D	D	B	B	D	A	–	B
Hydrofluoric Acid 50%	C	D	C[1]	C[2]	D	A	A[1]	D	D	D	A[2]	A	A	B[1]	A	D	D	B	B	B[1]	D	D	D	C	B	D	D	D	–	B[2]	D	D	B	B	D	A	–	B
Hydrofluoric Acid 75%	C	D	C[1]	B[1]	D	B	C[1]	D	D	D	C[1]	B	A	C	A	D	C	B	B	D	D	D	D	C	B	D	D	D	–	B[1]	D	D	B	B	D	A	C	B
Hydrofluoric Acid 100%	D	D	C[1]	–	D	D	–	D	D	D	C[1]	D	A	C	A	D	D	B	A	D	D	D	D	D	B	B[1]	B[1]	D	–	B[1]	D	D	B	B	D	–	–	B
Hydrofluosilicic Acid 20%	–	B	A	C[1]	–	B	B[2]	B[2]	D	–	A	A	A	A[2]	A	A	A	B	A	A	B	–	D	A	A	C[2]	B[1]	D	–	B[2]	D	B	B	B	D	A	–	–
Hydrofluosilicic Acid 100%	–	A	–	C[1]	–	C	B[1]	B[2]	D	–	A	A[1]	A	B[1]	A[1]	B	A	B	B	A	B	–	D	D	A	D	D	D	–	B[2]	D	D	–	B	D	A	–	–
Hydrogen Gas	–	–	A[2]	–	A	A	A[2]	A[1]	A[2]	A[2]	A	A	A	A[2]	A	A	A	A	B	B	A	–	C	A	A	A	A	A	–	A	A	–	A	A	A	A	–	–
Hydrogen Peroxide 10%	A	D	A	C[1]	–	A	A	A[2]	C[1]	A[2]	A	A	A	A[1]	A	D	A	D	A	B	D	–	A	B	A	B[2]	B	A	–	B[1]	C	C	D	A	A	C	–	A
Hydrogen Peroxide 30%	–	D	A	B	–	A	C[2]	A[2]	D	A[2]	B[1]	A[1]	A	A[1]	A	D	B	D	B	C	D	–	B	B	A	B[2]	B	A	–	B[1]	B	B	D	A	B[1]	C	–	A
Hydrogen Peroxide 50%	–	D	A	–	–	A	C[2]	–	D	A[2]	B[1]	–	A	A[1]	A[1]	D	B	D	A	C	D	–	B	B	A	B[2]	A[2]	A	–	B[1]	B	–	D	A	A	C	–	A
Hydrogen Peroxide 100%	A	D	A	A	–	A	C[2]	A	D	A	B[1]	C	A	A	A[1]	D	D	D	B	C	D	–	B	B	A	B[2]	A[2]	A	D	B[1]	D	B	D	A	B	C	A	A
Hydrogen Sulfide (aqua)	B	C	A	A	–	A	A	A[1]	C[1]	A	A[1]	A	A	B[1]	A	D	B	D	A[1]	C	A	–	C	A	D	C	A	B	–	A	D	D	–	A	B	A	A	A
Hydrogen Sulfide (dry)	–	–	A	A	A	A	A	–	C[1]	–	A[1]	A	A	A[2]	A	D	B	B	B	C	A	–	C	D	D	C[1]	A	B	D	B	D	D	D	A	A	A	–	–
Hydroquinone	D	A	A	–	–	–	A	–	D	–	A	–	A	B	–	D	D	D	–	A	A	–	–	–	B	B	B	B	–	–	–	–	B	B	B	A	–	A
Hydroxyacetic Acid 70%	–	A	A	A	–	–	A	–	–	–	–	–	A	D	A	A	A	–	–	–	A	–	–	–	A	–	–	–	–	–	D	B	–	–	A	–	–	–
Ink	A	B	–	A	–	–	–	–	C	–	–	–	A	C	A	A	–	–	–	D	A	–	–	C	A	C	C	–	–	–	D	D	A	–	–	–	A	A
Iodine	D	D	D	C	B	B	A[1]	C[1]	A	–	C	D	A	A	A[2]	B	B	D	A	D	D	–	–	A	A	D	D	A	–	A	D	D	D	A	A	D	–	–
Iodine (in alcohol)	–	D	–	–	–	B	B	–	C	–	–	–	–	A	A	–	A	–	–	–	–	–	–	–	–	–	–	B	–	B	–	–	–	B	B	–	–	–
Iodoform	–	–	–	–	–	–	–	–	–	–	–	–	C	A	C	D	A	–	–	B	A	–	–	C	–	A	A	–	–	–	A	–	B	D	B	–	–	–
Isooctane	–	–	–	A[2]	A	B	B	D	A[1]	B[1]	A[2]	A	A	A[1]	A[2]	A[2]	D	–	A[1]	A[1]	B[1]	D	D	D	A[1]	A[1]	A[1]	A[1]	A	A[1]	–	–	–	–	–	A[2]	–	–
Isopropyl Acetate	–	D	–	A	C	B	B[1]	–	B[1]	D	B[1]	–	A	D	D	D	B	D	–	D	D	–	D	D	D	C	A	D	–	A[1]	B	–	–	B	–	A	–	–
Isopropyl Ether	–	D	–	D	–	D	B	–	A[1]	D	B	–	A[1]	B	D	B	D	C	A	A	D	–	D	D	D	A	A	A	A	A	A	–	B	A	–	A	–	–
Isotane	–	–	–	A	–	–	–	–	D	–	D	–	–	A	A	A	–	–	–	–	D	–	–	–	A	–	–	D	–	–	–	–	–	–	–	–	–	–
Jet Fuel (JP3, JP4, JP5, JP8)	–	A[1]	–	A	–	D	D	D	C	A[1]	A[1]	A	A	C	B	A	D	D	A	D	D	D	D	D	A	A	A	A	–	A	A	A	A	A	A	A	–	–
Kerosene	D	A[2]	–	A	C	B	C[1]	D	A	D	B	A	A	A[2]	A	A	D	D	A	D	A	D	D	D	A	A	A	A	A	A	A	A	B	B	A	A	A	B
Ketones	A	D	–	C	–	D	C[1]	D	A[2]	D	C	A	A	D	C[1]	D	A	–	B[1]	A	D	D	–	D	D	A	A	B	–	A	A	–	A	A	A	A	A	–
Lacquer Thinners	A	D	–	A	D	D	A	D	A[1]	B	D	–	A	D	–	D	D	D	–	D	D	–	D	D	D	A[1]	A	A	A	A	A	C	A	A	C	A	–	–
Lacquers	A	D	–	A	–	D	A	D	A[1]	D	D	–	A	D	D	D	D	D	–	D	D	–	D	A	D	A[1]	A	A	–	A	A	C	A	A	–	A	–	–
Lactic Acid	D	B	A[1]	B[1]	D	A	A[1]	A	B	B	B	A	A	B[1]	B[1]	A	A	A	A[1]	A	A	–	A	A	A	B[1]	B[1]	B	D	B[2]	C	D	B	B[1]	A	A	A	–
Lard	–	A	–	B	–	A	A	A	A[1]	A[1]	B[1]	–	A	A[1]	A	A	D	B	–	D[1]	D	A	B	D	A	A	A	A	–	A	A	A	A	A	A	A	–	–
Latex	B	B	–	A	–	–	–	–	A[1]	–	A[2]	–	A	–	A	A	A	–	–	–	–	–	A	A	A	A[2]	A[2]	A	–	–	A	–	–	A	–	–	–	–	–
Lead Acetate	B	B	A[2]	A	–	A	A[2]	A[1]	A	–	A[1]	A	A	B	A	B	A	D	A	A	A	–	A	B	D	B	B[1]	D	–	B[1]	A	A	–	B[1]	A[1]	A	A	–
Lead Nitrate	B	–	A[2]	–	–	A	A[2]	A[1]	–	–	A[2]	A	A[1]	A[2]	A[2]	A[2]	A[2]	–	–	A[1]	A[1]	–	B[1]	A[2]	A[2]	B[1]	B[1]	D	–	B[2]	–	–	–	B[2]	–	A[1]	–	–
Lead Sulfamate	–	A	–	A	–	–	A[1]	–	B[1]	A[1]	A[2]	–	B	B	A	B	A	A	–	B	A	–	B	–	A	C	C	C	–	–	–	–	–	–	–	–	–	–
Ligroin	–	B	–	A	–	–	A	–	D	–	A[2]	–	A	–	A	A	D	C	–	D	B	–	D	A	A	–	A	D	–	–	A	–	–	–	–	–	–	–
Lime	–	B	–	A	–	–	A	–	A[1]	–	–	–	A[1]	B	A	A	D	–	–	–	A	–	–	A	A	A	A	A	–	–	A	A	–	–	A	A	–	–
Linoleic Acid	A	B	A[2]	–	–	–	A	–	–	–	B[1]	–	A	A[2]	A[2]	B[1]	D	D	–	D	–	–	B[1]	A[2]	B[1]	B	A	A[2]	–	–	–	–	D	–	–	A[2]	–	–
Lithium Chloride	–	A	A[2]	–	–	D	A[2]	–	–	B[1]	A[2]	–	A	D	A[2]	A[2]	A[1]	–	–	B[1]	A[1]	–	A[1]	A[2]	A[1]	A[1]	A[2]	D	–	A[2]	A	A	–	–	–	A[2]	–	–
Lithium Hydroxide	–	–	–	–	–	D	–	–	–	D	–	–	A	–	–	C	–	–	–	–	–	–	–	–	–	B	B	D	–	B	D	–	–	B	–	B	–	–
Lubricants	–	A	–	A	A	B	D	C[1]	A[1]	A[1]	A[1]	A	A	B[2]	A	A	D	A	–	D	D	–	D	B	A	A[2]	A[2]	A[2]	–	A[2]	A	A	A	A	A	A	–	–
Lye: KOH Potassium Hydroxide	A	A	A	A	D	B	A	A[1]	C	D	A	A	A	B	A	B[1]	A[2]	A	B	B	B	A	C	B	B	B	A[1]	D	D	D	B	B[2]	B	B[1]	D	C	D	A
Lye: NaOH Sodium Hydroxide	C	C	A	A	C	B	D	A	A	D	A	A	A	A	D	A[1]	B[1]	A	B	A[1]	B[2]	A	A[1]	B	B[1]	B	B[1]	D	D	D	D	D	B	C	B	–	A	–
Lye: $Ca(OH)_2$ Calcium Hydroxide	–	D	A[2]	A[1]	B[1]	B	A[2]	A[2]	A[2]	D	A[2]	A	A	B[2]	A[2]	A	A	A	A[2]	B[2]	A	A	A	B[2]	B[1]	B[1]	B	C[1]	–	D	B	A	–	A[1]	A	A	A	A
Magnesium Bisulfate	–	–	–	–	–	–	–	–	A[1]	A[1]	A[2]	–	A	A[2]	–	B	–	–	–	B[2]	B	–	–	A[2]	–	A[1]	A[1]	D	–	A[1]	–	–	–	–	–	A[1]	–	–
Magnesium Carbonate	B	A	A[2]	A	–	–	B	A[2]	–	A[1]	A	–	A[1]	B	A	A[2]	A	A	–	–	A	–	–	–	A	B	B	A	–	A	A	–	A	B	A	–	A	A
Magnesium Chloride	B	B[1]	A	A	C	A	A[1]	A[1]	A[1]	A[2]	A[2]	A[1]	A	B	A	A[2]	A	A[2]	A	A	A	–	A	–	A[2]	D	D	D	D	B	C	D	A[2]	A[2]	A[2]	A[2]	A[2]	A
Magnesium Hydroxide	B	A	A	A	C	B	A[2]	A[2]	B[1]	A[1]	A	A	A	A[2]	A	A	A	A	A	A	A	–	A	A	A	B	A[1]	C[1]	D	B	A	A	B	A	A	A	–
Magnesium Nitrate	B	A	A	A	–	B	A[2]	A[1]	A[1]	A[1]	A	A	A	A[2]	A	A	A	A	–	A	A	–	–	A	A	B	B	B	–	A	D	D	B	A	A	–	A	A
Magnesium Oxide	–	A	–	A	–	–	–	–	–	–	–	–	A	–	–	A	–	–	–	–	A	–	–	–	C	A	A	B	–	–	A	A	–	–	–	–	–	–
Magnesium Sulfate (Epsom Salts)	B[2]	B	A[1]	A	–	A	A[2]	A[1]	A[1]	A[1]	A	A	A	A[1]	A	A	A	A	A	B	A	–	A	A	A	A	B	B[1]	A	A	C	A	A	B	A[1]	A	–	–
Maleic Acid	–	A	A	A	–	A	B[2]	A[1]	A	–	A	B	A	A[2]	A	D	D	D	–	B	D	–	–	D	A	A	B	B[1]	–	B	A	A	–	B	A	A	–	–
Maleic Anhydride	–	D	–	A	–	A	D	–	–	–	D	–	A	–	A	D	D	D	–	D	D	–	–	–	A	A	A	A	–	–	–	–	–	–	–	–	–	–
Malic Acid	–	A	–	–	–	–	B[2]	–	A	–	A[1]	–	A	A[2]	A	A	D	D	–	B	D	–	B	A	A	A	A[2]	B[1]	B	B[2]	A	–	D	B	A	B	–	–
Manganese Sulfate	B[2]	A[1]	A	–	–	–	A[1]	A[2]	A[2]	A[1]	–	A[2]	A	C	A[2]	A[2]	A[2]	–	A[1]	A[2]	A[2]	–	A[1]	A[1]	A[2]	B	B[2]	B[1]	D	A[2]	C	A	B	A[2]	A[2]	A[2]	A	–
Mash	–	A	–	A	–	–	A	–	A	–	–	–	–	–	–	A	A	–	–	–	A	–	–	A	A	A	A	A	–	–	A	–	–	–	–	–	–	–
Mayonnaise	–	A	–	A	–	–	D	–	A	–	–	–	A	D	A	C	–	–	–	D	A	–	–	D	A	C	A	A	–	–	D	D	B	A	–	–	–	–
Melamine	–	A	A[2]	A	–	–	–	–	A	–	A	–	A	D	–	C	A	–	–	–	D	–	C	D	A	–	D	–	–	–	D	D	–	–	–	D	–	–
Mercuric Chloride (dilute)	B	B	A	A	B	A	A	A[2]	D	A	B	A	A	A	A	A	A[1]	A	A	A	A	–	–	D	A	D	D	D	D	D	D	D	C	A[1]	C	A	–
Mercuric Cyanide	B	–	A	A	–	–	A	–	A[2]	–	B	A	B	A	A	A	A[1]	–	D	–	A	–	A	–	A[1]	C	C	D	–	D	–	C	D	A	A	–	A	–
Mercurous Nitrate	C[2]	–	A[2]	–	–	–	A	A[2]	–	A[2]	A	–	A	A	A	B[1]	A[1]	–	–	B[1]	B[1]	–	–	A[2]	A[1]	A[1]	A[1]	D	–	–	–	–	–	A[1]	A[1]	C	A	A
Mercury	B	A	A	A	B	A	A	A[1]	A	D	B	–	A	A	A	A	A	A	A	A	A	–	–	A	A	A	A	D	D	A	D	A	D	A[2]	A	C	A	A
Methane	–	A	–	–	–	–	–	–	A	–	A	–	A	B	A	A	D	B	–	D	B	D	D	A	A	A	A	A	–	A	A	–	–	A	–	B	–	–

Explanation of footnotes: 1. Satisfactory to 72°F (22°C) 2. Satisfactory to 120°F (48°C) 3. Satisfactory to 90°F (32°C) 4. Satisfactory to 200°F (93°C)

Delrin, Hytrel, Teflon—Reg TM E. I. DuPont de Nemours & Co.
Hypalon, Viton—Reg TM DuPont Dow Elastomers L.L.C.
Kynar—Reg TM Elf Atochem North America
Noryl—Reg TM General Electric Co.
Ryton—Reg TM Phillips Petroleum Co.
Santoprene—Reg TM Monsanto Chemical Co
Tygon—Reg TM Norton Co.
Hastelloy C—Reg TM Cabot Corp.

Chemical Resistance Charts

Chemical–Ratings

A – No effect

B – Minor effect

C – Moderate effect

D – Severe effect; not recommended

— No data available

⚠ WARNING

The information in this chart was supplied to Cole-Parmer by other reputable sources and is to be used **ONLY** as a guide in selecting equipment for chemical compatibility testing. Always test the equipment with the specific chemicals and under the specific conditions of your application.

Ratings of chemical behavior listed in this chart apply to a 48-hour exposure period. Cole-Parmer does not warrant (neither expressed nor implied) the accuracy or completeness of this chart or that any material is suitable for any purpose.

⚠ DANGER

Variations in temperature, pressure, and concentration can cause equipment to fail, even though it passed an initial test.

SERIOUS INJURY MAY RESULT.

Use suitable guards and/or personal protection when handling chemicals.

	Plastics														Elastomers									Metals										Non-metals		
CHEMICAL	ABS plastic	Acetal (Delrin®)	CPVC	Epoxy	Hytrel®	HDPE	LDPE	NORYL®	Nylon	Polycarbonate	Polypropylene	PPS (Ryton®)	PTFE (Teflon®)	PVC	PVDF (Kynar®)	Buna N (Nitrile)	EPDM	Hypalon®	PCTFE	Natural rubber	Neoprene	Santoprene®	Silicone	Tygon® (R-3603)	Viton®	304 stainless steel	316 stainless steel	Aluminum	Brass	Bronze	Carpenter 20	Cast iron	Copper	Hastelloy-C®	Titanium	Carbon graphite	Ceramic Al_2O_3	Ceramic magnet
Methanol (Methyl Alcohol)	D	A	A	B[1]	B	A	A[1]	A	B[1]	B[1]	A[2]	A	A	A[1]	A	A	A	A	A[1]	A	A	A	A	D	C	A	A	A[1]	A	A	A	A	B[1]	A	B	A	A	A
Methyl Acetate	D	B	–	D	–	C	B[1]	–	A[2]	D	D	–	A	D	B[1]	D	B	D	A	D	B	–	D	D	D	D	A	A	–	A	A	A	B	A	–	A	–	–
Methyl Acetone	–	D	–	C	–	–	–	–	A	–	–	–	A	D	D	D	A[1]	–	–	A	D	–	–	A	D	A	A	A	A	A	B	A	–	–	–	A	–	–
Methyl Acrylate	–	B	–	A	–	–	–	–	–	–	D	–	–	–	B[1]	D	B	D	–	D	B	D	D	–	D	A	–	–	–	–	–	A	–	–	–	–	–	–
Methyl Alcohol 10%	D	A	A	B[1]	B	A	A[1]	A[2]	B[1]	B[1]	A[2]	A	A	A[1]	A	A	A	A	A	A	A	A	A	A[1]	C	A	A	A[1]	A	A	A	A	A	A	B	A	A	A
Methyl Bromide	D	D	D	B	–	–	C[1]	–	B[1]	–	C	–	A	D	A	B[1]	D	D	–	D	D	D	–	D	A	A	A	D	–	–	–	A	B	–	–	A	–	–
Methyl Butyl Ketone	–	D	–	C	–	–	–	–	D	D	D	–	–	A	D	D	A[1]	D	–	D	D	–	D	–	D	A	A	–	–	–	A	–	–	–	–	–	–	–
Methyl Cellosolve	–	D	D	C	–	–	–	–	C	D	B	–	A	D	A	A[1]	B[2]	D	–	D	B	–	D	C	D	B	B	B	A	A	–	C	B	–	–	A	–	–
Methyl Chloride	D	B	D	A	–	–	C[1]	D	B[1]	D	D	B	A	D	A	D	D	D	A	D	D	D	D	D	A[1]	A	A	D	A	B[2]	C	D	–	B	A	A	–	–
Methyl Dichloride	–	D	–	A	–	–	–	–	C	–	D	–	–	A	D	D	D	–	–	–	–	–	–	–	A[1]	–	–	–	–	–	–	–	–	–	–	–	–	–
Methyl Ethyl Ketone	D	C	D	C[1]	B	D	D	D	A[1]	D	B[2]	A	A	D	D	D	A[2]	D	A	D	D	D	D	D	D	A	A	B	A	A	A	A	A	A	A	A	A	A
Methyl Ethyl Ketone Peroxide	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	D	D	D	–	D	D	–	B	–	D	–	–	–	–	–	–	–	–	–	–	–	–	–
Methyl Isobutyl Ketone	D	–	D	C	B	D	C	D	B[2]	D	A	A	A	D	D	D	B[1]	D	A	D	D	D	D	D	D	B	B	B	–	A	C	C	B	A	A	A	–	–
Methyl Isopropyl Ketone	–	–	–	A	–	–	D	D	A	D	–	–	A	D	–	D	C[1]	D	–	D	D	–	C	–	D	A	A	A	–	A	–	C	A	–	–	A	–	–
Methyl Methacrylate	–	D	–	A	–	–	–	–	–	–	D	–	–	A	B[1]	D	D	D	–	D	D	C	C	–	D	B	B	–	–	–	–	C	–	–	–	–	–	–
Methylamine	D	D	–	A	–	–	A[1]	–	–	–	A[2]	–	A	D	C	B	A[1]	–	A	B	–	–	–	D	D	A	A	A	D	A[2]	D	A	–	–	–	A[2]	–	–
Methylene Chloride	D	B	D	A	D	D	D	D	C[1]	D	B[1]	A	A	D	B[1]	D	C[1]	–	A	B	–	D	–	D	B	B	B	C	A	B	A	B	B	B	B	A	–	–
Milk	B	A	A	A	–	–	A	A[2]	A	A	B	–	A	A[2]	A[2]	A[1]	A	A	A	A	A	–	A	A	A	A	A	A	D	A	C	D	D	A	A	A	A	A
Mineral Spirits	D	A	A	A	–	D	B	A	A	C	B	A	A	A	–	A	D	C	A	D	C	–	D	D	A	A	A	A	–	A	C	B	–	B	B	A	–	–
Molasses	B	A	A	A	–	A	A	A[2]	A[1]	–	B	–	A	A	B[1]	A	A[1]	–	A	A	A	–	–	A	A	A	A	A	B	A	D	B	A	A	A	A	A	A
Molybdic Acid 5%	–	–	–	–	–	–	–	–	–	–	–	–	A	–	–	–	–	–	–	–	–	–	–	–	–	A	A	–	–	–	A	–	–	A	–	–	–	–
Monochloroacetic acid	–	D	–	–	D	D	–	–	D	D	–	–	A[2]	–	B[1]	D	C	A[2]	B	–	A[1]	D	–	–	C	A[1]	A[1]	D	B	B[1]	–	D	D	A[2]	A[2]	B[2]	–	–
Monoethanolamine	–	D	–	A	–	–	C	A	A	–	B	A	A	D	C	B[1]	B	D	–	B	D	–	B	D	D	A	A	B	–	A	–	A	D	–	B	A	–	–
Morpholine	C	–	–	–	–	–	–	D	A[2]	D	B[2]	C	A[2]	–	B[1]	D	D	–	–	A[1]	D	–	–	–	–	–	A[1]	A[1]	–	–	–	–	–	A[1]	–	A[1]	–	–
Motor oil	C	B	A	–	B	–	C[1]	A	A[2]	A	A[1]	A	A	B	B	A	D	–	A	–	B[1]	–	–	D	–	A[1]	A[2]	A[1]	–	A[1]	–	–	–	–	A[1]	A[2]	A	A
Muriatic Acid	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	A	–	–	–	–	A	–	–	–	–	–	–	–	–	A	–	–	–	–
Mustard	B	C	A	A	–	–	A	A	A	A	A	–	A	B	A	B	A	–	–	B	A	–	–	B	D	A	A	B	–	A	D	D	–	A	A	A	–	–
Naphtha	D	A[1]	A	A	B	–	A[1]	D	A	B	B	A	B	A[1]	A	A	D	D	A	D	D	D	D	D	A	A	A	A	A	A	B	B	A	B	B	A	–	–
Naphthalene	D	A[1]	D	A	B	B	C	D	A[1]	–	B	A	A	D	A[2]	D	D	D	A	D	D	D	D	D	A	A	A	B[1]	–	A	C	A	–	A	A	A	A	–
Natural Gas	B	B	–	–	–	–	A	–	–	–	A	–	A	A	–	A	D	–	–	–	A	D	A	A	A	A	A	A	–	A	–	A	–	–	–	–	–	–
Nickel Chloride	A	A	A	A	–	B	A	A[1]	C[1]	A[2]	A	A	A	A	A	A[1]	A[1]	A	A	A	B	–	A	B	A	D	C	D	D	B[1]	D	D	–	B	A	A	A	–
Nickel Nitrate	A	–	A[2]	A[1]	–	B	A	A[2]	A[1]	D	A[2]	–	A[2]	A	A[2]	A[1]	A[2]	D	A	A[1]	A[2]	–	–	A[2]	A[2]	B	B[2]	D	–	A[2]	–	C	–	B[2]	–	–	A	A
Nickel Sulfate	B	A	A	A	–	B	A	A[1]	A[1]	A	A	A	A	A	A	A[1]	A[1]	A	A	B	A	–	A	A	A	B	B[1]	D	D	B	C	D	–	B	B	A	A	–
Nicotinic Acid	–	–	A	–	–	A	A	–	–	–	A	–	A	A	A	–	A	–	–	–	A	–	–	–	–	–	B	–	–	B	–	–	A	–	–	–	–	–
Nitrating Acid (≤1% Acid)	–	–	–	–	–	–	–	–	–	–	C	C	A	D	–	–	–	–	–	C	A	–	–	D	–	C	A	D	–	–	D	–	–	A	–	–	–	–
Nitrating Acid (≤15% H_2SO_4)	–	–	–	–	–	–	–	–	–	–	C	C	A	D	–	–	–	–	–	C	A	–	–	D	–	C	C	D	–	–	D	A	–	A	A	–	–	–
Nitrating Acid (>15% H_2SO_4)	–	D	–	D	–	–	–	–	–	–	C	D	A	D	–	D	A[1]	–	–	C	A	–	–	D	–	C	C	D	–	–	D	C	–	A	C	–	–	–
Nitrating Acid (<15% HNO_3)	–	–	–	–	–	–	–	–	–	–	C	C	A	D	–	–	–	–	–	C	A	–	–	D	–	C	D	D	–	–	D	C	–	A	C	–	–	–
Nitric Acid (5-10%)	B	D	A	A[1]	C	A	B	A	D	A	A	B[1]	A	A[1]	A[1]	D	A[1]	B	A	D	B	D	C	D	A	A	A	A	D	A[1]	D	D	D	A[1]	A[1]	A	A	–
Nitric Acid (20%)	B	D	A[2]	B[1]	D	B	C	B[2]	D	B[1]	A[2]	C	A	A[1]	A	D	A[1]	D	A[1]	D	D	D	D	D	A	A	A	D	D	A[1]	D	D	D	A[1]	A[1]	A	A	–
Nitric Acid (50%)	C	D	B[1]	D	D	D	B[1]	B[2]	D	B	B	C	A	B[1]	A[1]	D	D	D	A	D	D	D	D	D	A	A[2]	A[1]	D	D	A[1]	D	D	D	A[1]	A[1]	D	A	C
Nitric Acid (Concentrated)	D	D	D	D	D	D	C[1]	B[1]	D	C[1]	D	C	A	B[1]	A[1]	D	D	D	A[1]	D	D	D	D	D	A	A[1]	A[1]	D	D	A[2]	D	D	D	B[1]	A[1]	D	A	C
Nitric Acid:Sulfuric Acid 50:50	–	–	–	–	–	–	–	–	–	–	–	–	A	–	A	–	–	–	–	–	–	–	–	–	–	A	A	–	–	A	A	–	–	–	–	–	–	–
Nitrobenzene	D	C	D	C[1]	D	D	C[1]	D	B[1]	D	B[1]	A[2]	A	D	A[1]	D	B[1]	D	A[1]	D	D	–	D	D	B	B	B	B	–	A	C	C	B	D	A	B	–	–
Nitrogen Fertilizer	–	–	–	–	–	–	–	–	–	–	–	–	A	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Nitromethane	D	A	–	–	C	D	A	D	B[1]	D	B[2]	A[2]	A	B[2]	A[2]	D	B[2]	–	A	B[1]	D	–	D	D	D	A	A[1]	A	–	–	–	–	A	A	–	A[2]	–	–
Nitrous Acid	D	–	A	D	–	–	–	–	–	–	A	–	A	A	B	–	A	–	B	C	D	–	–	A	B	B	B	D	D	B	A	–	C	D	–	–	–	–
Nitrous Oxide	–	–	–	–	–	–	C	–	C	–	D	–	A	A	D	–	A	–	–	A	A	–	–	A	B	B	B	B	B	D	B	–	B	B	–	C	–	–
Octane	–	–	–	A	–	–	A	–	–	–	A	A	A	A	A	–	–	–	–	–	–	–	–	–	A	–	B	B	B	B	B	–	B	A	–	–	–	–
Oils: Aniline	D	D	–	A	D	–	–	D	A	–	A	–	A	D	A	D	B	D	–	D	D	–	D	D	C	A	A	D	D	A	A	A	D	B	D	–	–	–
Anise	–	D	–	A	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	D	–	–	–	–	–	A	–	–	A	A	A	–	–	–	–	–	–
Bay	–	D	–	A	–	–	–	–	–	–	–	–	–	–	A	–	–	–	–	–	D	–	–	–	A	–	A	–	–	A	A	A	–	–	–	–	–	–
Bone	–	D	–	A	–	–	–	–	–	–	A	–	A	–	A	A	–	–	–	–	D	–	–	A	A	–	A	–	–	A	A	A	–	–	–	–	–	–
Castor	A	A	C	A	B[1]	–	–	–	A	–	A	–	A	A	A	B	B	A	–	A	A	–	A	A	A	A	A	A	A	–	A	A	A	–	A	–	A	A
Cinnamon	–	D	–	A	–	D	D	–	–	D	D	–	A	D	–	–	–	–	–	–	C	–	–	–	A	A	A	–	–	–	A	–	–	A	–	–	–	–
Citric	D	A	–	A	–	–	A	A	A	A	A	–	A	B	A	D	B	–	–	–	D	–	–	D	A	A	A	A	B	–	D	D	–	A	–	–	–	–
Clove	–	–	–	A	–	–	–	–	–	–	–	–	A	–	–	A	–	–	–	–	C	–	–	–	A	A	A	B	–	–	A	–	–	A	–	–	–	–
Coconut	A	A	A[1]	A	–	–	A	–	–	–	A[1]	–	A	A[1]	A	A	D	C	–	D	C	–	A	A	A	A	A	A	–	–	A	A	–	A	–	–	–	–
Cod Liver	A	B	A[1]	A	–	–	–	–	–	–	A[1]	–	A	A[1]	A	A	A	B	–	D	B	–	B	–	A	A	A	A	–	–	A	–	–	A	–	–	–	–
Corn	B	A	–	A	A	–	A	A	A	–	A[2]	–	A	B	A	D	C	B	–	D	A	–	A	B	B	A	A	A	–	–	C	A	B	A	–	–	–	–
Cottonseed	A	A	A	A[1]	A[1]	–	A	A	B	–	A	A	A	B[2]	A	A	D	B	A	D	C	–	A	B	A	A	A	A	A	–	A	A	A	A	A	A	A	–
Creosote	–	D	–	A	D	–	C	D	D	–	C	–	A	C	–	D	D	D	A	D	C	–	D	–	A	B	B	B	–	A	C	–	–	B	A	A	–	–
Crude Oil	A	A	A	A	–	D	–	D	A	–	A	A	A	A	A	A	D	D	–	D	D	–	–	–	A	A	A	A	B	C	–	–	B	A	A	A	–	–
Diesel Fuel (20, 30, 40, 50)	–	D	–	A[1]	A[1]	–	A	D	A	–	A[1]	A	A	B	A	A	D	B	A[1]	D	B	–	D	A	A	A	A	A	–	A	A	A	–	B	B	A	–	–
Fuel (1, 2, 3, 5A, 5B, 6)	D	D	–	A[1]	A	–	B	A[1]	A	B	B	A	A	A[2]	B	A	D	D	A	D	D	–	C	A	B	A	A	C[1]	B	A	A	A	A	A[1]	B	A	–	–

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Delrin, Hytrel, Teflon—Reg TM E. I. DuPont de Nemours & Co. Kynar—Reg TM Elf Atochem North America Ryton—Reg TM Phillips Petroleum Co. Tygon—Reg TM Norton Co.

Hypalon, Viton—Reg TM DuPont Dow Elastomers L.L.C. Noryl—Reg TM General Electric Co. Santoprene—Reg TM Monsanto Chemical Co Hastelloy C—Reg TM Cabot Corp.

Chemical Resistance Charts

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CHEMICAL	Plastics														Elastomers								Metals									Non-metals		
	ABS plastic	Acetal (Delrin™)	CPVC	Epoxy	Hytrel®	HDPE	LDPE	NORYL®	Nylon	Polycarbonate	Polypropylene	PPS (Ryton™)	PTFE (Teflon™)	PVC	PVDF (Kynar®)	Buna N (Nitrile)	EPDM	Hypalon™	PCTFE	Natural rubber	Neoprene	Santoprene™	Silicone	Tygon® (R-3603)	Viton®	304 stainless steel	316 stainless steel	Aluminum	Brass	Bronze	Carpenter 20	Cast iron	Copper	Hastelloy-C	Titanium	Carbon graphite	Ceramic Al_2O_3	Ceramic magnet
Oils cont'd: Ginger	–	A	–	A	–	–	–	–	–	–	–	–	A	–	A	A	A	–	–	–	A	–	–	–	A	D	D	–	–	D	D	–	–	–	–	–	–	–
Hydraulic Oil (Petro)	–	B	–	A	–	–	C	–	A¹	–	D	D	A	A	A	A	D	A	–	D	A	–	B	A	A	A	A	A	A	A	A	A	A	A	A	B	–	–
Hydraulic Oil (Synthetic)	–	–	–	A	–	–	A	–	A¹	–	D	–	A	A	A	D	A	A	–	D	A	–	B	A	A	A	A	A	A	A	A	–	A	A	–	B	–	–
Lemon	C	D	–	A	–	–	–	–	–	–	–	–	A	–	A	–	D	–	–	–	D	–	–	–	A	A	A	A	–	A	A	–	–	–	–	–	–	–
Linseed	–	A	C	A	B¹	–	A	A¹	A¹	–	A	B	A	A²	A	A	D	C	–	D	D	–	A	A	A	A	A	B	B	A	A	–	B	B	A	A	A	A
Mineral	A	A	A	A	A	A	B¹	A¹	A	B	A	A	A	B	A	A	D	B	A	D	B	–	C	B	A	A	A	A	A	A	A	–	B	A	A	A	A	A
Olive	A	A	C	A	–	A	A¹	A²	A¹	A²	A	–	A¹	C	–	D	D	B	–	D	B	–	D	B	A	A	A	A	–	A	A	–	–	A	A	A	A	–
Orange	–	D	–	A	–	C	C¹	–	–	C¹	A	–	–	C¹	A	A	–	–	–	–	C	–	D	–	A	A	A	A	–	A	A	–	–	A	A	–	–	–
Palm	A	A	A	A	–	–	A	–	–	–	–	–	A	A	A	A	A	–	–	–	D	–	–	–	A	A	A	–	–	A	A	A	A	–	–	–	–	–
Peanut	–	A	C	A	–	–	A	–	–	–	D	–	A	A¹	A	A	D	B	–	D	B	–	A	A	A	A	A	–	–	A	A	A	A	–	A	–	–	–
Peppermint	D	D	–	A	–	–	–	–	–	–	–	–	A	–	A	D	–	–	–	–	D	–	–	–	A	A	A	D	–	A	A	–	–	–	–	–	–	–
Pine	D	A	A	A	–	B	D	–	A	A	B	–	A	D	A	D	D	D	–	D	D	–	D	D	A	A	A	A	–	A	D	C	–	–	A	–	–	–
Rapeseed	–	A	A	A	–	–	D	–	–	–	D	–	A	–	A	D	A	D	–	D	B	–	D	–	A	A	A	–	–	A	A	A	–	–	A	–	–	–
Rosin	–	–	–	A	–	–	B²	–	A¹	–	A²	–	A	C¹	A	A	–	–	–	–	–	–	–	–	A	A¹	A¹	B¹	–	B¹	A	–	B	A	–	A	–	–
Sesame Seed	A	D	A	A	–	–	–	–	–	–	A	–	A	A	A	A	–	–	–	–	D	–	–	A	A	A	A	–	–	A	A	A	–	–	A	–	–	–
Silicone	A	A	A	A	A	A	A	A¹	A¹	–	A	A¹	A	A	A	A	A	A	–	D	D	–	C	A	A	A	A	A	–	A	A	A	A	A	–	A	–	A
Soybean	A	A	A²	A	B	–	A¹	–	A	–	A¹	–	A	A¹	A	A	C	C	–	D	C	–	A	B	A	A	A	A	–	A	A	A	–	A	A	A	–	–
Sperm (whale)	A	D	A	A	–	–	–	–	–	–	–	–	A	–	A	A	–	–	–	–	D	–	–	A	A	A	A	–	–	A	A	A	–	–	A	–	–	–
Tanning	–	D	–	A	–	–	–	–	–	–	–	–	–	–	A	A	–	–	–	–	D	–	–	–	A	A	A	–	–	A	A	–	–	–	–	–	–	–
Transformer	–	A	A	B	–	–	C¹	–	A¹	–	B	–	A	B	A	A	D	–	–	D	B	–	B	–	A	A	A	A	–	–	A	–	–	–	–	–	–	–
Turbine	–	A	A	A	–	–	C	–	A	–	B¹	–	A	A¹	A	B	A	D	–	D	D	–	D	A	A	A	A	A	–	A	A	A	A	A	A	–	–	–
Oleic Acid	D	A	A	A	A	C	C²	A¹	A	–	B¹	A	A	C²	A	B	B	C	B	D	C	–	D	D	B	A	A	A	D	B¹	C	–	A	A²	B	A	A	–
Oleum 25%	–	D	D	D	C	–	D	–	D	–	D	A¹	A	D	C¹	D	D	D	A	D	D	–	D	A	A	B²	B	B	–	B	D	–	–	A	D	D	–	–
Oleum 100%	D	D	D	D	–	–	D	A¹	D	–	D	A¹	A	D	D	D	D	D	A	D	D	–	D	C	A	A	B	A	–	D	D	–	–	D	D	D	–	–
Oxalic Acid (cold)	A	B	A	A	D	A	A²	A¹	B²	–	A²	A	A¹	B	B	D	A	B	D	B	D	A	B	B	A	B	A	A	D	B²	A	C	B	B	A	A	A	–
Oxygen	A	A	A	–	–	A	A	A	A	–	A	–	A	A	A	–	A	–	–	–	–	–	–	–	A	B	B	B	B	B	B	–	B	–	–	–	–	–
Ozone	B	C	A	–	C	A	C¹	–	D	A¹	B	–	A	B	A	D	A	A	A	D	C	D	A	A	A	B	A	B	–	B	–	–	A	–	–	–	–	–
Palmitic Acid	A	A	A¹	A	A	–	–	–	A	–	B¹	–	A²	B¹	A²	A²	B¹	D	–	B¹	D	A	D	D	A¹	B¹	A¹	B	D	A	–	–	B	B	–	A²	–	–
Paraffin	A	A	A	A	–	B	B	A	A¹	A¹	A¹	–	A	B	A	B	D	–	–	B	B	–	–	D	B	A	A	A	A	A	A	–	B	B	A	A	A	–
Pentane	–	B	–	A	–	–	D	–	A¹	A	D	–	A	A	A	A	D	B	–	D	B	D	B	A	A	C	C	B	–	C	C	–	–	A	–	A	–	–
Perchloric Acid	–	C	A¹	–	–	D	B	–	D	–	C	–	A	C	A	D	B	–	B	–	A	D	D	–	A	C	C	D	–	B	–	–	D	B	D	A	–	–
Perchloroethylene	D	B	C¹	D	C	D	D	D	C¹	D	D	A	A	C¹	A	C	D	D	A	D	D	D	D	D	A	B	A¹	C	–	B	D	A	B	B	A	A	A	–
Petrolatum	–	B	–	A	–	–	B	–	D	–	D	–	C	B	A	A	A	–	–	C	A	–	–	D	B	A	A	–	–	A	A	–	–	A	–	A	–	–
Petroleum	B	B	A²	A²	B	D	C¹	D	A¹	–	B¹	–	A²	–	A	A²	D	D	–	D	B¹	C	D	–	A²	A¹	A¹	D	–	A¹	–	–	B	–	A¹	A²	–	–
Petroleum Ether	–	A	–	A	–	A	–	–	A	–	–	A	A	–	A	–	–	–	–	–	–	–	–	–	–	A	A	A	–	–	A	–	A	A	A	–	–	–
Phenol (10%)	D	B	A¹	C	–	D	B	D	D	B¹	B¹	A	A	C¹	A	D	B	D	B	A	D	D	D	B	A	B	B	A	–	B	C	D	B	B	B	A	A	–
Phenol (Carbolic Acid)	D	D	B¹	C	D	D	D	D	D	D	B	A	A	D	A¹	D	B	D	B	D	D	–	D	B	A	B	B	A	D	B	C	D	D	A	A	A	A	–
Phosgene Gas	A	–	–	–	–	–	–	–	–	–	–	–	A	–	–	–	A	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	B	–	–	–	–
Phosphoric Acid (≤40%)	B	D	A	A	–	A	A	A	B¹	A	A²	A	A	B	B	D	B	B	A	B	B	A	C	D	A	D	C	C	D	B	D	D	D	A²	C	A	A	–
Phosphoric Acid (>40%)	C	D	A	B	–	A	B¹	A	B¹	A	A²	A	A	B	B	D	B	B	A	B	B	C	D	D	A	D	D	C	D	B	D	D	D	A²	C	B	A	C
Phosphoric Acid (crude)	C	D	–	B	–	B	B¹	A	B¹	A	B²	A	A	B²	A	D	B	B	A	D	D	–	D	D	A	D	B	C	–	B	D	D	D	A²	C	A	–	–
Phosphoric Acid (molten)	D	D	–	–	–	D	–	–	–	–	D	–	–	D	D	–	–	–	–	–	A	–	–	D	–	–	C	C	–	–	A	–	D	C	D	–	–	–
Phosphoric Acid Anhydride	–	D	–	–	–	A	–	–	–	D	A	D	–	–	D	D	–	–	–	–	A	–	–	–	–	–	–	C	–	–	A	–	–	–	D	–	–	–
Phosphorus	–	B	B¹	–	–	–	B	–	–	–	A	–	A²	A¹	A¹	–	–	–	–	–	–	–	–	B¹	–	A²	A²	B	–	A²	–	–	B	A²	–	D	–	–
Phosphorus Trichloride	D	D	D	A¹	–	A	B	–	–	C	–	A	A²	D	A²	D	A¹	D	A²	D	D	–	–	A	A¹	A¹	A²	D	–	–	–	–	D	A²	A	A	–	–
Photographic Developer	B	D	A	A	–	–	A	A	–	A²	A	–	A	A	–	A	B	A	–	A	A	–	B	A	A	A	A	–	–	A	D	D	D	B	A	A	A	A
Photographic Solutions	–	D	A	B²	B	A	A	A¹	A¹	A¹	A²	A²	A²	A	B²	B	A¹	A¹	A²	B	B¹	–	A	A²	B¹	D	–	–	–	A²	–	–	D	B²	A¹	A²	–	–
Phthalic Acid	B	C	B	–	–	B	B²	–	B¹	–	A	–	A²	–	A²	D	A¹	A²	–	–	A	–	B¹	D	A¹	B²	A	B²	–	B²	–	–	C	B²	A	A¹	–	–
Phthalic Anhydride	B	C	D	–	–	–	–	–	–	A¹	D	–	A	D	A	D	A	–	–	A	A	–	–	D	A	A	A	A	–	A	B	–	C	A	–	A	–	–
Picric Acid	A	A	D	A	–	D	A	–	C1	D	B¹	A	A	D	A1	C	B	B	A	D	A	D	D	A	A	B	B	C	–	B	D	A	D	B	A	A	–	–
Plating Solutions:																																						
Antimony Plating 130°F	–	A	A	B	–	–	–	A	D	–	A	–	A	A	A	A	–	–	–	–	A	–	–	–	A	A	A	A	–	A	A	A	–	A	A	–	–	–
Arsenic Plating 110°F	–	A	A	B	–	–	–	–	A	–	A	–	A	A	A	A	–	–	–	–	A	–	–	–	A	A	A	A	–	A	A	A	–	A	A	–	–	–
Brass Plating:																																						
Regular Brass Bath 100°F	–	A	A	B	–	–	B	A	A	–	A	–	A	A	B	A	–	–	–	–	A	–	–	–	A	A	A	A	–	A	A	A	–	A	A	A	–	–
High-Speed Brass Bath 110°F	–	A	A	B	–	–	B	A	A	–	A	–	A	A	B	A	–	–	–	–	A	–	–	–	A	–	A	A	–	–	A	A	–	A	A	–	–	–
Bronze Plating:																																						
Cu-Cd Bronze Bath R.T.	–	A	A	B	–	–	–	A	A	–	A	–	A	A	A	A	A	–	–	–	A	–	–	–	A	A	A	A	–	–	A	A	–	A	A	–	–	–
Cu-Sn Bronze Bath 160°F	–	B	D	C	–	–	–	A	A	–	A	–	A	D	A	A	A	–	–	–	A	–	–	–	A	A	A	A	–	–	A	A	–	A	D	–	–	–
Cu-Zn Bronze Bath 100°F	–	A	A	B	–	–	–	A	A	–	A	–	A	A	A	A	–	–	–	–	A	–	–	–	A	A	A	A	–	–	A	A	–	A	A	–	–	–
Cadmium Plating:																																						
Cyanide Bath 90°F	–	A	A	B	–	–	–	A	A	–	A	–	A	A	A	A	–	–	–	–	A	–	–	–	A	–	A	A	–	–	A	A	–	A	A	–	–	–
Fluoborate Bath 100°F	–	C	A	B	–	–	–	A	D	–	A	–	A	A	A	B	–	–	–	–	C	–	–	–	A	A	A	A	–	–	A	D	–	D	D	–	–	–

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Plating solutions cont'd																																						
Chromium Plating:																																						
Barrel Chrome Bath 95°F	–	D	A	C	–	–	–	D	D	–	A	–	A	A	C	D	–	–	–	–	D	–	–	–	C	–	D	A	–	–	D	C	–	D	C	–	–	–
Black Chrome Bath 115°F	–	D	A	C	–	–	–	D	D	–	A	–	A	A	C	C	–	–	–	–	D	–	–	–	C	–	C	A	–	–	C	A	–	D	A	–	–	–
Chromic-Sulfuric Bath 130°F	–	D	A	C	–	–	–	D	D	–	A	–	A	A	C	D	–	–	–	–	D	–	–	–	C	–	C	A	–	–	C	A	–	D	A	–	–	–
Fluoride Bath 130°F	–	D	A	C	–	–	–	D	D	–	A	–	A	A	C	D	–	–	–	–	D	–	–	–	C	–	D	A	–	–	D	C	–	D	C	–	–	–
Fluosilicate Bath 95°F	–	D	A	C	–	–	–	D	D	–	D	–	A	A	C	D	–	–	–	–	D	–	–	–	C	–	C	A	–	–	C	C	–	D	C	–	–	–
Copper Plating (Cyanide):																																						
Copper Strike Bath 120°F	–	A	A	B	–	–	–	A	A	–	A	–	A	A	B	A	–	–	–	–	A	–	–	–	A	–	A	–	–	–	–	A	–	A	–	–	–	–
High-Speed Bath 180°F	–	B	D	C	–	–	–	A	A	–	A	–	A	D	A	A	–	–	–	–	B	–	–	–	A	–	A	A	–	–	–	A	–	A	D	–	–	–
Rochelle Salt Bath 150°F	–	B	D	C	–	–	–	A	A	–	A	–	A	D	A	A	–	–	–	–	B	–	–	–	A	–	A	A	–	–	–	A	–	A	D	–	–	–
Copper Plating (Acid):																																						
Copper Fluoborate Bath 120°F	–	C	A	D	–	–	–	A	D	–	A	–	A	A	A	B	–	–	–	–	C	–	–	–	A	A	D	A	–	–	D	D	–	D	D	–	–	–
Copper Sulfate Bath R.T.	–	A	A	D	–	–	–	A	D	–	A	–	A	A	A	A	–	–	–	–	A	–	–	–	A	–	D	A	–	–	D	A	–	D	A	–	–	–
Copper Plating (Misc):																																						
Copper Pyrophosphate	–	A	A	B	–	–	–	A	A	–	A	–	A	A	A	A	–	–	–	–	A	–	–	–	A	–	A	A	–	–	A	A	–	A	A	–	–	–
Copper (Electroless)	–	D	A	B	–	–	–	A	A	–	A	–	A	A	A	D	–	–	–	–	D	–	–	D	A	–	–	A	–	–	–	–	–	–	A	–	–	–
Gold Plating:																																						
Acid 75°F	–	–	A	A	–	–	–	A	A	–	A	–	A	A	–	A	–	–	–	–	A	–	–	–	A	–	C	–	–	–	–	–	–	A	A	–	–	–
Cyanide 150°F	–	–	D	D	–	–	–	A	A	–	A	–	A	D	–	A	–	–	–	–	A	–	–	–	A	–	A	–	–	–	–	–	–	A	A	–	–	–
Neutral 75°F	–	–	A	A	–	–	–	A	A	–	A	–	A	A	–	A	–	–	–	–	A	–	–	–	A	–	C	–	–	–	–	–	–	A	A	–	–	–
Indium Sulfamate Plating R.T.	–	–	A	A	–	–	–	A	D	–	A	–	A	A	–	A	–	–	–	–	A	–	–	–	A	–	C	–	–	–	–	–	–	A	A	–	A	–
Iron Plating:																																						
Ferrous Am Sulfate Bath 150°F	–	–	D	D	–	–	–	A	D	–	A	–	A	D	–	A	–	–	–	–	B	–	–	–	A	–	C	–	–	–	–	–	–	A	A	–	–	–
Ferrous Chloride Bath 190°F	–	–	D	D	–	–	–	A	D	–	C	–	A	D	–	B	–	–	–	–	D	–	–	–	A	–	D	–	–	–	–	–	–	D	A	–	–	–
Ferrous Sulfate Bath 150°F	–	–	D	D	–	–	–	A	D	–	A	–	A	D	–	A	–	–	–	–	B	–	–	–	A	–	C	–	–	–	–	–	–	A	A	–	–	–
Fluoborate Bath 145°F	–	–	D	D	–	–	–	A	D	–	A	–	A	D	–	B	–	–	–	–	C	–	–	–	A	–	D	–	–	–	–	–	–	B	D	–	–	–
Sulfamate 140°F	–	–	A	A	–	–	–	A	D	–	A	–	A	A	–	A	–	–	–	–	A	–	–	–	A	–	D	–	–	–	–	–	–	B	A	–	–	–
Sulfate-Chloride Bath 160°F	–	–	D	D	–	–	–	A	D	–	A	–	A	D	–	B	–	–	–	–	C	–	–	–	A	–	D	–	–	–	–	–	–	D	A	–	–	–
Lead Fluoborate Plating	–	–	A	A	–	–	–	A	D	–	A	–	A	A	–	B	–	–	–	–	A	–	–	–	A	–	C	–	–	–	–	–	–	A	D	–	A	–
Nickel Plating:																																						
Electroless 200°F	–	–	D	B	–	–	–	D	D	–	D	–	A	D	–	D	–	–	–	–	D	–	–	–	A	–	–	–	–	–	–	–	–	–	–	–	–	–
Fluoborate 100-170°F	–	–	A	A	–	–	–	A	D	–	A	–	A	A	–	B	–	–	–	–	A	–	–	–	A	–	C	–	–	–	–	–	–	A	D	–	–	–
High-Chloride 130-160°F	–	–	D	D	–	–	–	A	D	–	A	–	A	D	–	A	–	–	–	–	B	–	–	–	A	–	C	–	–	–	–	–	–	A	A	–	–	–
Sulfamate 100-140°F	–	–	A	A	–	–	–	A	A	–	A	–	A	A	–	A	–	–	–	–	A	–	–	–	A	–	C	–	–	–	–	–	–	A	A	–	–	–
Watts Type 115-160°F	–	–	D	D	–	–	–	A	A	–	A	–	A	D	–	A	–	–	–	–	A	–	–	–	A	–	C	–	–	–	–	–	–	A	A	–	–	–
Rhodium Plating 120°F	–	–	A	A	–	–	–	A	D	–	A	–	A	A	–	A	A	–	–	–	B	–	–	–	A	–	D	–	–	–	–	–	–	D	D	–	A	–
Silver Plating 80-120°F	–	–	A	A	–	–	–	A	A	–	A	–	A	A	–	A	A	–	–	–	A	–	–	–	A	–	A	–	–	–	–	–	–	A	A	–	–	–
Tin-Fluoborate Plating 100°F	–	–	A	A	–	–	–	A	D	–	A	–	A	A	–	B	–	–	–	–	C	–	–	–	A	–	C	–	–	–	–	–	–	A	D	–	–	–
Tin-Lead Plating 100°F	–	–	A	A	–	–	–	A	D	–	A	–	A	A	–	B	–	–	–	–	C	–	–	–	A	–	C	–	–	–	–	–	–	A	D	–	–	–
Zinc Plating:																																						
Acid Chloride 140°F	–	–	A	A	–	–	–	A	D	–	A	–	A	A	–	A	–	–	–	–	A	–	–	–	A	–	D	–	–	–	–	–	–	D	A	–	–	–
Acid Fluoborate Bath R.T.	–	–	A	A	–	–	–	A	D	–	A	–	A	A	–	B	–	–	–	–	C	–	–	–	A	–	C	–	–	–	–	–	–	A	D	–	–	–
Acid Sulfate Bath 150°F	–	–	D	D	–	–	–	A	D	–	A	–	A	D	–	A	–	–	–	–	B	–	–	–	A	–	C	–	–	–	–	–	–	A	A	–	–	–
Alkaline Cyanide Bath R.T.	–	–	A	A	–	–	–	A	A	–	A	–	A	A	–	A	–	–	–	–	A	–	–	–	A	–	A	–	–	–	–	–	–	A	A	–	–	–
Potash (Potassium Carbonate)	A	B	A	A	D	B	A[1]	A	A	–	A	–	–	A	A	A	A[1]	–	–	A	A	–	–	A	A	B	B	D	–	B	B	C	B	B	A	A	D	–
Potassium Bicarbonate	A	–	A	A	–	B	A	A[1]	A[1]	–	A	A	A	A	B	A	A	–	A	A	A	–	A[1]	A	A	B	B	D	–	B	B	A	B	B	A	A	A	A
Potassium Bromide	A[1]	A	A	A	–	B	A	A[1]	A[1]	A[1]	A	A	A	A	A	A	A[1]	–	A	A	A	–	A[1]	B	A	B	B	C[1]	–	B	B	D	B	B	A	A	C	A
Potassium Chlorate	A	B	A	A	–	B	A[1]	A[1]	C[1]	A[1]	A	A	A	A	A	A[1]	A[1]	–	A[2]	–	A	–	B	B	A	B[1]	B	B	–	B1	B	C	B[1]	B	A	A[2]	B	–
Potassium Chloride	A	A	A	A	B	A	A[1]	A[1]	A[1]	A	A	A	A	A	A	A[1]	A[1]	A	A	A	A	–	A	A	A	B[1]	A[1]	D	D	B	A	A	B	A	A	A	–	–
Potassium Chromate	–	C	A	C	–	–	A	A[2]	B	–	A	–	A[1]	A	B	A[1]	A[2]	–	–	B	A	–	–	B	A	B[1]	B[1]	B[1]	–	B[1]	B	A	–	A	–	A	B	–
Potassium Cyanide Solutions	A	C	A	A	B	–	A	A[1]	A[1]	–	A	A	A	A	A	A[1]	A[1]	A	A	A	B	–	A	A	A	B[1]	B[1]	D	D	D	B	B	D	B	A	A	D	–
Potassium Dichromate	B[1]	A	A	C	C	B	A	A[1]	B[1]	A[1]	A	A	A	A	A	A[1]	A[1]	A	A	B	A	–	A	–	A	B	B[1]	B	–	B[1]	B	A	B	B	A	A	B	A
Potassium Ferricyanide	B	B[1]	A	A[1]	–	–	A[2]	A[2]	B[1]	–	A[2]	–	A[2]	A	A[2]	D	A	A[1]	A[1]	B	A[1]	–	–	B	A	B[1]	B[1]	B[2]	–	B[2]	B	C	B	B[2]	A[2]	A[2]	B	A
Potassium Ferrocyanide	–	–	B	A	–	–	A[1]	A	B[1]	–	A	–	A	A	A	D	A	–	A	A	A	–	–	B	A	B	B	B[1]	–	B[1]	B	C	B	B	A	A	–	A
Potassium Hydroxide (Caustic Potash)	A	A	A	A	D	A	A	A[1]	C[1]	D	A	A	A	A[1]	A	B[1]	A[2]	A	B	B	B	B	C	B	B	B	A[1]	D	D	D	B	B[2]	B	B[1]	D	C	D	A
Potassium Hypochlorite	–	–	–	–	–	–	C[1]	–	B[1]	–	–	A	A[2]	B[1]	A[1]	A[1]	A[1]	A[1]	–	C[1]	B[2]	–	–	B[1]	–	C[1]	B	D	–	D	B	A	D	B[2]	A[1]	–	D	–
Potassium Iodide	B	–	A	–	–	B	B[1]	–	A[1]	–	A[2]	A[2]	A[2]	A[2]	A[2]	A[1]	A	A[2]	–	B	A	–	–	B	A	A[1]	A[1]	B[1]	–	A[1]	A	A	A[1]	A[2]	A[1]	A[1]	B	–
Potassium Nitrate	B	A	A	A	B	B	A	A[1]	B[1]	A[1]	A	A	A	A	A	A[2]	A	A	–	A	A	–	A	A	A	B	B	B	B	B[1]	B	A	A	B[1]	A	A	B	–
Potassium Oxalate	–	–	–	–	–	–	–	–	–	–	–	–	A[2]	–	–	–	–	–	–	–	–	–	–	–	–	B	B[1]	B[1]	–	A[1]	B	A	B	A[1]	A[1]	A[1]	A	–
Potassium Permanganate	B[1]	A	A[1]	A	D	A	A	A	D	A[2]	A[1]	A	A	A[1]	A	C	A	–	–	A[1]	A	–	–	B	A	B[1]	B	B[1]	–	A[1]	B	A	A	A[1]	A	B[1]	A	–
Potassium Sulfate	B	B	A	A	B	B	A[2]	A	A[1]	A[1]	A	A	A	A[2]	A	A[2]	A[1]	A	A[1]	A	A	–	A	A	A[2]	B[1]	A	C	D	A[1]	A	A	B	B[1]	A	A	A	A
Potassium Sulfide	B	–	A[2]	–	–	–	A[2]	A	A	–	A	A	A	A[2]	A	A	A	B	A	B	A	–	A	–	A	B	B	D	–	D	A	B	D	–	A	A	A	–
Propane (liquefied)	–	A	A[1]	A	A	D	C[1]	A[1]	A[1]	C[1]	A	–	A	A[1]	A	A	D	–	A	D	C	–	D	–	A	A	A	A	A	A[2]	A	A	A	A	–	A	–	–
Propylene	B	–	–	–	–	–	–	–	–	–	–	–	A[2]	B[1]	–	D	D	D	–	D	D	–	D	A	A[1]	B[1]	A[1]	A	–	–	A	A	A	–	–	A[2]	–	–

Explanation of footnotes: 1. Satisfactory to 72°F (22°C) 2. Satisfactory to 120°F (48°C) 3. Satisfactory to 90°F (32°C) 4. Satisfactory to 200°F (93°C)

Delrin, Hytrel, Teflon—Reg TM E. I. DuPont de Nemours & Co.
Hypalon, Viton—Reg TM DuPont Dow Elastomers L.L.C.
Kynar—Reg TM Elf Atochem North America
Noryl—Reg TM General Electric Co.
Ryton—Reg TM Phillips Petroleum Co.
Santoprene—Reg TM Monsanto Chemical Co
Tygon—Reg TM Norton Co.
Hastelloy C—Reg TM Cabot Corp.

Chemical Resistance Charts

Chemical–Ratings

A – No effect

B – Minor effect

C – Moderate effect

D – Severe effect; not recommended

— No data available

WARNING

The information in this chart was supplied to Cole-Parmer by other reputable sources and is to be used **ONLY** as a guide in selecting equipment for chemical compatibility testing. Always test the equipment with the specific chemicals and under the specific conditions of your application.

Ratings of chemical behavior listed in this chart apply to a 48-hour exposure period. Cole-Parmer does not warrant (neither expressed nor implied) the accuracy or completeness of this chart or that any material is suitable for any purpose.

DANGER

Variations in temperature, pressure, and concentration can cause equipment to fail, even though it passed an initial test.

SERIOUS INJURY MAY RESULT.

Use suitable guards and/or personal protection when handling chemicals.

CHEMICAL	Plastics														Elastomers									Metals										Non-metals		
	ABS plastic	Acetal (Delrin®)	CPVC	Epoxy	Hytrel®	HDPE	LDPE	NORYL®	Nylon	Polycarbonate	Polypropylene	PPS (Ryton®)	PTFE (Teflon®)	PVC	PVDF (Kynar®)	Buna N (Nitrile)	EPDM	Hypalon®	PCTFE	Natural rubber	Neoprene	Santoprene®	Silicone	Tygon® (R-3603)	Viton®	304 stainless steel	316 stainless steel	Aluminum	Brass	Bronze	Carpenter 20	Cast iron	Copper	Hastelloy-C®	Titanium	Carbon graphite	Ceramic Al_2O_3	Ceramic magnet
Propylene Glycol	B	B	C[1]	B	–	A	B[2]	–	A	B[1]	A[2]	–	A	C[1]	–	A	A	A	–	A	C	–	A	A	A	B	B	B	–	A	A	A	A	B	A	–	A	A
Pyridine	–	B	D	A	C	D	B[1]	B	C[1]	D	A[2]	A	A	D	D	D	B	D	A[1]	D	D	A	D	D	D	A	A	B	B	B	A	A	B	B	B	A	A	–
Pyrogallic Acid	–	D	A	A	–	–	–	–	–	–	A	–	A	A	A	–	B	–	A	–	A	D	–	–	A	B[2]	B	B	–	A	B	D	B	B	A	A	–	–
Resorcinal	A	–	–	–	D	–	B[2]	–	D	B[1]	A[2]	–	A[2]	C	–	–	B[1]	–	–	–	D	–	–	C	A[1]	–	–	–	–	–	–	–	–	–	–	A[2]	–	–
Rosins	–	B	C[1]	A	–	B	B[1]	–	A[1]	–	A[2]	–	A	C[1]	–	A[2]	–	B	A	–	A	–	A	–	A	A[1]	A[1]	B[1]	–	B	B	D	B	–	–	A	–	–
Rum	–	A	A	A	–	–	–	A	A	–	A	–	–	A	–	A	A	A	–	A	A	–	A	–	A	A	A	–	–	A	–	–	–	–	–	–	–	–
Rust Inhibitors	–	A	–	A	–	–	–	–	–	–	A	–	–	–	–	A	–	–	–	–	C	–	–	–	A	A	A	–	–	A	B	C	–	–	–	–	–	–
Salad Dressings	–	A	–	A	–	–	–	A	A	–	A	–	–	–	–	A	–	–	–	–	–	–	–	–	A	A	A	B	–	–	B	D	–	–	–	–	–	–
Salicylic Acid	A	D	–	–	–	–	B[2]	–	A[1]	A[1]	A[1]	–	A[2]	B[1]	A	B	A	A	A[1]	A	–	–	–	B[1]	A[1]	B[2]	B[2]	B[2]	–	A	B	A	A	A[2]	A[1]	A[2]	–	–
Salt Brine (NaCl saturated)	–	–	A[2]	A	A[1]	A	A	A	A	A	A	A	A[2]	A	A	A	A	A[2]	–	A	A[2]	A	A[1]	–	A[2]	B[1]	A[2]	B[1]	–	B[2]	B	D	B	A[2]	A[2]	A[2]	–	–
Sea Water	–	A	A	A	A	A	A[2]	A[1]	A[2]	A[2]	A	A	A	A[2]	A	A[2]	A[2]	A	A	A[1]	B[2]	A	A[1]	–	A	C	C	B	D	A	A	D	B	A	A	A	–	–
Shellac (Bleached)	–	A	–	A	–	–	A[1]	–	A[1]	–	A	–	A	–	–	A[2]	A[2]	A	–	A[1]	B[2]	–	–	–	A	A	A	A	B	A	A	A	A	–	–	A	–	–
Shellac (Orange)	–	A	–	A	–	–	A[1]	–	A[1]	–	A	–	A	–	–	A	A	–	–	D	D	–	–	–	A	A	A	A	B	A	A	A	A	–	–	A	–	–
Silicone	D	A	A	A	A	–	–	A[1]	A[1]	A[2]	A	A[1]	A	A	A	A	A	A	–	C	A	–	C	–	A	A	A	A	–	–	A	A	A	–	–	A	–	–
Silver Bromide	–	C	–	A	–	–	A	A	–	–	–	–	A	–	–	–	–	–	A	–	–	–	–	–	–	D	D	D	–	D	A	D	–	A	–	–	–	–
Silver Nitrate	B	A	A[1]	A	–	A	A	A	A[1]	A[2]	A[1]	A	A	A[1]	A	B	A	A	A	A	A	–	A	B	A	B	B	D	–	B	C	C	–	A	A	A	–	–
Soap Solutions	A	A	A	A	A	B	D	A[1]	A[1]	A[1]	A	A	A	A	A[1]	A	A	A	–	B	B	A	A	A	A	A	A[1]	C	B	B	A	A	A	A	A	A	A	A
Soda Ash (see Sodium Carbonate)	B	A	A	C	B	A	B	A	B	A	A	A	A	A	A	A[1]	A[2]	A	–	A	A[1]	–	A	–	A	A	A	D	–	B	A	B	–	–	–	–	–	–
Sodium Acetate	B	B	A	A	–	A	A	A[1]	B[1]	A[1]	A	A	A	B[1]	A	B	A	–	A	A	B	–	D	A	D	B	B[1]	B	B	B	A	B	A	A	A	A	A	–
Sodium Aluminate	–	B	–	A	–	–	–	A	A[1]	–	–	A	A	–	–	A	A	A	–	B	A	–	–	–	A	A	A	–	–	A	B	A	–	B	A	A	–	–
Sodium Benzoate	A	–	A[2]	A[2]	–	B	A[2]	–	B[1]	A[2]	A[2]	–	A[2]	B[1]	A[2]	B	A	B	–	A	A[1]	–	–	B[1]	A[1]	–	–	A[1]	–	A	–	–	–	A[1]	A[1]	A[2]	–	–
Sodium Bicarbonate	A	A	A[2]	A	–	A	A[2]	A	A	A[2]	A	A	A	A[2]	A	A[1]	A[2]	A	A	A	A	–	A	B	A	A	A[1]	D	D	A	A	C	B	B[1]	A[2]	A	A	A
Sodium Bisulfate	A	B	A[2]	A	C	B	A[2]	A[1]	A[1]	A[1]	A	A	A	A[2]	A	B[2]	A[2]	A	A[2]	A	A	–	A	B	A	D	C	D	D	A[2]	C	D	B	B[2]	A	A	A	–
Sodium Bisulfite	A	C	A[2]	A	B	B	A[2]	A[1]	C[1]	A[1]	A	A	A	A[2]	A	A[2]	A[2]	A	–	A	A	–	A	B	A	B[1]	B[1]	D	–	B[1]	B	D	B	B	A	A	A	–
Sodium Borate (Borax)	A	–	A[2]	A	B	B	A[2]	A[1]	A[1]	A[1]	A[2]	A	A	A[2]	A	A[1]	A	A	–	A	A	–	A	–	A	B[2]	B	C	–	A	A	–	B	A	B	A	A	A
Sodium Bromide	B	A	A[2]	A	–	–	A[2]	A[2]	B[1]	–	–	–	A[2]	B[2]	A[2]	–	A	B	A[1]	A[1]	A[1]	–	–	B[2]	A[1]	C	C	D	–	A	B	C	D	–	A[1]	A[2]	–	–
Sodium Carbonate	B	A[1]	A[2]	C[1]	–	A	B[2]	A	B[1]	A[2]	A	A	A	A[2]	A	A	A[2]	A	A	A	A	–	A	B	A	A	A	D	B	A[2]	B	B	A	A	A[1]	A	A	A
Sodium Chlorate	A	A	A[1]	A	–	–	B[2]	A[1]	D	A[1]	A	A	A	A[1]	A	B	A	A	–	A	A	–	C	B	A	A	B[1]	C[1]	–	B[1]	B	–	B	B[1]	A	C	A	–
Sodium Chloride	A	A[1]	A[2]	A	A	A	A[2]	A	A[1]	A[2]	A	A	A	A[2]	A	A	A	A	A	A	A	A	A	B	A	B	B	C	D	B	B	D	B	A	A	A	A	A
Sodium Chromate	–	D	–	C	–	–	–	A	C	A[2]	–	A	A	–	A	A	–	C	A	B	A	–	–	–	A	B[1]	B	B	–	B	A	B	B	A	A	A	–	–
Sodium Cyanide	A	A	A[2]	A	B	B	A[2]	A[1]	A[1]	–	A	A	A	A[2]	A	A	A[2]	A	A	A	A[1]	–	A	A	A[2]	A[1]	B[1]	D	D	D	A	A	D	A	A	A	A	A
Sodium Ferrocyanide	–	A	A	A	–	–	A	A	–	–	A	–	A	A	A	A	A	B	–	B	A	–	–	A	A	B	B	A	–	–	–	–	D	A	–	A	A	–
Sodium Fluoride	A	–	A[2]	A	–	–	A[2]	A[2]	B	–	A	–	A[1]	A[2]	A	A[1]	A	B	–	–	A	–	–	D	A	D	D	B	–	A	C	C	D	A	A	A	A	–
Sodium Hydrosulfite	–	–	C	–	–	–	–	–	A	–	–	–	A	C	–	C	B	B	–	C	B	–	C	A	A	–	–	A	–	–	C	–	–	A	–	–	–	–
Sodium Hydroxide (20%)	B	A	A	A[2]	B	C	B	A	A	A[2]	A	A	A	A	A	A	B	A	A	A[1]	B[2]	A	A[2]	A[1]	B[1]	B	B[2]	D	B	B	A[2]	A[2]	A[2]	B	A[1]	A[2]	A	–
Sodium Hydroxide (50%)	A	A	A	A	C	C	B	A	A	D	A	A	A	A	D	A[1]	B[1]	A	B	A[1]	B[2]	A	A[1]	C	B[1]	B	B[1]	D	D	C	B[2]	D	B	C	B	–	A	–
Sodium Hydroxide (80%)	A	D	A	A[1]	–	C	–	A	C	D	A	A	A[1]	A	D	D	B[1]	A[2]	A	A[1]	B[1]	C	A[1]	C	B[1]	C	B[1]	D	D	C	D	D	D	A[1]	D	A[2]	A	C
Sodium Hypochlorite (100%)	–	D	C[2]	D	D	C	B[2]	A	D	–	B	A	A	B	A	D	B[1]	B	A	C	C	D	B	–	A[1]	D	D	D	D	C	D	D	–	B	C	C	A	A
Sodium Hypochlorite (<20%)	B	D	A	C	A	A	A	A	D	C	A	A	A	A	A	B	B	A	A	C	C	A	B	C	A[1]	C	C	D	D	C	D	D	–	A	C	B	A	A
Sodium Hyposulfate	–	–	–	C	–	–	–	–	–	–	–	–	A	–	–	–	–	–	–	C	C	–	–	–	–	A	A	D	–	–	D	D	–	–	–	–	–	–
Sodium Metaphosphate	–	B	A[1]	A	–	B	A[1]	–	A[1]	–	A[1]	–	A	A	A	A	A	B	–	A	B	–	A	–	A	A	A	C	D	A	A	C	B	–	–	A	–	–
Sodium Metasilicate	–	D	A	A	–	–	–	–	–	–	A	–	A	A	–	A	A[1]	B	–	A	A	–	–	–	A	A	A	D	–	A	B	A[1]	B	A	–	–	–	–
Sodium Nitrate	–	A	A	A	–	B	A[2]	A[1]	A[1]	–	A	A	A	A[2]	A	A[1]	A	A	A	B	B	–	D	B	A	B[1]	B[1]	B	–	B	C	B	D	B	A	C	A	A
Sodium Perborate	–	B	A[1]	B	–	–	A[1]	A	B[1]	–	A	–	A	A[2]	–	B	A	B	A	B	B	–	B	–	A	B	B	C	D	B	D	C	B	B	–	C	–	–
Sodium Peroxide	–	D	A[2]	C	–	B	A	–	A[1]	A[2]	B	–	A	B[2]	A	B	A	B	A	B	B[1]	–	D	–	A	A	A	C	D	A	D	C	B	B	–	A	–	–
Sodium Polyphosphate	–	B	A[1]	A	–	B	A	A[1]	A[1]	–	A	–	A	A[1]	A	A	A	B	A	C	B	–	D	–	A	B	B	D	D	B	C	D	A	A	A	A	–	–
Sodium Silicate	–	C	A[2]	A	–	A	A[2]	A[1]	A[1]	–	A	A	A	A[2]	A	A	A	A	A	A	A	–	A	B	A	A	B	A	D	B	A	B	B	B	A	A	A	–
Sodium Sulfate	–	B	A[2]	A	–	–	A[2]	A	A	A[2]	A	A	A	A[2]	A	A	A	A	A	B	A	–	A	A	A	B	B[1]	A	B	B	C	B	B	B	A	A	A	–
Sodium Sulfide	–	B	A[2]	A	–	B	A[2]	A	A[1]	D	A	A	A	A[2]	A	A	A[2]	A	A[1]	B	A	–	A	B	A[2]	B	D	D	D	B[1]	D	C	D	B[1]	A	A	A	–
Sodium Sulfite	–	–	A[2]	A	–	B	B[1]	A	D	–	A[2]	–	A	A[2]	A	A	A	A	A	B	A	–	A	A	A[2]	B	A	C[1]	D	B	C	A[1]	D	B	A	A	–	–
Sodium Tetraborate	–	B	A	A	–	B	A[2]	A	A	–	–	–	A	A[2]	–	A	A	A	–	A	B	–	A	–	A	A[2]	A	C	–	A	–	–	B	–	–	A	–	–
Sodium Thiosulfate (hypo)	–	C[1]	A[2]	A	–	–	A[1]	A	B	D	A[2]	A	A	A[2]	A	B	A[2]	A	A	B	A[2]	–	A	–	A	A[2]	B	A	D	A[2]	D	C	D	A[2]	A	A	–	–
Sorghum	–	A	–	A	–	–	–	–	A	–	–	–	–	–	–	A	–	–	–	A	A	–	–	–	A	A	A	–	–	A	D	A	–	–	–	–	–	–
Soy Sauce	–	A	–	A	–	–	–	A	A	–	–	–	–	–	–	A	–	–	–	A	A	–	–	–	A	A	A	A	–	A	A	D	–	–	–	–	–	–
Stannic Chloride	–	C	A[2]	A	–	–	A[2]	A[1]	B[1]	A[1]	A	A	A	A[2]	A	A	A	C[1]	A	A	C[1]	–	B	–	A	D	D	D	–	A	D	D	–	B	A	A	A	–
Stannic Fluoborate	–	C	–	A	–	–	–	A	–	–	–	–	–	–	–	A	–	–	–	–	A	–	–	–	A	–	A	–	–	–	D	D	–	–	–	–	–	–
Stannous Chloride	–	–	A[2]	A	C	–	B[2]	A[2]	C[1]	–	A	A[1]	A	A[1]	A	A	C	A[1]	A	A	A[1]	–	B	A	A	C[2]	A[2]	D	–	A[1]	D	–	–	B	A	–	A	–
Starch	–	A	A	A	–	–	B	A[2]	A[1]	–	A[2]	–	A	A	–	A	A	A	A	–	A	–	–	–	A	A	A	A	–	–	A	C	–	–	–	A	A	A
Stearic Acid	–	A	B[2]	B	C	A	B[1]	A	A[2]	A[1]	A[2]	–	A	B[2]	A	B	B	C	–	–	B[1]	A	B	D	A[1]	B	A	B	D	B	C	C	D	B	A	A	–	–
Stoddard Solvent	B	A	C[1]	A	–	–	C[2]	D	A	A[2]	C	A	A	C[1]	A	A	D	–	A	D	C[1]	D	D	C	A	A	A	A	–	A	A	A	A	A	A	A	A	–
Styrene	–	A[1]	D[1]	A[1]	D	–	–	A	A[1]	D	–	–	A	D	–	D	D	D	–	D	D	–	D	–	B	A	A	A	A	A	A	A	B	D	–	A	–	–
Sugar (Liquids)	B	A	–	A	–	–	–	A[2]	A[1]	–	A	–	A	–	–	A	A	A	–	A	A	–	A	B	A	A	A	A	–	A	A	–	A	A	–	A	–	–
Sulfate (Liquors)	–	D	B	A	–	A	A[2]	–	B[1]	–	A	–	A	B	A	A[2]	A	B	–	B	B	–	B	–	A[1]	B	B	D	–	B	D	C	D	B	–	A	–	–
Sulfur Chloride	–	D	C[1]	C	–	–	C[1]	A	A[1]	–	C[1]	–	A	C[1]	A[1]	D	D	–	A	D	D	–	C	D	A	D	D	D	D	B	D	D	B	A	D	D	–	–
Sulfur Dioxide	D	B	A[2]	A[1]	C	D	B[1]	A	C[1]	–	A[1]	A	A	A[1]	A	D	A[2]	C	A	–	B	–	B	A	A	D	A[1]	B	D	B	B	–	B	C	A	A	–	–

Explanation of footnotes: 1. Satisfactory to 72°F (22°C) 2. Satisfactory to 120°F (48°C) 3. Satisfactory to 90°F (32°C) 4. Satisfactory to 200°F (93°C)

Delrin, Hytrel, Teflon—Reg TM E. I. DuPont de Nemours & Co.
Hypalon, Viton—Reg TM DuPont Dow Elastomers L.L.C.
Kynar—Reg TM Elf Atochem North America
Noryl—Reg TM General Electric Co.
Ryton—Reg TM Phillips Petroleum Co.
Santoprene—Reg TM Monsanto Chemical Co
Tygon—Reg TM Norton Co.
Hastelloy C—Reg TM Cabot Corp.

Chemical Resistance Charts

Chemical–Ratings

A – No effect
B – Minor effect
C – Moderate effect
D – Severe effect; not recommended
— No data available

WARNING

The information in this chart was supplied to Cole-Parmer by other reputable sources and is to be used **ONLY** as a guide in selecting equipment for chemical compatibility testing. Always test the equipment with the specific chemicals and under the specific conditions of your application.

Ratings of chemical behavior listed in this chart apply to a 48-hour exposure period. Cole-Parmer does not warrant (neither expressed nor implied) the accuracy or completeness of this chart or that any material is suitable for any purpose.

⚠ DANGER

Variations in temperature, pressure, and concentration can cause equipment to fail, even though it passed an initial test.

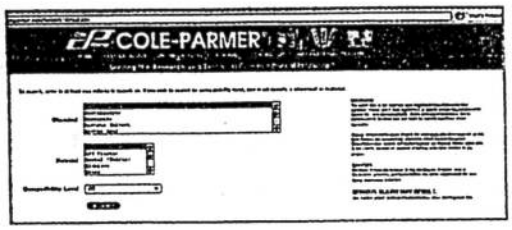
SERIOUS INJURY MAY RESULT.

Use suitable guards and/or personal protection when handling chemicals.

	Plastics															Elastomers										Metals										Non-metals		
CHEMICAL	ABS plastic	Acetal (Delrin®)	CPVC	Epoxy	Hytrel®	HDPE	LDPE	NORYL®	Nylon	Polycarbonate	Polypropylene	PPS (Ryton®)	PTFE (Teflon®)	PVC	PVDF (Kynar®)	Buna N (Nitrile)	EPDM	Hypalon®	PCTFE	Natural rubber	Neoprene	Santoprene®	Silicone	Tygon® (R-3603)	Viton®	304 stainless steel	316 stainless steel	Aluminum	Brass	Bronze	Carpenter 20	Cast iron	Copper	Hastelloy-C®	Titanium	Carbon graphite	Ceramic Al_2O_3	Ceramic magnet
Sulfur Dioxide (dry)	–	B	A[2]	A[1]	C	A	A[1]	A	B[1]	A[1]	A[1]	A	A	A[2]	A	D	A[2]	–	A	C	D	–	B	A	A	D	A	B	D	B	A	A	A	B	A	A	–	–
Sulfur Hexafluoride	–	–	–	–	–	–	B	–	B	–	–	–	–	B	–	B	B	B	–	D	A	–	B	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Sulfur Trioxide	–	–	A	A	–	–	–	D	D	–	C	–	A	A	–	D	C[2]	D	–	C	D	–	B	A	A	A	C	A	D	C	A	B	–	–	–	B	–	–
Sulfur Trioxide (dry)	–	D	A	A	–	–	C[1]	D	A[1]	–	D	–	A	A[1]	C[1]	D	C[1]	–	–	–	D	–	B	B	A	D	A	A	A	B	B	A	B	B	D	D	–	–
Sulfuric Acid (<10%)	B	D	A	A[1]	A	A	A[1]	A	C[1]	A[1]	A[2]	A	A	A[1]	A	A[1]	A	A	A	A[1]	B[2]	A	C	A	A	D	B	D	–	B	D	C	–	B[1]	D	A[1]	A	–
Sulfuric Acid (10-75%)	B	D	A	A[1]	–	A	A[1]	A	D	B[1]	A[1]	A	A	A[1]	A	B[1]	B[2]	B	A	C	B[1]	B	D	C	A[2]	D	D	D	–	B	A[2]	D	–	B[1]	D	A[1]	A	–
Sulfuric Acid (75-100%)	–	–	C	C[1]	C	B	C	A	D	D	C[1]	A[1]	A	D	A	C	B[1]	C	A	D	D	D	D	D	A[1]	C	D	D	–	B	A[2]	D	D	B[1]	D	C[1]	A	A
Sulfuric Acid (cold concentrated)	–	–	D	D	B	B	D	A	D	–	A[2]	A[1]	A	D	A	D	C	C	A	D	D	D	D	D	B	C	B	B	–	B	A[2]	D	–	A[1]	D	D	–	–
Sulfuric Acid (hot concentrated)	–	–	D	D	–	B	D	D	D	D	D	D	A	D	C	D	D	D	A	D	D	D	D	D	A[2]	D	C	D	–	B	D	D	–	D	D	D	A	–
Sulfurous Acid	–	C	A[2]	A	–	B	B[2]	A	D	–	A	A	A	A[2]	A	B[1]	B	A	A	B	C	–	D	B	A	B[1]	B	B[1]	–	B	D	D	D	B	A	A	–	–
Sulfuryl Chloride	–	A	–	A	–	–	–	–	–	–	–	–	A	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Tallow	–	A	–	A	–	A	C	A	A[1]	–	A[2]	–	A	–	–	A	A	C	–	–	B	–	–	–	A	A	A	A	–	–	–	–	–	–	–	A	–	–
Tannic Acid	–	B	A[1]	A	A	A	B[2]	A[2]	C[1]	C	A	A	A	A[1]	B	A	A	A	A	A	A	A	B	B	A	B[1]	A	C	B	B	A	C	A	B[1]	A	A	A	A
Tanning Liquors	–	B	A[1]	A	–	–	A[1]	A[2]	A[1]	–	A[1]	–	A	A[1]	–	B[1]	B	B	–	C	A	–	B	B	A	A[2]	A[2]	A	–	A[2]	A	–	–	B	A	A	–	–
Tartaric Acid	–	B	A[1]	A	C	A	A[1]	A[1]	B[2]	–	A	A	A	A[1]	B	A	B	A	A[2]	A	A[2]	A	A	B	A	C[2]	C[2]	B[1]	D	B[1]	A	C	A	B	A[1]	A	A	A
Tetrachloroethane	–	A	C	A	–	–	–	D	C[1]	–	C	–	A	C	A	D	D	D	A	D	D	D	D	–	A	B	A	C	–	–	–	A	A	A	A	A	–	–
Tetrachloroethylene	–	A	D	–	–	C	B	D	A[1]	D	D	–	A	D	–	D	D	D	A	D	D	–	D	–	A	–	A	–	–	–	–	A	A	–	–	A	–	–
Tetrahydrofuran	–	A	D	A	B	C	C[1]	D	A	D	C[2]	A	A	D	B[1]	D	D	D	A[1]	D	D	D	D	–	D	A	A	–	–	A	D	–	–	A	B	A	A	–
Thread Cutting Oil	–	–	A	–	–	–	–	–	A	–	–	–	A	A	A	–	–	–	–	–	–	–	–	–	–	B	B	–	–	–	–	–	–	–	–	–	–	–
Tin Salts	–	–	–	–	–	–	–	–	–	–	A	–	A	A	A	A	B	A	–	A	–	–	B	A	A	–	D	D	–	–	–	–	–	C	A	–	–	–
Toluene (Toluol)	D	C[1]	D	B[1]	B	D	C[1]	D	A[1]	D	C[1]	A	A	D	A[1]	D	D	D	B[2]	D	D	D	D	D	C	A	A	A	A	A	A	A	A	A	A	A	A	A
Tomato Juice	B	B	–	A	–	A	A[1]	A	A[1]	A[1]	A	A	A	A	A	A	A	–	A	–	A	–	–	–	A	A	A	A	–	A	C	–	–	–	–	A	–	–
Trichloroacetic Acid	–	–	–	D	–	C	A	–	C	D	A	A	A	B	B	–	B	–	A	C	D	–	D	A	C	D	C	D	–	–	–	D	D	B	D	A	A	–
Trichloroethane	–	A	–	A	–	D	–	D	C[1]	D	C	–	A	C	A	D	D	D	A	D	D	D	D	D	A	B	B	D	–	A	A	B	–	A	A	A	–	–
Trichloroethylene	D	D	D	C[1]	C	D	D	D	C[1]	–	C[1]	A[1]	A	D	B	D	D	D	A	D	D	D	D	D	A	B	B	D	–	B	A	C	A[1]	A	A	A	A	A
Trichloropropane	D	A	–	A	–	–	–	D	–	–	–	–	A[1]	–	–	D	–	–	A	D	A	–	–	D	A	A	A	D	–	A	A	A	A	A	–	–	–	–
Tricresylphosphate	B	C	D	A	–	–	B[1]	A	A[2]	–	A[1]	–	A	D	D	D	A	D	–	B	C	–	C	D	A[2]	B	B	D	–	A[2]	A	B	B	A	B	A	D	–
Triethylamine	–	D	A	A	–	–	–	B	A[1]	–	D	–	A	B	A[2]	C	A	–	A	B	A	–	–	A	D	A	A	–	–	–	A	A	A[1]	–	–	A	B	–
Trisodium Phosphate	B[1]	A	A	A	A	A	A	A	A	–	A	A	A	A	A	A	A	–	–	A	A	–	A	A	A	B	B	D	–	A	C	–	B[1]	A	–	A	–	–
Turpentine	D	A[2]	A	B	–	B	D	D	B	D	D	A	A	D	A	–	D	D	A	D	D	D	D	D	A	A	A	A	D	A	C	–	B	B	B	A	A	–
Urea	B	A	A	–	–	A	A	A	A	D	A	A	A	D	A	B	A	–	–	–	B	–	B	B	A	B	B	B	–	B	–	–	–	B	A	A	B	–
Uric Acid	–	–	–	–	–	–	B	–	A	–	–	–	A	A	–	–	–	–	–	–	A	A	–	A	–	B	B	D	–	B	–	D	A	B	A	A	D	–
Urine	–	A	A	A	–	A	A[2]	A[2]	B	–	A	–	A[1]	A	A	A[1]	A[1]	–	–	D	D	–	–	–	A[1]	A	A	B	–	A	C	A	–	–	–	A	–	–
Varnish	–	A	–	A	–	B	A	D	A	–	A	–	A	D	–	B	D	D	A	D	D	–	D	D	A	A	A	A	A	–	A	C	B	A	–	A	–	–
Vegetable Juice	B	A	–	A	–	–	–	A	A	–	–	–	A	–	–	A[2]	A	–	–	–	–	–	B	A	A	A	A	D	A	A	C	D	A	–	–	–	A	–
Vinegar	A	B	A	A	–	A	A	A[1]	A	A[2]	A	A	A	B	B	B	A	A	A	B	B	–	A	A[1]	A	A	A	D	D	A	C	D	B	A	A	A	A	A
Vinyl Acetate	–	–	D	A[1]	–	D	A	–	–	–	B[1]	–	A[2]	D	A[2]	D	B[2]	A[2]	–	D	D	–	D	D	A[1]	B	B	A[1]	–	–	–	B	B	–	–	A[2]	B	–
Vinyl Chloride	D	–	D	–	–	–	–	–	A[1]	–	–	–	A[2]	D	B[1]	D	C	–	–	C	D	–	–	D	A[1]	B[2]	A[1]	B[1]	–	A[2]	–	B	B	A[2]	A	A[2]	A	–
Water, Deionized	–	–	A	A[2]	–	A	–	A[2]	A[1]	–	A[2]	A	A[2]	A[2]	A[2]	A[1]	A[1]	A[2]	A[1]	A	A	A	–	A[2]	A[1]	A[1]	A[2]	A[2]	A	–	–	D	B	A[2]	A[2]	A[2]	B	–
Water, Acid, Mine	B	A[1]	A	A	–	A	A[2]	–	A	B[2]	A	A	A	B	A	A	A	–	A	B	C	A	B	–	A	B	B	D	D	A	C	D	D	A	A	A	A	–
Water, Distilled	B	B	A	A	–	A	A[2]	A	A[1]	A[2]	A	A	A	A[2]	A	A	A	–	A	A	A	A	C	B	A	A	A	A	A	A	D	D	B	A	A	A	–	–
Water, Fresh	A	A[2]	A	A	A	A	A[2]	A	A[1]	A[2]	A	A	A	B	A	A	A	–	A	A	A	A	B	B	A	A	A	B	D	A[1]	A	D	B	A	A	A	A	–
Water, Salt	–	A	A	A	A	A	A[2]	A	A[2]	A[2]	A	A	A	B	A	A	A	–	A	A	A	A	B	B	A	B	B	B	D	A	D	D	B	A	A	A	B	–
Weed Killers	–	A	–	A	–	–	–	–	A	–	–	–	–	–	–	A	–	–	–	–	C	–	A	–	A	A	A	D	–	–	C	–	–	–	–	–	B	–
Whey	–	A	–	A	–	–	–	–	–	–	–	–	A	–	–	A	–	–	–	–	–	–	–	–	A	A	A	B	–	–	–	–	–	–	–	–	–	–
Whiskey & Wines	C	A	A[2]	B	–	B	C	A[2]	A[1]	A[1]	A	–	A	A[2]	A	A	A	A	A	A	C	–	A	C	A	A	A	C[1]	B	A	C	D	B	–	A	A	A	A
White Liquor (Pulp Mill)	–	D	A	A	–	–	A[2]	A[1]	A[1]	–	A[1]	–	A	A[2]	A[1]	A	–	–	–	–	A	–	A	–	A	A	A	B	B	A	D	C	–	A	–	A	–	–
White Water (Paper Mill)	–	B	–	A	–	–	–	D	A	–	A	–	–	A	–	–	–	–	–	–	A	–	–	–	A	A	A	–	–	–	A	A	–	–	–	–	–	–
Xylene	D	A	D	A	B	D	B	B	A[2]	D	B	A	A	D	A	D	D	D	A	D	D	D	D	D	B	B	B	A[1]	A	A	A	B	A	A	A	A	A	–
Zinc Chloride	A	C	A	A	A	A	A[1]	A[1]	A	A[2]	A	A	A	B	A	A	A	A	A	A	A	B	B	B	A	B	B	D	D	B[1]	D	D	C	B	A[1]	A	D	–
Zinc Hydrosulfite	A	C	–	A	–	–	–	A	A	–	–	A	A	–	–	A	A	–	–	–	A	–	–	–	–	A	A	D	–	–	D	D	B	–	–	–	–	–
Zinc Sulfate	A	C	A	A	–	A	A[2]	A[1]	A	A[2]	A	A	A	A[2]	A	A	A	A	A	B	A	–	A	A	A	B[1]	A	D	B[2]	B	C	D	B[1]	A[2]	A[2]	A	D	A

Explanation of footnotes: 1. Satisfactory to 72°F (22°C) 2. Satisfactory to 120°F (48°C) 3. Satisfactory to 90°F (32°C) 4. Satisfactory to 200°F (93°C)

Delrin, Hytrel, Teflon—Reg TM E. I. DuPont de Nemours & Co.
Hypalon, Viton—Reg TM DuPont Dow Elastomers L.L.C.
Kynar—Reg TM Elf Atochem North America
Noryl—Reg TM General Electric Co.
Ryton—Reg TM Phillips Petroleum Co.
Santoprene—Reg TM Monsanto Chemical Co
Tygon—Reg TM Norton Co.
Hastelloy C—Reg TM Cabot Corp.

More info

Also visit our interactive Chemical Resistance Charts at www.coleparmer.com.