Chemical Resistance Data [Hoses]

⚠ Notes for use of Chemical Resistance Data (Hoses/Couplings/KAMLOK/Gasket)

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As of November 2018

	Material / Chemical (Concentration density % / Temperature ℃)	Hose inner fluid contact surface				
		Soft PVC	Polyolefin resin	Silicone rubber	Tetrafluororesin	Nylon
A	A (ASTM standard fuel)	—	△	×	◎	—
	Acetaldehyde	△	○	◎	◎	○
	Acetamide	△	○	○	—	—
	Acetic acid [10%]	○	◎	○	◎	○
	Acetic acid [100%]	×	△	○	◎	—
	Acetic acid [50%]	×	◎	○	◎	—
	Acetic acid [50% 70℃]	×	△	○	◎	—
	Acetic acid anhydride	×	◎	△	◎	△
	Acetone	×	△	△	◎	○
	Acetonitrile	—	—	—	◎	—
	Acetophenone	—	—	—	◎	—
	Acrylonitrile	×	—	×	◎	◎
	Aluminum acetate	◎	◎	×	◎	—
	Aluminum bromide	○	◎	○	◎	—
	Aluminum chloride	○	◎	○	◎	—
	Aluminum fluoride	○	◎	○	◎	—
	Aluminum nitrate	○	◎	○	◎	—
	Aluminum sulfate (Cake alum, filter alum)	◎	◎	◎	◎	○
	Alums NH3, Cr, K	◎	◎	◎	◎	◎
	Ammonia (anhydrous)	○	◎	◎	◎	◎
	Ammonia water (Ammonium hydroxide)	○	◎	◎	◎	—
	Ammonium carbonate	◎	◎	○	◎	◎
	Ammonium chloride	◎	◎	○	◎	○
	Ammonium hydroxide (Ammonia water)	○	◎	◎	◎	—
	Ammonium nitrate	○	◎	○	◎	○
	Ammonium nitrite	○	◎	○	◎	—
	Ammonium phosphate	○	◎	◎	◎	○
	Ammonium sulfate	◎	◎	◎	◎	○
	Amyl acetate	×	△	△	◎	◎
	Amyl alcohol	△	○	△	◎	○
	Amyl naphthalene	—	○	×	◎	—
	Aniline	×	○	○	◎	△
	Anone (Cyclohexanone)	×	△	△	◎	○
	Aqua regia	×	△	△	◎	—
	Argon gas	◎	◎	—	◎	—
	Arsenic acid	○	◎	◎	◎	—
	Asphalt	◎	◎	○	◎	—

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As of November 2018

	Material / Chemical (Concentration density % / Temperature ℃)	Hose inner fluid contact surface				
		Soft PVC	Polyolefin resin	Silicone rubber	Tetrafluororesin	Nylon
B	B (ASTM standard fuel)	—	△	×	◎	—
	Barium chloride	◎	◎	◎	◎	◎
	Barium hydroxide	◎	◎	◎	◎	—
	Barium sulfate	◎	◎	○	◎	—
	Barium sulfide	○	◎	○	◎	—
	Beer	○	◎	◎	◎	—
	Beet sugar liquid	◎	◎	◎	◎	—
	Benzaldehyde	×	△	◎	◎	○
	Benzene (Benzol)	×	○	△	◎	○
	Benzine	○	△	◎	◎	◎
	Benzoic acid	○	—	—	◎	○
	Benzoyl chloride	—	—	—	◎	—
	Benzyl alcohol	×	—	—	◎	—
	Bleach solution	—	—	○	—	—
	Blue vitriol	◎	◎	◎	◎	○
	Borax (Sodium tetraborate)	◎	◎	◎	◎	○
	Boric acid	○	◎	○	◎	—
	Brake oil DOT3	—	—	—	◎	—
	Bromine	×	×	△	◎	×
	Butane	○	◎	×	◎	○
	Butyl acetate	×	△	△	◎	◎
	Butyl acrylate	×	△	◎	◎	—
	Butyl alcohol (Butanol)	×	—	○	◎	—

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As of November 2018

	Material / Chemical (Concentration density % / Temperature ℃)	Hose inner fluid contact surface				
		Soft PVC	Polyolefin resin	Silicone rubber	Tetrafluororesin	Nylon
C	C (ASTM standard fuel)	—	△	×	◎	—
	Calcium acetate	◎	◎	—	◎	—
	Calcium bisulfite	◎	◎	○	◎	—
	Calcium chloride	◎	◎	◎	◎	◎
	Calcium hydroxide	◎	◎	○	◎	—
	Calcium hypochlorite (High-test hypochlorite) [20%]	◎	◎	○	◎	—
	Calcium nitrate	◎	◎	○	◎	—
	Calcium sulfide	◎	◎	○	◎	—
	Carbitol	×	—	◎	—	—
	Carbon dioxide (Carbonic acid gas)	◎	◎	◎	◎	—
	Carbon disulfide	×	×	△	◎	○
	Carbon tetrachloride	×	×	×	◎	×
	Carbonic acid	○	○	◎	◎	—
	Carbonic acid gas (Carbon dioxide)	◎	◎	◎	◎	—
	Castor oil	△	◎	◎	◎	—
	Caustic potash (Potassium hydroxide)	◎	◎	△	◎	○
	Caustic soda (Sodium hydroxide) [30%]	△	◎	×	◎	○
	Caustic soda (Sodium hydroxide) [30% 70℃]	×	◎	×	◎	△
	Cellosolve	×	△	—	◎	—
	Cellosolve acetate	×	—	○	—	—
	Chlorinated solvent	×	×	×	○	—
	Chloroacetic acid	—	—	—	◎	—
	Chlorobenzene (Monochlorobenzene)	×	△	○	◎	△
	Chloroform	×	×	×	◎	×
	Chloronaphthalene	×	—	×	—	—
	Chlorosulfonic acid	×	×	×	◎	×
	Chlorotoluene	×	△	×	◎	—
	Chromic acid [2% 50℃]	○	○	△	◎	×
	Chromic acid [2% 70℃]	○	○	△	◎	×
	Chromic acid [5% 70℃]	○	○	△	◎	×
	Chromic acid [10% 70℃]	○	△	△	◎	×
	Chromic acid [25% 70℃]	○	×	△	◎	×
	Citric acid	○	◎	◎	◎	○
	Coconut oil	△	◎	△	◎	—
	Copper chloride	○	◎	◎	◎	—
	Corn oil	△	○	△	◎	—
	Cotton seed oil	△	○	△	◎	○
	Creosote oil	×	—	△	◎	—
	Cresol	△	○	△	◎	×
	Cyclohexane	×	△	×	◎	○
	Cyclohexanol	×	○	—	◎	◎
	Cyclohexanone (Anone)	×	△	△	◎	○

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As of November 2018

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		Soft PVC	Polyolefin resin	Silicone rubber	Tetrafluororesin	Nylon
D	Developer (Sodium thiosulfate)	○	◎	◎	◎	—
	Diacetone alcohol	—	—	—	◎	○
	Dibutyl ether	×	△	×	○	—
	Dibutyl phthalate	×	△	○	◎	—
	Dichlorobenzene	×	△	×	◎	—
	Diethyl Ether (Ether, Ethyl ether)	×	△	×	◎	○
	Diethyl sebacate	×	○	◎	◎	—
	Diethylene glycol	×	◎	○	◎	—
	Dimethyl formamide	×	△	◎	◎	○
	Dimethylacetamide	—	△	—	◎	—
	Di-n-butylamine	—	—	—	◎	—
	Dioctyl phthalate	×	○	◎	◎	—
	Dioctyl sebacate	×	○	◎	◎	—
	Dioxane	×	—	△	◎	—
	Diphenyl	—	—	△	◎	○
	Diphenyl oxide	×	—	○	◎	—
E	Epichlorohydrin	×	—	×	◎	—
	Ethanolamine	×	○	○	◎	—
	Ether (Diethyl ether, Ethyl ether)	×	△	×	◎	○
	Ethyl acetate	×	△	△	◎	◎
	Ethyl acetoacetate	×	—	△	◎	—
	Ethyl acrylate	×	△	○	◎	—
	Ethyl alcohol (Ethanol)	×	○	○	◎	○
	Ethyl benzene	×	△	×	◎	—
	Ethyl cellulose	×	◎	○	◎	—
	Ethyl ether (Ether, Diethyl ether)	×	△	×	◎	○
	Ethylene chlorohydrin	×	△	△	◎	—
	Ethylene diamine	×	○	◎	◎	◎
	Ethylene dichloride	×	—	△	◎	—
	Ethylene glycol	×	○	◎	◎	○
	Ethylene oxide	×	◎	△	◎	○

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		Soft PVC	Polyolefin resin	Silicone rubber	Tetrafluororesin	Nylon
F	Fatty acid	◎	△	○	◎	◎
	Ferric chloride	◎	◎	○	◎	○
	Ferric nitrate	◎	◎	△	◎	—
	Ferric sulfate	○	◎	○	◎	—
	Fluorboric acid	○	◎	—	◎	—
	Fluorine	—	×	—	—	×
	Fluorobenzene	×	△	×	◎	—
	Formaldehyde [40 %]	○	◎	×	◎	○
	Formic acid [25%]	△	◎	×	◎	△
	Formic acid [50%]	×	◎	×	◎	△
	Formic acid [90%]	×	◎	×	◎	×
	Fuel oil (Heavy oil)	×	—	×	◎	—
	Furfural	×	×	◎	◎	○
G	Gasoline	×	○	×	◎	○
	Gelatin	◎	◎	◎	◎	—
	Glacial acetic acid	—	—	—	◎	—
	Glauber's salt (Sodium sulfate)	◎	◎	◎	◎	○
	Glucose	◎	◎	◎	◎	○
	Glycerin	△	◎	◎	◎	○
	Glycolic acid	—	—	—	◎	—
	Grease	×	△	—	◎	—

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		Soft PVC	Polyolefin resin	Silicone rubber	Tetrafluororesin	Nylon
H	Helium gas	◎	◎	—	—	—
	Heptane	—	×	—	◎	◎
	Hexaldehyde	×	—	◎	◎	—
	Hexan	×	△	×	◎	◎
	Hexyl alcohol	△	○	○	◎	—
	High-test hypochlorite (Calcium hypochlorite) [20%]	◎	◎	○	◎	—
	Hydraulic oil	△	—	×	◎	—
	Hydrazine	—	△	△	◎	—
	Hydrobromic acid [20%]	△	◎	—	◎	—
	Hydrobromic acid [20% 70℃]	△	◎	—	◎	—
	Hydrobromic acid [37%]	×	◎	×	◎	—
	Hydrochloric acid [10%]	○	◎	○	◎	◎
	Hydrochloric acid [20%]	○	◎	○	◎	△
	Hydrochloric acid [20% 80℃]	×	○	×	◎	×
	Hydrochloric acid [38%]	△	◎	×	◎	×
	Hydrofluoride [10%]	○	◎	—	◎	—
	Hydrofluoride [40%]	×	◎	×	◎	—
	Hydrogen fluoride	—	—	—	◎	—
	Hydrogen peroxide [5%]	○	◎	◎	◎	◎
	Hydrogen peroxide [5% 50℃]	○	◎	◎	◎	○
	Hydrogen peroxide [30%]	○	◎	◎	◎	○
	Hydroquinone	○	◎	—	◎	—
	Hypochlorous acid	○	◎	×	◎	—
I	Isobutyl alcohol	×	◎	◎	◎	—
	Isooctane	×	—	×	◎	○
	Isopropyl alcohol	×	◎	◎	◎	—
K	Kerosene (Lamp oil)	△	△	×	◎	○
	Kerosene (Light oil)	×	△	×	◎	○
L	Lacquer	×	△	×	◎	—
	Lactic acid	○	◎	◎	◎	○
	Lamp oil (Kerosene)	△	△	×	◎	○
	Lard	△	◎	○	◎	○
	Lead acetate	○	◎	×	◎	○
	Linolenic acid	○	◎	◎	◎	—
	Linseed oil	△	◎	◎	◎	○
	Liquid ammonia	○	△	◎	◎	—
	Liquid chlorine	×	×	—	○	—
	Lubricant	△	○	×	◎	—

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		Soft PVC	Polyolefin resin	Silicone rubber	Tetrafluororesin	Nylon
M	Magnesium chloride	◎	◎	◎	◎	◎
	Magnesium hydroxide	◎	◎	—	◎	◎
	Magnesium sulfate	◎	◎	○	◎	—
	Maleic acid	○	◎	—	◎	—
	Malic acid	○	◎	○	◎	—
	Mercuric chloride	○	◎	—	◎	—
	Methyl acetate	×	△	△	◎	○
	Methyl alcohol (Methanol)	×	○	○	◎	○
	Methyl ethyl ketone (MEK)	×	△	△	◎	○
	Methyl isobutyl ketone (MIBK)	×	△	○	◎	—
	Methyl methacrylate	×	△	△	◎	—
	Methylene dichloride	×	△	×	◎	—
	Milk	◎	◎	◎	◎	—
	Mineral oil	△	○	×	◎	—
	Monochloroacetic acid	△	△	—	◎	×
	Monochlorobenzene (Chlorobenzene)	×	△	○	◎	△
	Monoethanolamine	○	○	○	◎	—
N	Naphtha	△	△	△	◎	○
	Naphthalene	○	◎	×	◎	◎
	Naphthenic acid	○	◎	—	◎	—
	n-Dibutylamine	—	—	—	◎	—
	Nickel acetate	○	◎	—	◎	—
	Nickel chloride	◎	◎	◎	◎	○
	Nickel sulfate	◎	◎	◎	◎	—
	Nikawa (Collagen based glue)	◎	◎	◎	◎	—
	Nitric acid [10%]	○	◎	×	◎	×
	Nitric acid [10% 70℃]	△	○	—	◎	×
	Nitric acid [30%]	△	○	—	◎	×
	Nitric acid [30% 70℃]	×	△	—	◎	×
	Nitric acid [61.3%]	×	○	×	◎	×
	Nitrobenzene	×	×	○	◎	△
	Nitroethane	×	×	△	◎	—
	Nitrogen	◎	◎	◎	◎	○
	Nitromethane	×	×	△	◎	◎
	Nitropropane	×	×	△	◎	—
	n-Methylaniline	—	—	—	◎	—
	n-Methylpyrrolidone [40℃]	—	—	—	◎	—
	No.1 (ASTM oil)	△	○	×	◎	○
	No.2 (ASTM oil)	△	○	×	◎	○
	No.3 (ASTM oil)	△	○	×	◎	○

Chemical Resistance Data [Hoses]

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		Soft PVC	Polyolefin resin	Silicone rubber	Tetrafluororesin	Nylon
O	Octane	–	–	—	◎	–
	Octene	–	–	—	◎	–
	Octyl alcohol	×	◎	○	◎	–
	Oleic acid	△	○	×	◎	○
	Olive oil	△	○	△	◎	–
	Oxalic acid	○	◎	○	◎	○
	Oxygen	◎	◎	◎	◎	◎
P	Palmitic acid	△	◎	×	◎	–
	Perchloric acid	○	△	×	◎	–
	Petroleum	△	○	×	◎	○
	Phenol	×	◎	◎	◎	×
	Phenylhydrazine	×	–	–	◎	–
	Phosphoric acid [50%]	◎	◎	◎	◎	○
	Phosphoric acid [50% 70℃]	△	◎	–	◎	–
	Phosphoric acid [75%]	○	◎	–	◎	–
	Phosphoric acid [85 % 70℃]	–	–	–	◎	–
	Phosphorus oxychloride	–	–	—	◎	–
	Phosphorus trichloride	–	–	–	◎	–
	Phthalic acid	–	–	–	◎	–
	Picric acid	×	○	×	◎	△
	Pine oil	×	○	–	◎	○
	Pinene	×	–	×	◎	–
	Potassium chloride	◎	◎	◎	◎	○
	Potassium dichromate [10%]	◎	◎	◎	◎	△
	Potassium hydroxide	◎	◎	△	◎	○
	Potassium nitrate	◎	◎	–	◎	◎
	Potassium permanganate [5%]	○	◎	—	◎	×
	Potassium sulfate	◎	◎	◎	◎	○
	Propyl acetate	×	△	△	◎	–
	Propyl alcohol	–	○	○	◎	–
	Propylene oxide	–	–	–	◎	–
	Pyridine	×	–	–	◎	△

Chemical Resistance Data [Hoses]

⚠ Notes for use of Chemical Resistance Data (Hoses/Couplings/KAMLOK/Gasket)

(1) This table is based on documents concerning the resistance of the materials used in hoses and couplings to various chemicals, and does not guarantee TOYOX products.
(2) The data may differ according to the conditions such as usage methods, temperature, pressure, concentration and period, etc., so evaluate results as the user with the actual equipment and usage conditions.
(3) Chemicals which are dangerous when permeating (active gases, etc.) should not be used in gaseous form. Be sure to confirm the precautions for each product or to consult TOYOX. Regarding the use of fluids not indicated in the Chemical Resistance Data, consult our website at http://english.toyox-hose.com/ .
(4) This data may be amended or added to based on changing product specifications or new information; check the TOYOX website for the latest data.

◎ = Excellent, can be used without problems.
○ = Good, may be affected to some extent, but can be used under general conditions.
△ = Fair, need to verify suitability.
× = Poor, cannot be used.
— = No data

⚠ Caution The following tables are intended to serve only as your reference of materials, and are not intended to guarantee our products. Evaluate results as the user with the actual equipment and usage conditions.

As of November 2018

	Material / Chemical (Concentration density % / Temperature ℃)	Hose inner fluid contact surface				
		Soft PVC	Polyolefin resin	Silicone rubber	Tetrafluororesin	Nylon
S	Salad oil	—	—	—	◎	—
	Salicylic acid	◎	◎	—	◎	○
	Salt	◎	◎	◎	◎	○
	Salt water	◎	◎	◎	◎	○
	Seawater	—	◎	—	◎	○
	Silicon tetrachloride [55℃]	—	—	—	◎	—
	Silicone grease	△	○	○	◎	—
	Silicone oil	△	○	△	◎	◎
	Silver nitrate	○	◎	—	◎	—
	Soap solution	◎	◎	◎	◎	◎
	Sodium bicarbonate	◎	◎	◎	◎	○
	Sodium bisulfite	○	◎	◎	◎	—
	Sodium carbonate (Soda ash)	◎	◎	◎	◎	◎
	Sodium hydrogen sulfite	○	◎	◎	◎	○
	Sodium hydroxide (Caustic soda) [30%]	△	◎	×	◎	○
	Sodium hydroxide (Caustic soda) [30% 70℃]	×	◎	×	◎	△
	Sodium hypochlorite (hypochlorous acid) [5%]	○	◎	◎	◎	—
	Sodium hypochlorite (hypochlorous acid) [5% 70℃]	△	○	◎	◎	—
	Sodium hypochlorite (hypochlorous acid) [30%]	—	○	○	—	—
	Sodium nitrate	◎	◎	△	◎	○
	Sodium perborate	○	◎	○	◎	—
	Sodium peroxide	○	◎	△	◎	—
	Sodium phosphate	◎	◎	△	◎	—
	Sodium silicate	—	—	—	◎	○
	Sodium sulfate (Glauber's salt)	◎	◎	◎	◎	○
	Sodium sulfite	○	◎	○	◎	○
	Sodium tetraborate (Borax)	◎	◎	◎	◎	○
	Sodium thiosulfate	◎	◎	◎	◎	—
	Soybean oil	△	◎	×	◎	—
	Steam (100° C or above)	×	△	△	◎	—
	Stearic acid	○	◎	△	◎	◎
	Styrene	×	○	×	◎	○
	Sugarcane liquid	—	—	◎	—	—
	Sulfur	○	◎	◎	◎	○
	Sulfuric acid [10%]	◎	◎	○	◎	○
	Sulfuric acid [10% 70℃]	×	◎	△	◎	×
	Sulfuric acid [30%]	○	◎	○	◎	△
	Sulfuric acid [30% 70℃]	×	◎	×	◎	×
	Sulfuric acid [98%]	×	△	×	◎	×
	Sulfuric acid [98% 70℃]	×	△	×	◎	×
	Sulfurous acid	—	—	—	◎	—
	Sulfurous acid [10%]	○	◎	○	◎	—

Chemical Resistance Data [Hoses]

⚠ Notes for use of Chemical Resistance Data (Hoses/Couplings/KAMLOK/Gasket)

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As of November 2018

	Material / Chemical (Concentration density % / Temperature ℃)	Hose inner fluid contact surface				
		Soft PVC	Polyolefin resin	Silicone rubber	Tetrafluororesin	Nylon
T	Tannic acid	○	◎	○	◎	—
	Tar	×	○	○	◎	—
	Tartaric acid	○	◎	◎	◎	○
	Tetrachloroethylene	×	△	○	◎	△
	Tetrahydrofuran	×	△	×	◎	◎
	Tetralin	×	△	△	◎	○
	Thionyl chloride	×	×	—	◎	×
	Tin (II) chloride	○	◎	○	◎	—
	Toluene	×	△	×	◎	○
	Trichloroacetic acid	—	—	—	◎	—
	Trichloroethylene	×	△	×	◎	△
	Tricresyl phosphate (TCP)	×	—	△	◎	—
	Triethanolamine	△	○	◎	◎	○
	Triethylamine	—	—	—	◎	—
	Tung oil	○	◎	×	◎	—
	Turbine oil	×	—	×	—	—
	Turpentine oil	○	△	×	◎	○
V	Vinegar	○	◎	◎	◎	—
W	Water	◎	◎	◎	◎	◎
	Whiskey, wine	◎	◎	◎	◎	—
X	Xylene	×	△	×	◎	○
Z	Zinc acetate	◎	◎	×	◎	—
	Zinc chloride	◎	◎	—	◎	○
	Zinc sulfide	◎	◎	◎	◎	○