



## RECOMMENDED USE DEFINITIONS

### IMMERSION SERVICE (Most Severe) – IS

Suitable for continuous contact with chemical exposure up to specified temperature.

### CARGO/TEMPORARY IMMERSION – CI

Suitable for 60 day continuous contact with chemical exposure up to specified temperature. Coating will show no effect except slight softening or color change, possibly permanent, after 60 days or less continuous immersion. When used in transport or hauling conditions, the vessel must be completely drained to prevent puddling that would constitute continuous immersion.

### SECONDARY CONTAINMENT – SC

Suitable for continuous contact with chemical for up to 72 hours. Softening or discoloration may occur during the exposure.

### FREQUENT CONTACT – FC

Suitable for frequent splash or up to 72 hours exposure to concentrated vapors. The coating will show no effects except slight softening or color change, possibly permanent, after eight hours continuous immersion in the liquid chemical or 72 hours exposure to the vapor.

### OCCASIONAL CONTACT (Least Severe) – OC

Suitable for occasional splash and spillage or occasional exposure to concentrated vapors. The coating shows no effects, except slight softening or color changes, following short exposure to splash or spillage which evaporates, is hosed off, or dried overnight or, 24 hours exposure to vapor.

**NOT TESTED** – This chemical has not been tested or evaluated for the listed chemical.

**NOT RECOMMENDED** – This product is not recommended for the listed exposure. The product's resistance to the listed chemical is often queried, therefore this information is provided as a reference even though the product is not recommended.

## IMPORTANT NOTES

The term "chemicals" is used broadly in this guide and can refer to various constituents including, but not limited to, acids, fatty acids, food and beverage materials, finished and unrefined hydrocarbons, as well as individual chemicals and chemical blends.

Temperature can have a significant effect on a coating's chemical resistance. Prior to coating selection, due care should be taken to determine the service temperature of stored chemicals, elevated temperature caused by natural environmental conditions (i.e. radiant heat from sun, weather), and temperature fluctuations during service (i.e. loading of cargo, service cycling).

Chemical mixtures and alternating chemical storage can aggressively degrade a coating or lining system. Prior to coating selection and application, the expected chemical exposures and sequence of chemical storage should be discussed with Tnemec Technical Service to ensure the proper coating is selected.

Proper surface preparation is always important to ensure optimum coating performance but it is even more so for coatings that will undergo chemical exposure. Carefully read product data sheets along with related application guides to determine the required level of surface preparation and surface profile.

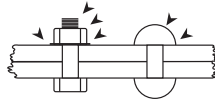
Structural designs of tanks, structures, and containment areas can greatly affect coating performance. Sharp angles, channels, edges, corners, pits, voids, defects, rough welds, and other similar conditions present areas that are either difficult to coat or achieve the required film thickness. Avoid skip welds in favor of continuous welds. A stripe coat on these areas, prior to full coating application, can help achieve needed film thickness and prevent premature coating failure. (Reference NACE SP0178-2007 for more information.)

The length of a coating system's service life depends on surface cleanliness and preparation prior to application, proper application procedures, exposure conditions, physical abuse, cleaning techniques, and frequency of inspection, maintenance, and repair. No coating system has an unlimited service life. Regular inspection of the coating system can prolong service life by identifying areas in need of repair. Additionally, regular inspections can determine when the coating system is nearing its end of service and should be completely replaced.

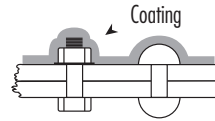
Chemical resistance information is provided for the purpose of establishing a general profile of the coating and was obtained through laboratory testing, field experience, and industry knowledge. Test results were produced in a controlled environment and Tnemec makes no claim that any tests, or published chemical resistance information, accurately represent all environments or correlate to actual field performance. Application, environmental and design factors, chemical temperatures, chemical mixtures, sequence of storage, conditions of service, and cleaning procedures can significantly impact coating performance, so due care must be exercised in the selection and use of the coating. Tnemec disclaims responsibility for product use outside its published information. Contact Tnemec Technical Service to review full project details before the coating or coating system is selected and applied.

## COMMON PROBLEM AREAS FOR COATINGS AND SOLUTIONS

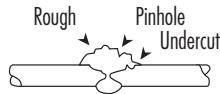
**Problem:**  
Points of failure due to thin spots in coating



**Solution:**  
Carefully and fully coat



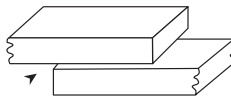
**Problem:**  
Uneven welds



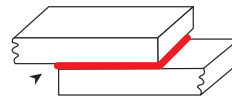
**Solution:**  
Grind smooth



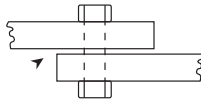
**Problem:**  
Gaps between plates, coating can not cover



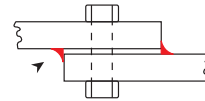
**Solution:**  
Continuous welds



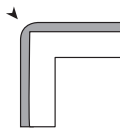
**Problem:**  
Gaps between plates, coating can not cover



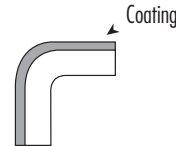
**Solution:**  
Continuous welds



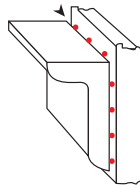
**Problem:**  
Sharp surface contours create thin spots in coating



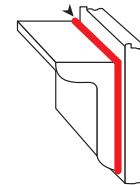
**Solution:**  
Round the contours



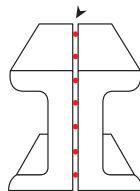
**Problem:**  
Skip welding creates gaps that coating can not cover



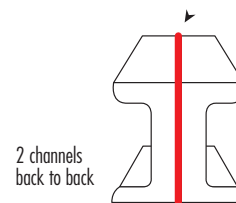
**Solution:**  
Continuous welds



**Problem:**  
Skip welding creates gaps that coating can not cover



**Solution:**  
Continuous welds



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PERMA-SHIELD H<sub>2</sub>S<sup>®</sup> | SERIES 434

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Chemical	Intended Use (Maximum Temperature Listed)				
	Occasional Contact	Frequent Contact	Secondary Containment	Cargo Immersion	Immersion Service
1, 1, 1-Trichloroethane (Trichloroethane)	PC	PC	PC	PC	PC
Acetaldehyde	NR	NR	NR	NR	NR
Acetic Acid					
5%	100°F (38°C)				
10%	100°F (38°C)				
30%	NR	NR	NR	NR	NR
Acetic Acid, Glacial	NR	NR	NR	NR	NR
Acetic Anhydride					
100%	NR	NR	NR	NR	NR
Acetone	PC	PC	PC	PC	PC
Acetonitrile					
20%	NR	NR	NR	NR	NR
100%	NR	NR	NR	NR	NR
Acrylic Acid					
25%	NR	NR	NR	NR	NR
Acrylic Latex Solution	NR	NR	NR	NR	NR
Acrylonitrile					
100%	NR	NR	NR	NR	NR
Activated Carbon	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Adipic Acid (Dry)	100°F (38°C)	100°F (38°C)			
Allyl Chloride	NR	NR	NR	NR	NR
Aluminum Chloride					
25%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Aluminum Hydroxide	PC	PC	PC	PC	PC
Aluminum Nitrate					
50%	PC	PC	PC	PC	PC
Aluminum Sulfate (Alum)					

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	Occasional Contact	Frequent Contact	Secondary Containment	Cargo Immersion	Immersion Service
49%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Ammonium Bisulfite	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Ammonium Carbonate	PC	PC	PC	PC	PC
Ammonium Chloride					
50%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Ammonium Fluoride	NR	NR	NR	NR	NR
Ammonium Hydroxide					
5%	PC	PC	PC	PC	PC
10%	PC	PC	PC	PC	PC
20%	PC	PC	PC	PC	PC
30%	PC	PC	PC	PC	PC
Ammonium Lauryl Sulfate					
30%	NR	NR	NR	NR	NR
Ammonium Nitrate					
10%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
20%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
38%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
50%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Ammonium Nitrite					
50%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Ammonium Perchlorate (Dry)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Ammonium Persulfate					
10%	PC	PC	PC	PC	PC
Ammonium Phosphate	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Ammonium Sulfate	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Ammonium Sulfide	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Ammonium Sulfite	PC	PC	PC	PC	PC
Amyl Acetate	100°F (38°C)	100°F (38°C)			

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Chemical	Intended Use (Maximum Temperature Listed)				
	Occasional Contact	Frequent Contact	Secondary Containment	Cargo Immersion	Immersion Service
Aniline					
20%	NR	NR	NR	NR	NR
Animal Fats	PC	PC	PC	PC	PC
Aqua Ammonia	PC	PC	PC	PC	PC
Aqua Regia	100°F (38°C)				
Aviation Gas	PC	PC	PC	PC	PC
Barium Chloride					
50%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Barium Hydroxide					
50%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Barium Nitrate	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Barium Sulfate	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Barium Sulfide	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Beer (non-food contact) <sup>1</sup>	PC	PC	PC	PC	PC
Benzene	PC	PC	PC	PC	PC
Benzene Sulfonic Acid	NR	NR	NR	NR	NR
Benzoic Acid	NR	NR	NR	NR	NR
Benzoyl Chloride	PC	PC	PC	PC	PC
Benzyl Alcohol	100°F (38°C)				
Benzyl Chloride	PC	PC	PC	PC	PC
Borax	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Boric Acid					
1%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
3%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
5%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Butyl Acrylate	NR	NR	NR	NR	NR
Butyl Amine	NR	NR	NR	NR	NR
Butyric Acid	NR	NR	NR	NR	NR

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	Occasional Contact	Frequent Contact	Secondary Containment	Cargo Immersion	Immersion Service
Cadmium Bromide					
10%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Cadmium Chloride					
50%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Cadmium Plating (Cyanide)	NR	NR	NR	NR	NR
Calcium Bisulfate	NR	NR	NR	NR	NR
Calcium Bromide	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Calcium Carbonate	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Calcium Chloride					
50%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Calcium Hydroxide (Lime Slurry)					
10%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
30%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Calcium Hypochlorite					
5%	PC	PC	PC	PC	PC
Calcium Nitrate	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Calcium Nitrite	100°F (38°C)				
Calcium Oxide	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Calcium Sulfate	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Calcium Sulfite	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Caprolactam	PC	PC	PC	PC	PC
Carbon Disulfide	PC	PC	PC	PC	PC
Carbon Tetrachloride	PC	PC	PC	PC	PC
Castor Oil	PC	PC	PC	PC	PC
Chlorine Dioxide	PC	PC	PC	PC	PC
Chlorobenzene	NR	NR	NR	NR	NR
Chloroform	NR	NR	NR	NR	NR

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	Occasional Contact	Frequent Contact	Secondary Containment	Cargo Immersion	Immersion Service
Chlorosulfonic Acid	NR	NR	NR	NR	NR
Chromic Acid					
10%	100°F (38°C)	100°F (38°C)			
20%	NR	NR	NR	NR	NR
Citric Acid					
50%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Coal (high and low sulfur)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Cola (non-food contact) <sup>1</sup>	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Copper Acetate					
50%	PC	PC	PC	PC	PC
Copper Chloride	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Copper Sulfate					
10%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
20%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
50%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Copper Sulfate (dry)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Corn Mash Solution (non-food contact) <sup>1</sup>	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Corn Oil (non-food contact) <sup>1</sup>	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Cottonseed Oil (non-food contact) <sup>1</sup>	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Cresylic Acid	NR	NR	NR	NR	NR
Crude Oil (Sour)	PC	PC	PC	PC	PC
Crude Oil (Sweet)	PC	PC	PC	PC	PC
Cumene Hydroperoxide	NR	NR	NR	NR	NR
Cuprous Chloride	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Cyclohexane	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Cyclohexanol	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Cyclohexanone	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Cyclohexylamine	NR	NR	NR	NR	NR

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	Occasional Contact	Frequent Contact	Secondary Containment	Cargo Immersion	Immersion Service
Dextrose	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Diacetone Alcohol	PC	PC	PC	PC	PC
Dibutyl Phthalate	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Diesel Fuel (Fuel Oil, Diesel Oil)	PC	PC	PC	PC	PC
Diethanolamine	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Diethylene Glycol	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Diethylene Glycol Monobutyl Ether (Butyl "Carbitol")	PC	PC	PC	PC	PC
Diethylenetriamine	NR	NR	NR	NR	NR
Dimethyl Formamide	NR	NR	NR	NR	NR
Dimethyl Sulfoxide					
20%	NR	NR	NR	NR	NR
Dioctyl Phthalate	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Dipropylene Glycol	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Dodecyl Alcohol (Lauryl Alcohol)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Ethanol (Ethyl Alcohol, Denatured Alcohol)	PC	PC	PC	PC	PC
Ethanolamine	PC	PC	PC	PC	PC
Ethyl Acetate	PC	PC	PC	PC	PC
Ethyl Benzene	PC	PC	PC	PC	PC
Ethylamine					
20%	NR	NR	NR	NR	NR
Ethylene Glycol	PC	PC	PC	PC	PC
Ethylene Glycol Monobutyl Ether (Butyl "Cellosolve")	PC	PC	PC	PC	PC
Ethylene Glycol Monobutyl Ether Acetate (Butyl "Cellosolve" Acetate)	100°F (38°C)	100°F (38°C)			
Ethylenediamine					

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Chemical	Intended Use (Maximum Temperature Listed)				
	Occasional Contact	Frequent Contact	Secondary Containment	Cargo Immersion	Immersion Service
20%	100°F (38°C)	100°F (38°C)			
Fatty Acids (Greater than C6)	PC	PC	PC	PC	PC
Ferric Nitrate	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Ferric Sulfate					
20%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Ferrous Chloride	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Fluorosilicic Acid (Hydrofluorosilicic Acid)					
10%	NR	NR	NR	NR	NR
Formaldehyde					
37%	PC	PC	PC	PC	PC
Formic Acid					
10%	NR	NR	NR	NR	NR
Fructose (non-food contact) <sup>1</sup>	PC	PC	PC	PC	PC
Furan	NR	NR	NR	NR	NR
Furfural					
10%	NR	NR	NR	NR	NR
Furfuryl Alcohol	PC	PC	PC	PC	PC
Gasoline (Unleaded)	PC	PC	PC	PC	PC
Glucose (non-food contact) <sup>1</sup>	PC	PC	PC	PC	PC
Glycerin	PC	PC	PC	PC	PC
Glycolic Acid					
70%	NR	NR	NR	NR	NR
Gold Plating Solution	NR	NR	NR	NR	NR
Grape Juice	PC	PC	PC	PC	PC
Guar Gum (non-food contact) <sup>1</sup>	PC	PC	PC	PC	PC
Heptane	PC	PC	PC	PC	PC
Hexane	PC	PC	PC	PC	PC

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	Occasional Contact	Frequent Contact	Secondary Containment	Cargo Immersion	Immersion Service
Hexanol	PC	PC	PC	PC	PC
Hydraulic Fluid (Hydraulic Oil)	PC	PC	PC	PC	PC
Hydrochloric Acid					
5%	PC	PC	PC	PC	PC
10%	PC	PC	PC	PC	PC
15%	PC	PC	PC	PC	PC
20%	PC	PC	PC	PC	PC
28%	PC	PC	PC	PC	PC
37%	PC	PC	PC	PC	PC
Hydrofluoric Acid					
10%	PC	PC	PC	PC	PC
20%	NR	NR	NR	NR	NR
Hydrofluoroboric Acid	NR	NR	NR	NR	NR
Hydrogen Peroxide					
30%	100°F (38°C)	100°F (38°C)			
Hydrogen Sulfide	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Iodine					
5%	100°F (38°C)	100°F (38°C)			
Isobutyl Acetate	100°F (38°C)	100°F (38°C)			
Isobutyl Alcohol	PC	PC	PC	PC	PC
Isopropyl Acetate	PC	PC	PC	PC	PC
Isopropyl Alcohol	PC	PC	PC	PC	PC
Jet A Fuel	PC	PC	PC	PC	PC
JP-4 Aviation Fuel	PC	PC	PC	PC	PC
JP-5 Aviation Fuel	PC	PC	PC	PC	PC
Kaolin	PC	PC	PC	PC	PC
Kerosene	PC	PC	PC	PC	PC

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Chemical	Intended Use (Maximum Temperature Listed)				
	Occasional Contact	Frequent Contact	Secondary Containment	Cargo Immersion	Immersion Service
Lactic Acid					
2%	PC	PC	PC	PC	PC
10%	PC	PC	PC	PC	PC
85%	PC	PC	PC	PC	PC
Lauric Acid	PC	PC	PC	PC	PC
Lauryl Chloride	100°F (38°C)	100°F (38°C)			
Lead Acetate	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Levulinic Acid	NR	NR	NR	NR	NR
Linseed Oil	PC	PC	PC	PC	PC
Lithium Bromide	PC	PC	PC	PC	PC
Lithium Chloride	PC	PC	PC	PC	PC
Lithium Hydroxide (saturated)	100°F (38°C)	100°F (38°C)			
Lubricating Oil (SAE 5W-40, et al) (Motor Oil)	PC	PC	PC	PC	PC
Magnesium Bisulfite	100°F (38°C)	100°F (38°C)			
Magnesium Chloride					
50%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Magnesium Hydroxide					
50%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Magnesium Sulfate	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Maleic Acid	100°F (38°C)	100°F (38°C)			
Maleic Anhydride	100°F (38°C)	100°F (38°C)			
Mercuric Chloride	100°F (38°C)	100°F (38°C)			
Mercury	NR	NR	NR	NR	NR
Methacrylic Acid	NR	NR	NR	NR	NR
Methane Gas	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Methanol (Methyl Alcohol)	PC	PC	PC	PC	PC
Methyl Acetate					

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	Occasional Contact	Frequent Contact	Secondary Containment	Cargo Immersion	Immersion Service
20%	NR	NR	NR	NR	NR
Methyl Acrylate	100°F (38°C)	100°F (38°C)			
Methyl Amyl Ketone	100°F (38°C)				
Methyl Ethyl Ketone	100°F (38°C)	100°F (38°C)			
Methyl Isobutyl Chloride	NR	NR	NR	NR	NR
Methyl Isobutyl Ketone	PC	PC	PC	PC	PC
Methyl Methacrylate	NR	NR	NR	NR	NR
Methyl Propyl Ketone	PC	PC	PC	PC	PC
Methyl tert-Butyl Ether (MTBE)	NR	NR	NR	NR	NR
Methylene Chloride	NR	NR	NR	NR	NR
Milk (non-food contact) <sup>1</sup>	PC	PC	PC	PC	PC
Mineral Oil	PC	PC	PC	PC	PC
Mineral Spirits	PC	PC	PC	PC	PC
Molasses (non-food contact) <sup>1</sup>	PC	PC	PC	PC	PC
Morpholine	NR	NR	NR	NR	NR
Mustard (non-food contact) <sup>1</sup>	PC	PC	PC	PC	PC
Naphtha	PC	PC	PC	PC	PC
Naphthalene	NR	NR	NR	NR	NR
Naphthenic Acid	PC	PC	PC	PC	PC
n-Butyl Acetate (Butyl Acetate)	100°F (38°C)	100°F (38°C)			
n-Butyl Alcohol (1-Butanol) (Butanol (Normal))	PC	PC	PC	PC	PC
n-Decyl Alcohol (Decyl Alcohol (1-Decanol))	PC	PC	PC	PC	PC
Nickel Chloride	PC	PC	PC	PC	PC
Nitric Acid					
5%	100°F (38°C)				
10%	100°F (38°C)				

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	Occasional Contact	Frequent Contact	Secondary Containment	Cargo Immersion	Immersion Service
25%	100°F (38°C)				
70%	NR	NR	NR	NR	NR
Nitrobenzene	NR	NR	NR	NR	NR
n-Methyl-2-Pyrrolidone	NR	NR	NR	NR	NR
n-Octyl Alcohol (Octanol)	PC	PC	PC	PC	PC
n-Propyl Alcohol (Propyl Alcohol)	PC	PC	PC	PC	PC
Octane	PC	PC	PC	PC	PC
Oleic Acid	PC	PC	PC	PC	PC
Oxalic Acid					
10%	PC	PC	PC	PC	PC
Ozone <2 ppm	NR	NR	NR	NR	NR
Palm Oil	PC	PC	PC	PC	PC
Pentane	PC	PC	PC	PC	PC
Perchloroethylene	PC	PC	PC	PC	PC
Petroleum Ether	PC	PC	PC	PC	PC
Phosphoric Acid					
5%	100°F (38°C)	100°F (38°C)			
10%	100°F (38°C)	100°F (38°C)			
25%	100°F (38°C)				
43%	NR	NR	NR	NR	NR
85%	NR	NR	NR	NR	NR
Phosphorous	NR	NR	NR	NR	NR
Phosphorous Acid	NR	NR	NR	NR	NR
Phthalic Acid (all)	PC	PC	PC	PC	PC
Picric Acid (conc)	NR	NR	NR	NR	NR
Pine Oil	PC	PC	PC	PC	PC
Polyethylene Glycol	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)

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	Occasional Contact	Frequent Contact	Secondary Containment	Cargo Immersion	Immersion Service
Polypropylene	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Polystyrene	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Polytetrafluoroethane	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Polyvinyl Chloride	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Potash Ore	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Potassium Acetate	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Potassium Bromide	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Potassium Carbonate	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Potassium Chlorate	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Potassium Chloride	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Potassium Cyanide	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Potassium Ferricyanide	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Potassium Fluoride	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Potassium Hydroxide					
50%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Potassium Iodide	NR	NR	NR	NR	NR
Potassium Nitrate	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Potassium Permanganate	100°F (38°C)	100°F (38°C)			
Potassium Persulfate	NR	NR	NR	NR	NR
Potassium Sulfate	NR	NR	NR	NR	NR
Propionic Acid					
50%	NR	NR	NR	NR	NR
Propylene Glycol	PC	PC	PC	PC	PC
Pulpmill (Black Liquor)	PC	PC	PC	PC	PC
Pulpmill (Green Liquor)	PC	PC	PC	PC	PC
Pulpmill (White Liquor)	PC	PC	PC	PC	PC
Pyridine					
20%	NR	NR	NR	NR	NR

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	Occasional Contact	Frequent Contact	Secondary Containment	Cargo Immersion	Immersion Service
Silver Nitrate	NR	NR	NR	NR	NR
Skydrol	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Sodium Acetate	NR	NR	NR	NR	NR
Sodium Aluminate	NR	NR	NR	NR	NR
Sodium Bicarbonate	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Sodium Bisulfate					
30%	100°F (38°C)	100°F (38°C)	100°F (38°C)		
Sodium Bisulfite					
38%	100°F (38°C)	100°F (38°C)	100°F (38°C)		
Sodium Borate	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Sodium Bromide (all)	NR	NR	NR	NR	NR
Sodium Carbonate (sat'd)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Sodium Carbonate (slurry)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Sodium Chloride (sat'd) (Brine, Water (Sea), Salt Brine)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Sodium Chlorite (>6 pH)	NR	NR	NR	NR	NR
Sodium Chromate					
50%	100°F (38°C)	100°F (38°C)	100°F (38°C)		
Sodium Cyanide					
18%	NR	NR	NR	NR	NR
Sodium Dichromate (all)	100°F (38°C)	100°F (38°C)	100°F (38°C)		
Sodium Fluoride	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Sodium Formate					
50%	100°F (38°C)	100°F (38°C)	100°F (38°C)		
Sodium Hydrosulfide					
72%	100°F (38°C)	100°F (38°C)	100°F (38°C)		
Sodium Hydrosulfite					
10%	PC	PC	PC	PC	PC

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	Occasional Contact	Frequent Contact	Secondary Containment	Cargo Immersion	Immersion Service
Sodium Hydroxide (Caustic Soda)					
50%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Sodium Hypochlorite (Bleach)					
5%	PC	PC	PC	PC	PC
13%	PC	PC	PC	PC	PC
Sodium Lauryl Sulfate	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Sodium Oxalate					
1%	NR	NR	NR	NR	NR
Sodium Phosphate					
10%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Sodium Silicate	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Sodium Sulfate					
6%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Sodium Sulfite	100°F (38°C)	100°F (38°C)	100°F (38°C)		
Sodium Thiosulfate					
30%	100°F (38°C)	100°F (38°C)	100°F (38°C)		
Sodium Tripolyphosphate					
1%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Soybean Oil (non-food contact) <sup>1</sup>	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Stannic Chloride (all)	NR	NR	NR	NR	NR
Stannous Chloride (all)	NR	NR	NR	NR	NR
Stearic Acid (conc)	NR	NR	NR	NR	NR
Styrene	100°F (38°C)	100°F (38°C)			
Sulfite Liquor (paper industry)	NR	NR	NR	NR	NR
Sulfuric Acid (Sulphuric Acid)					
5%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)

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	Occasional Contact	Frequent Contact	Secondary Containment	Cargo Immersion	Immersion Service
10%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
30%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
50%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
70%	NR	NR	NR	NR	NR
98%	NR	NR	NR	NR	NR
Sulfurous Acid					
10%	NR	NR	NR	NR	NR
Tall Oil	PC	PC	PC	PC	PC
Tannic Acid	PC	PC	PC	PC	PC
Tartaric Acid	100°F (38°C)	100°F (38°C)	100°F (38°C)		
Tetrachloroethylene	PC	PC	PC	PC	PC
Tetrahydrofuran	NR	NR	NR	NR	NR
Toluene	PC	PC	PC	PC	PC
Toluenesulfonic Acid	NR	NR	NR	NR	NR
Transmission Fluid	PC	PC	PC	PC	PC
Trichloroethylene	NR	NR	NR	NR	NR
Trichlorofluoroethane	NR	NR	NR	NR	NR
Tricresyl Phosphate	NR	NR	NR	NR	NR
Triethanolamine	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Triethylamine	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Triethylenetetramine	NR	NR	NR	NR	NR
Trisodium Phosphate (Sodium Phosphate (Tribasic))					
20%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Turpentine	PC	PC	PC	PC	PC
Urea					
50%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Urea Ammonium Nitrate	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)

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	Occasional Contact	Frequent Contact	Secondary Containment	Cargo Immersion	Immersion Service
Vegetable Oil (non-food contact) <sup>1</sup>	PC	PC	PC	PC	PC
Vinegar (non-food contact) <sup>1</sup>	PC	PC	PC	PC	PC
Vinyl Trichloride	NR	NR	NR	NR	NR
Water (deionized, non-potable) (Water (Demineralized, Non-potable))	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Water (distilled, non-potable)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Water (fresh, non-potable)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Xylene	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Zinc Bromide	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Zinc Chloride					
40%	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Zinc Phosphate (dry)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)
Zinc Sulfate	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)	100°F (38°C)

IMPORTANT: Definitions for the terms and acronyms used in this guide to describe the recommended exposures, along with other important information, can be found on the cover page of this guide or by contacting Tnemec Technical Service. Coatings should not be applied in a chemical exposure environment until the user has thoroughly read and understood the product information and full project details have been discussed with Tnemec Technical Service.