

Chemical Resistance Charts

WARNING

The information in this chart has been supplied to Cole-Parmer by other reputable sources and is to be used **ONLY** as a guide in selecting equipment for appropriate chemical compatibility. Before permanent installation, test the equipment with the chemicals under the specific conditions of your application. **For further information, see pages 18 and 19 in this catalog.**

Ratings of chemical behavior listed in this chart apply to a 48-hour exposure period; Cole-Parmer has no knowledge of possible effects beyond this period. Cole-Parmer does not warrant (neither expressed nor implied) that the information in this chart is accurate or complete or that any material is suitable for any purpose.

DANGER

Variations in chemical behavior due to factors such as 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.

Ratings—Chemical Behavior

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

CHEMICAL	Plastics						Elastomers			Metals			Non-metals
	ABS plastic Acetal (Delrin®) CPVC Epoxy Hytrex®	LDPE Noryl® Nylon Polycarbonate Polypropylene	PPS (Ryton®) PTFE (Teflon®) PVC PVDF (Kynar®)	Buna N (Nitrile) EPDM Hypalon® Kef-F® Natural rubber	Neoprene 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 Al2O3 Ceramic magnet				
Acetaldehyde	D A D A —	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 —	A —				
Acetamide	— A — A —	A — A D A —	A A D C	A A C A D	B B D B	A A B A —	— D — —	A —	A —				
Acetate Solvent	— C — A —	A D A — B ¹	A A D A C	C A C A B	C C D D	A A B A —	A D A A A	A —	A —				
Acetic Acid	D D C C —	A ² A D B ¹ B	A A D C	C A C A B	D C D D	A D B A D C	A D B A A	A A —	A —				
Acetic Acid 20%	C C A A ¹ —	A A D A' A	A A D A	B A A B	A B D B	B A B D C	A D B A A	A A A	A A A				
Acetic Acid 80%	D D C B ¹ —	D A D B ¹ A	A A C C	C A C A C	C B D B	D B D D C	A D B A A	A A A	A A A				
Acetic Acid, Glacial	D D B ¹ B ¹ A ¹	D A B B ¹ A ¹	A A D A ¹	C B C A ² C	D B D D	C A B C —	A D B A A	A A A	A A A				
Acetyl Anhydride	C ¹ D D C C	D D A ¹ D B ¹	A A D B ¹	D B A A C	A C D D	B A A ¹ D C	B D B A A	A A A	A A —				
Acetone	D A D B ¹ B	B ¹ D A D A	A A D D	D A C A C	C D D D	A 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 B D D	A A C A ²	D D D A	D C D A	A A D D —	B B A A —	— — —	— — —				
Acetylene	D — A C A A	D — A D A ¹	A A A ¹ A	B A B A B	B A B A ¹	A A A D B C	A A D —	A —	A —				
Acrylonitrile	D — A A —	A — A ¹ D A ¹	— A B ¹ A ¹	D D C D D	C D D D	A ¹ A ¹ B ¹ A —	A ¹ A ¹ A B —	B —	B —				
Adipic Acid	— — A ² 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 —	A ² —	A ² —				
Alcohols: Amyl	— A A ² B —	B ² C A ¹ B ¹	A A A ² A	B A A B A	A D A ² B	A B A B A A	A B A B A B	A A —	A A —				
Benzyl	D A A C —	D D B ¹ — A	A A D A	B D C A A D	C — D A	B B B A A	A B B A A A	A B B A A	A B A —				
Butyl	A ¹ A A ² A —	A A D A ² A	A A A ² A	C B C A —	C B A ² A	A A A B A A	A B A A A A	A A —	A A —				
Diacetone	— 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 A A	A A A A A A	A A —	A A —				
Ethyl	B ¹ A ¹ B A ² —	B A ¹ A ¹ B ² A	— A C —	C A C A A A	A B C A	A A B A A A	A B A A A A	A A —	A A —				
Hexyl	— A — A —	— A — A —	— A A ² —	A C B — A	A B A ² C	A A A A —	A A A A —	A A —	A — —				
Isobutyl	B A — A —	A ² A A ¹ — A ¹	— A ² A ¹ —	B A A — A	A A A ¹ A	A B A — A	A C — A B	A —	A —				
Isopropyl	— A C — 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 A B A B	A A A A	A A A				
Methyl	D A B B ¹ B	A ¹ A B ¹ B ¹ A ²	A A A — —	B A B — B	B B B — B	A A A A A A	A A A B A B	A A A A	A A A				
Octyl	A ¹ A B ¹ A —	A A A — A	— — —	A A A — A	A A A — A	A A A A A A	A A A A A A	— — —	— — —				
Propyl	B ¹ A A ² A —	A ² A ² D — A	— A A A ²	A A A — A	A A A — A	A A A A A A	A A A A A A	A A A A	A A A				
Aluminum Chloride	A — A A ¹ C	B ² A B ¹ A ¹	A A A ² A	A A B A A	A B A B A	B B D D D	B ¹ D B A B	A A —	A A —				
Aluminum Chloride 20%	— C A A ¹ —	B ² A D A ¹	A A A ¹ A	A A B A A	A B A ¹ A	C D C D D	C ¹ D — A B A	A A —	A A B				
Aluminum Fluoride	A C A B ¹ —	A ² A ¹ A ¹ — A	A A A ² A	A A A B —	A B A ² A	D D D B ¹ —	C D D D B A	A A —	A B —				
Aluminum Hydroxide	B A B A ¹ B —	A ² A B 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 —	A —				
Aluminum Nitrate	— B A A ² 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 ² —	A ² —				
Aluminum Potassium Sulfate 10%	— C B A ¹ —	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 —	A —				
Aluminum Potassium Sulfate 100%	— C B A ¹ —	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 D B C A	A —	A —				
Aluminum Sulfate	A ² B ¹ A ² A ² B ¹	A ² A ² A ² A	A A A ² A	A A A A A	A A A ² A	B B ² B ¹ B	B D A ² B A	A —	A A —				
Alums	— A A D —	A — A —	— A — —	A ¹ — —	B A ¹ —	— A A —	A D C B A	— — —	— — —				
Amines	D D D A ² A ¹	C ¹ D D D B ²	B A ² D —	D B D A B	B D B D D	A B A B ¹ D	B D — B B	A —	A —				
Ammonia 10%	— D A A ² —	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 —	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 A —	— — —	— — —				
Ammonia, anhydrous	D D A ¹ A D —	B ² B ¹ A D A	A ¹ A A ² A	B A D A D	A C B D	A A A ² D D	A A A D B C	A —	A —				
Ammonia, liquid	— D A A ¹ —	C ¹ — B ¹ D A ²	A ¹ A A ¹ A	C A D A D	A A A ² D	B ² A ² A D	B ² A B C A	A A —	A A —				
Ammonium Acetate	— A — —	A — A — A	— A A —	B A — —	A A A — A	A A A A 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 D B A	A — —	A — —				
Ammonium Carbonate	A ² D A A ² —	B ² A ² A ¹ — A	A A A ² A	B A — — A	A C A ² A	B B B D B	B D D B A	A A A A	A A A A				
Ammonium Caseinate	D — A —	— A — —	— — —	— — —	— — —	— — —	— — —	— — —	— — —				
Ammonium Chloride	A ² B A ² A ¹ A ¹	A ² A B A ² A	A A A ² A	B A A A A	B C A ² A ²	C B ² B ¹ D —	B D D D B B A	A A A A	A A A A				
Ammonium Hydroxide	B C A A ¹ C	A ¹ A A D A	A A A A	D A A A D	A A A B A	A ¹ A ² B ² D	A D D B A	A A A A	A A A A				
Ammonium Nitrate	— A ² A ² A ² B ¹	A ¹ A A ¹ — A	A A A ² A	A A A C	B C A ² A	A ¹ A B ¹ D D	A B D B A A	A A —	A A —				
Ammonium Oxalate	— B — A —	— A — A ¹ A	— A — —	D A — —	A A — —	A A D —	A D C G A —	— — —	— — —				
Ammonium Persulfate	A ² D A A ¹ —	A ² A ¹ D — A	— A ¹ A ² A ¹	A B A A A	D A D ² A	B D D D D	B D D D B A	A A A A	A A A A				
Ammonium Phosphate, Dibasic	A ² B ² A A ¹ —	A ² A C ¹ A ² A	A A A ² A	A A A A A	A A A ² A	B C B ¹ D —	A ¹ D D D B A	A A —	A A —				
Ammonium Phosphate, Monobasic	— B A A B ¹	A — A — —	— A A —	A A A — A	A A A A A	B C C B —	C D D D B A	— — —	— — —				
Ammonium Phosphate, Tribasic	— B — A —	C A B — A	— A A —	A A A — A	A A A A A	B B B C —	D D D D B A	— — —	— — —				
Ammonium Sulfate	A ² B ¹ A A ² B ¹	A ¹ A A ¹ A ²	A A A ² A	A A A A A	A A A ² A	B B B A ¹ D D	B D D D B A	A A A A	A A A A				
Ammonium Sulfite	— D A — B ¹	B ² A ² A ¹ — A ²	— A ² A ² —	A ¹ A ² A ² A ²	A ¹ — A ² D	B B D — D A	B D D D B A	— — —	— — —				
Ammonium Thiosulfate	— B — A —	— A — —	— — —	A ¹ — —	A — D —	D D D D A	B D D D B 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 A —	A A —				
Amyl Alcohol	A ¹ A A ² B ² A ¹	B ² C A ¹ — B ¹	A A A ² A	B A A B A	B D D D D	A B A B ¹ A A	A B A A A B	A A —	A A —				
Amyl Chloride	D C A C ¹ —	D D C ¹ — A	— A D A	D D D A D	B D D D B ¹	A ² A ² A ¹ C	A ² A A A C	A A C A A	A A A A				
Aniline	D A ¹ B ² D D	C D A ² D A ¹	A A C ¹ A ¹	D B D A ² D	D B D A	A B C D C	A C D B C	A A —	A A —				
Aniline Hydrochloride	D — D D D D	D — D D D D	— A B ² A ²	D B — — A	D B D A	B C B ¹ D D	B D D D B A	D —	D —				
Antifreeze	B D A A —	— A D — D	— A — A	A A — A	C C C B A	B C B —	C D D D B A	— — —	— — —				
Antimony Trichloride	A ² — A ² D —	B ² A ² D A ² A	— A A ² A	B B ¹ — A —	D C C A D	D D D D D A	B D D D D B	B — — —	B — —				
Aqua Regia (80% HCl, 20% HNO ₃)	D D C ¹ D —	B ¹ D D D B ¹	D A C ¹ A ²	D B — —	D B D B	D D D D D D	D D D D D D	D D D C A ¹	D D C				
Arochlor 1248	— — A ² C ¹	C ¹ — A ¹ —	D — A —	C ¹ B D A ¹ D	D B — —	B B A A ¹ A	B B A A ¹ A	B — A ¹ —	B — A ¹ —				
Aromatic Hydrocarbons	— A D A C ¹	C D — D —	— D — D	D D D D D	D D D D D	A C A — C	A C A — C	— A — —	— A — —				
Arsenic Acid	A ² D A A ² —	B ² A ² C ¹ A ¹	A A A A A	A A B A — B	A A B A — B	A ² A ² D D D	A ¹ D A B B	A — — —	A — — —				
Arsenic Salts	— — — B ¹	B — A — —	— — A —	D A D D	D D D D	A B A B A	A ² A ² D D D	A ¹ D C A A	A A A A				
Asphalt	— B ² A ² A B ¹	A ¹ — A D A B ¹	A A A ² A	B D D A D	D D D D	B A A B ¹ A ¹	A A A A A A	A A A A A A	A A A A				
Barium Carbonate	A ² A A ² A ² —	B ² A ² A ¹ A ²	A ² A A ² A	A ² A A — A	D A D D	B ¹ B D B ¹ B	B ¹ B D B ¹ B	B ¹ A A B A	A A A A				

Explanation of footnotes:

1. Satisfactory to 72°F (22°C)

2. Satisfactory to 120°F (48°C)

Chemical Resistance Charts

WARNING

Ratings— Chemical Behavior

- A – No effect
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- C – Moderate effect
- D – Severe effect;
not recommended
- No data available

DANGER

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	ABS Plastic Acetal (Delrin®) CPVC Epoxy Hytrel®	LDPE NORYL® Nylon Polycarbonate Polypropylene	PPS (Rytac®) PTFE (Teflon®) PVC PVDF (Kynar®)	Buna N (Nitrile) EPDM Hypalon® Kel-F® Natural rubber	Neoprene 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 ₂ O ₃ Ceramic magnet										
Barium Chloride	A ² A A ¹ A ² B ¹	A ¹ A A A D	A A A ¹ A	A A A A A	C C A A A	A ¹ A ¹ D B ¹	B C	B A	A A A										
Barium Cyanide	— B D A —	B — A ¹ —	— A ¹ D —	C A A A —	— A — A	A ¹ A ² C ¹ C	A ¹ C ¹ D	A —	— A —										
Barium Hydroxide	A ² D A ² A ² B ¹	B ² A ² A ¹ D	A A A ² A	A A A A A	A A A A A	B ¹ B D D	B ¹ B	B —	A A A										
Barium Nitrate	— B ² A A ¹ —	B ² A A ¹ D	— A ¹ A —	A ² A — A	A B — A	B ¹ B D D	B ¹ B	B —	A A —										
Barium Sulfate	A ² B ² B ¹ A ² D	B ² A ¹ D	A B ¹ A	A A A A A	A A A A A	B ¹ B B C	B B B	B A B	A A A										
Barium Sulfide	A ² A A ² B ²	B ² A ² A ¹ —	— A ² A —	A A A A A	A A A A A	B ¹ B D D	A ¹ D D	A —	A A A										
Beer	A ² A A ² A ² A ¹	A ² A ¹ A ¹ A ²	A ² A A ² A	A A A A A	A A A A A	A A A B A ¹	A D B A ¹ B	A —	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 A A — C	A A A A —	A A —	A — A										
Benzaldehyde	B A D D B	A ¹ B A D	A A ¹ D A ²	D A D A D	D D D D	B B B —	A A A B A A	A A A A A	A A A										
Benzene	D A ¹ D C ¹ C	D D A ¹ D	D A A C ¹ A ²	D D D B D	D D D A	B B B — A	A A B B A	A A A A	A A A										
Benzene Sulfonic Acid	— D B B	A ¹ A D D D	A A A A —	D D — A	A D D A	B B D —	A — B B	A A —	A A —										
Benzoic Acid	— B A ¹ A ¹ D	A ¹ B D B ¹	A ¹ A ² A A	D D D A D	B B D A A	B B B — B	B D — B ¹ A	A A A A	A A A A										
Benzol	D A — A ¹ C	C ¹ B D D B	A — A —	D D D A D	D D C ¹ A	A ¹ A ¹ B ¹	A A B B A	A A A A	A A A A										
Benzonitrile	— — —	— — A ¹ —	— A ² —	— — A ² —	D D D — D	D D — A ²	D D — C	— — D C	A — —										
Benzyl Chloride	D A — —	— D A ² — C ¹	— — —	D D D — D	D D B ¹ D	— D — D	— — D C	— — D C	A ¹ —										
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 ² A ¹ A — B	A A A A A	B A A A A	A B — A	A A B ¹ — B	A A B B B	A A —	A — A										
Boric Acid	— A A A ¹ A ¹	A ² A ¹ B — A	A A A A A	D A A A A	B ² A ¹ D — B	B ² D B A A	B ² D B A A	A A A A	A A A A										
Brewery Slop	— B — A —	— — — —	— — — —	A — — —	A — — —	— — — A	A A — —	A A — —	— — —										
Bromine	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 D	D D D D D	D — — D	D — — A D	D A A A										
Butadiene	— A A ¹ A ¹ —	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 — —	A — —										
Butane	B A C ¹ A ¹ —	C ¹ D A ² D 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	A — —	A — —										
Butanol (Butyl Alcohol)	— A A D B ¹	B ² A B ¹ A ¹	A A ² C ¹ A	A A A A A	A B D A A	A A ¹ B A — A	A — B B B	A — —	A — —										
Butter	B A — A —	— B — — —	— A — —	A A B — D	B B B A A	C A A A — D	— D — —	— D — —	— — —										
Buttermilk	B A A ¹ A ¹ —	A ¹ A B A ¹ A ¹	A A A ¹ —	A A ¹ A D	D A B A A	A A A A — D	— D — A — A	A — —	A — —										
Butyl Armine	— C ¹ — B ² —	C ¹ D A ² D ¹	D A ² D ¹ A ¹	D B ¹ D D	D B ¹ D D	— A A ² — B	— — B ² B ²	A ² —	A ¹ —										
Butyl Ether	— D D A ¹ —	— D A ² — D	D A ² A ¹ A ²	B ² D — A ¹	D D A ² D	— A ¹ A ¹ —	— — — —	— — — —	— — — —										
Butyl Phthalate	— D B ² —	C ¹ A ² A ² D B ²	A A ² D 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 —	A ² —										
Butylacetate	— A C ¹ B ¹ B	C ¹ B A D B ¹	A A D B ²	A A D A ¹ D	D D D D	B A A A A	B ¹ A A A A	A A A A A	A A A A A										
Butylene	— A A A ¹ —	B ¹ B — B D —	A A A A A	A D D B ¹ D	D D — A	A A A A — D	A A — D	A A — D	A A — D										
Butyric Acid	D A D A B ¹	D D C ¹ D B ¹	A A ² B ¹ A	D B D A D	D D D B ¹	B ² B ² B — D	B D C A ¹ A	A — A	A — A										
Calcium Bisulfate	— D — A —	— D — — —	— A — — —	A A C — A	A C — A	— A — C C	— D — —	— D — —	— D — —										
Calcium Bisulfide	— D A ¹ A B ¹	B ¹ A A — A	— A A ² A	A C — A D	A C — A	B B C — C	B — — A A	— — —	— — —										
Calcium Bisulfite	— D A ¹ A ¹ B	A ¹ A ¹ A ² D A	A A B A A	A D A A D	A A A — A	B A D — A	B ¹ — — B A	A — A	A — A										
Calcium Carbonate	— A A A ¹ —	B ¹ A ² C ² A	— A A ² A	A A A A A	A A A A A	A ¹ B D — A	B ¹ — — B B	A A — A	A A — A										
Calcium Chlorate	— A A ¹ —	— — — —	— A B ² A	A A B — A	— — — A	— C B ² D — A	— A C B A A	— A —	— A —										
Calcium Chloride (30% in water)	B D A ² A ¹ A ¹	B ² A A ¹ — A ²	A A C A A	A A A A A	A A A A A	C ¹ B ² D — A	B C B A A	A A A A	A A A A										
Calcium Hydroxide	— D A ² A ¹ B ¹	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 A A	A A A A										
Calcium Hypochlorite	— D B ¹ A ¹ C ¹	A ¹ A D D A ¹	A A B ¹ A	D B A A A	C ¹ B ¹ D — D	C D — B A ¹	A A A A A	A A A A	A A A A										
Calcium Nitrate	A D A ² A ²	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 ² B ¹ A ² A ²	C ¹ B ² B ¹ — B ²	B — B — B ² B ²	A ² A —	A ² A —										
Calcium Oxide	D A A A A	B ¹ A B — B	A A B A B	A A A B — B	A A C B	A A C C B	A — A A A A	— — — —	— — — —										
Calcium Sulfate	C D A ² A ²	B ¹ A D A ² A	A A B ² A	A A B C B	B B C C — C	B B C C — C	B ¹ A — B A	A A A A	A A A A										
Calgon	— A — A —	— A A — A	— — — —	A A A A A	A A A A A	— D — —	— D — —	— D — —	— D — —										
Cane Juice	— A A ² A —	— — — C ¹	— A A ¹ A ¹	A A A A A	A A A A A	A A A A A	A A 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 A	B B B A D B	C D D A A A	A A A A	A A A A										
Carbon Bisulfide	— A D A C ¹	— — — D	— D — —	C D D D	D D D D	D A B B B	B — — — —	— — — —	— — — —										
Carbon Dioxide (dry)	B A A A A	A ¹ A ¹ A ¹ A ²	A A A A A	B B B A B	B B B A B	A A ¹ B ¹ B A	A D — A A A	A A —	A A —										
Carbon Dioxide (wet)	B A A A A	A ¹ A ¹ A ¹ A ²	A A A A A	B B B A B	B B B A B	A A ¹ A ¹ A A	A D — A A A	A A —	A A —										
Carbon Disulfide	— A ¹ D C ¹	C ¹ D B D D	A A D B ²	D D D A D	D D D A D	A ¹ B A — D	B A — B B A	A A —	A 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 D D D A	A A A A — A	B A A B — B	B — — —	B — — —										
Carbon Tetrachloride	D B ¹ D A ¹ D	D D D D D	A A D A ²	D D D D A	D D D D A	B B D D D	B D D A A A	B D D A A A	B D D A A A										
Carbon Tetrachloride (dry)	D — — D	D D — — D	A ² A — A ²	C ¹ B ¹ D D D	D D D D A	B B D D D	B B ² D A ¹ B ²	B ² A ² B A ²	B ² A ² A A										
Carbon Tetrachloride (wet)	D A ¹ D —	D D — — D	A ² A — A ²	D D D D A	D D D D A	B B D D D	B B ² D A ¹ B ²	A C C B A ²	A C C B A ²										
Carbonated Water	— A A A —	A A A — B	— A — A	A — — A	A — — A	A A A D A	C D B — —	— — — —	— — — —										
Carbonic Acid	— B ¹ A A ² D	B ² A ¹ A ¹ A ¹ A	A A A ² A	D B C A C	D A A A A	A ¹ A B ¹ D B	A D — A ² B ¹	A A —	A A —										
Catsup	B B A A A	— A A A — A	— A — A	A A A — A	A A A — A	A A A D A	C D C D D	A C D D D	A C D D D										
Chloric Acid	— D D A —	— D D — —	— A A — A	B B B — —	D D D D A	D D D D A	D C ¹ D D D	A ¹ D D D A ²	D — —										
Chlorinated Glue	— D — A —	— — — —	— — — —	D D D D A	D D D D A	D D D D A	A D — — A	A D — — A	D — —										
Chlorine Water	— D A ² A ¹ —	B ¹ C ¹ C ¹ — D	D A A ² B	D C C A C	D D D A	C C D D D	A ² D — D A ²	A A A A A	A A A A A										
Chlorine, Anhydrous Liquid	— A ¹ D C ¹ —	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 D	A D D A ² D	A — C										
Chlorine (dry)	— D D D D	D B ¹ D — D	D A D A	B A D D D	C D A A A	B B C D C	A D A D D	A D A D D	A — A										
Chloroacetic Acid	— D D C ¹ D	D — D D C ¹	A A B ¹ A ¹	D B — A ² D	D D D A	B ¹ A ¹ D C	B ¹ D D A ¹ A ¹	B ¹ D D A ¹ A ¹	A A —										
Chlorobenzene (Mono)	D D D C ¹ D	C ¹ D D D C ¹	A B D A ¹	D D D A ¹ D	D D D A	A B A B ¹ C	A B B A B B	A B B A B B	A A A A										
Chlorobromomethane	— — — —	A — C — A	— A D —	D B D D	D D D A	D D D A	— B B B —	— B B B —	— A A —										

Explanation of footnotes:

1. Satisfactory to 72°F (22°C)

2. Satisfactory to 120°F (48°C)

Chemical Resistance Charts

WARNING

The information in this chart has been supplied to Cole-Parmer by other reputable sources and is to be used **ONLY** as a guide in selecting equipment for appropriate chemical compatibility. Before permanent installation, test the equipment with the chemicals under the specific conditions of your application. **For further information, see pages 18 and 19 in this catalog.**

Ratings of chemical behavior listed in this chart apply to a 48-hour exposure period; Cole-Parmer has no knowledge of possible effects beyond this period. Cole-Parmer does not warrant (neither expressed nor implied) that the information in this chart is accurate or complete or that any material is suitable for any purpose.

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CHEMICAL	Plastics								Elastomers				Metals				Non-metals	
	ABS plastic Acetal (Delrin®) CPVC Epoxy Hytrex®	LDPE NORYL® Nylon Polycarbonate Polypropylene	PPS (Ryon®) PTFE (Teflon®) PVC PVDF (Kynar®)	Buna N (Nitrile) EPDM Hypalon® Keltene® Natural rubber	Neoprene Silicone Tytgon® (R-3650) Viton®	304 stainless steel 316 stainless steel	Aluminum Brass	Bronze	Carpenter 20 Cast iron Copper Hastelloy-C® Titanium	Carbon graphite Ceramic Al2O3 Ceramic magnet								
Chloroform	D A D C ¹ D	C ¹ D A D C ¹	A A ¹ D A	D D D B ¹ D	D D D A	A A B ¹ B ¹ B	A B A A ¹ A ²	A A A	A B A A ¹ A ²	A A A	A A A							
Chlorosulfonic Acid	— D D C ¹ D	D D D C ¹ D	D A D D	D D D A ² D	D D D D	D D D B	D D D B	D D D B	D D D B	D D D B	D D D B							
Chocolate Syrup	— A — A —	— A A — A A ²	— A — —	A A — —	— — — —	— — — —	— — — —	— — — —	— — — —	— — — —	— — — —							
Chromic Acid 5%	B D A D D D	D A ¹ — B D	A A A ² A	D D A B A B	D C C A D	B B B D D	D D D B	D D D B	D D D B	D D D B	D D D B							
Chromic Acid 10%	B D A ² D D	D A ¹ — B D	A A A ² A	D C C A B	B B B D D	D D D B	D D D B	D D D B	D D D B	D D D B	D D D B							
Chromic Acid 30%	B D A ¹ D D	D D — C D	B A A ¹ A ²	D B C A D	D C B A	B ² B ² D D D	D D D A	D D D A	D D D A	D D D A	D D D A							
Chromic Acid 50%	D D D D D	D D — D D	A ¹ A D A ²	D B C A ² D	D C B A	C B ² D D D	D D D A	D D D A	D D D A	D D D A	D D D A							
Chromium Salts	— — — B ¹	B — B —	— A — —	— — — —	— — — —	— — — —	— — — —	— — — —	— — — —	— — — —	— — — —							
Cider	— A — A B ¹	B A A A A	— A — —	A A — —	A A C A ² A	A A B ¹ — A	A A B A — A	A D — —	A B D — A	D — — A A	D — — A A							
Citric Acid	D B ¹ B ² A ¹ A ¹	D A ¹ A ¹ A ¹	A A B ² A	A A C A — A	A A C D D	B B D D D	B B D D D	B B D D D	B B D D D	B B D D D	B B D D D							
Citric Oils	— B — A —	— A — — A	— — — —	D B A A A	D — — A	A A C — A	D D — —	D D — —	D D — —	D D — —	D D — —							
Clorox® (Bleach)	B D A D —	— A A — D	— — — —	D B B D D	B B B A	A A A A — A	D D — —	D D — —	D D — —	D D — —	D D — —							
Coffee	— A A A —	— A A — A	— — — —	A A A A — A	A A A A — A	A A A A — A	D D — —	D D — —	D D — —	D D — —	D D — —							
Copper Chloride	A A A A A ¹	— A D — A	A A A A — A	A A C A C	A A A A — A	D D — —	D D — —	D D — —	D D — —	D D — —	D D — —							
Copper Cyanide	— A A B ¹ —	B ² A ¹ D D	A A A A — A	A A C — A	A A A A — A	B B D D D	B B D D D	B B D D D	B B D D D	B B D D D	B B D D D							
Copper Fluoborate	— B A ¹ A —	— — — —	— — A —	B — — —	A — — A A	D D — —	D D — —	D D — —	D D — —	D D — —	D D — —							
Copper Nitrate	— A A A A ¹	B ² A ¹ D D	A A A A — A	A A B A A	A A B A A	A A D D D	A A D D D	A A D D D	A A D D D	A A D D D	A A D D D							
Copper Sulfate 5%	— D A A A ¹	A ² A ¹ D A ¹	A A A A — A	A A C A C	A A A A — A	B B B D D	B B B D D	B B B D D	B B B D D	B B B D D	B B B D D							
Copper Sulfate >5%	— D A A A ¹	A ² A ¹ D A ¹	A A A A — A	A A C A C	A A A A — A	B B B D D	B B B D D	B B B D D	B B B D D	B B B D D	B B B D D							
Cream	— A A A —	— — — —	— A — —	D — — —	D — — —	A A A A — A	D D — —	D D — —	D D — —	D D — —	D D — —							
Cresols	D D D A ¹ D	C ¹ D D D D	A — D A ²	D D D A ¹ D	D D D A	A ² A A B — A	A ² C A B ² B	A A A B — A	A A A B — A	A A A B — A	A A A B — A							
Cresylic Acid	— D D D —	B ¹ — D D A ¹	— A D B ¹	D D D — A ²	D D D A	A ¹ A B ² — D	— — — —	— — — —	— — — —	— — — —	— — — —							
Cupric Acid	— D — A ¹ —	— — — —	— A — —	C — — —	C — — —	D D D —	D D D —	D D D —	D D D —	D D D —	D D D —							
Cyanic Acid	— A ¹ D A ² A ¹	B ¹ D A B D	A A D A	B D D A D	A ¹ A A A B	A ¹ A A A B	A ² B B B A	A ² B B B A	A ² B B B A	A ² B B B A	A ² B B B A							
Cyclohexane	— A ¹ D A ² A ¹	B ¹ D A B D	A A D A	B D D A D	A ¹ A A A B	A ¹ A A A B	A ² B B B A	A ² B B B A	A ² B B B A	A ² B B B A	A ² B B B A							
Cyclohexanone	D A D C —	D D A D D D	A A D D D	D B — A ¹ D	D D D D A	A ¹ A ² A — B	A ² B B A ¹ A ¹	A ² B B A ¹ A ¹	A ² B B A ¹ A ¹	A ² B B A ¹ A ¹	A ² B B A ¹ A ¹							
Detergents	B A ¹ A A ¹ —	D A ¹ A ¹ A ¹	A A A A — A	D B A B A	D B A B A	A ¹ A ¹ B ¹ A ¹	A ² B B A ¹ A ¹	A ² B B A ¹ A ¹	A ² B B A ¹ A ¹	A ² B B A ¹ A ¹	A ² B B A ¹ A ¹							
Diacetone Alcohol	— D A —	A — A ¹ D A ¹	— A D D	D A A B —	D D D D	D D D D	D D D D	D D D D	D D D D	D D D D	D D D D							
Dichlorobenzene	D — D A —	— D D C ¹	— A D A —	D D D D	D D D D	D D D D	D D D D	D D D D	D D D D	D D D D	D D D D							
Dichloroethane	D A ¹ D D —	C ¹ A ¹ D A ¹	— A D A —	D D D D	D D D D	D D D D	D D D D	D D D D	D D D D	D D D D	D D D D							
Diesel Fuel	— A A ¹ A —	C ¹ A A A ² A ¹	A A A A — A	A D B A ¹ D	D B D D A	A ¹ A ¹ A ¹ A ¹	A A A B B B B	A A A B B B B	A A A B B B B	A A A B B B B	A A A B B B B							
Diethyl Ether	— D D D C	— A D A —	A A A A — A	A D D D	D D D D	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B							
Diethylamine	D B D A —	D — D A —	A A A A — A	C B C A A	A B A A A	A B A A A	A B A A A	A B A 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 —	B ² A ¹ A ¹ B ¹	A ² C ¹ A	A ² C ¹ A — A ¹	A ² B ¹ C ¹ A ²	A ¹ A B ¹ — —	A A A B B B B	A A A B B B B	A A A B B B B	A A A B B B B	A A A B B B B							
Dimethyl Aniline	D D D A —	D A D D D	A A D A —	D B ² — A ² D	D D D D	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B							
Dimethyl Formamide	D D D D —	A A D A D D	A A D D D	D B D A C G	D C D G C	A B A B — —	— — — —	— — — —	— — — —	— — — —	— — — —							
Diphenyl	— D — — —	— — — —	— — — —	D D B B B D	B D D D D	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B							
Diphenyl Oxide	— D — — —	— — — —	— — — —	A D D D D	D C D C A	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B							
Dyes	— C — — —	— A A — —	— — — —	C C — — —	C C — — —	C C — — —	C C — — —	C C — — —	C C — — —	C C — — —	C C — — —							
Epsom Salts (Magnesium Sulfate)	B ² B A ¹ A —	A ² A ¹ A ¹ A ¹	A A A A — A	A A A A — A	A A A A — A	A A A A — A	C A A A B A A	C A A A B A A	C A A A B A A	C A A A B A A	C A A A B A A							
Ethane	— A ¹ A ¹ A ¹ —	— D — D —	— A — D —	A D B A —	D D D D A	A A A A — —	A A A A — —	A A A A — —	A A A A — —	A A A A — —	A A A A — —							
Ethanol	B ¹ A ¹ B ² —	B ¹ A ¹ B ¹ A ²	B ¹ A ¹ B ¹ A ²	C A A A A	A B C A A	A B A A A	A B A A A	A B A A A	A B A A A	A B A A A	A B A A A							
Ethanolamine	— D — A ¹ —	— A A — D	— A A — D	A A D C ¹	B B C D B	B B B D D	B B B D D	B B B D D	B B B D D	B B B D D	B B B D D							
Ether	D A ¹ D A ¹ —	D D A D —	D D A D —	D C D B ¹	D D D D	A A A B B B B	A A A B B B B	A A A B B B B	A A A B B B B	A A A B B B B	A A A B B B B							
Ethyl Acetate	D A D A B —	A A A ² D A ¹	A A D D D	D B D A ¹ C	D D D D	A A A B B B B	A A A B B B B	A A A B B B B	A A A B B B B	A A A B B B B	A A A B B B B							
Ethyl Benzoate	D — D — —	O ² A ² — D ¹	— A D D D	D — — D	D D D D A	— — — —	— — — —	— — — —	— — — —	— — — —	— — — —							
Ethyl Chloride	D A ¹ D D C —	C ¹ D A ¹ D D	A A D D D	A D B B B C	D C D D A	A A A B B B B	A C C B A B	A C C B A B	A C C B A B	A C C B A B	A C C B A B							
Ethyl Ether	D A ¹ D A ² —	D D A ¹ —	D A D A ²	D D D D	D D D D	A A A B B B B	A B B B B B	A B B B B B	A B B B B B	A B B B B B	A B B B B B							
Ethyl Sulfate	— — A ¹ —	— — — —	— A — D —	A D C C	D D D D	A A A B B B B	A B B B B B	A B B B B B	A B B B B B	A B B B B B	A B B B B B							
Ethylene Chloride	D A ¹ D D —	D D A D D D	A A D D A	D B C C —	D C D D A	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B							
Ethylene Chlorohydrin	D D D D A ¹ —	D A D D A ²	A A D D A	A A B D B	A B A B A	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B							
Ethylene Diamine	D D D D A ¹ —	D A D D A ²	A A D D A	D C D A ¹	D D D D	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B							
Ethylene Dichloride	D B ¹ D D C —	D A D A ²	A A D D A	A A A A A	D D D D	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B							
Ethylene Glycol	A B A A A —	A ² A ¹ B ¹ A	A A A A — A	A A A A A	A A A A A	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B							
Ethylenoxide	D D C ¹ D A —	A A A ¹ A ¹ C ¹ D	D A D A —	D C D A D	D D D D	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B							
Fatty Acids	A A A A A —	D A ¹ A ¹ B ¹ A	— A A A A A	B D B A C	D C D A	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B							
Ferric Chloride	A D A A C —	A ¹ A ² A ² A ²	A A A A A	A A B A ¹ A	B B B A	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B							
Ferric Nitrate	A ² D A A —	A ² A ² A ¹ A ¹	A A A A A	A A B A ¹ A	B B B A	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B							
Ferric Sulfate	A ² D A A —	A ² A ² A ² A ¹	A A A A A	A A B A ¹ A	B B B A	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B							
Ferrochloride	A ² D A A —	A ² A ² D A ¹	A A A A A	A A B A ¹ A	B B B A	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B							
Fluorine	A ¹ D A D —	D — D C D	D D D A ¹	D A ¹ — A C	D D D D	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B							
Fluorosilicic Acid	A ² A ¹ A C —	A ² A ² D A ¹	A A A D A	A A B A C	A B A B	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B							
Formaldehyde 40%	A ² A ² A ² A ² B	D A A A ¹ A	A A A A A	B A B A B	B ¹ D A	A ¹ A B A A A	A B B B B B	A B B B B B	A B B B B B	A B B B B B	A B B B B B							
Formaldehyde 100%	B A A A —	B A D A ² C	B A A A A	C A C A C	C B D D	A ¹ A B A A A	C A A A B	C A A A B	C A A A B	C A A A B	C A A A B							
Formic Acid	D A ² A ² C ¹ B	D A D A ¹	A A A A A	C A A A C	A B A C	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B	B B B B B B							

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CHEMICAL	Plastics								Elastomers				Metals				Non-metals	
	ABS plastic Acetal (Delrin®) CPVC Epoxy Hyrel®	LDPE Noryl® Nylon Polycarbonate Polypropylene	PPS (Ryton®) PTFE (Teflon®) PVC PVDF (Kynar®)	Buna N (Nitrile) EPDM Hypalon® Ket-F® Natural rubber	Neoprene Silicone Tigon® (R-3603) Viton®	304 stainless steel 316 stainless steel Aluminum Brass Bronze	Carpenter 20 Cast iron Copper Hastelloy-C® Titanium	Carbon graphite Ceramic Al ₂ O ₃ Ceramic magnet										
Freon® 11	D D A ² A A	C B D — A	A A A ² A	B D B A D	D D A B	A A A A B	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 A B	B ¹ B B ¹ B ¹	A A A A B	— A A										
Freon 22	— A A B A —	— B B — B	A A A A	D A B A D	A D A D	A A A D A	A D B A B	— A A										
Freon 113	— A A B A A	— D B ¹ D	A A B B	A D A — D	A D B	— — —	A A A C A	— A A										
Freon TF	— A B A A	— D D D	A D A B B	A D A — D	A D B	— — —	A A A A B	— A A										
Fruit Juice	B D A A —	A B A — B	— A A A B	— B A D	A — A A	A A A D —	C D A A A	— A A										
Fuel Oils	D A — A ¹ —	B B A ¹ B ¹ A	A B A ² A	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 A D	D C D A ¹	D D D A	A ¹ A A —	— — B —	— — —										
Furfural	D A D A ¹ —	D B D D D	A A D B ²	D D B D D	D D D D	A B A ¹ — B	A B A B A	— A —										
Gallic Acid	— C —	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	A B A A A A	A B A A	A D B A D	A D — A	A A D — A	A A — A B	A A A A										
Gasoline, leaded, ref.	D A — A ² A	— B A ² A ² B	A A B A	A ² D B A ² D	B D D A ¹	A ¹ A ² A — A ²	— — B A A	A ² A A										
Gasoline, unleaded	D A C A ² —	— D A ² A ² C ¹	A A C ² A	A ¹ D A A ² D	B D D A ¹	A A A ² A D A	A A A A A	A ² —										
Gelatin	— B A ² B —	A ² A ² A ¹ — A	— A B A	A A B — A	A A A A A	A ² A A A —	A A A A A	— A —										
Glucose	B A A ² B —	A ² A ² A A ¹ A	B A A ² A	A A B — A	A A A A A	A ¹ A A A —	A A A A A	— A —										
Glue, P.V.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 ¹ A A ¹ A ² A	A A A A A	A A A A A	A ² A A B	A ² A A —	A A A A A	A — A										
Glycolic Acid	B A A A —	A ² — — —	A A B B	A A A B D	A A A A A	A A A A —	— — A A	— — —										
Gold Monocyanide	— A — A —	— — — —	— D A A	A — — —	A A A A A	A A A A —	— — — —	— — — —										
Grape Juice	B A A A —	B — A — —	— A A A	A A — —	D A B A	A 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 A	— — — —										
Heptane	D A A A —	B ¹ B A B C ²	A A C ¹ A	A D B A D	B D D A	A A A A A	A A A A A	— — — —										
Hexane	D A B ¹ A A	D B B D D ¹	A A B ¹ A	A D B A D	B D D 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 —	A A A A —	— — — —										
Hydraulic Oil (Petro)	— B — A —	C — A — —	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 — 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 C	— A — A	B A B — C	B B D A	A A A — —	D D D A —	— — — —										
Hydrobromic Acid 20%	— C A B ¹ —	B ² B D — A ²	— B ² A	D A 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 —	B ¹ B D — C ¹	A ¹ A A ¹ A	D A 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 ² A D B ¹ B ²	D A A D	— A A A A A	C D A ¹ A	D D D D — D	D D D A ¹ D	A C A										
Hydrochloric Acid 37%	A C A ² A C	B ² A D D C	D A B D	B C B A A	B B A ¹ A	D D D D — D	D D D B D	A C A										
Hydrochloric Acid 100%	A C A — —	— A D D B ¹	D A D D	D D D A D	D D A ¹	D D D D D	D D D A D	A C A										
Hydrochloric Acid, Dry Gas	— — A A —	A ² A A ¹ — B	D A A ² D	— — — —	— — — —	D D D D D A	D — D A C	A — A										
Hydrocyanic Acid	B B A A C	A ² A ¹ B A	B B A B A	B C A A A	B ¹ A A D	D D D D A	D D D A B	A — A										
Hydrocyanic Acid (Gas 10%)	— C A — —	— C — B ¹ A	— A A —	B A — B	A D A A A	— — — —	D — — A	— — — —										
Hydrofluoric Acid 20%	C D C ¹ A —	A ² C ¹ C ¹ D A ²	A A B A	D D B B B ¹	B D A A	D D D D — B ²	D D B B D	A — B										
Hydrofluoric Acid 50%	C D C ¹ C ² D	A ¹ D D D C ¹	A B A ¹ A	D D B B B ¹	D D C B	D D D D — B ²	D D B B D	A — C										
Hydrofluoric Acid 75%	C D C ¹ B ¹ D	C ¹ D D D C ¹	B A C A	D C B B D	D D C B	D D D D — B ²	D D B B D	A — C										
Hydrofluoric Acid 100%	D D C ¹ — D	— D D D C ¹	D A C A	D D B A D	D D D B	B ¹ B D — B ¹	D D B B D	— B										
Hydrofluosilicic Acid 20%	— B A C ¹ —	B ² B ² D — A	A A A A	A B A A A	B ² C ¹ B ² D	B ² B ² D — B ²	D B B B D	A — A										
Hydrofluosilicic Acid 100%	— A — C ¹ —	B ¹ B ² D — A	A ¹ A B ¹ A ¹	B A B B A	B D D A A	D D D D — B ²	D D — B D	A — —										
Hydrogen Gas	— — A ² — A	A ² A ¹ A ² A ²	A A A A A	A A A B B	A C A A A	A A A A A	A — A A A	A — —										
Hydrogen Peroxide 10%	A D A C ¹ —	A ² A ¹ C ² A ²	A A A A A	D A D B A	D A B A	B ² B A — B ¹	C C D A A	C — A										
Hydrogen Peroxide 30%	— D A B —	C ² A ² D 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 —	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 —	C ² A D A D A ¹	C A A A ¹	D D B C	D B B A	B ² A ² A D B ¹	D B D A B	C A A A										
Hydrogen Sulfide (aqua)	B C A A —	A A ¹ C ¹ A A ¹	A A B ¹ A	D B D A ¹ C	D C A A D	B ² A ² B D B	D D D A A	A A A A										
Hydrogen Sulfide (dry)	— — A A A	A — C ¹ — A ¹	A A A ² A	D B B B C	A C D D B	C ¹ A B D B	D D D A A	A — —										
Hydroquinone	D A A — —	A — D — A	— A B —	D D D D A	D B B A	B ² B B — A	D D D A A	A — —										
Hydroxyacetic Acid 70%	— A A A —	A — D — A	A A — —	A A — —	A A — —	B B B — —	D B — — A	— — —										
Ink	A B — A —	— C — —	— A C A	— — — D	A — C A	C C — —	D D A — A	— A A										
Iodine	D D D C B	A ¹ C ¹ A — C	D A A A ²	D — — —	D D A — A	D D D A — A	D D D A B	— A A										
Iodine (in alcohol)	— D — — —	B — C — —	— A A A	D — — —	— — —	— — B — B	— — B B B	— — —										
Iodoform	— — — —	— — — —	— C A C	D A — — B	— — —	— — D — D	— — B D B	— — —										
Isooctane	— — — —	— — — —	— C A C	D A — — D	— — —	— — B — B	— — B B B	— — —										
Isopropyl Acetate	— D — A C	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 —	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 — —										
Istane	— — — A	— D — D —	— A A A	D D D D	D D D D	A A A A A	— — — —	— — — —										
Jet Fuel (JP3, JP4, JP5, JP8)	— A ¹ — A —	D D C A ¹ A ¹	A A C B	A D D A D	D D D A	A A A A A	A A A A A	A — —										
Kerosene	D A ² — A C	C ¹ D A D B	A A A A ²	A D D A D	A D D A	A A A A A	A A A A A	A A A A B										
Ketones	A D — C —	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 A —										
Lacquer Thinners	A D — A D	A D A ¹ B D	— A D —	D D D D	D D D D	A A A A A	A C A A A C	A — —										
Lacquers	A D — A —	A D A ¹ D D	— A D D	D D D D	D D D D	A A A A A	A C A A — A	A — —										
Lactic Acid	D B A ¹ B ¹ D	A ¹ A B B B	B A A B ¹	A A A A ¹ A	A A A A A	B ¹ B D D ²	C D B B ¹ A	A A —										
Lard	— A — B —	A A A ¹ A ¹ B ¹	— A A ¹ A	A D B — D ¹	D B D A	A A A A — A	A A — A A A	A A —										

Explanation of footnotes:

1. Satisfactory to 72°F (22°C)

2. Satisfactory to 120°F (48°C)

Chemical Resistance Charts

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DANGER

Variations in chemical behavior due to factors such as temperature, pressure, and concentration can cause equipment to fail, even though it passed an initial test.

Ratings— Chemical Behavior

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

Explanation of footnotes:

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

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CHEMICAL	Plastics								Elastomers				Metals				Non-metals																					
	ABS plastic	Acetal (Delrin®)	CPVC	Epoxy	Hytrex®	LDPE	NORYL®	Nylon	Polycarbonate	Polypropylene	PPS (Ryton®)	PTFE (Teflon®)	PVC	PVDF (Kynar®)	Buna N (Nitrile)	EPDM	Hypalon®	Ke-F®	Natural rubber	Neoprene	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 ₂ O ₃	Ceramic magnet		
Nitric Acid (20%)	B	D	A ²	B ¹	D	C	B ²	D	B ¹	A ²	C	A	A ¹	A	D	A ¹	D	A ¹	D	D	D	A	A ²	A	D	A ¹	A ¹	A	A	—								
Nitric Acid (50%)	C	D	D	B ¹	D	D	B ¹	B ²	D	B	C	A	B ¹	A ¹	D	D	D	A	D	D	A	A ²	A	D	D	A ¹	A ¹	D	A	C								
Nitric Acid (Concentrated)	D	C	D	D	C ¹	D	C ¹	B ¹	D	C ¹	A ²	A	B ¹	A ¹	D	D	D	A	D	D	A	A ²	A	D	D	B ¹	A ¹	D	B	—								
Nitrobenzene	D	C	D	C ¹	D	C ¹	D	B ¹	D	B ¹	A ²	A	B ¹	A ¹	D	D	D	B	D	D	B	B	B	B	B	B	B	C	C	—								
Nitrogen Fertilizer	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	A ²	—	—							
Nitromethane	D	A	—	—	C	A	D	B ¹	D	B ²	A ²	A	B	B ²	A ²	D	B ²	—	A ¹	D	D	D	A	—	—	—	—	—	—	—	—	—						
Nitrous Acid	D	—	A	D	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—						
Nitrous Oxide	—	—	—	—	—	C	—	C	—	D	—	A	A	D	—	—	—	A	—	A	B	B	B	B	B	B	B	B	C	—	—							
Oils: Aniline	D	D	—	A	D	—	D	A	—	A	—	A	D	A	D	B	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	—						
Anise	—	D	—	A	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—						
Bay	—	D	—	A	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—						
Bone	—	D	—	A	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—						
Castor	A	A	C	A	B ¹	—	—	A	—	A	—	A	A	A	A	B	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A				
Cinnamon	—	D	—	A	—	—	D	—	D	—	—	A	D	—	—	—	—	—	C	—	A	A	—	—	—	A	—	—	—	—	—	—	—	—				
Citric	D	A	—	A	—	—	A	A	A	A	—	A	B	A	—	D	B	—	—	D	—	A	A	B	—	D	D	—	A	—	—	—	—	—				
Clove	—	—	A	—	—	—	—	—	—	—	—	—	—	—	—	—	A	—	—	C	—	A	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	—	—	—	—	—	—					
Cod Liver	A	B	A ¹	A	—	—	—	—	—	A ¹	—	A	A	B	—	D	B	A	—	B	B	A	—	A	—	A	—	—	—	—	—	—	—					
Corn	B	A	—	A	A	—	—	A	—	A ²	—	A	B	A	—	D	C	B	—	D	A	B	A	—	C	A	B	A	—	—	—	—	—	—				
Cottonseed	A	A	A	A ¹	A ¹	—	A	A	B	—	A	A	B	A ²	A	D	B	B	A ²	D	C	A	B	A	—	A	A	A	—	—	—	—						
Creosote	—	D	—	A	D	—	C	D	D	C	—	A	C	—	D	D	D	A	D	A	D	D	B	—	C	—	B	A	—	A	—	—	—	—				
Diesel Fuel (20, 30, 40, 50)	—	D	—	A ¹	A ¹	—	A	A	D	A ¹	—	A	B	A	—	D	B	D	A ¹	D	B	D	A ¹	—	A	A	—	B	B	—	—	—	—					
Fuel (1, 2, 3, 5A, 5B, 6)	D	D	—	A ¹	A	—	B	A ¹	A	B	B	A	A	A ²	B	B	D	D	A	D	B	D	C	A	A	A ¹	B	A	—	—	—	—	—					
Ginger	—	A	—	A	—	—	—	—	—	—	—	—	—	—	—	—	A	—	A	A	—	—	D	—	D	—	D	—	—	—	—	—	—					
Hydraulic Oil (Petro)	—	B	—	A	—	C	—	A ¹	—	D	—	A	D	A	—	D	B	—	A	B	A	A	A	A	A	A	A	—	B	—	—	—	—	—				
Hydraulic Oil (Synthetic)	—	—	A	—	—	A	—	A	—	D	—	A	A	A	—	D	B	A	—	A	B	A	A	A	A	A	A	A	—	B	—	—	—	—	—			
Lemon	C	D	—	A	—	—	—	—	—	—	—	—	—	—	—	—	D	—	—	D	—	A	A	A	—	A	—	A	—	A	—	—	—					
Linseed	—	A	C	A	B ¹	—	A	A ¹	A ¹	—	A	B	A ²	A	D	A	D	C	A	A	B	B	A	A	A	A	A	A	A	A	A	A	A					
Mineral	A	A	A	A	—	B ¹	A ¹	A	B	A	A	B	A	—	A	D	B	A	D	B	C	B	A	A	A	A	A	A	A	A	A	A	A	A				
Olive	A	A	C	A	—	A ¹	A ²	A ²	A	A ²	A	A	B	A	—	D	D	D	D	D	D	D	A	A	A	A	A	A	A	A	A	A	A					
Orange	—	D	—	A	—	C ¹	—	C ¹	A	—	—	C ¹	A	—	—	D	C	D	—	D	C	D	—	A	A	A	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	A	A	A	A	A	A	A	A	A	A			
Peanut	—	A	C	A	—	A	—	D	—	A	—	A	A ¹	A	—	A	D	B	D	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A				
Peppermint	D	D	—	A	—	—	—	—	—	—	—	A	—	A	—	D	—	—	D	—	—	D	—	D	—	D	—	D	—	D	—	D	—	D				
Pine	D	A	A	A	—	D	—	A	A	B	—	A	D	A	—	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D			
Rapeseed	—	A	A	A	—	D	—	D	—	D	—	A	D	—	A	—	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D			
Rosin	—	—	A	A	—	B ²	—	A ¹	—	A ²	—	A	C ¹	A	—	D	—	—	A	—	—	D	—	A	—	A	—	A	—	A	—	A	—					
Sesame Seed	A	D	A	A	—	—	—	A	—	A	—	A	A	A	—	D	—	—	A	—	A	—	A	—	A	—	A	—	A	—	A	—	A	—	A			
Silicone	A	A	A	A	—	A	A ¹	A ¹	—	A ¹	—	A	A ¹	A ¹	—	A	A	A	—	C	D	C	A	A	A	A	A	A	A	A	A	A						
Soybean	A	A	A ²	A	B	—	A ¹	—	A ¹	—	A	A	A ¹	A ¹	—	A	A	C	—	D	C	A	B	A	A	A	A	A	A	A	A	A	A					
Sperm (whale)	A	D	A	A	—	—	—	—	—	—	—	A	—	—	—	D	—	—	D	—	A	A	—	A	—	A	—	A	—	A	—	A	—	A	—			
Tanning	—	D	—	A	—	—	—	—	—	—	—	A	—	—	—	D	—	—	D	—	A	A	—	A	—	A	—	A	—	A	—	A	—	A	—			
Transformer	—	A	A	B	—	C ¹	—	A ¹	—	B	—	A	B	A	—	D	B	—	D	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B			
Turbine	—	A	A	A	—	C	—	A	—	B ¹	—	A	A	B	—	D	A	D	—	D	B	D	A	D	A	D	A	D	A	D	A	D	A	D	A	D		
Oleic Acid	D	A	A	A	—	C ²	A ¹	A ¹	—	B ¹	—	A	A	C ²	A	D	B	C	B	D	D	D	D	D	D	D	D	D	D	D	D	D	D	A				
Olein 25%	—	D	D	D	C	D	D	D	—	D	—	A ¹	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	
Olein 100%	D	D	D	D	D	D	D	D	—	D	—	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Oxalic Acid (cold)	A	B	A	A	D	A ²	A ¹	B ²	—	A ²	—</																											

Chemical Resistance Charts

WARNING

The information in this chart has been supplied to Cole-Parmer by other reputable sources and is to be used **ONLY** as a guide in selecting equipment for appropriate chemical compatibility. Before permanent installation, test the equipment with the chemicals under the specific conditions of your application. **For further information, see pages 18 and 19 in this catalog.**

Ratings of chemical behavior listed in this chart apply to a 48-hour exposure period; Cole-Parmer has no knowledge of possible effects beyond this period. Cole-Parmer does not warrant (neither expressed nor implied) that the information in this chart is accurate or complete or that any material is suitable for any purpose.

DANGER

Variations in chemical behavior due to factors such as 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.

Ratings—Chemical Behavior

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

CHEMICAL	Plastics						Elastomers				Metals			Non-metals																
	ABS plastic Aerzel (Delrin®)	CPVC	Epoxy	Hytrex®	LDPE	NORYL® Nylon	Polycarbonate	Polypropylene	PPS (Ryton®)	PTFE (Teflon®)	PVC	PVDF (Kynar®)	Buna N (Nitrile) EPDM	Hypalon® Kelt-F®	Natural rubber	Neoprene	Silicone	Tygon® (R-3603) Viton®	304 stainless steel	316 stainless steel	Aluminum	Bronze	Carpenter 20 Cast Iron	Cast Iron	Copper	Hastelloy-C® Titanium	Carbon graphite	Ceramic Al ₂ O ₃	Ceramic magnet	
Phosphorus Trichloride	D	D	D	A ¹ —	B	—	—	C —	A	A ² D	A ²	D	D	—	A	A ¹	A ¹	A ¹ A ² D	—	—	—	—	—	—	A	—	—			
Photographic Developer	B	D	D	A	A	A	A	A ² B	A	A	A ²	A	A	B	B	B	B	A A —	A A —	A A —	A A —	A A —	A A —	D	D	D	B	A	A	A
Photographic Solutions	—	D	A	B ² B	A	A ¹	A ¹	A ²	B ²	B ¹	—	A ²	D	B	B ¹	A ¹	A ²	B	D	—	A ²	—	—	—	—	—	—			
Phthalic Acid	B	C	B	—	B ²	B ¹	—	A	—	A ²	A ²	A	D	A	D	A	A	B	B ²	B ²	B ²	B ²	B ²	B ²	B ²	B ²	A ¹	—		
Phthalic Anhydride	B	C	D	—	—	—	—	A ¹ D	—	A	D	A	D	A	D	A	A	A A A	A A A	A A A	A A A	A A A	A A A	B	C	A	—	A	—	—
Picric Acid	A	A	D	A	A	C ¹	D	B ¹	A	A	D	A ¹	C	B	B	A	D	A A A	B B C	—	B	D	B	A	—	—	—	—	—	—
Plating Solutions																														
Antimony Plating 130°F	—	A	A	B	—	—	A	D	—	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	—	—
Brass Plating:																														
Regular Brass Bath 100°F	—	A	A	B	—	B	A	A	—	A	A	B	—	A	—	—	—	A	—	A	A	A	—	A	A	—	A	A	—	A
High-Speed Brass Bath 110°F	—	A	A	B	—	B	A	A	—	A	A	B	—	A	—	—	—	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	—	—
Cu-Sn Bronze Bath 160°F	—	B	D	C	—	—	A	A	—	A	A	D	—	A	—	—	—	A	—	A	A	A	—	A	A	—	A	A	—	—
Cu-Zn Bronze Bath 100°F	—	A	A	B	—	—	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	—	—
Fluoroborate Bath 100°F	—	C	A	B	—	—	A	D	—	A	A	A	—	C	—	—	—	C	—	A	A	A	—	A	D	—	—	—	—	
Chromium Plating:																														
Barrel Chrome Bath 95°F	—	D	A	C	—	—	D	D	—	A	A	C	—	D	—	—	—	D	—	C	—	D	A	—	D	C	—	—	—	
Black Chrome Bath 115°F	—	D	A	C	—	—	D	D	—	A	A	C	—	C	—	—	—	D	—	C	—	C	A	—	D	A	—	—	—	
Chromic-Sulfuric Bath 130°F	—	D	A	C	—	—	D	D	—	A	A	C	—	D	—	—	—	D	—	C	—	C	A	—	D	A	—	—	—	
Fluoride Bath 130°F	—	D	A	C	—	—	D	D	—	A	A	C	—	D	—	—	—	D	—	C	—	D	A	—	D	C	—	—	—	
Fluosilicate Bath 95°F	—	D	A	C	—	—	D	D	—	A	A	C	—	D	—	—	—	D	—	C	—	C	A	—	D	C	—	—	—	
Copper Plating (Cyanide):																														
Copper Strike Bath 120°F	—	A	A	B	—	—	A	A	—	A	A	B	—	A	—	—	—	A	—	A	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	—	A	A	—	—
Rochelle Salt Bath 150°F	—	B	D	C	—	—	A	A	—	A	A	D	A	A	—	—	—	B	—	A	A	A	—	A	A	—	A	A	—	—
Copper Plating (Acid):																														
Copper Fluoroborate Bath 120°F	—	C	A	D	—	—	A	D	—	A	A	A	—	B	—	—	—	C	—	A	D	A	—	D	D	—	D	D	—	—
Copper Sulfate Bath R.T.	—	A	A	D	—	—	A	D	—	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	—	—	—
Copper (Electroless)	—	D	A	B	—	—	A	A	—	A	A	A	—	D	—	—	—	D	—	D	A	—	D	A	—	D	A	—	—	—
Gold Plating:																														
Acid 75°F	—	—	A	A	—	—	A	A	—	A	A	—	—	A	—	—	—	A	—	C	—	—	A	A	—	A	A	—	—	—
Cyanide 150°F	—	—	D	D	—	—	A	A	—	A	A	D	—	A	—	—	—	A	—	A	A	—	A	A	—	A	A	—	—	—
Neutral 75°F	—	—	A	A	—	—	A	A	—	A	A	D	—	A	—	—	—	A	—	C	—	—	A	A	—	A	A	—	—	—
Indium Sulfamate Plating R.T.	—	—	A	A	—	—	A	D	—	A	A	A	—	A	—	—	—	A	—	C	—	—	A	A	—	A	A	—	A	—
Iron Plating:																														
Ferrous Am Sulfate Bath 150°F	—	—	D	D	—	—	A	D	—	A	D	—	—	B	—	—	—	B	—	A	C	—	—	A	A	—	—	—	—	—
Ferrous Chloride Bath 190°F	—	—	D	D	—	—	A	D	—	A	D	—	—	B	—	—	—	D	—	D	A	—	—	D	A	—	—	—	—	—
Ferrous Sulfate Bath 150°F	—	—	D	D	—	—	A	D	—	A	D	—	—	B	—	—	—	B	—	B	C	—	—	A	A	—	—	—	—	—
Fluoroborate Bath 145°F	—	—	D	D	—	—	A	D	—	A	D	—	—	B	—	—	—	C	—	D	B	—	—	B	D	—	—	—	—	—
Sulfamate 140°F	—	—	A	A	—	—	A	D	—	A	D	—	—	B	—	—	—	A	—	A	D	—	—	B	A	—	—	—	—	—
Sulfate-Chloride Bath 160°F	—	—	D	D	—	—	A	D	—	A	D	—	—	B	—	—	—	C	—	D	B	—	—	D	A	—	—	—	—	—
Lead Fluoroborate Plating	—	—	A	A	—	—	A	D	—	A	D	—	—	B	—	—	—	A	—	A	C	—	—	A	D	—	—	—	—	—
Nickel Plating:																														
Electroless 200°F	—	—	D	B	—	—	D	D	—	A	D	—	—	D	—	—	—	D	—	A	B	—	—	A	D	—	—	—	—	—
Fluoroborate 100-170°F	—	—	A	A	—	—	A	D	—	A	D	—	—	B	—	—	—	B	—	A	C	—	—	A	D	—	—	—	—	—
High-Chloride 130-160°F	—	—	D	D	—	—	A	D	—	A	D	—	—	B	—	—	—	B	—	A	C	—	—	A	A	—	—	—	—	—
Sulfamate 100-140°F	—	—	A	A	—	—	A	D	—	A	D	—	—	A	—	—	—	A	—	C	D	—	—	A	A	—	—	—	—	—
Watts Type 115-160°F	—	—	D	D	—	—	A	D	—	A	D	—	—	A	—	—	—	A	—	C	D	—	—	A	A	—	—	—	—	—
Rhodium Plating 120°F	—	—	A	A	—	—	A	D	—	A	D	—	—	A	—	—	—	B	—	A	D	—	—	D	D	—	—	—	—	—
Silver Plating 80-1																														

