



WELDING HOSE TECHNICAL INFORMATION

PRECAUTIONS IN THE USE OF WELDING HOSE

WARNING: The use of certain fuel gases may damage welding hose and lead to fires and explosions.

FOREWORD:

This bulletin is issued to alert dealers and users of welding hose that special hose may be necessary for use with certain fuel gases.

SCOPE:

This bulletin relates to welding hose manufactured in conformance to RMA/CGA specification or to welding hose conforming to individual manufacturer or user specifications.

CAUTION:

The fuel gases listed below are recorded to alert welding hose users to a potential hazard with these or similar gases. It should be noted that no condemnation of any of the gases listed is intended. The purpose is to advise against the use of hose that may not be designed for a particular gas or pressure. A user of any fuel gas is urged to relate the type of gas along with the expected working pressure (regulator setting) to the hose manufacturer for a specific hose recommendation.

ALERT LISTING:

These and similar fuel gases may damage some grades or types of welding hose:

APACHE, FLAMEX, MAPP, PROPANE, PROPYLENE.

Use of the indicated or similar fuel gases at regulator settings above 40 psi may be particularly hazardous.

Users are also alerted against the use of ACETYLENE at any pressure above 15 psi.

IN-SERVICE CAUTION:

The user is first cautioned to shut off the gas at the torch and then at the regulator or supply source when the torch will not be used for periods in excess of 30 minutes, in order to limit permeation of gas through the hose wall.

The user is further cautioned not to shut off the fuel gas at the regulator or supply source first as a flashback may result and thereby damage the hose.

Adequate ventilation must be provided in confined areas where fuel gas is being used to prevent the accumulation or concentration of gas that could be explosive or otherwise harmful to personnel.

BACKGROUND INFORMATION:

The RMA/CGA specification for welding hose, as originally promulgated, considered welding hose that would be used to convey the then common fuel gas, acetylene, at the recommended low pressure (15 psi). Several grades were described, the variance between grades relating to a difference in their resistance to deterioration in the presence of oil, or to their resistance to destruction by flame, or both. No differentiation was made for a variance in performance resulting from exposure to the fuel gas itself. It had been determined that acetylene, when conveyed under the low pressures common to its recommended use, had little effect on hose, regardless of its composition or construction.

In recent years, there have been developed or adopted a number of fuel gases based on specific hydrocarbons or mixtures of hydrocarbons. It is known that these special fuel gases have a different effect on rubber compounds than does acetylene. The precise effect on all the many and varying hose compounds and constructions of the many manufacturers has not been determined for all the known special fuel gases.

The effect of any material being conveyed in a hose on the rubber compounds used in the hose can be measured by one or several test procedures. In the case of fuel gases, the test procedures most applicable would be designed to measure a change of the physical properties after exposure to the fuel gas including tensile, elongation, hardness and volume.

A characteristic of rubber hose that is significant in its use as welding hose is a phenomenon known as permeation. Any gas confined in the bore of a hose exhibits a tendency to pass through the tube wall and subsequently through the reinforcement and cover to the environment. Each gas has its own specific characteristic tendency to permeate. Each rubber compound exhibits specific resistance to permeation. The rate of permeation increases with higher temperature. To minimize the permeation of fuel gas through the hose wall it is logical to design the tube compound for the lowest possible permeation rate. The problem in the case of welding hose results from the variety of gases now encountered, the varying pressures used in service, and the varying temperatures to be found in the work place. The need to ventilate the work place is evident, both for maintaining the lowest practical temperature and to dissipate the permeating gas, however slight, to prevent buildup to concentrations that are either explosive or dangerous for breathing by workmen.

Some rubber compounds are known to have low permeation rates with several fuel gases but no specific rule can be laid down to predict overall performance. Thus, it becomes advisable to check the characteristic of each hose construction with each gas under actual or simulated service conditions to qualify it for use.

CAUTION:







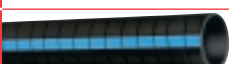
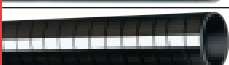







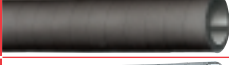


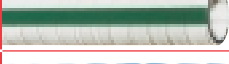




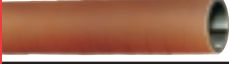
Users of welding hose are urged to communicate their service conditions to the hose manufacturer and obtain the best recommendation of the manufacturer for a hose suitable for those conditions.

* Reprinted with permission from the Rubber Manufacturers Association (RMA) Hose Handbook, RMA/IP-2/2003.

Hose information is subject to change. For full details, visit our website or contact Customer Service.

BULK TRANSFER/TRANSPORTER® HOSE PRODUCT REFERENCE

TECHNICAL REFERENCE

	NAME	I.D. (in.)	TUBE	COVER	COLOR	APPLICATION DATA
Chemical	 ULTRA-CHEM	1-6	UHMWPE	EPDM	Green w/Yellow Stripe	Handles 98% of all common industrial chemicals in pressure, gravity flow and suction service
	 MULTI-CHEM	1-4	XLPE	EPDM	Green/Black w/Orange Stripe	Extreme versatility, resists 95% of all industrial chemicals
	 CHLORO-CHEM	1¼-4	CM	EPDM	Green w/White Stripe	Resists 75% of all industrial chemicals; maximum temperature limitation 150°F
	 CHEMICAL H	1-4	1/16" CSM	CR	Yellow w/Red Stripe	Designed primarily for the handling of inorganic acids, alcohols, and highly corrosive chemicals
	 CHEMICAL B	1-4	IIR	EPDM	Brown	General purpose chemical hose for handling strong and oxidizing acids, esters, ketones and alcohols
	 CHEMICAL V	1½-4	FKM	NBR/PVC	Orange	Handles a wide range of moderate and oxidizing chemicals, and aromatic solvents such as benzene, toluene and chlorinated hydrocarbons
Petroleum	 EBONITE L.T.	1½-4	NBR/ECO	NBR	Black w/Blue Stripe	Extremely flexible, lightweight, sub-zero (to -65°F) corrugated drop hose
	 EBONITE	1-4	NBR	NBR/PVC	Black w/White Stripe	Frequently used to replace plastic drop hose; exceptional flexibility and lightweight
	 X.L.W. CORRUGATED	2-4	NBR	CR	Red w/White Stripe	Easy to maneuver, "fight-free" hose for the transfer of petroleum based products
	 L.W. CORRUGATED TANK TRUCK	2-4	NBR	NBR/PVC	Orange/Black	Bulk transfer of gasoline or other petroleum based products. Corrugated for additional flexibility
	 RED/BLACK TANK TRUCK	Red-1½-4 Black-1-4	NBR	NBR/PVC	Red/Black	For transfer of petroleum based products where strength, lightweight and flexibility are required
	 FLEX-DEVIL	2-4	NBR	CR	Red	For use in the transfer of gasoline, petroleum based products and a wide range of oils and chemicals
	 TYPE 924 PETROLEUM TRANSFER	1-4	NBR	NBR/PVC	Black w/Red Stripe	Handles most hydrocarbons, fats, etc., along with hydraulic fluid and a wide range of chemicals
	 VAPOR RECOVERY	3-4	NBR	NBR/PVC	Black w/White Stripe	For the recovery of hydrocarbon vapors during bulk loading of gasoline
	 OIL FIELD VACUUM	1½-4	NBR/SBR	SBR/EPDM	Black	Designed for crude oil transfer; lightweight and flexible
	 FUEL TRANSFER	2-4	NBR	NBR/PVC	Black	Handles gasoline fuel oil delivery applications
Liquid Food	 GRAY SHADOW	1½-4	NBR White FDA	NBR/PVC	Gray	Handles wide variety of liquids, including oily edibles
	 FOOD SUCTION	1¼-4	NBR White FDA	NBR/PVC	White	FDA acceptable for handling liquid food products including oily edible materials
	 FOOD DISCHARGE	2-4	NBR White FDA	NBR/PVC	White w/Green Stripe	Same as Transporter Food Suction except for discharge service only
Material Handling	 MATERIAL SUCTION	1½-4	3/16" NR White FDA	SBR	Blue	Handles a wide variety of materials: mild acids; dry materials such as sand, limestone and fertilizers; dry foods such as grain, flour and sugar
	 MATERIAL DISCHARGE	2-4	3/16" NR White FDA	SBR	Blue w/Yellow Stripe	Same as Transporter Material Suction except for discharge service only
	 HOT TAR & ASPHALT	1½-4	CR	CR	Black	For hot petroleum based products such as asphalt
	 TYPE 120 DRY CEMENT/MATERIAL	4	1/8", 3/16", 1/4" Available SBR/NR	SBR/EPDM	Black	Transfer of dry cement and other mildly abrasive materials
	 HOT AIR BLOWER	2½-4	EPDM	EPDM	Brown	For conveying hot air from compressor to trailer on dry bulk material trucks

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CHEMICAL RESISTANCE CHART

This chart is designed to help you select the correct hose or hoses to conduct the many types of materials found in industry. It should be used only as a guide because the ability of a particular tube compound to resist a material depends on many variables—temperature, concentration, pressure, velocity, duration of exposure, aeration, stability of the fluid, etc. The special variations in elastomer types and their compounding for specific service conditions play an important part in the service life of the hose.

WARNING: The following data has been compiled from generally available sources and should not be relied upon without consulting and following the hose manufacturer's specific chemical recommendations. Neglecting to do so might result in failure of the hose to fulfill its intended purpose, and may result in possible damage to property and serious bodily injury.

Refer to additional information and warnings on pages 2, 7-13, 117 and 128.

If you have any questions about the suitability of a hose for a particular service, contact HBD Industries' Customer Service Department, 800/438-2312, for a recommendation.

The most commonly used chemicals, materials, oil, solvents, etc., are listed here. Ratings are for concentrated or saturated solutions at room temperature (70°F) unless otherwise specified. The rating code indicates the degree or range of serviceability for each style of hose listed under the group headings.

RATING CODE:

A – Excellent. Suitable for continuous service.

B – Good. Generally suitable for continuous service and for intermittent service.

C – Fair or Conditional. NOT recommended for continuous service, but generally suitable for intermittent service.

D – Unsatisfactory. Not Recommended.

1. Anhydrous Ammonia Hose Only
2. FDA Tube Required
3. Use Butane-Propane Hose Only
4. (See HCL 37%)
5. Contact HBD Technical

These ratings are to be used only as a guide.

As a guide to the user of hose in contact with oil, the oil resistance classes and corresponding description are listed.

PHYSICAL PROPERTIES AFTER EXPOSURE TO OIL

	Volume Change Maximum	Tensile Strength Retained
Class A (High oil resistance)	+25%	80%
Class B (Medium-High oil resistance)	+65%	50%
Class C (Medium oil resistance)	+100%	40%

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TECHNICAL REFERENCE

	NATURAL RUBBER	SBR	BUTYL	NITRILE	NEOPRENE*	HYPALON	EPDM	EPICHLOROHYDRIN	VITON	CROSSLINKED POLYETHYLENE	CPE	UHMW
Acetal	C	C	B	D	C	C	C	D	D	B		B
Acetaldehyde	C	D	A	D	C	C	A	D	D	A		A
Acetamide	C	C	A	B	B	B	A	C	B	A		A
Acetate Solvents	C	D	C	D	D	D	C	D	D	A	B	A
Acetic Acid, 10%	D	D	B	D	C	B	B	C	A	A	A	A
Acetic Acid, 30%	D	D	B	C	B	B	C	C	A	A	A	A
Acetic Acid, 50%	D	D	B	C	C	D	B	C	D	B	A	B
Acetic Acid, Glacial	D	D	B	D	C	D	D	D	D	B	A	B
Acetic Anhydride	D	D	B	D	D	B	B	D	D	B	A	B
Acetic Ester (Ethyl Acetate)	D	D	B	D	D	D	B	D	D	A	B	A
Acetic Ether (Ethyl Acetate)	D	D	B	D	D	C	B	D	D	A	B	A
Acetic Oxide (Acetic Anhydride)	D	D	C	D	D	B	B	D	D	A	A	A
Acetone	B	B	A	D	C	C	A	D	D	A	A	A
Acetophenone	C	D	A	D	D	D	A	D	D	B		B
Acetyl Acetone	D	D	B	D	D	D	A	D	D	A	B	A
Acetyl Chloride	D	D	C	D	D	C	D	B	B	A	A	B
Acetylene	A	A	A	A	C	C	B	B	A	A		A
Acrylonitrile	B	D	D	D	D	D	D	D	D	B	A	B
Air	A	A	A	A	A	A	A	A	A	A	A	A
Alcohols, Aliphatic	A	B	A	A	A	A	A	A	C	A	A	A
Alcohols, Aromatic	C	D	D	C	C	D	D	B	A	A	C	A
Alk-Tri (Trichloroethylene)	D	D	D	D	D	D	D	B	A	D	A	D
Allyl Alcohol	A	B	A	A	A	A	A	A	B	A	A	A
Allyl Bromide	D	D	D	D	D	D	D	D	B	B	A	B
Allyl Chloride	D	D	D	D	D	D	D	B	B	B	A	B
Alum (Ammonium) Potassium Sulfate	A	A	A	A	A	A	A	A	A	A	A	A
Aluminum Acetate	A	C	B	B	B	B	B	B	C	A	A	A
Aluminum Chloride	A	A	A	A	A	A	A	A	A	A	A	A
Aluminum Fluoride	A	A	A	A	A	A	A	A	A	A	A	A
Aluminum Hydroxide	A	A	A	A	A	A	A	A	A	A	A	A
Aluminum Phosphate	A	A	A	A	A	A	A	A	A	A	A	A
Aluminum Nitrate	A	A	A	A	A	A	A	A	A	A	A	A
Aluminum Sulfate	B	A	A	A	A	A	A	A	A	A	A	A
Ammonia, Anhydrous	A	C	A	B	A	B	A	C	D	A	A	A
Ammonia, Liquid	B	B	A	A	A	A	A	C	A	A	A	A
Ammonia, in Water	B	B	B	B	B	B	A	B	B	A	A	A
Ammonia, Gas (Cold)	Anhydrous Ammonia Hose Only											
Ammonia, Gas (150°F)	Anhydrous Ammonia Hose Only											
Ammonium Carbonate	A	A	A	C	A	A	A	A	A	A		A
Ammonium Chloride	A	A	A	A	A	A	A	A	A	A	A	A
Ammonium Hydroxide	B	B	A	B	B	A	B	B	B	A	A	A
Ammonium Metaphosphate	A	A	A	A	A	A	A	A	A	A	A	A
Ammonium Nitrate	B	A	A	A	A	A	A	A	A	A	A	A
Ammonium Nitrite	A	A	A	A	A	A	A	A	A	A	A	A
Ammonium Persulfate	A	D	A	D	A	A	B	C	A	A		A
Ammonium Phosphate	A	A	A	A	A	A	A	A	A	A	A	A
Ammonium Sulfate	A	A	A	A	A	A	A	A	A	A	A	A
Ammonium Sulfide	A	A	A	A	A	A	A	A	A	A	A	A

These ratings are to be used only as a guide.

* Trademark of DuPont.

	NATURAL RUBBER	SBR	BUTYL	NITRILE	NEOPRENE	HYPALON	EPDM	EPICHLOROHYDRIN	VITON	CROSSLINKED POLYETHYLENE	CPE	UHMW
Ammonium Sulfite	A	A	A	A	A	A	A	A	A	A	A	A
Ammonium Thiocyanate	A	A	A	A	A	A	A	A	A	A	A	A
Ammonium Thiosulfate	A	A	A	A	A	A	A	A	A	A	A	A
Amyl Acetate	C	D	B	D	D	D	B	D	D	D	C	D
Amyl Acetone	D	D	B	D	D	D	B	D	D	A		A
Amyl Alcohol	A	A	A	A	A	A	A	B	A	A	A	A
Amylamine	C	B	B	C	D	C	D	C	D	A	B	A
Amyl Borate	D	D	D	A	C	C	D	C	A	A		A
Amyl Chloride	D	D	D	D	D	D	D	D	A	A	C	A
Amyl Chloronaphthalene	D	D	D	B	D	D	D	C	A	A		A
Amyl Naphthalene	D	D	D	D	D	D	D	C	A	A		A
Amyl Oleate	D	D	B	D	D	D	B	C	C	A		A
Amyl Phenol	D	D	D	D	D	D	D	C	A	A		A
Anethole	D	D	D	D	D	D	D	B	B	D	B	B
Aniline	D	D	B	D	C	C	B	D	B	B	B	B
Aniline Dyes	C	C	B	C	C	C	B	C	B	A		A
Aniline Hydrochloride	A	C	C	C	D	D	B	C	B	A		A
Animal Fats	D	D	B	A	B	B	B	A	A	A	A	A
Animal Grease	D	D	C	B	B	C	B	B	A	A	B	A
Animal Oils	D	D	B	A	D	D	C	B	A	A	A	A
Ansul Ether	D	D	C	C	D	D	C	D	D	A		A
Antifreeze (Ethylene Glycol)	A	A	A	A	A	A	A	A	A	A	A	A
Antimony Trichloride	D	D	A	B	B	B	B	C	A	A		B
Antimony Pentachloride	D	D	C	D	D	D	C	C	A	B		B
Aqua Regia	D	D	D	D	D	C	C	D	B	D	B	B
Aromatic Hydrocarbons	D	D	D	C	D	D	D	B	A	A	C	A
Arguard	A	A	A	A	A	A	A	A	A	A		A
Arsenic Acid	A	A	A	A	A	A	A	A	A	A	A	A
Arsenic Chloride	D	D	D	C	A	D	B	C	D	D		D
Arsenic Trichloride	D	D	D	C	A	D	B	C	D	D		D
Asphalt	D	D	D	A	B	D	B	A	A	B		B
Astm #1 Oil	D	D	D	A	A	B	D	A	A	A	A	A
Astm #2 Oil	D	D	D	A	B	C	D	A	A	A	A	A
Astm #3 Oil	D	D	D	A	B	C	D	A	A	A	A	A
Aviation Gasoline	D	D	D	A	C	D	D	A	A	A	B	A
Barium Carbonate	A	A	A	A	A	A	A	A	A	A	A	A
Barium Chloride	A	A	A	A	A	A	A	A	A	A	A	A
Barium Hydroxide	A	A	A	A	A	A	A	A	A	A	A	A
Barium Sulfate	A	A	A	A	A	A	A	A	A	A	A	A
Barium Sulfide	A	A	A	A	A	A	A	A	A	A	A	A
Beer	(F.D.A. Tube Required)											
Beet Sugar Liquors	A	A	A	A	A	A	A	A	A	A	A	A
Benzaldehyde	D	D	B	D	D	D	B	D	D	A	C	A
Benzene (Benzol)	D	D	D	C	D	D	D	C	A	A	C	A
Benzene Sulfonic Acid	D	D	D	C	A	A	C	B	A	A		A
Benzine Solvent (Ligroin)	D	D	D	A	B	D	D	B	A	A		A
Benzoic Acid	B	D	A	D	A	B	B	C	A	A	A	A
Benzoic Aldehyde	D	D	D	D	D	D	D	C	D	A		A
Benzotrithloride	D	D	D	D	D	D	D	D	B	B	D	B

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	NATURAL RUBBER	SBR	BUTYL	NITRILE	NEOPRENE	HYPALON	EPDM	EPICHLOROHYDRIN	VITON	CROSSLINKED POLYETHYLENE	CPE	UHMW
Benzoyl Chloride	D	D	D	D	D	D	D	D	B	B	D	B
Benzyl Acetate	D	D	B	D	D	B	B	D	D	A	A	A
Benzyl Alcohol	B	B	B	D	B	B	B	D	A	A	A	A
Benzyl Chloride	D	D	C	D	D	D	D	D	A	A	D	A
Bichromate of Soda (Sodium Dichromate)	D	D	A	D	B	B	C	C	A	A	A	A
Black Sulfate Liquor	B	B	A	B	A	B	A	A	A	A		A
Blast Furnace Gas	D	D	C	C	B	B	C	C	A	A		A
Bleach Solutions	D	D	B	D	D	C	B	D	B	B	A	B
Borax	B	B	A	B	A	A	A	A	A	A	A	A
Bordeaux Mixture	B	B	A	A	A	A	A	A	A	A		A
Boric Acid	A	A	A	A	A	A	A	A	A	A	A	A
Brandy	(F.D.A. Tube Required)											2
Brine	A	A	A	A	A	A	A	B	A	A	A	A
Bromine	D	D	D	D	D	C	D	D	C	D		D
Bromine Water	D	D	C	C	B	A	C	C	A	A		A
Bromobenzene	D	D	D	D	D	D	D	D	B	C	D	C
Bunker Oil	D	D	D	A	B	D	D	A	A	A	A	A
Butanol (Butyl Alcohol)	A	A	A	B	A	A	A	A	A	A	A	A
Butadiene	D	D	D	D	C	B	D	D	A	C		C
Butane	Use Butane—Propane Hose Only											3
Butter (Non F.D.A.)	C	C	A	A	B	A	B	A	A	A	A	A
Butyl Acetate	D	D	B	D	D	D	C	D	D	A	B	A
Butyl Acrylate	D	D	D	D	D	D	D	D	B	B	B	B
Butylamine	B	C	C	C	D	C	C	C	D	A	B	A
Butyl Benzene	D	D	D	D	D	D	D	D	D	A	C	A
Butyl Bromide	D	D	D	D	D	D	D	D	B	B	C	B
Butyl Butyrate	D	D	C	D	D	D	B	C	C	B	C	B
Butyl Carbitol	D	D	A	B	B	B	A	A	A	A	A	A
Butyl Cellosolve	D	D	A	B	B	B	A	A	D	A	B	A
Butyl Chloride	D	D	C	D	D	D	D	C	A	B	C	B
Butyl Ether	D	D	C	B	B	B	C	B	D	A	A	A
Butyl Ethyl Acetaldehyde	D	D	C	D	D	D	D	C	D	A		A
Butyl Ethyl Ether	D	D	C	D	D	B	C	C	C	A	A	A
Butyl Oleate	D	D	B	D	D	D	B	C	A	A		A
Butyl Phthalate	D	D	C	D	D	D	C	C	A	C	A	A
Butyl Stearate	D	D	C	B	D	D	C	C	A	A	B	A
Butyraldehyde	C	D	D	D	D	D	D	D	D	A	B	A
Butyric Acid	C	D	C	C	C	B	C	B	C	A	A	A
Butyric Anhydride	C	D	C	C	D	B	C	B	C	A		A
Calcium Acetate	C	D	A	D	D	D	A	C	D	A	B	A
Calcium Bisulfate	A	A	A	A	A	A	A	A	A	A	A	A
Calcium Bisulfite	C	A	B	A	A	A	C	A	A	A	A	A
Calcium Carbonate	A	A	A	A	A	A	A	A	A	A	A	A
Calcium Chloride	A	A	A	A	A	A	A	A	A	A	A	A
Calcium Hydroxide	A	B	A	B	A	B	A	A	C	A	A	A
Calcium Hypochlorite	D	D	B	D	D	C	B	C	A	B	A	B
Calcium Nitrate	A	A	A	A	A	A	A	A	A	A	A	A
Calcium Sulfate	A	A	A	A	A	A	A	A	A	A	A	A

These ratings are to be used only as a guide.

	NATURAL RUBBER	SBR	BUTYL	NITRILE	NEOPRENE	HYPALON	EPDM	EPICHLOROHYDRIN	VITON	CROSSLINKED POLYETHYLENE	CPE	UHMW
Calcium Sulfide	A	A	A	A	A	A	A	A	A	A	A	A
Calcium Sulfite	A	A	A	A	A	A	A	A	A	A	A	A
Caliche Liquor (Crude Sodium Nitrate)	A	A	A	C	B	A	A	A	A	A	A	A
Cane Sugar Liquors (Non F.D.A.)	A	A	A	A	A	A	A	A	A	A	A	A
Carbitol	D	D	A	B	B	B	B	C	A	A	A	A
Carbitol Acetate	D	D	B	D	D	D	B	C	D	A		A
Carbolic Acid (Phenol)	D	D	B	D	C	C	C	D	A	A	A	A
Carbon Bisulfide (See Carbon Disulfide)												
Carbon Dioxide	A	A	A	A	A	A	A	A	A	A	A	A
Carbon Disulfide	D	D	D	D	D	D	D	D	A	A	C	C
Carbonic Acid	A	A	A	A	A	A	A	A	A	A	A	A
Carbon Monoxide	A	A	A	A	A	A	A	A	A	A	A	A
Carbon Tetrachloride	D	D	B	C	D	D	B	D	A	C	C	C
Carbon Tetrafluoride	D	D	D	C	D	D	D	C	A	C		C
Castor Oil	C	D	B	A	B	C	B	A	A	A	A	A
Caustic Potash (Potassium Hydroxide)	A	B	A	A	B	A	A	A	C	A	A	A
Caustic Soda (Sodium Hydroxide)	A	B	A	B	B	B	A	A	C	A	A	A
Cellosolve	D	D	B	B	A	B	B	B	C	A	A	A
Cellulose Acetate	C	D	B	D	C	C	B	C	D	B		B
Cellulube	C	D	B	D	D	D	A	D	C	A		A
China Wood Oil (Tung Oil)	D	D	B	A	B	B	B	B	A	A	A	A
Chlorine Dioxide	D	D	D	D	D	C	D	D	A	B		B
Chlorine Gas (Dry)	C	C	C	C	D	B	C	B	A	B		B
Chlorine, Water Solns. (2%)	C	D	C	D	D	B	C	C	A	A		A
Chloroacetic Acid	B	D	C	D	D	D	C	D	C	A		D
Chloroacetone	D	D	B	D	D	B	D	D	D	A	D	A
Chlorobenzene	D	D	D	D	D	D	D	D	A	B	D	B
Chlorobutane	D	D	D	D	D	D	D	D	A	B	C	B
Chlorobutadiene	D	D	D	D	D	D	D	D	A	B		B
Chloroform	D	D	D	D	D	D	D	D	A	B	C	B
Chlorinated Hydrocarbons	D	D	D	D	D	D	D	D	A	B	D	B
Chloropentane	D	D	D	D	C	D	D	C	A	A	C	A
Chlorophenol	D	D	D	D	D	D	D	D	B	B	C	B
Chloropropanone	D	D	C	D	D	D	C	D	D	A	D	A
Chlorosulfonic Acid	D	D	D	D	D	C	D	C	D	B		B
Chlorothene (Trichloroethane)	D	D	D	D	D	D	D	C	A	B	C	B
Chlorotoluene	D	D	D	D	D	D	D	D	A	B	B	B
Chromic Acid	D	D	D	D	D	A	C	C	A	A	A	A
Citric Acid	A	A	A	B	B	A	A	A	A	A	A	A
Coal Oil	D	D	D	A	B	D	D	B	A	A	A	A
Coal Tar	D	D	D	A	B	B	B	A	A	A	A	A
Coal Tar Naptha	D	D	D	C	C	D	D	C	A	A	A	A
Cobalt Chloride	A	A	A	A	A	A	A	A	A	A	A	A
Coconut Oil	D	D	B	A	B	B	A	A	A	A	A	A
Cod Liver Oil	D	D	A	A	B	B	A	A	A	A	A	A

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Coke Oven Gas	D	D	C	D	D	B	D	C	A	A	A	A	
Copper Arsenate	A	A	A	A	A	A	A	A	A	A	A	A	A
Copper Chloride	A	A	A	A	A	A	A	A	A	A	A	A	A
Copper Cyanide	A	A	A	A	A	A	A	A	A	A	A	A	A
Copper Nitrate	A	A	A	A	A	A	A	A	A	A	A	A	A
Copper Nitrite	A	A	A	A	A	A	A	A	A	A	A	A	A
Copper Sulfate	C	A	A	A	A	A	A	A	A	A	A	A	A
Copper Sulfide	C	A	A	A	A	A	A	A	A	A	A	A	A
Corn Oil	D	D	B	A	B	B	B	A	A	A	A	A	A
Cottonseed Oil	D	D	A	A	B	B	A	A	A	A	A	A	A
Creosote (Wood)	D	D	D	B	C	C	D	B	A	A	A	A	A
Creosote (Coal Tar)	D	D	D	B	C	C	D	B	A	A	A	A	A
Cresols	D	D	D	C	C	C	D	C	A	A	A	A	A
Cresylic Acid	D	D	D	C	C	C	D	C	A	A	A	A	A
Crotonaldehyde	D	D	A	D	D	D	C	D	A	A	A	A	A
Crude Oil	D	D	D	A	C	D	D	A	A	A	A	A	A
Cumene	D	D	D	C	C	D	D	C	A	A	A	C	A
Cupric Carbonate	C	C	A	B	B	B	A	B	A	A	A	A	A
Cupric Chloride	C	C	A	A	B	A	A	B	A	A	A	A	A
Cupric Nitrate	C	C	A	A	B	A	A	B	A	A	A	A	A
Cupric Nitrite	C	C	A	A	B	A	A	B	A	A	A	A	A
Cupric Sulfate	C	B	A	A	B	B	A	A	A	A	A	A	A
Cyclohexane	D	D	D	B	D	D	D	B	A	A	A	A	A
Cyclohexanone	D	D	D	D	D	D	D	D	C	A	C	A	A
Cyclohexanol	D	D	D	B	B	D	D	B	B	A	A	A	A
Cyclopentane	D	D	D	C	D	D	D	B	A	A	C	A	A
P-Cymene	D	D	D	C	D	D	D	B	A	A	C	A	A
DDT In Kerosene	D	D	D	A	B	C	D	A	A	A	A	A	A
Decaline	D	D	D	D	D	D	D	D	A	A	C	A	A
Decane	D	D	D	B	D	D	D	B	A	A	A	A	A
Detergent Solutions	B	B	A	B	A	A	B	A	A	A	A	A	A
Diacetone Alcohol	D	D	A	D	B	B	B	D	D	A	A	A	A
Diamylamine	B	C	A	B	A	C	C	B	B	A	A	A	A
Dibenzyl Ether	D	D	B	D	D	D	D	D	C	A	C	A	A
Dibenzyl Sebacate	C	D	B	D	D	D	B	D	B	A	A	A	A
Dibromobenzene	D	D	D	D	D	D	D	D	A	B	B	B	B
Dibutylamine	B	C	C	B	A	C	B	B	D	A	A	A	A
Dibutylether	D	D	D	D	D	D	B	C	C	A	A	A	A
Dibutylphthalate	D	D	B	D	D	D	A	D	D	A	C	A	A
Dibutyl Sebacate	D	D	B	D	D	D	B	D	B	B	B	B	B
Dicalcium Phosphate	A	A	A	A	A	A	A	A	A	A	A	A	A
Dichloroacetic Acid	D	D	C	D	D	D	C	D	C	A	B	A	A
P-Dichlorobenzene	D	D	D	D	D	D	D	D	D	A	A	D	B
Dichlorobutane	D	D	D	D	D	D	D	D	A	A	C	A	A
Dichloroisopropyl Ether	D	D	C	D	D	D	C	D	C	A	A	A	A
Dicyclohexylamine	D	D	D	D	D	B	D	D	A	B	B	B	B
Dichlorodifluoromethane (Freon 12)	D	D	D	A	B	D	D	B	A	A	A	A	A
Dichloroethane	D	D	C	D	D	D	D	D	A	A	C	C	C

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Dichloroethylene	D	D	C	D	D	D	D	D	D	A	A	A	D
Dichloroethyl Ether	D	D	D	D	D	D	D	D	D	C	A	B	A
Dichlorohexane	D	D	D	D	D	D	D	D	D	A	A	C	A
Dichloromethane	D	D	D	D	D	D	D	D	D	A	A	C	A
Dichloropentane	D	D	D	D	D	D	D	D	D	A	A	C	A
Dieldrin In Xylene	D	D	D	D	D	D	D	D	D	A	A	A	A
Dieldrin In Xylene And Water Spray	D	D	D	B	B	D	D	D	B	A	A	A	A
Diesel Oil	D	D	D	A	B	C	D	A	A	A	A	A	A
Diethanolamine	B	C	B	B	B	C	C	B	B	A	A	A	A
Diethylamine	B	C	B	B	B	C	C	B	D	A	B	A	A
Diethyl Benzene	D	D	D	D	D	D	D	D	A	A	C	A	A
Diethyl Ether	D	D	D	B	C	D	D	D	D	A	A	A	A
Diethylene Dioxide	D	D	B	D	D	A	B	C	D	A	B	A	A
Diethylene Glycol	A	A	A	A	A	A	A	A	A	A	A	A	A
Diethylenetriamine	B	B	A	B	C	C	A	B	C	A	A	A	A
Diethyl Oxalate	C	D	C	D	D	D	A	D	C	A	A	A	A
Diethyl Phthalate	D	D	A	D	D	D	C	D	C	A	B	A	A
Diethyl Sebacate	D	D	A	D	D	D	C	D	B	A	B	A	A
Diethyl Sulfate	D	D	B	D	D	D	B	D	A	A	A	A	A
Diethyl Triamine	B	C	A	B	B	C	B	B	C	A	A	A	A
Dihydroxyethyl Amine	B	C	A	B	B	C	B	B	C	A	A	A	A
Dihydroxyethyl Ether	A	A	A	A	B	A	B	A	A	A	A	A	A
Diisobutylene	D	D	D	A	B	D	D	A	A	A	C	A	A
Diisobutyl Ketone	D	D	B	D	D	D	B	D	D	A	A	A	A
Diisodecyl Adipate	D	D	A	D	D	C	A	D	C	A	A	A	A
Diisodecyl Phthalate	D	D	A	D	D	C	A	D	C	A	A	A	A
Diisooctyl Adipate	D	D	A	D	D	D	A	D	C	A	A	A	A
Diisooctyl Phthalate	D	D	A	D	D	C	A	D	C	A	A	A	A
Diisopropanol Amine	B	C	A	B	D	C	A	B	C	A	A	A	A
Diisopropyl Benzene	D	D	D	C	D	D	D	C	A	A	A	A	A
Diisopropyl Ether	D	D	D	B	D	D	D	B	B	A	A	A	A
Diisopropyl Ketone	D	D	A	D	D	D	A	D	D	A	C	A	A
Dilauryl Ether	D	D	D	C	D	C	D	D	C	A	A	A	A
Dimethylamine	B	C	A	B	B	C	A	B	C	A	A	A	A
Dimethyl Benzene	D	D	D	D	D	D	D	D	A	A	D	A	A
Dimethylaniline	D	D	D	D	D	D	C	D	D	B	C	B	B
Dimethylformamide (DMF)	C	C	C	D	C	C	C	D	D	A	A	A	A
Dimethyl Ketone (Acetone)	B	C	A	D	C	C	A	B	D	A	A	A	A
Dimethyl Phthalate	D	D	A	D	D	D	B	D	C	A	A	A	A
Dimethyl Sulfate	D	D	B	D	D	D	D	D	D	A	A	A	A
Dimethyl Sulfide	D	D	C	D	D	D	D	D	C	B	B	B	B
Dinitrobenzene	D	D	C	D	C	D	C	D	A	A	A	A	A
Dinitrotoluene	D	D	D	D	D	D	D	D	B	A	A	A	A
Diocetyl Adipate (DOA)	D	D	A	D	D	D	B	D	C	A	C	A	A
Diocetylamine	B	B	A	B	D	C	B	B	C	A	A	A	A
Diocetyl Phthalate (DOP)	D	D	B	D	D	D	B	B	A	A	C	A	A
Diocetyl Sebacate (DOS)	D	D	B	D	D	D	B	D	B	A	C	A	A
Dioxane	D	D	B	D	D	D	B	D	D	A	B	A	A

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Dioxolane	D	D	C	D	D	D	B	D	C	A	B	A
Dipentene (Limonene)	D	D	D	C	D	D	D	C	A	A	B	A
Diphenyl (Biphenyl)	D	D	D	D	D	D	D	D	A	A		A
Diphenyl Oxide (Phenyl Ether)	D	D	D	D	D	C	D	D	A	A		A
Dipropylene Glycol	A	A	A	A	A	A	A	A	A	A	A	A
Dipropyl Ketone	D	D	B	D	D	D	B	D	D	A	C	A
Dipropylamine	B	B	A	B	B	C	A	B	C	A	B	A
Disodium Phosphate	A	A	A	A	A	A	A	A	A	A	A	A
Divinyl Benzene	D	D	D	D	D	D	D	D	A	A	D	A
D.M.P. (Dimethyl Phenols)	D	D	D	D	D	D	D	D	D	C	A	C
Dodecyl Benzene	D	D	D	D	D	D	D	D	A	A		A
Dodecyl Toluene	D	D	D	D	D	D	D	D	A	A		A
Dowfume W 40, 100%	D	D	D	D	C	C	C	D	C	B		B
Dow-Per (Perchloroethylene)	D	D	D	C	D	D	D	C	A	A	C	A
Dowtherm Oil, A and E	D	D	D	D	D	C	D	D	A	A	C	A
Dowtherm S.R.I.	A	A	A	A	A	A	A	A	A	A		A
Dry Cleaning Fluids	D	D	D	C	D	D	D	C	A	B		B
Epichlorohydrin	D	D	C	D	D	C	B	D	D	B		B
Ethanol (Ethyl Alcohol)	A	A	A	A	A	A	A	A	C	A	A	A
Ethanolamine	B	C	B	B	B	C	B	B	D	A	A	A
Ethers	D	D	C	D	D	C	D	D	C	A	A	A
Ethyl Acetate	D	D	B	D	D	C	B	D	D	A	B	A
Ethyl Acetoacetate	D	D	B	D	D	D	B	D	D	A	A	A
Ethyl Acrylate	D	D	C	D	D	D	D	D	D	B	B	B
Ethyl Benzene	D	D	D	C	D	D	D	C	A	A	C	A
Ethyl Benzoate	D	D	B	B	C	C	B	B	C	A		A
Ethyl Butyl Alcohol	A	A	A	A	A	A	A	A	A	B	A	A
Ethyl Butyl Amine	B	C	A	B	B	C	B	B	B	A		A
Ethyl Butyl Ketone	D	D	B	D	D	D	B	D	D	A	C	A
Ethyl Cellulose	B	B	B	B	B	B	B	B	D	A		A
Ethyl Chloride	C	C	D	C	C	D	D	B	A	A		B
Ethyl Dichloride	D	D	D	D	D	D	D	D	B	B	C	B
Ethylene	D	D	D	A	B	C	D	A	A	A		A
Ethylene Bromide	D	D	D	D	D	D	D	D	A	B		B
Ethylene Chloride	D	D	D	D	D	D	D	D	A	B		B
Ethylene Diamine	B	C	A	B	A	C	A	A	D	A	A	A
Ethylene Dibromide	D	D	D	D	D	D	D	D	B	B	C	B
Ethylene Dichloride	D	D	D	D	D	D	D	D	B	B	C	B
Ethylene Glycol	A	A	A	A	A	A	A	A	A	A	A	A
Ethylene Oxide	D	D	C	D	D	C	D	D	C	A		C
Ethylene Trichloride (Trichloroethylene)	D	D	D	C	D	D	D	C	A	B	C	B
Ethyl Ether	D	D	D	C	D	D	D	B	D	A	A	D
Ethyl Formate	D	D	B	D	D	D	C	D	D	A	A	A
Ethyl Hexanol	A	A	A	A	A	A	A	A	B	A	A	A
Ethyl Methyl Ketone	C	D	B	D	D	D	B	D	D	A	C	A
Ethyl Oxalate	A	A	A	D	D	D	B	D	C	A	A	A
Ethyl Phthalate	D	D	A	D	D	D	B	D	C	A	B	A

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Ethyl Propyl Ether	D	D	D	D	D	D	D	D	C	A	A	A
Ethyl Propyl Ketone	D	D	B	D	D	D	B	D	D	A	C	A
Ethyl Silicate	C	C	A	A	A	A	A	A	A	A	A	A
Ethyl Sulfate	D	D	B	D	D	D	B	D	D	A		A
EX. TRI (Trichloroethylene)	D	D	D	C	D	D	D	C	A	B	C	B
Fatty Acids	D	D	D	B	B	B	C	A	A	A		A
Ferric Bromide	A	A	A	A	A	A	A	A	A	A	A	A
Ferric Chloride	A	A	A	A	A	A	A	A	A	A	A	A
Ferric Nitrate	A	A	A	A	A	A	A	A	A	A	A	A
Ferric Sulfate	A	A	A	A	A	A	A	A	A	A	A	A
Ferrous Acetate	D	D	A	D	D	D	B	D	D	A		A
Ferrous Ammonium Sulfate	A	A	A	A	A	A	A	A	A	A	A	A
Ferrous Chloride	A	A	A	A	A	A	A	A	A	A	A	A
Ferrous Hydroxide	B	C	A	B	A	B	A	B	A	C	A	A
Ferrous Sulfate	A	A	A	A	A	A	A	A	A	A	A	A
Fish Oil	D	D	A	A	A	A	A	A	A	A	A	A
Fluoroboric Acid	A	C	A	A	B	A	A	A	C	A	A	A
Fluorine	D	D	D	D	D	D	D	D	D	D		D
Fluosilicic Acid	B	B	A	B	B	A	B	C	A	A	A	A
Formaldehyde (Formalin)	C	C	A	B	B	B	B	B	A	A	A	A
Formamide	A	A	A	A	A	A	A	A	D	A		A
Formic Acid	B	B	A	C	C	C	C	C	D	B		B
Freon 11	D	D	D	A	A	C	D	C	A	A		A
Freon 12	D	D	D	B	C	D	C	A	B	B		B
Freon 13	A	A	A	A	A	A	A	A	A	A	A	A
Freon 21	D	D	D	D	B	D	D	B	D	A		A
Freon 22	D	D	A	D	A	D	A	A	D	A		A
Freon 31	B	B	A	D	A	B	A	D	D	A		A
Freon 32	A	A	A	A	A	A	A	A	C	A		A
Freon 112	D	D	D	B	B	B	D	B	A	A		A
Freon 113	C	B	D	A	A	A	D	A	B	A		A
Freon 114	A	A	A	A	A	A	A	A	B	A		A
Freon 115	A	A	A	A	A	A	A	A	B	A		A
Freon 142b	A	A	A	A	A	A	A	A	D	A		A
Freon 152a	A	A	A	A	A	C	A	A	D	A		A
Freon 218	A	A	A	A	A	A	A	A	A	A	A	A
Freon C316	A	A	A	A	A	A	A	A	A	A		A
Freon C318	A	A	A	A	A	A	A	A	A	A		A
Freon 13B1	A	A	A	A	A	A	A	A	A	A	A	A
Freon 114B2	D	C	D	B	A	A	D	B	B	A		A
Freon 502	A	A	A	B	A	A	A	B	B	A		A
Freon TF	C	B	A	A	A	A	A	A	A	A		A
Freon T-WD602	C	B	A	A	B	B	B	A	A	A		A
Freon TMC	B	C	B	B	B	B	B	B	A	A		A
Freon T-P35	A	A	A	A	A	A	A	A	A	A	A	A
Freon TA	A	A	A	A	A	A	A	A	C	A		A
Freon TC	D	B	A	A	A	A	B	A	A	A		A
Freon MF	D	B	D	A	C	B	D	A	A	A		A
Freon BF	D	D	D	B	B	B	D	B	A	A		A
Fuel Oil	D	D	D	A	B	C	D	A	A	A	A	A

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Fuel, ASTM A	D	D	D	A	A	C	D	A	A	A	A	A	A
Fuel, ASTM B	D	D	D	A	B	C	D	A	A	A	B	A	A
Fuel, ASTM C	D	D	D	B	C	D	D	B	A	B	C	B	A
Fumaric Acid	A	A	D	A	B	B	D	A	A	A	A	A	A
Furan	D	D	C	D	D	D	C	D	D	A	A	A	A
Furfural	D	D	B	D	C	B	B	D	D	A	A	A	A
Furfuryl Alcohol	D	D	C	D	C	C	C	D	D	A	A	A	A
Gallic Acid	A	A	B	B	B	B	B	B	B	A	A	A	A
Gasoline, Reg	D	D	D	A	A	C	D	A	A	A	B	A	A
Gasoline, Hi-Test	D	D	D	A	B	D	D	A	A	A	A	A	A
Gasoline, Lead Free	D	D	D	B	B	D	D	A	A	A	A	A	A
Gelatin	A	A	A	A	A	A	A	A	A	A	A	A	A
Gluconic Acid	D	D	C	C	C	B	C	C	A	A	A	A	A
Glucose	A	A	A	A	A	A	A	A	A	A	A	A	A
Glue	A	A	A	A	A	A	A	A	A	A	A	A	A
Glycerine (Glycerol)	A	A	A	A	A	A	A	A	A	A	A	A	A
Glycols	A	A	A	A	A	A	A	A	A	A	A	A	A
Grease	D	D	D	A	B	C	D	A	A	A	A	A	A
Green Sulfate Liquor	A	A	A	A	B	A	A	A	B	A	A	A	A
Halowax Oil	D	D	D	D	D	D	D	D	A	A	A	A	A
Heptachlor in Petroleum Solvents	D	D	D	B	B	D	D	B	A	A	A	A	A
Heptachlor in Petroleum Solvents, Water Spray	D	D	D	B	B	D	D	B	A	A	A	A	A
Heptanal (Heptaldehyde)	D	D	D	D	D	D	B	D	D	A	C	A	A
Heptane	D	D	D	A	A	B	D	A	A	A	A	A	A
Heptane Carboxylic Acid	D	D	C	C	B	B	C	A	A	A	A	A	A
Hexaldehyde	D	D	B	D	B	C	B	D	D	A	A	A	A
Hexane	D	D	D	A	A	C	D	A	A	A	A	A	A
Hexene	D	D	D	B	B	C	D	B	A	A	A	A	A
Hexanol (Hexyl Alcohol)	A	A	A	A	A	A	A	A	A	A	A	A	A
Hexylamine	B	C	B	B	B	C	B	B	D	A	B	A	A
Hexylene	D	D	D	A	B	D	C	A	A	B	B	A	A
Hexylene Glycol	A	A	A	A	A	A	A	A	A	A	A	A	A
Hexyl Methyl Ketone	D	D	B	D	D	D	B	D	D	A	C	A	A
Hi-Tri (Trichloroethylene)	D	D	D	C	D	D	D	C	A	B	C	B	A
Hydraulic Fluid (Petroleum)	D	D	D	A	B	B	D	A	A	A	A	A	A
Hydraulic Fluid (Phosphate Ester Base)	D	D	A	D	D	D	A	D	D	A	A	A	A
Hydraulic Fluid (Poly Alkylene Glycol Base)	B	B	A	A	A	A	A	A	A	A	A	A	A
Hydrobromic Acid	A	D	A	D	C	A	B	C	A	A	A	A	A
Hydrochloric Acid, 37%	A	B	A	C	C	A	B	D	A	A	A	A	A
Hydrochloric Acid, 50%	A	C	B	D	D	A	C	D	A	A	A	A	A
Hydrochloric Acid, 100%	B	C	C	D	D	B	C	D	C	A	A	A	A
Hydrocyanic Acid	B	C	A	B	C	A	B	C	B	A	A	A	A
Hydrofluoric Acid	B	D	B	D	C	A	B	D	B	A	A	A	A
Hydrofluosilic Acid	A	D	A	D	C	A	B	C	B	A	A	A	A
Hydrogen Gas	B	B	A	A	A	A	B	A	A	A	A	A	A
Hydrogen Peroxide, 3%	A	B	A	B	C	A	B	B	A	A	A	A	A
Hydrogen Peroxide, 10%	D	D	C	D	C	C	C	C	A	A	A	A	A

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	NATURAL RUBBER		SBR	BUTYL	NITRILE	NEOPRENE	HYPALON	EPDM	EPICHLOROHYDRIN	VITON	CROSSLINKED POLYETHYLENE	CPE	UHMW
Hydrogen Peroxide, 30%	D	D	D	D	D	D	C	D	A	A	A	A	A
Hydrogen Peroxide, 90%	D	D	D	D	D	D	C	D	B	B	B	B	B
Hydrogen Sulfide	D	D	A	D	A	B	C	A	C	A	A	A	A
Hydroquinone	B	B	B	D	D	C	B	C	D	D	A	A	A
Hypochlorous Acid	B	B	B	D	B	A	B	B	A	A	A	A	A
Ink Oil (Linseed Oil Base)	D	D	B	B	B	B	B	A	A	A	A	A	A
Insulating Oil	D	D	D	A	B	D	D	A	A	A	A	A	A
Iodine	D	D	D	D	D	C	D	D	C	A	A	A	A
Iron Acetate	D	D	A	D	D	D	B	D	D	A	A	A	A
Iron Hydroxide	C	C	A	B	A	B	B	B	C	A	A	A	A
Iron Salts	A	A	A	A	A	A	A	A	A	A	A	A	A
Iron Sulfate	A	A	A	A	A	A	A	A	A	A	A	A	A
Iron Sulfide	A	A	A	A	A	A	A	A	A	A	A	A	A
Isoamyl Acetate	D	D	A	D	D	D	B	D	D	A	C	A	A
Isoamyl Alcohol	A	A	A	A	A	A	A	A	A	A	A	A	B
Isoamyl Bromide	D	D	D	D	D	D	D	B	B	C	B	B	B
Isoamyl Butyrate	D	D	C	D	D	D	C	D	D	B	B	C	B
Isoamyl Chloride	D	D	C	D	D	D	D	D	B	B	C	B	B
Isoamyl Ether	D	D	D	D	D	D	D	D	D	A	A	A	A
Isoamyl Phthalate	D	D	A	D	D	D	B	D	C	A	C	A	A
Isobutane	D	D	D	A	A	D	D	A	A	A	A	A	A
Isobutanol (Isobutyl Alcohol)	A	A	A	A	A	A	A	A	A	A	A	A	A
Isobutyl Acetate	D	D	A	D	D	D	B	D	D	A	B	A	A
Isobutyl Aldehyde	C	D	B	D	D	D	B	D	D	A	B	A	A
Isobutyl Amine	B	C	B	D	D	C	B	D	D	A	B	A	A
Isobutyl Bromide	D	D	D	D	D	D	D	B	B	C	B	B	B
Isobutyl Carbinol	A	A	A	A	B	A	A	A	B	A	A	A	A
Isobutyl Chloride	D	D	D	D	D	D	D	D	B	B	C	B	B
Isobutylene	D	D	D	A	D	D	D	B	A	A	A	A	A
Isobutyl Ether	D	D	D	D	D	D	D	D	D	A	A	A	A
Isocyanates	C	D	B	D	D	C	B	C	C	B	B	A	A
Isooctane	D	D	D	A	A	B	D	A	A	A	A	A	A
Isopentane	D	D	D	A	A	D	D	A	A	A	B	A	B
Isopropyl Amine	B	C	A	B	A	C	B	B	D	A	A	A	A
Isopropyl Acetate	D	D	A	D	D	C	B	D	D	A	B	A	A
Isopropyl Alcohol (Iso-propanol)	A	A	A	A	A	A	B	A	B	B	A	B	B
Isopropyl Amine	B	D	B	C	A	C	B	C	D	A	A	A	A
Isopropyl Benzene	D	D	D	D	D	D	D	D	A	A	C	A	A
Isopropyl Chloride	D	D	D	D	D	D	D	B	B	C	B	B	B
Isopropyl Ether	D	D	D	C	D	C	D	C	D	A	A	A	A
Isopropyl Toluene	D	D	D	D	D	D	D	D	A	A	C	A	A
Jet Fuels (JP 1-JP 6)	D	D	D	A	B	C	D	A	A	A	A	A	A
Kerosene	D	D	D	A	B	C	D	A	A	A	A	A	A
Ketones	B	B	B	D	D	D	B	D	D	A	C	A	A
Lactic Acid	B	B	B	A	A	A	B	A	A	A	A	A	A
Lacquers	D	D	D	D	D	D	D	D	D	A	A	A	A
Lacquer Solvents	D	D	D	D	D	D	D	D	D	A	A	A	A
Lard	D	D	D	A	B	D	C	A	A	A	A	A	A
Lauryl Alcohol	A	A	A	A	A	A	A	A	B	A	A	A	A

Hose information is subject to change. For full details, visit our website or contact Customer Service.

	NATURAL RUBBER	SBR	BUTYL	NITRILE	NEOPRENE	HYPALON	EPDM	EPICHLOROHYDRIN	VITON	CROSSLINKED POLYETHYLENE	CPE	UHMW
Lead Acetate	D	D	A	C	C	D	B	B	C	A	A	A
Lead Nitrate	A	A	A	A	A	A	A	A	A	A	A	A
Lead Sulfamate	B	B	A	B	A	B	A	B	A	A	A	A
Lead Sulfate	A	A	A	A	A	A	A	A	A	A	A	A
Ligroin	D	D	D	A	A	D	D	A	A	A	A	A
Lime Water	D	D	A	C	A	A	A	C	A	A	A	A
Linseed Oil	D	D	A	A	B	B	B	A	A	A	A	A
Lindol (Tricresyl Phosphate)	D	D	A	D	D	B	A	D	A	A	A	A
Liquid Soap	A	A	A	A	A	A	A	A	A	A	A	A
Liquified Petroleum Gas	D	D	D	A	B	B	D	A	A	A	A	A
Lubricating Oils	D	D	D	A	B	C	D	A	A	A	A	A
Lye (Sodium Hydroxide)	A	B	A	B	A	A	A	B	D	A	A	A
Magnesium Acetate	D	D	A	D	D	D	B	D	D	A	A	A
Magnesium Carbonate	A	A	A	A	A	A	A	A	A	A	A	A
Magnesium Chloride	A	A	A	A	A	A	B	A	A	A	A	A
Magnesium Hydrate	A	B	A	B	A	B	A	C	B	A	A	A
Magnesium Hydroxide	A	A	A	A	A	A	B	A	A	A	A	A
Magnesium Nitrate	A	A	A	A	A	A	A	A	A	A	A	A
Magnesium Sulfate	A	A	A	A	A	A	A	A	A	A	A	A
Malathion 50 in Aromatic Solvents	D	D	D	C	C	D	D	D	A	A	A	A
Malathion 50 in Aromatic Solvents, Water Spray	D	D	D	A	A	D	D	A	A	A	A	A
Maleic Acid	D	D	C	D	C	D	C	C	A	B	A	B
Maleic Anhydride	D	D	C	D	C	D	C	C	A	A	A	A
Malic Acid	A	B	D	B	C	B	D	C	A	A	A	A
Manganese Sulfate	A	A	A	A	A	A	A	A	A	A	A	A
Manganese Sulfide	C	A	A	A	B	A	B	C	A	A	A	A
Manganese Sulfite	C	A	A	A	B	A	B	C	A	A	A	A
Mercuric Chloride	B	B	B	C	C	B	C	A	A	A	A	A
Mercury	B	B	A	A	B	A	A	A	A	A	A	A
Methane	D	D	D	A	B	B	D	A	A	A	A	A
Methyl Acetate	C	D	B	D	D	D	B	D	D	A	A	A
Methyl Acrylate	C	D	B	D	C	D	B	D	D	A	A	A
Methacrylic Acid	D	D	B	D	B	C	B	D	B	A	A	A
Methyl Alcohol (Methanol)	A	A	A	A	A	A	A	B	C	A	A	A
Methyl Benzene (Toluene)	D	D	D	D	D	D	D	D	A	A	C	A
Methyl Bromide	D	D	B	B	D	D	B	C	A	A	A	A
Methyl Butyl Ketone	D	D	B	D	D	D	B	D	D	A	C	A
Methyl Cellosolve	D	D	B	C	B	C	B	C	D	A	A	A
Methyl Chloride	D	D	D	C	D	D	D	C	B	B	C	A
Methyl Cyclohexane	D	D	D	D	D	D	D	D	C	B	B	B
Methylene Bromide	D	D	D	D	D	D	D	D	B	B	C	C
Methylene Chloride	D	D	D	D	D	D	D	D	B	A	C	B
Methyl Ethyl Ketone (MEK)	B	D	B	D	D	D	B	D	D	A	C	A
Methyl Formate	C	C	B	D	B	C	B	D	C	B	B	B
Methyl Hexanol	A	A	A	A	A	A	A	A	B	A	A	A
Methyl Hexyl Ketone	D	D	B	D	D	D	B	D	D	A	C	A
Methyl Isobutyl Carbinol	B	C	A	B	B	B	A	C	B	A	A	A
Methyl Isobutyl Ketone (MIBK)	D	D	B	D	D	D	B	D	D	A	C	A

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	NATURAL RUBBER	SBR	BUTYL	NITRILE	NEOPRENE	HYPALON	EPDM	EPICHLOROHYDRIN	VITON	CROSSLINKED POLYETHYLENE	CPE	UHMW
Methyl Isopropyl Ketone	D	D	B	D	D	D	B	D	D	A	C	A
Methyl Propyl Ether	D	D	D	D	D	D	D	D	D	A	A	A
Methyl Propyl Ketone	D	D	B	D	D	D	B	D	D	A	C	A
Methyl Methacrylate	D	D	D	D	D	D	B	D	D	B	C	B
Methyl Salicylate	D	D	B	D	D	D	B	D	C	B	B	B
Mineral Oil	D	D	D	A	B	B	D	A	A	A	A	A
Mineral Spirits	D	D	D	A	B	D	D	A	A	A	A	A
Monochlorobenzene	D	D	D	D	D	D	D	D	A	A	A	A
Monochlorodifluoromethane (Freon 22)	D	D	A	D	A	D	A	A	D	A	A	A
Monoethanolamine	B	C	B	C	B	B	B	C	D	A	A	A
Monomethylether	B	B	A	A	A	C	A	A	C	A	A	A
Monovinyl Acetate	D	D	B	D	D	C	C	C	A	A	A	A
Motor Oil	D	D	D	A	A	D	D	A	A	A	A	A
Muriatic Acid	(See HCL 37%)											4
Naphtha	D	D	D	A	B	D	D	A	A	A	A	A
Napthalene	D	D	D	D	D	D	D	D	A	A	A	A
Napthenic Acid	D	D	D	C	D	D	D	C	A	A	A	A
Natural Gas	Contact HBD Tech.											5
Neatsfoot Oil	D	D	B	A	B	B	B	A	A	A	A	A
Neu-Tri (Trichloroethylene)	D	D	D	C	D	D	D	C	A	B	C	B
Nickel Acetate	D	D	A	D	D	D	B	D	D	A	A	A
Nickel Chloride	A	A	A	A	A	A	A	A	A	A	A	A
Nickel Nitrate	A	A	A	A	A	A	A	A	A	A	A	A
Nickel Plating Solution	A	D	B	B	C	B	B	B	A	A	A	A
Nickel Sulfate	A	A	A	A	A	A	A	A	A	A	A	A
Niter Cake	A	A	A	A	A	A	A	A	A	A	A	A
Nitric Acid, 10%	D	D	B	D	C	B	B	D	A	A	A	A
Nitric Acid, 20%	D	D	B	D	D	B	C	D	A	A	A	A
Nitric Acid, 30%	D	D	B	D	D	C	C	D	A	B	C	B
Nitric Acid, 30-70%	D	D	C	D	D	D	D	D	C	C	D	C
Nitric Acid, Red Fuming	D	D	D	D	D	D	D	D	D	D	D	D
Nitrobenzene	D	D	D	D	D	D	D	D	D	B	C	A
Nitrogen Gas	A	A	A	A	A	A	A	A	A	A	A	A
Nitrogen Tetraoxide	D	D	D	D	D	D	D	D	D	D	D	D
Nitromethane	B	B	B	D	C	C	B	C	D	A	A	A
Nitropropane	C	C	A	D	C	C	B	C	D	A	A	A
Nitrous Oxide	A	A	A	A	A	A	A	A	A	A	A	A
Octadecanoic Acid	D	D	B	A	B	D	C	A	C	A	A	A
Octane	D	D	D	A	B	D	D	A	A	B	A	B
Octanol (Octyl Alcohol)	B	B	B	B	A	B	B	A	A	A	A	A
Octyl Acetate	D	D	A	D	D	D	B	D	D	A	C	A
Octyl Amine	C	C	B	C	B	C	B	C	D	A	B	A
Octyl Carbinol	A	A	A	A	A	A	A	A	B	A	A	A
Octylene Glycol	A	A	A	A	A	A	A	A	A	A	A	A
Oil, Petroleum	D	D	D	A	A	C	D	A	A	A	A	A
Oil, Astm #1	D	D	D	A	A	B	D	A	A	A	A	A
Oil, Astm #2	D	D	D	A	A	C	D	A	A	A	A	A
Oil, Astm #3	D	D	A	B	C	D	A	A	A	A	A	A
Oleic Acid	D	D	B	B	C	C	B	B	C	A	A	A

	NATURAL RUBBER	SBR	BUTYL	NITRILE	NEOPRENE	HYPALON	EPDM	EPICHLOROHYDRIN	VITON	CROSSLINKED POLYETHYLENE	CPE	UHMW
Oleum (Fuming Sulfuric Acid)	D	D	D	D	D	D	D	D	D	D	D	D
Olive Oil (Non F.D.A.)	D	D	B	A	B	B	B	B	A	A		A
Orthodichlorobenzene	D	D	D	D	D	D	D	D	A	B		B
Oxalic Acid	C	C	A	C	B	B	A	C	C	A		B
Oxygen, Cold	B	B	A	B	B	B	B	B	A	A		A
Oxygen, Hot	D	D	D	D	D	D	D	D	B	A		A
Ozone	D	C	B	D	B	A	A	A	A	A		A
Paint Thinner (Duco)	D	D	D	D	D	D	D	D	C	A		A
Palmitic Acid	D	D	B	A	B	B	B	B	A	B		A
Palm Oil	D	D	A	A	B	B	B	A	A	A		A
Papermaker's Alum	A	A	A	A	A	A	A	A	A	A		A
Paradichlorobenzene	D	D	D	D	D	D	D	D	A	B		B
Paraffin	D	D	D	A	A	D	D	A	A	D		D
Paraformaldehyde	D	D	B	B	B	B	B	B	C	A		A
Peanut Oil	D	D	C	A	B	B	D	A	A	A		A
Pentane	D	D	D	A	A	B	D	A	A	A		C
Perchloroethylene	D	D	D	D	D	D	D	C	A	B		C
Perchloric Acid	B	B	B	D	A	A	B	C	A	A		A
Petrolatum	D	D	D	A	A	C	D	A	A	A		A
Petroleum, Crude	D	D	D	A	B	D	D	A	A	A		A
Petroleum Ether (Naphtha)	D	D	D	A	A	D	D	A	A	A		A
Petroleum Oils	D	D	D	A	A	C	D	A	A	A		A
Phenol	C	C	B	D	C	C	C	C	A	A		A
Phenolsulfonic Acid	D	D	D	C	D	C	D	C	C	A		B
Phenyl Chloride	D	D	D	D	D	D	D	D	A	A		D
Phenylhydrazine	C	D	B	D	D	C	C	D	A	A		A
Phorone	D	D	A	D	D	D	B	D	C	A		A
Phosphate Esters	D	D	A	D	D	D	A	D	C	A		A
Phosphoric Acid, 10%	A	A	A	A	A	A	A	A	A	A		A
Phosphoric Acid, 10-85%	C	C	A	C	B	A	A	C	A	A		A
Phosphorous Trichloride	D	D	A	D	D	D	A	C	A	A		A
Pickling Solution	C	C	C	C	C	C	C	C	B	A		A
Picric Acid, Molten	C	C	C	C	C	B	C	C	C	D		D
Picric Acid, Water Soln.	A	C	A	B	B	A	B	C	A	A		A
Pinene	D	D	D	A	D	D	D	A	A	A		B
Pine Oil	D	D	D	C	C	D	D	C	B	A		B
Piperidine	D	D	D	D	D	D	D	D	D	B		B
Pitch	D	D	D	B	B	C	D	B	C	A		A
Plating Solutions, Chrome	D	D	A	B	B	C	A	B	A	A		A
Plating Solutions, Others	A	A	A	B	B	C	A	B	B	A		A
Polyvinyl Acetate Emulsion (PVA)	C	C	A	C	B	B	A	C	C	A		A
Polyethylene Glycol	A	A	A	A	A	A	A	A	A	A		A
Polypropylene Glycol	A	A	A	A	A	A	A	A	A	A		A
Potassium Acetate	D	D	A	D	D	D	B	D	D	A		A
Potassium Bicarbonate	A	A	A	A	A	A	A	A	A	A		A
Potassium Bisulfate	A	A	A	A	A	A	A	A	A	A		A
Potassium Bisulfite	A	A	A	A	A	A	A	A	A	A		A
Potassium Carbonate	A	A	A	A	A	A	A	A	A	A		A
Potassium Chloride	A	A	A	A	A	A	A	A	A	A		A
Potassium Chromate	D	D	A	D	C	C	B	C	A	B		B

	NATURAL RUBBER	SBR	BUTYL	NITRILE	NEOPRENE	HYPALON	EPDM	EPICHLOROHYDRIN	VITON	CROSSLINKED POLYETHYLENE	CPE	UHMW
Potassium Cyanide	A	A	A	A	A	A	A	A	A	A		A
Potassium Dichromate	D	D	A	D	B	C	B	C	A	A		A
Potassium Hydrate	A	B	A	B	B	B	A	B	C	A		A
Potassium Hydroxide	A	A	A	B	A	A	A	A	D	A		A
Potassium Nitrate	A	A	A	A	A	A	A	A	A	A		A
Potassium Permanganate	D	D	A	D	D	D	A	D	A	A		A
Potassium Silicate	A	A	A	A	A	A	A	A	A	A		A
Potassium Sulfate	A	A	A	A	A	A	A	A	A	A		A
Potassium Sulfide	A	A	A	A	A	A	A	A	A	A		A
Potassium Sulfite	A	A	A	A	A	A	A	A	A	A		A
Producer Gas	D	D	D	A	B	B	D	A	A	A		A
Propane Gas	Use Butane-Propane Hose Only											
Propanediol	A	A	A	A	B	A	A	A	A	A		A
Propyl Acetate	D	D	B	D	D	D	B	D	D	A		B
Propyl Alcohol (Propanol)	A	A	A	A	A	A	A	A	A	A		A
Propyl Aldehyde	C	D	B	D	D	D	B	D	D	A		A
Propyl Chloride	D	D	C	D	C	D	C	C	B	B		C
Propylene Diamine	B	B	A	B	B	C	B	B	C	A		A
Propylene Dichloride	D	D	D	D	D	D	D	D	B	B		B
Propylene Glycol	A	A	A	A	A	A	A	A	A	A		A
Pydraul Hydraulic Fluids	D	D	B	D	D	D	B	D	C	B		B
Pyranol	D	D	D	C	D	D	D	C	A	A		A
Pyridine	D	D	B	D	D	D	B	D	D	A		A
Pyroligneous Acid	C	C	B	C	B	B	B	C	A	A		A
Pyrrrole	C	B	B	D	D	D	C	D	C	A		A
Rape Seed Oil	D	D	A	B	B	B	B	A	A	B		A
Red Oil (Crude Oleic Acid)	D	D	B	B	B	B	B	B	A	A		A
Richfield A Weed Killer, 100%	D	D	D	D	D	D	D	D	C	B		B
Richfield B Weed Killer, 33%	D	D	B	B	B	C	D	C	C	B		B
Rosin Oil	D	D	D	A	A	B	D	A	A	A		A
Rotenone And Water	A	A	A	A	A	A	A	A	A	A		A
Rum	(F.D.A. Tube Required)											
Sal Ammoniac (Ammonium Chloride)	A	A	A	A	A	A	A	A	A	A		A
Salicylic Acid	A	B	A	D	D	A	A	C	A	A		A
Salt Water (Sea Water)	A	A	A	A	A	A	A	A	A	A		A
Sewage	C	C	C	A	B	A	B	A	A	A		A
Silicate of Soda (Sodium Silicate)	A	A	A	A	A	A	A	A	A	A		A
Silicate Esters	D	D	D	B	A	A	D	C	A	A		A
Silicone Greases	A	A	A	A	A	A	A	A	A	A		A
Silicone Oils	A	A	A	A	A	A	A	A	A	A		A
Silver Nitrate	A	A	A	A	A	A	A	A	A	A		A
Skelly Solvent	D	D	D	A	B	C	D	A	A	A		A
Skydrol Hydraulic Fluids	D	D	A	D	D	D	A	D	D	A		B
Soap Solutions	A	A	A	A	A	A	A	A	A	A		A
Soda Ash (Sodium Carbonate)	A	A	A	A	A	A	A	A	A	A		A
Soda, Caustic (Sodium Hydroxide)	A	B	A	B	A	A	A	B	D	A		B
Soda, Lime	A	B	A	B	B	B	A	B	C	A		A
Soda Niter (Sodium Nitrate)	A	A	A	A	A	A	A	A	A	A		A

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	NATURAL RUBBER	SBR	BUTYL	NITRILE	NEOPRENE	HYPALON	EPDM	EPICHLOROHYDRIN	VITON	CROSSLINKED POLYETHYLENE	CPE	UHMW
Sodium Acetate	D	D	A	D	D	D	B	D	D	A	A	A
Sodium Aluminate	A	A	A	A	A	A	A	A	A	A	A	A
Sodium Bicarbonate	A	A	A	A	A	A	A	A	A	A	A	A
Sodium Bisulfate	A	A	A	A	A	A	A	A	A	A	A	A
Sodium Bisulfite	A	A	A	A	A	A	A	A	A	A	A	A
Sodium Borate	A	A	A	A	A	A	A	A	A	A	A	A
Sodium Carbonate	A	A	A	A	A	A	A	A	A	A	A	A
Sodium Chloride	A	A	A	A	A	A	A	A	A	A	A	A
Sodium Chromate	D	D	A	D	C	C	B	C	C	B	A	B
Sodium Cyanide	A	A	A	A	A	A	A	A	A	A	A	A
Sodium Dichromate	D	D	A	D	C	C	B	C	C	A	A	A
Sodium Fluoride	A	A	A	A	A	A	A	A	A	A	A	A
Sodium Hydroxide	A	B	A	B	A	A	A	B	D	A	A	A
Sodium Hypochlorite	C	D	B	D	D	C	B	C	A	B	A	B
Sodium Metaphosphate	A	A	A	A	B	B	A	A	A	A	A	A
Sodium Nitrate	A	A	A	A	A	A	A	A	A	A	A	A
Sodium Nitrite	A	A	A	A	A	A	A	A	A	A	A	A
Sodium Perborate	C	D	A	D	B	D	B	C	A	A		A
Sodium Peroxide	B	B	A	B	B	B	A	B	A	B		B
Sodium Phosphate	A	A	A	A	A	A	A	A	A	A	A	A
Sodium Silicate	A	A	A	A	A	A	A	A	A	A	A	A
Sodium Sulfate	A	A	A	A	A	A	A	A	A	A	A	A
Sodium Sulfide	A	A	A	A	A	A	A	A	A	A	A	A
Sodium Sulfite	A	A	A	A	A	A	A	A	A	A	A	A
Sodium Thiosulfate	A	A	A	A	A	A	A	A	A	A	A	A
Soybean Oil	D	D	B	B	B	B	B	B	A	A	A	A
Stannic Chloride	A	A	B	A	A	A	A	A	A	A	A	A
Stannic Sulfide	A	A	A	A	A	A	A	A	A	A	A	A
Stannous Chloride	A	A	A	A	A	A	A	A	A	A	A	A
Stannous Sulfide	A	A	A	A	A	A	A	A	A	A	A	A
Steam, under 300°F	Steam Hose Only											
Steam, over 300°F	Steam Hose Only											
Stearic Acid	D	D	B	A	B	B	C	B	A	A		A
Stoddards Solvent	D	D	D	A	C	D	D	A	A	A	A	A
Styrene	D	D	D	D	D	D	D	D	B	D	C	D
Sugar Solutions (Sucrose) (Non F.D.A.)	A	A	A	A	A	A	A	A	A	A	A	A
Sulfamic Acid	C	C	A	B	B	B	A	C	A	A	A	A
Sulfite Liquors	B	B	A	B	B	A	B	B	A	A		A
Sulfonic Acid	D	D	D	D	C	C	D	C	D	B		B
Sulfur (Molten)	D	D	B	C	C	C	C	B	A	D		D
Sulfur Chloride	D	D	D	D	B	D	C	A	B			B
Sulfur Dioxide	C	C	B	D	B	B	C	C	A	A		A
Sulfur Hexafluoride	A	A	A	A	A	A	A	A	A	A		A
Sulfur Trioxide	D	D	B	D	D	D	C	D	A	B		B
Sulfuric Acid, 25%	B	B	B	B	A	A	B	C	A	A	A	A
Sulfuric Acid, 25-50%	B	D	A	D	C	A	B	D	A	A	A	A
Sulfuric Acid, 50-93%	D	D	C	D	C	B	B	D	A	A	C	A
Sulfuric Acid, Fuming	D	D	D	D	D	D	D	D	D	D	D	D
Sulfurous Acid	B	C	B	C	B	A	B	C	A	A	A	A

These ratings are to be used only as a guide.

	NATURAL RUBBER	SBR	BUTYL	NITRILE	NEOPRENE	HYPALON	EPDM	EPICHLOROHYDRIN	VITON	CROSSLINKED POLYETHYLENE	CPE	UHMW
Tall Oil	D	D	D	A	B	B	D	B	A	A		A
Tallow	D	D	D	A	A	D	D	A	A	A		A
Tannic Acid	A	B	A	C	B	B	A	C	A	A	A	A
Tar	D	D	D	B	B	D	D	B	A	D		D
Tartaric Acid	A	A	B	B	B	A	A	A	B	A	A	A
Terpineol	D	D	C	D	D	D	C	D	A	B	A	B
Tertiary Butyl Alcohol	A	A	A	A	A	A	A	A	A	A	A	A
Tetrachlorobenzene	D	D	D	D	D	D	D	D	B	B	D	B
Tetrachloroethane	D	D	D	D	D	D	D	D	A	B		B
Tetrachloroethylene	D	D	D	D	D	D	D	D	A	B	C	B
Tetraethylene Glycol	A	A	A	A	A	A	A	A	A	A		A
Tetrachloromethane	D	D	D	C	D	D	D	D	A	B		B
Tetrachloronaphthalene	D	D	D	D	D	D	D	D	B	B		B
Tetraethyl Lead	D	D	D	B	C	D	D	C	A	A		A
Tetrahydrofuran (THF)	D	D	D	D	D	D	D	D	D	A	C	A
Thionyl Chloride	D	D	D	D	D	D	D	D	B	A		A
Tin Chloride	A	A	A	A	A	A	A	A	A	A	A	A
Tin Tetrachloride	A	A	A	A	A	A	A	A	A	A	A	A
Titanium Tetrachloride	D	D	D	B	C	C	C	C	A	A	C	A
Toluene (Toluol)	D	D	D	D	D	D	D	D	A	A	C	A
Toluene Diisocyanate (TDI)	C	C	A	C	D	D	A	C	B	A		A
Toxaphene	D	D	D	B	B	D	D	B	A	A		A
Transformer Oils (Petroleum Base)	D	D	D	A	B	B	D	A	A	A	A	A
Transformer Oils (Chlorinated Phenyl Base Askerels)	D	D	D	D	D	D	D	D	A	B	A	B
Transmission Fluids, A	D	D	D	B	C	D	D	A	A	A		A
Transmission Fluids, B	D	D	D	C	D	D	D	C	A	A		A
Tricetin	A	B	A	B	B	B	A	B	D	A		A
Tributyl Amine	B	B	A	B	B	C	A	B	D	A	A	A
Tributyl Phosphate	D	D	B	D	D	D	B	D	D	A	C	A
Trichlorobenzene	D	D	D	D	D	D	D	D	B	B	D	B
Trichloroethane	D	D	D	D	D	D	D	D	A	A	C	A
Trichloroethylene	D	D	D	C	D	D	D	C	A	B	C	D
Trichloropropane	D	D	D	D	D	D	D	D	A	A	C	A
Tricresyl Phosphate (TCP)	D	D	A	D	D	D	B	D	B	A	A	A
Triethanolamine (TEA)	B	B	A	B	A	A	B	B	D	A	A	A
Triethylamine	B	B	B	B	A	A	B	B	B	A	A	A
Triethylene Glycol	A	A	A	A	A	A	A	A	A	A	A	A
Trinitrotoluene (TNT)	D	D	D	D	B	B	D	D	B	D		D
Triphenyl Phosphate	D	D	A	D	C	C	B	D	C	A		A
Trisodium Phosphate	A	A	A	A	A	A	A	A	A	A	A	A
Tung Oil	D	D	C	A	B	B	D	A	A	A	A	A
Turbine Oil	D	D	D	B	B	B	D	A	A	A		A
Turpentine	D	D	D	B	B	D	D	A	A	A	B	A
2, 4D With 10% Fuel Oil	D	D	D	A	A	D	D	A	A	A		A
Ucon Hydrolube Oils	D	D	A	A	B	D	A	A	A	A		A
Undecanol	A	A	A	A	A	A	A	A	B	A	A	A
Unsymmetrical Dimethyl-Hydrazine (UDMH)	D	D	A	D	D	A	A	D	D	C		C

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	NATURAL RUBBER		SBR	BUTYL	NITRILE	NEOPRENE	HYPALON	EPDM	EPICHLOROHYDRIN	VITON	CROSSLINKED POLYETHYLENE	CPE	UHMW
Uran	B	C	B	B	B	A	B	B	C	A		A	
Urea	A	C	A	C	A	C	A	C	C	A	A	A	
Varnish	D	D	D	B	B	C	D	B	A	A		A	
Vegetable Oils	D	D	A	A	B	B	A	A	A	A	A	A	
Versilube	C	C	A	A	C	A	A	A	A	A	A	A	
Vinegar	A	C	A	C	A	A	B	C	B	A	A	A	
Vinyl Acetate	D	D	A	D	D	C	C	D	D	B	A	D	
Vinyl Benzene	D	D	D	D	D	D	D	D	A	B	C	B	
Vinyl Chloride (Monomer)	C	D	D	D	D	D	D	D	A	A		A	
Vinyl Ether	D	D	D	D	D	C	C	D	D	A		A	
Vinyl Toluene	D	D	D	D	D	D	D	D	A	B	C	B	
Vinyl Trichloride	D	D	D	D	D	D	D	D	A	A	C	A	
V.M.&P. Naptha	D	D	D	A	A	D	D	A	A	A	A	A	
Water, Fresh (Non F.D.A.)	A	A	A	A	A	A	A	A	A	A	A	A	
Water, Salt	A	A	A	B	A	A	A	C	A	A	A	A	
Whiskey, Wines	(F.D.A Tube Required)											2	
White Liquor	A	A	B	A	A	A	C	A	A	A		A	
White Oil	D	D	D	A	B	D	D	A	A	A	A	A	
Wood Alcohol (Methanol)	A	A	A	A	A	A	A	A	D	A	A	A	
Xylene (Xylol)	D	D	D	D	D	D	D	D	A	C	D	C	
Xylidine	D	D	D	D	D	D	D	D	C	B	C	B	
Zeolites	B	A	C	C	A	A	A	A	A	A	A	A	
Zinc Acetate	C	D	A	C	C	C	B	C	D	A		A	
Zinc Carbonate	A	A	A	A	A	A	A	A	A	A	A	A	
Zinc Chloride	A	A	A	A	A	A	B	B	A	A	D	A	
Zinc Chromate	A	C	A	A	A	C	A	A	A	B		B	
Zinc Sulfate	A	A	A	A	A	A	A	A	A	A	D	A	

These ratings are to be used only as a guide.

WARNING

HBD/Thermoid® Inc. recommends a hose product for its normal service as outlined in the price pages and our catalogs. Other applications should be referred to your respective marketing representative.

In any application there may be an inherent risk of bodily injury or property damage and user is responsible for proper use and implementation of adequate safety precautions. It is the responsibility of the buyer to advise user of proper instructions for safe use and/or precautions, proper coupling procedure and to warn user of consequences of failure to heed such instruction. Should a hose assembly fail during use with pressure, injurious and/or damaging chemicals, elevated temperature materials, explosives, or flammable materials, then serious bodily injury or destruction of property could result from impelled couplings, whipping hose, high pressure or high velocity discharge, chemical contact, high temperature materials, explosion, or fire.

In known high risk areas, it is recommended that hose inspections be performed at frequent intervals related to risk factor. Hose with obvious damage should be scrapped or tested before placing in use. These inspections should include tube condition, cover condition, leaking or slipped couplings, and proof test.

We have attempted to list some of the standard references below. This is a limited list, for specific details see standard itself.

- Federal Coast Guard Regulation on Dock Hose—Federal Register 12-21-72, Vol. 37, No. 346, Part II, Section 154.500, 155.800, 156.170.**
- NFPA 196 Standard for Fire Hose.**
- NFPA 198 Care and Maintenance of Fire Hose.**
- NFPA 407 Care and Maintenance of Aircraft Refueling.**
- RMA—Storage, Care, Maintenance.**
 - General
 - OS&D
 - LPG
 - Aircraft Ground Refueling
 - Motor Vehicle
 - Anhydrous Ammonia
 - Welding Hose
 - Steam
- RMA—Industry Hose Specs.**
 - Hydraulic Hose
 - RMA-CGA Welding
 - RMA-ANI Anhydrous Ammonia
 - RMA-LPG
 - OS&D
 - 300, 400, 600# Fire Hose
- ASTM-296 Fire Hose Spec.**

WARNING

Listing of hose products for conveying materials as mentioned in these charts is provided as a guide only. Materials not described or those outside of described conditions should be referred to your respective marketing or technical representative.

Blank spaces indicate unsatisfactory use.

Many materials listed here should be recognized by the buyer as hazardous due to their acidic, caustic, flammable or explosive characteristics, and proper precautions must be employed to assure safe use. It is the user's exclusive responsibility to develop appropriate techniques for the safe use of the hose product. Failure to take proper precautions could lead to serious bodily injury or property damage.

CAUTION

Product descriptions and specifications for products become dated. All product literature and information is subject to change, including the specifications outlined in this publication. For questions concerning any technical and/or product application information on the hose products contained in this catalog, please contact HBD/Thermoid, Inc. Customer Service Department at 800/543-8070 or log onto www.hbdthermoid.com.

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DECIMAL & METRIC EQUIVALENTS

64ths	32nds	16ths	8ths	Decimal	MM
1/64				0.01562	0.397
	1/32			0.03125	0.794
3/64				0.04688	1.191
		1/16		0.06250	1.588
5/64				0.07812	1.864
	3/32			0.09375	2.381
7/64				0.10938	2.778
			1/8	0.12500	3.175
9/64				0.14062	3.572
	5/32			0.15625	3.968
11/64				0.17188	4.365
		3/16		0.18750	4.753
13/64				0.20312	5.159
	7/32			0.21875	5.556
15/64				0.23438	5.953
			1/4	0.25000	6.350
17/64				0.26562	6.747
	9/32			0.28125	7.144
19/64				0.29688	7.541
		5/16		0.31250	7.938
21/64				0.32812	8.334
	11/32			0.34375	8.731
23/64				0.35938	9.128
			3/8	0.37500	9.525
25/64				0.39062	9.922
	13/32			0.40625	10.309
27/64				0.42188	10.716
		7/16		0.43750	11.113
29/64				0.45312	11.509
	15/32			0.46875	11.908
31/64				0.48438	12.303
			1/2	0.50000	12.700

64ths	32nds	16ths	8ths	Decimal	MM
33/64				0.51582	13.097
	17/32			0.53125	13.494
35/64				0.54688	13.891
		9/16		0.56250	14.288
37/64				0.57812	14.684
	19/32			0.59375	15.081
39/64				0.60938	15.478
			5/8	0.62500	15.875
41/64				0.64062	16.272
	21/32			0.65625	16.669
43/64				0.67188	17.066
		11/16		0.68750	17.463
45/64				0.70312	17.859
	23/32			0.71875	18.256
47/64				0.73438	18.653
			3/4	0.75000	19.050
49/64				0.76562	19.447
	25/32			0.78125	19.844
51/64				0.79688	20.241
		13/16		0.81250	20.638
53/64				0.82812	21.034
	27/32			0.84375	21.431
55/64				0.85938	21.823
			7/8	0.87500	22.225
57/64				0.89062	22.622
	29/32			0.90625	23.019
59/64				0.92188	23.415
		15/16		0.93750	23.813
61/64				0.95312	24.209
	31/32			0.96875	24.605
63/64				0.98438	25.003
			1	1.00000	25.400

CONVERSION FACTORS

To Convert	Into	Multiply By
Atmospheres	cms of mercury	76.0
atmospheres	ft. of water (at 4°C)	33.90
atmospheres	In of mercury (at 0°C)	29.92
atmospheres	kgs/sq cm	1.0333
atmospheres	kgs/sq meter	10.332
atmospheres	pounds/sq in	14.70
Bar	newtons/sq m	10 ⁵
bar	atmospheres	0.9869
bar	at (tech.)	1.0197
bar	psi	14.504
Barrels—Oil	gals/oil	42
BT Units	kg—calories	0.2520
BTUs	ft—lbs	777.9
BTUs	hp—hrs	3.927 x 10 ⁻⁴
BTUs	kg—meters	107.5
BTUs	kw—hrs	2.928 x 10 ⁻⁴
BTU/Min	ft—lb/sec	12.86
BTU/min	hp	0.02356
BTU/min	kw	0.01757
BTU/min	watts	17.57
Centimeters	inches	0.3937
cm	meters	0.01
cm	mm	10
Cms Mercury	atm	0.01316
cms mercury	ft water	0.4461
cms mercury	kgs/sq meter	136.0
cms mercury	lbs/sq ft	27.85
cms mercury	lbs/sq in	0.1934
Cms/Second	ft/min	1.969
cms/sec	ft/sec	0.03281
cms/sec	km/hr	0.036
cms/sec	meter/min	0.6
cms/sec	miles/hr	0.02237
cms/sec	miles/min	3.728 x 10 ⁻⁴
Cms/Sec/Sec	ft/sec/sec	0.03281
Cubic Cms	cu ft	3.531 x 10 ⁻⁵
cu cms	cu in	3.102 x 10 ⁻²
cu cms	cu meters	10 ⁶
cu cms	cu yards	1.308 x 10 ⁻⁶
cu cms	gals	2.642 x 10 ⁻⁴
cu cms	liters	10 ⁻³
cu cms	pints (liq)	2.113 x 10 ⁻³
cu cms	quarts (liq)	1.057 x 10 ⁻³

To Convert	Into	Multiply By
Cubic Feet	cubic cms	2.832 x 10 ⁴
cu ft	cu inches	1728
cu ft	cu meters	0.02832
cu ft	cu yards	0.03704
cu ft	gals	7.48052
cu ft	liters	28.32
cu ft	pints (liq)	59.84
cu ft	quarts (liq)	29.92
Cubic Ft/min	cu cms/sec	472.0
cu ft/min	gals/sec	0.1247
cu ft/min	liters/sec	0.4720
cu ft/min	lbs water/min	62.43
cu ft/sec	gals/min	448.831
Cubic Inches	cc	16.39
cu ins	cu ft	5.787 x 10 ⁻⁴
cu ins	cu meters	1.639 x 10 ⁻⁵
cu ins	cu yards	2.143 x 10 ⁻⁵
cu ins	gals	4.329 x 10 ⁻³
cu ins	liters	1.639 x 10 ⁻²
cu ins	pints (liq)	0.03463
cu ins	quarts (liq)	0.01732
Cubic Meters	cc	10 ⁴
cu M	cu ft	35.31
cu M	cu inches	61.023
cu M	cu yards	1.308
cu M	gals	264.2
cu M	liters	10 ³
cu M	pints (liq)	2113
cu M	quarts (liq)	1057
Cubic Yards	cu cms	7.646 x 10 ⁵
cu yds	cu ft	27
cu yds	cu ins	46,656
cu yds	cu meters	0.7645
cu yds	gals	202.0
Decimeters	meters	0.1
Degrees (Angle)	minutes	60
degs (angle)	radians	0.01745
degs (angle)	secs	3600

TECHNICAL REFERENCE — Industrial Hose Conversion Factors

Hose information is subject to change. For full details, visit our website or contact Customer Service.

CONVERSION FACTORS

To Convert	Into	Multiply By
Degrees/Sec	radians/sec	0.01745
degs/sec	revs/min	0.1667
degs/sec	revs.sec	0.002778
Feet	cms	30.48
ft	ins	12
ft	meters	0.3048
ft	yds	1/3
Ft of Water	atms	0.02850
ft of w	ins mercury	0.8826
ft of w	kgs/sq cm	0.03048
ft of w	lbs/sq ft	62.32
ft of w	lbs/sq in	0.4328
Feet/Min	cm/sec	0.5080
ft/min	ft/sec	0.01667
ft/min	kms/hr	0.01829
ft/min	meters/min	0.3048
ft/min	miles/hr	0.01136
Ft/Sec/Sec	cms/sec/sec	30.48
ft/sec/sec	Meters/sec/sec	0.3048
Ft-Pounds	BTUs	1.286 x 10 ⁻³
ft lbs	hp-hrs	5.050 x 10 ⁻⁷
ft lbs	kg-calories	3.241 x 10 ⁻⁴
ft lbs	kg-meters	0.1383
ft lbs	kw-hrs	3.766 x 10 ⁻⁷
Ft-Lbs/Min	BTUs/min	7.717 x 10 ⁻²
ft-lbs/min	ft-lbs/sec	0.01667
ft-lbs/min	hp	3.030 x 10 ⁻⁵
ft-lbs/min	kg-calories/min	3.241 x 10 ⁻³
ft-lbs/min	kws	2.260 x 10 ⁻⁵
Ft-Lbs/Sec	BTUs/min	7.717 x 10 ⁻²
ft-lbs/sec	hp	1.818 x 10 ⁻³
ft-lbs/sec	kg-calories/min	1.945 x 10 ⁻²
ft-lbs/sec	kws	1.356 x 10 ⁻³
Gallons	ccs	3785
gals	cu ft	0.1337
gals	cu ins	231
gals	cu meters	3.785 x 10 ⁻³
gals	liters	3.785
gals	pints (liq)	8
gals	quarts (liq)	4
Gallons, Imp	US gals	1.20095
gallons, US	Imp gals	0.83267
Gallons/Min	cu ft/sec	2.225 x 10 ⁻³
gal/min	liters/sec	0.06308
gal/min	cu ft/hr	8.0208

To Convert	Into	Multiply By
Horse-Power	BTUs/min	42.44
hp	ft-lbs/min	33,000
hp	ft-lbs/sec	550
hp	hp (metric)	1.014
hp	kg-calories/min	10.70
hp	kws	0.7457
hp	watts	745.7
Hp-Hours	BTUs	2547
hp-hrs	ft-lbs	1.98 x 10 ⁸
hp-hrs	kg-calories	641.7
hp-hrs	kg-meters	2.737 x 10 ⁵
hp-hrs	kw-hrs	0.7457
Inches	cms	2.540
Ins Mercury	atms	0.002458
ins mercury	ft water	1.133
ins mercury	kgs/sq cm	0.03453
ins mercury	lbs/sq ft	70.73
ins mercury	lbs/sq in	0.4912
Ins of Water	atms	0.002458
ins of w	ft mercury	0.07355
ins of w	kgs/sq cm	0.002540
ins of w	lbs/sq ft	5.202
ins of w	lbs/sq in	0.03613
Kilograms	dynes	980,665
kgs	lbs	2.205
kgs	ton (short)	1.102 x 10 ⁻³
kgs	grams	1000
Kgs/Sq Cm	atms	0.9678
kgs/sq cm	ft water	32.81
kgs/sq cm	ins mercury	28.96
kgs/sq cm	lbs/sq ft	2048
kgs/sq cm	lbs/sq in	14.22
Kilometers	cms	10 ⁵
kms	ft	3281
kms	meters	10 ³
kms	miles	0.6214
Kms/Hr	cms/sec	27.78
kms/hr	ft/min	54.68
kms/hr	ft/sec	0.9113
kms/hr	meters/min	16.87
kms/hr	miles/hr	0.6214
Kms/Hr/Sec	cms/sec/sec	27.78
kms/hr/sec	ft/sec/sec	0.9113
kms/hr/sec	meters/sec/sec	0.2778

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CONVERSION FACTORS

To Convert	Into	Multiply By
Kilowatts	BTUs/min	56.92
kws	ft-lbs/min	4.425 x 10 ⁴
kws	ft-lbs/sec	737.6
kws	hp	1.341
kws	kg-calories/min	14.34
kws	watts	10 ³
Kilowatts-Hrs	BTUs	3415
kw-hrs	ft-lbs	2.655 x 10 ⁶
kw-hrs	hp-hours	1.341
kw-hrs	kg-calories	860.5
kw-hrs	kg-meters	3.671 x 10 ⁵
Liters	ccs	103
liters	cu ft	0.03531
liters	cu ins	51.02
liters	cu meters	10 ⁻²
liters	gals	0.2642
liters	quarts (liq)	1.057
Liters/Min	gals/sec	4.403 x 10 ⁻³
Meters	cms	100
meters	ft	3.281
meters	ins	39.37
meters	kms	10 ³
meters	mms	10 ³
meters/min	cms/sec	1.667
meters/min	ft/min	3.281
meters/min	ft/sec	0.05468
meters/min	kms/hr	0.06
meters/min	miles/hr	0.03728
Meters/Sec	ft/min	196.8
meters/sec	ft/sec	3281
meters/sec	kms/hr	3.6
meters/sec	kms/min	0.06
meters/sec	miles/hr	2.237
meters/sec	miles/min	0.03728
Micron	meters	10 ⁻⁸
microns	in	39 x 10 ⁻⁶
Miles/Hr	cms/sec	44.70
miles/hr	ft/min	88
miles/hr	ft/sec	1.467
miles/hr	kms/hr	1.609
miles/hr	meters/min	26.82
Millimeters	cms	0.1
mms	ins	0.0397
Minutes (Angle)	radians	2.909 x 10 ⁻⁴

To Convert	Into	Multiply By
Newton	kgs	0.1020
Ounces	lbs	1.805
ozs	gram	28.349527
Ounces (Fluid)	cu in	1.805
ozs (fluid)	liters	0.02957
Pounds	ozs	16
lbs	tons (short)	0.005
lbs	newtons (N)	4.44
lbs	gram	453.5924
Lbs of Water	cu ft	0.01605
lbs of water	cu in	27.73
lbs of water	gals	0.1204
Lbs of Water/Min	cu ft/sec	2.679 x 10 ⁻⁴
Pounds/Cu Ft	lbs/cu in	5.787 x 10 ⁻⁴
Pounds/Cu In	lbs/cu ft	1728
Pounds/Sq In	atms	0.06804
lbs/sq in	ft water	2.311
lbs/sq in	in mercury	2.036
lbs/sq in	kgs/sq cm	0.07031
Radians	degrees	57.29578
Tons (Long)	kgs	1016
tons (long)	lbs	2240
tons (long)	tons (short)	1.12000
Tons (Short)	kgs	2000
tons (short)	kps	907.18486
tons (short)	tons (long)	0.89287
tons (short)	tons (metric)	0.90718
Watts	BTUs/min	0.05682
watts	ft-lbs/min	44.26
watts	ft-lbs/sec	0.7376
watts	hp	1.341 x 10 ⁻³
watts	kg-calories/min	0.01434
watts	kws	10
Watts/Hours	BTUs	3.415
watts/hours	ft-lbs	2655
watts/hours	hp-hrs	1.341 x 10 ⁻³
watts/hours	kg-calories	0.8605
watts/hours	kg-meters	367.1
watts/hours	kw-hrs	10 ⁻³

TECHNICAL REFERENCE — Industrial Hose Conversion Factors

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TEMPERATURE CONVERSION

Look up reading in middle column (shaded). If in degrees Centigrade, read Farenheit equivalent in right-hand column; if in Farenheit degrees, read Centigrade equivalent in left-hand column. $^{\circ}\text{F} = (^{\circ}\text{C} \times 1.8) + 32$ $^{\circ}\text{C} = (^{\circ}\text{F} - 32) \times .5556$

C	F ^C	F
-51	-60	-76
-46	-50	-58
-40	-40	-40
-34	-30	-22
-29	-20	-4
-23	-10	14
-17.8	0	32
-17.2	1	33.8
-16.7	2	35.6
-16.1	3	37.4
-15.6	4	39.2
-15.0	5	41.0
-14.4	6	42.8
-13.9	7	44.6
-13.3	8	45.4
-12.8	9	48.2
-12.2	10	50.0
-11.7	11	51.8
-11.1	12	53.6
-10.6	13	55.4
-10.0	14	57.2
-9.4	15	59.0
-8.9	16	60.8
-8.3	17	62.6
-7.8	18	64.4
-7.2	19	66.2
-6.7	20	68.0
-6.1	21	69.8
-5.6	22	71.6
-5.0	23	73.4
-4.4	24	75.2
-3.9	25	77.0
-3.3	26	78.8
-2.8	27	80.6
-2.2	28	82.4
-1.7	29	84.2
-1.1	30	86.0
-6	31	87.7
0	32	89.6

C	F ^C	F
.6	33	91.4
1.1	34	93.2
1.7	35	95.0
2.2	36	96.8
2.8	37	98.6
3.3	38	100.4
3.9	39	102.2
4.4	40	104.0
5.0	41	105.6
5.6	42	107.6
6.1	43	109.4
6.7	44	111.2
7.2	45	113.0
7.8	46	114.8
8.3	47	116.6
8.9	48	118.4
9.4	49	120.2
10.0	50	122.0
10.6	51	123.8
11.1	52	125.6
11.7	53	127.4
12.2	54	129.2
12.8	55	131.0
13.3	56	132.8
13.9	57	134.8
14.4	58	136.4
15.0	59	138.2
15.6	60	140.0
16.1	61	141.8
16.7	62	143.6
17.2	63	145.4
17.8	64	147.2
18.3	65	149.0
18.9	66	150.8
19.4	67	152.6
20.0	68	154.4
20.6	69	156.2
21.1	70	158.0
21.7	71	159.8

C	F ^C	F
22.2	72	161.6
22.8	73	163.4
23.3	74	165.2
23.9	75	167.0
24.4	76	168.8
25.0	77	170.6
25.6	78	172.4
26.1	79	174.2
26.7	80	176.0
27.2	81	177.8
27.8	82	179.6
28.3	83	181.4
28.9	84	183.2
29.4	85	185.0
30.0	86	186.8
30.6	87	188.6
31.1	88	190.4
31.7	89	192.2
32.2	90	194.0
32.8	91	195.8
33.3	92	197.6
33.9	93	199.4
34.4	94	201.2
35.0	95	203.0
35.6	96	204.8
36.1	97	206.6
36.7	98	208.4
37.2	99	210.2
37.8	100	212.0
43	110	230
49	120	248
54	130	266
60	140	284
66	150	302
71	160	320
77	170	338
82	180	356

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Seller warrants that its products shall be free from defects in material and workmanship under normal use and service for a period of 12 months from date of shipment. On equipment and materials furnished by Seller but manufactured by others, Buyer shall accept in lieu of any liability or guarantees on the part of Seller, the benefits of guarantees as are obtained by Seller from such manufacturers or vendors. SELLER MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, EXCEPT AS IS EXPRESSLY SET FORTH HEREIN. Failure by Buyer to object to or reject products or materials delivered hereunder, in writing within 30 days from the date of shipment of the products or materials, shall constitute an acceptance and waiver by Buyer of all claims hereunder on account of alleged errors, shortages, defective workmanship or material, breach of warranty or otherwise, discoverable upon inspection by Buyer.

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