Setting Standards for Excellence

Cable Ties
Application Guide No. 3
March 2021

APPLICATION ENVIRONMENTS:

Corrosive Atmospheres

Cable ties and their associated fixing devices are generally suitable for use in wet and dry locations and/or where they may be subjected to exposure to common corrosive elements. Types of corrosive environments include: wet or damp areas; salt laden air as is common in coastal areas; areas known for acid rain; harsh industrial environments; and even areas that are subject to radiation exposure. While concerns for deterioration resulting from atmospheric corrosion immediately lead one to think of metallic products, some corrosive elements in certain application environments can have equally deteriorating effects on nonmetallic materials. Other NEMA Application Guides address additional environmental factors.

Cable tie products are available in all-metallic materials, composite (combination of metallic and nonmetallic) materials, and all-nonmetallic materials. Cable ties constructed of the most common nonmetallic materials are generally immune to corrosive effects from exposure to water and moist sodium and sulfur laden atmospheres and are resistant to the effects of many other airborne contaminants. The table below provides guidance on selecting cable tie products constructed from specialized polymer materials where resistance to particular chemicals is a concern.

Products constructed entirely from metallic materials are typically specified where the application places a high reliance on mechanical strength, even when subjected to physical abuse. The National Electrical Code®, NFPA 70, requires all metallic products used in an electrical system to have a degree of resistance to corrosion. Product standards for cable ties include mechanical tests for metallic and composite cable ties and fixing devices both before and after exposure to salt spray. Metallic cable ties and the metallic components of composite cable ties are most often constructed from stainless steel. Stainless steel grades that contain at least 16% chromium, such as 304, 310 and 316, are generally considered capable of providing the degree of resistance to atmospheric corrosion required in UL 62275.

The manufacturer should always be consulted if there is a question about the proper application of a cable tie or associated fixing device.

NEMA members provide high value, consistent quality, safe and efficient use for cable ties and their associated fixing devices that meet the expectations of a wide variety of users. Visit us at http://www.nema.org/prod/be/cable-ties/ for current information on our industry and for the names of NEMA member cable tie manufacturers.

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Resistance of Materials to Chemicals @ 70° F

Ratings: E= Excellent S= Satisfactory F= Fair NR= Not Recommended AQ= Aqueous

REAGENTS	CONCENTRATION	HEAT-STABILIZED 6.6 NYLON	FLUOROPOLYMER LOW-SMOKE	WEATHERABLE ACETAL	STANDARD 6.6 NYLON	6.6 WEATHER-RESISTANT NYLON	6.6 FIRE-RETARDANT NYLON	WEATHER-RESISTANT NYLON 12	POLY-PROPYLENE	WEATHER-RESISTANT POLY-PROPYLENE	FLUOROPOLYMER RADIATION-RESISTANT	STAINLESS STEEL
Arsenic Acid	40%	—	—	—	—	—	—	—	E	E	—	E
Acetaldehyde	50%	S	—	—	S	S	S	—	—	—	—	—
Acetone	100%	E	E	F	E	E	E	E	E	E	E	E
Aluminum Hydroxide	AQ	—	E	—	—	—	—	—	E	E	E	E
Ammonia	All	—	E	—	—	—	—	E	E	E	E	
Ammonium Carbonate	5%	S	E	—	S	S	S	E	E	E	E	E
Ammonium Hydroxide	10%	E	E	F	E	E	E	—	E	E	E	E
Ammonium Nitrate	—	—	E	—	—	—	—	E	E	E	E	E
Ammonium Sulfate	10%	—	E	—	—	—	—	S	S	S	S	S
Barium Carbonate	All	—	E	—	—	—	—	E	E	E	E	E
Barium Chloride	5%	NR		—	NR	NR	NR	E	E	E	E	E
Barium Sulfate	10%	E		—	E	E	E	E	E	E	E	E
Barium Sulfide	10%	S		—	S	S	S	E	E	E	E	E
Benzene	100%	E	E	F	E	E	E	E	S	S	E	E
Benzoic Acid	100%	NR	E	—	NR	NR	NR	E	E	E	E	E
Butyric Acid	50%	NR	E	—	NR	NR	NR	—	E	E	E	E
Calcium Carbonate	AQ	—	E	—	—	—	—	—	E	E	E	E
Calcium Hydroxide	20%	—	F	E	—	—	—	—	E	E	E	E
Calcium Hydrochlorite	2	NR	—	—	NR	NR	NR	—	F	F	F	F
Calcium Sulfate	2%	—	E	—	—	—	—	—	E	E	E	E
Carbon Tetrachloride	100%	E	E	E	E	E	E	E	F	F	E	E
Chlorine (WET)	—	NR	—	—	NR	NR	NR	—	F	F	F	F
Chlorine (DRY)	—	NR	—	—	NR	NR	NR	—	NR	NR	F	F
Chloroacetic Acid	30%	NR	—	—	NR	NR	NR	—	—	—	F	F
Chloroform	100%	—	E	—	—	—	—	F	F	F	E	E
Chromic Acid	50%	NR	S	—	NR	NR	NR	—	F	F	F	F
Citric Acid	50%	S	E	E	S	S	S	E	E	E	E	E
Copper Cyanide	10%	—	E	—	—	—	—	—	E	E	E	E
Copper Nitrate	50%	—	E	—	—	—	—	—	E	E	E	E
Cider	—	—	E	—	—	—	—	—	E	E	E	E
Dichloroethane	100%	—	E	—	—	—	—	—	—	—	E	E
Diethyl Ether	100%	—	E	S	—	—	—	E	E	E	E	E
Ethyl Alcohol	100%	S	E	—	S	S	S	E	E	E	E	E
Ethyl Chloride	100%	—	S	E	—	—	—	F	F	F	E	E
Ethylene Glycol	100%	E	E	S	E	E	E	—	E	E	E	E
Ferric Hydroxide	All	—	E	—	—	—	—	—	E	E	E	E
Ferric Nitrate	10%	—	E	—	—	—	—	—	E	E	E	E
Ferrous Sulfate	10%	—	E	—	—	—	—	—	E	E	E	E
Fuel Oil	100%	—	E	—	—	—	—	E	—	—	E	E
Furfural	100%	—	E	—	—	—	—	—	F	F	E	E
Gallic Acid	AQ	—	E	—	—	—	—	—	—	—	E	E
Gasoline	100%	E	E	—	E	E	E	—	S	S	E	E
Glycerine	100%	—	E	—	—	—	—	E	E	E	—	E
Hydrocyanic Acid	All	—	E	—	—	—	—	—	E	E	E	E
Hydrogen Peroxide	30%	NR	E	F	NR	NR	NR	S	E	E	E	E
Hydrogen Sulfide	Dry	NR	E	—	NR	NR	NR	E	E	E	E	E
Iodoform	100%	—	E	—	—	—	—	—	—	—	E	E
Isopropyl Alcohol	100%	S	E	—	S	S	S	E	E	E	E	E
Jet Fuel	100%	E	E	—	E	E	E	—	S	S	E	E
Lactic Acid	10%	E	E	—	E	E	E	S	E	E	E	E
Lanolin	10%	E	E	—	E	E	E	E	E	E	E	E
Lead Acetate	5%	—	E	—	—	—	—	—	E	E	E	E
Linseed Oil	10%	E	E	E	E	E	E	E	E	E	E	E
Magnesium Carbonate	All	—	E	—	—	—	—	E	E	E	E	E
Magnesium Chloride	10%	F	—	—	F	F	F	F	F	F	F	F

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Resistance of Materials to Chemicals @ 70° F (Continued)

Ratings: E= Excellent S= Satisfactory F= Fair NR= Not Recommended AQ= Aqueous

REAGENTS	CONCENTRATION	HEAT-STABILIZED 6.6 NYLON	LOW-SMOKE FLUOROPOLYMER	WEATHERABLE ACETAL	STANDARD 6.6 NYLON	6.6 WEATHER-RESISTANT NYLON	6.6 FIRE-RETARDANT NYLON	WEATHER-RESISTANT NYLON 12	POLY-PROPYLENE	WEATHER-RESISTANT POLY-PROPYLENE	RADIATION-RESISTANT FLUOROPOLYMER	STAINLESS STEEL
Magnesium Nitrate	All	—	E	—	—	—	—	E	E	E	E	E
Malic Acid	AQ	—	E	—	—	—	—	—	E	E	E	E
Mercury	100%	—	E	—	—	—	—	E	E	E	E	E
Methyl Alcohol	100%	S	E	—	S	S	S	E	E	E	E	E
Methyl Chloride	100%	—	S	—	—	—	—	—	S	S	E	E
Methyl Ethyl Ketone	100%	—	E	F	—	—	—	E	E	E	E	E
Naptha	100%	—	E	—	—	—	—	—	E	E	E	E
Nitric Acid	30%	NR	E	NR	NR	NR	NR	—	E	E	E	E
Nitric Acid	30—70%	NR	S	NR	NR	NR	NR	—	F	F	S	E
Nitrous Acid	5%	—	E	—	—	—	—	—	F	F	E	E
Oleic Acid	100%	—	E	S	—	—	—	—	E	E	E	E
Oxalic Acid	10%	—	E	—	—	—	—	S	E	E	E	E
Paraffin	100%	E	E	—	E	E	E	E	E	E	E	E
Petroleum Ether	100%	—	E	—	—	—	—	E	F	F	E	E
Phenol	90%	NR	E	NR	NR	NR	NR	—	E	E	E	E
Phosphoric Acid	10%	NR	E	—	NR	NR	NR	—	E	E	E	E
Picric Acid	1%	—	E	—	—	—	—	—	E	E	E	E
Potassium Bromide	AQ	—	—	—	—	—	—	—	S	S	S	S
Potassium Carbonate 1%	—	E	—	—	—	—	E	E	E	E	E	
Potassium Chlorate	AQ	—	E	—	—	—	—	S	E	E	E	E
Potassium Dichromate	40%	NR	E	—	NR	NR	NR	F	E	E	E	E
Potassium Ferrocyanide	25%	—	E	—	—	—	—	—	E	E	E	E
Potassium Hydroxide	5%	S	E	—	S	S	S	—	E	E	E	E
Potassium Iodide	All	—	E	—	—	—	—	E	E	E	E	E
Potassium Nitrate	50%	F	E	—	F	F	F	E	E	E	E	E
Potassium Permanganate	5%	NR	E	S	NR	NR	NR	NR	E	E	E	E
Potassium Sulfate	5%	—	E	—	—	—	—	E	E	E	E	E
Potassium Sulfide	AQ	—	E	—	—	—	—	—	E	E	E	E
Propyl Alcohol	100%	E	E	—	E	E	E	—	E	E	E	E
Silver Nitrate	10%	—	E	—	—	—	—	E	E	E	E	E
Sodium Acetate	60%	E	E	—	E	E	E	—	E	E	E	E
Sodium Bicarbonate	All	E	E	—	E	E	E	E	E	E	E	E
Sodium Bisulfate	10%	—	E	E	—	—	—	E	E	E	E	E
Sodium Borate	All	—	E	—	—	—	—	—	E	E	E	E
Sodium Carbonate	5%	E	E	S	E	E	E	E	E	E	E	E
Sodium Chlorate	25%	—	E	E	—	—	—	S	E	E	E	E
Sodium Chloride	2%	E	E	S	E	E	E	E	E	E	E	E
Sodium Fluoride	5%	—	—	—	—	—	—	—	F	F	F	F
Sodium Hydroxide	10%	E	E	S	E	E	E	E	E	E	E	E
Sodium Hyposulfite	AQ	—	E	—	—	—	—	—	—	—	E	E
Sodium Nitrate	5%	E	E	—	E	E	E	E	E	E	E	E
Sodium Nitrite	AQ	—	E	—	—	—	—	S	E	E	E	E
Sodium Perchlorate	10%	—	E	—	—	—	—	—	—	—	E	E
Sodium Phosphate	5%	—	E	—	—	—	—	E	E	E	E	E
Sodium Sulfate	5%	S	E	—	S	E	E	E	E	E	E	E
Sodium Thiosulfate	5%	—	—	S	—	—	—	S	S	S	S	S
Stearic Acid	100%	—	E	—	—	—	—	F	E	E	E	E
Sulfur	100%	—	E	—	—	—	—	E	E	E	E	E
Sulfur Dioxide	All	NR	E	—	NR	NR	NR	E	E	E	E	E
Sulfuric Acid	Conc.	NR	E	NR	NR	NR	NR	—	S	S	E	E
Sulfuric Acid	5%	NR	F	F	NR	NR	NR	F	F	F	F	F
Tannic Acid	10%	—	E	—	—	—	—	—	E	E	E	E
Tartaric Acid	50%	—	E	E	—	—	—	E	E	E	E	E
Tetrahydrofuran	100%	—	F	E	—	—	—	S	F	F	E	E
Toluene	100%	E	E	F	E	E	E	E	F	F	E	F
Xylene	100%	E		—	E	E	E	E	F	F	E	E
Zinc Chloride	70%	F	E	NR	F	F	F	E	E	E	E	E
Zinc Nitrate	AQ	—	E	—	—	—	—	E	E	E	E	E
Zinc Sulfate	AQ	—	E	—	—	—	—	E	E	E	E	E

Ratings: E=Excellent **S**=Satisfactory **F**=Fair **NR**=Not Recommended (**AQ**=Aqueous)

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