Safety & Technical Information

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A complete listing of industry standards is available in the Introduction section.
See the pages immediately following the Table of Contents for a complete index by series, and by product application and name.

Parker Safety Guide for Selecting and Using Hose, Tubing, Fittings, Connectors, Conductors, Valves and Related Accessories

Parker Publication No. 4400-B.1

WARNING: Failure or improper selection or improper use of hose, tubing, fittings, assemblies, valves, connectors, conductors or related accessories ("Products") can cause death, personal injury and property damage. Possible consequences of failure or improper selection or improper use of these Products include but are not limited to:

- Fittings thrown off at high speed.
- High velocity fluid discharge.
- Explosion or burning of the conveyed fluid.
- Electrocution from high voltage electric powerlines.
- Contact with suddenly moving or falling objects that are controlled by the conveyed fluid.
- Injections by high-pressure fluid discharge.
- Dangerously whipping Hose.
- Tube or pipe burst.
- Weld joint fracture.
- Contact with conveyed fluids that may be hot, cold, toxic or otherwise injurious.
- Sparking or explosion caused by static electricity buildup or other sources of electricity.
- Sparking or explosion while spraying paint or flammable liquids.
- Injuries resulting from inhalation, ingestion or exposure to fluids.

Before selecting or using any of these Products, it is important that you read and follow the instructions below. No product from any division in Parker Fluid Connectors Group is approved for in-flight aerospace applications. For hoses and fittings used in in-flight aerospace applications, please contact Parker Aerospace Group.

1.0 GENERAL INSTRUCTIONS

1.1 Scope: This safety guide provides instructions for selecting and using (including assembling, installing, and maintaining) these Products. For convenience, all rubber and/or thermoplastic products commonly called "hose" or "tubing" are called "Hose" in this safety guide. Metallic tube or pipe are called "tube". All assemblies made with Hose are called "Hose Assemblies". All assemblies made with Tube are called "Tube Assemblies". All products commonly called "fittings", "couplings" or "adapters" are called "Fittings". Valves are fluid system components that control the passage of fluid. Related accessories are ancillary devices that enhance or monitor performance including crimping, flaring, flanging, presetting, bending, cutting, deburring, swaging machines, sensors, tags, lockout handles, spring guards and associated tooling. This safety guide is a supplement to and is to be used with the specific Parker publications for the specific Hose, Fittings and Related Accessories that are being considered for use. Parker publications are available at www.parker.com. SAE J1273 (www.sae.org) and ISO 17165-2 (www.ansi.org) also provide recommended practices for hydraulic Hose Assemblies, and should be followed.

1.2 Fail-Safe: Hose, Hose Assemblies, Tube, Tube Assemblies and Fittings can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode, so that failure of the Hose, Hose Assembly, Tube, Tube Assembly or Fitting will not endanger persons or property.

1.3 Distribution: Provide a copy of this safety guide to each person responsible for selecting or using Hose, Tube and Fitting products. Do not select or use Parker Hose, Tube or Fittings without thoroughly reading and understanding this safety guide as well as the specific Parker publications for the Products.

1.4 User Responsibility: Due to the wide variety of operating conditions and applications for Hose, Tube and Fittings. Parker does not represent or warrant that any particular Hose, Tube or Fitting is suitable for any specific end use system. This safety guide does not analyze all technical parameters that must be considered in selecting a product. The user, through its own analysis and testing, is solely responsible for:

- Making the final selection of the Products.
- Assuring that the user's requirements are met and that the application presents no health or safety hazards.
- Following the safety guide for Related Accessories and being trained to operate Related Accessories.
- Providing all appropriate health and safety warnings on the equipment on which the Products are used.
- Assuring compliance with all applicable government and industry standards.

1.5 Additional Questions: Call the appropriate Parker technical service department if you have any questions or require any additional information. See the Parker publication for the Products being considered or used, or call 1-800-CPARKER, or go to www.parker.com, for telephone numbers of the appropriate technical service department.

2.0 HOSE, TUBE AND FITTINGS SELECTION INSTRUCTIONS

2.1 Electrical Conductivity: Certain applications require that the Hose be nonconductive to prevent electrical current flow. Other applications require the Hose and the Fittings and the Hose/Fitting interface to be sufficiently conductive to drain off static electricity. Extreme care must be exercised when selecting Hose, Tube and Fittings for these or any other applications in which electrical conductivity or nonconductivity is a factor.

The electrical conductivity or nonconductivity of Hose, Tube and Fittings is dependent upon many factors and may be susceptible to change. These factors include but are not limited to the various materials used to make the Hose and the Fittings, Fitting finish (some Fitting finishes are electrically conductive while others are nonconductive), manufacturing methods (including moisture control), how the Fittings contact the Hose, age and amount of deterioration or damage or other changes, moisture content of the Hose at any particular time, and other factors.

The following are considerations for electrically nonconductive and conductive Hose. For other applications consult the individual catalog pages and the appropriate industry or regulatory standards for proper selection.

2.1.1 Electrically Nonconductive Hose: Certain applications require that the Hose be nonconductive to prevent electrical current flow or to maintain electrical isolation. For applications that require Hose to be electrically nonconductive, including but not limited to applications near high voltage electric lines, only special nonconductive Hose can be used. The manufacturer of the equipment in which the nonconductive Hose is to be used must be consulted to be certain that the Hose, Tube and Fittings that are selected are proper for the application. Do not use any Parker Hose or Fittings for any such application requiring nonconductive Hose, including but not limited to applications near high voltage electric lines or dense magnetic fields, unless (i) the application is expressly approved in the Parker technical publication for the product, (ii) the Hose is marked "nonconductive", and (iii) the manufacturer of the equipment on which the Hose is to be used specifically approves the particular Parker Hose, Tube and Fittings for such use.

2.1.2 Electrically Conductive Hose: Parker manufactures special Hose for certain applications that require electrically conductive Hose. Parker manufactures special Hose for conveying paint in airless paint spraying applications. This Hose is labeled "Electrically Conductive Airless Paint Spray Hose" on its layline and packaging. This Hose must be properly connected to the appropriate Parker Fittings and properly grounded in order to dissipate dangerous static charge buildup, which occurs in all airless paint spraying applications. Do not use any other Hose for airless paint spraying, even if electrically conductive. Use of any other Hose or failure to properly connect the Hose can cause a fire or an explosion resulting in death, personal injury, and property damage. All hoses that convey fuels must be grounded.

Parker manufactures a special Hose for certain compressed natural gas ("CNG") applications where static electricity buildup may occur. Parker CNG Hose assemblies comply with the requirements of ANSI/IAS NGV 4.2; CSA 12.52, "Hoses for Natural Gas Vehicles and Dispensing Systems" (www.ansi.org). This Hose is labeled "Electrically Conductive for CNG Use" on its layline and packaging. This Hose must be properly connected to the appropriate Parker Fittings and properly grounded in order to dissipate dangerous static charge buildup, which occurs in, for example, high velocity CNG dispensing or transfer. Do not use any other Hose for CNG applications where static charge buildup may occur, even if electrically conductive. Use of other Hoses in CNG applications or failure to properly connect or ground this Hose can cause a fire or an explosion resulting in death, personal injury, and property damage. Care must also be taken to protect against CNG permeation through the Hose wall. See section 2.6, Permeation, for more information. Parker CNG Hose is intended for dispenser and vehicle use within the specified temperature range. Parker CNG Hose should not be used in confined spaces or unventilated areas or areas exceeding the specified temperature range. Final assemblies must be tested for leaks. CNG Hose Assemblies should be tested on a monthly basis for conductivity per ANSI/IAS NGV 4.2; CSA 12.52.

Parker Safety Guide, Parker Publication No. 4400-B.1 (Continued)

Parker manufactures special Hose for aerospace in-flight applications. Aerospace in-flight applications employing Hose to transmit fuel, lubricating fluids and hydraulic fluids require a special Hose with a conductive inner tube. This Hose for in-flight applications is available only from Parker's Stratoflex Products Division. Do not use any other Parker Hose for in-flight applications, even if electrically conductive. Use of other Hoses for in-flight applications or failure to properly connect or ground this Hose can cause a fire or an explosion resulting in death, personal injury and property damage. These Hose assemblies for in-flight applications must meet all applicable aerospace industry, aircraft engine and aircraft requirements.

2.2 Pressure: Hose, Tube and Fitting selection must be made so that the published maximum working pressure of the Hose, Tube and Fittings are equal to or greater than the maximum system pressure. The maximum working pressure of a Hose, or Tube Assembly is the lower of the respective published maximum working pressures of the Hose, Tube and the Fittings used. Surge pressures or peak transient pressures in the system must be below the published maximum working pressure for the Hose, Tube and Fitting. Surge pressures and peak pressures can usually only be determined by sensitive electrical instrumentation that measures and indicates pressures at millisecond intervals. Mechanical pressure gauges indicate only average pressures and cannot be used to determine surge pressures or peak transient pressures. Published burst pressure ratings for Hose is for manufacturing test purposes only and is no indication that the Product can be used in applications at the burst pressure or otherwise above the published maximum recommended working pressure.

2.3 Suction: Hoses used for suction applications must be selected to insure that the Hose will withstand the vacuum and pressure of the system. Improperly selected Hose may collapse in suction application.

2.4 Temperature: Be certain that fluid and ambient temperatures, both steady and transient, do not exceed the limitations of the Hose, Tube, Fitting and Seals. Temperatures below and above the recommended limit can degrade Hose, Tube, Fittings and Seals to a point where a failure may occur and release fluid. Tube and Fittings performances are normally degraded at elevated temperature. Material compatibility can also change at temperatures outside of the rated range. Properly insulate and protect the Hose Assembly when routing near hot objects (e.g. manifolds). Do not use any Hose in any application where failure of the Hose could result in the conveyed fluids (or vapors or mist from the conveyed fluids) contacting any open flame, molten metal, or other potential fire ignition source that could cause burning or explosion of the conveyed fluids or vapors.

2.5 Fluid Compatibility: Hose, and Tube Assembly selection must assure compatibility of the Hose tube, cover, reinforcement, Tube, Plating and Seals with the fluid media used. See the fluid compatibility chart in the Parker publication for the product being considered or used. This information is offered only as a guide. Actual service life can only be determined by the end user by testing under all extreme conditions and other analysis.

Hose, and Tube that is chemically compatible with a particular fluid must be assembled using Fittings and adapters containing likewise compatible seals. Flange or flare processes can change Tube material properties that may not be compatible with certain requirements such as NACE

2.6 Permeation: Permeation (that is, seepage through the Hose or Seal) will occur from inside the Hose or Fitting to outside when Hose or Fitting is used with gases, liquid and gas fuels, and refrigerants (including but not limited to such materials as helium, diesel fuel, gasoline, natural gas, or LPG). This permeation may result in high concentrations of vapors which are potentially flammable, explosive, or toxic, and in loss of fluid. Dangerous explosions, fires, and other hazards can result when using the wrong Hose for such applications. The system designer must take into account the fact that this permeation will take place and must not use Hose or Fitting if this permeation could be hazardous. The system designer must take into account all legal, government, insurance, or any other special regulations which govern the use of fuels and refrigerants. Never use a Hose or Fitting even though the fluid compatibility is acceptable without considering the potential hazardous effects that can result from permeation through the Hose or Tube Assembly.

Permeation of moisture from outside the Hose or Fitting to inside the Hose or Fitting will also occur in Hose or Tube assemblies, regardless of internal pressure. If this moisture permeation would have detrimental effects (particularly, but not limited to refrigeration and air conditioning systems), incorporation of sufficient drying capacity in the system or other appropriate system safeguards should be selected and used. The sudden pressure release of highly pressurized gas could also result in Explosive Decompression failure of permeated Seals and Hoses.

2.7 Size: Transmission of power by means of pressurized fluid varies with pressure and rate of flow. The size of the components must be adequate to keep pressure losses to a minimum and avoid damage due to heat generation or excessive fluid velocity.

2.8 Routing: Attention must be given to optimum routing to minimize inherent problems (kinking or flow restriction due to Hose collapse, twisting of the Hose, proximity to hot objects or heat sources). For additional routing recommendations see SAE J1273 and ISO 17165-2. Hose Assemblies have a finite life and should be installed in a manner that allows for ease of inspection and future replacement. Hose because of its relative short life, should not be used in residential and commercial buildings inside of inaccessible walls or floors, unless specifically allowed in the product literature. Always review all product literature for proper installation and routing instructions.

2.9 Environment: Care must be taken to insure that the Hose, Tube and Fittings are either compatible with or protected from the environment (that is, surrounding conditions) to which they are exposed. Environmental conditions including but not limited to ultraviolet radiation, sunlight, heat, ozone, moisture, water, salt water, chemicals and air pollutants can cause degradation and premature failure.

2.10 Mechanical Loads: External forces can significantly reduce Hose, Tube and Fitting life or cause failure. Mechanical loads which must be considered include excessive flexing, twist, kinking, tensile or side loads, bend radius, and vibration. Use of swivel type Fittings or adapters may be required to insure no twist is put into the Hose. Use of proper Hose or Tube clamps may also be required to reduce external mechanical loads. Unusual applications may require special testing prior to Hose selection.

2.11 Physical Damage: Care must be taken to protect Hose from wear, snagging, kinking, bending smaller that minimum bend radius and cutting, any of which can cause premature Hose failure. Any Hose that has been kinked or bent to a radius smaller than the minimum bend radius, and any Hose that has been cut or is cracked or is otherwise damaged should be removed and discarded. Fittings with damages such as scratches on sealing surfaces and deformation should be replaced.

2.12 Proper End Fitting: See instructions 3.2 through 3.5. These recommendations may be substantiated by testing to industry standards such as SAE J517 for hydraulic applications, or MIL-A-5070, AS1339, or AS3517 for Hoses from Parker's Stratoflex Products Division for aerospace applications.

2.13 Length: When determining the proper Hose or Tube length of an assembly, be aware of Hose length change due to pressure, Tube length change due to thermal expansion or contraction, and Hose or Tube and machine tolerances and movement must be considered. When routing short hose assemblies, it is recommended that the minimum free hose length is always used. Consult the hose manufacturer for their minimum free hose length recommendations. Hose assemblies should be installed in such a way that any motion or flexing occurs within the same plane.

2.14 Specifications and Standards: When selecting Hose, Tube and Fittings, government, industry, and Parker specifications and recommendations must be reviewed and followed as applicable.

2.15 Hose Cleanliness: Hose and Tube components may vary in cleanliness levels. Care must be taken to insure that the Hose and Tube Assembly selected has an adequate level of cleanliness for the application.

2.16 Fire Resistant Fluids: Some fire resistant fluids that are to be conveyed by Hose or Tube require use of the same type of Hose or Tube as used with petroleum base fluids. Some such fluids require a special Hose, Tube, Fitting and Seal, while a few fluids will not work with any Hose at all. See instructions 2.5 and 1.5. The wrong Hose, Tube, Fitting or Seal may fail after a very short service. In addition, all liquids but pure water may burn fiercely under certain conditions, and even pure water leakage may be hazardous.

2.17 Radiant Heat: Hose and Seals can be heated to destruction without contact by such nearby items as hot manifolds or molten metal. The same heat source may then initiate a fire. This can occur despite the presence of cool air around the Hose or Seal. Performance of Tube and Fitting subjected to the heat could be degraded.

2.18 Welding or Brazing: When using a torch or arc welder in close proximity to hydraulic lines, the hydraulic lines should be removed or shielded with appropriate fire resistant materials. Flame or weld spatter could burn through the Hose or Seal and possibly ignite escaping fluid resulting in a catastrophic failure. Heating of plated parts, including Hose Fittings and adapters, above 450°F (232°C) such as during welding, brazing or soldering may emit deadly gases. Any elastomer seal on fittings shall be removed prior to welding or brazing, any metallic surfaces shall be protected after brazing or welding when necessary. Welding and brazing filler material shall be compatible with the Tube and Fitting that are joined.

2.19 Atomic Radiation: Atomic radiation affects all materials used in Hose and Tube assemblies. Since the long-term effects may be unknown, do not expose Hose or Tube assemblies to atomic radiation. Nuclear applications may require special Tube and Fittings.

2.20 Aerospace Applications: The only Hose, Tube and Fittings that may be used for in-flight aerospace applications are those available from Parker's Stratoflex Products Division. Do not use any other Hose or Fittings for

in-flight applications. Do not use any Hose or Fittings from Parker's Stratoflex Products Division with any other Hose or Fittings, unless expressly approved in writing by the engineering manager or chief engineer of Stratoflex Products Division and verified by the user's own testing and inspection to aerospace industry standards.

2.21 **Unlocking Couplings:** Ball locking couplings or other Fittings with quick disconnect ability can unintentionally disconnect if they are dragged over obstructions, or if the sleeve or other disconnect member, is bumped or moved enough to cause disconnect. Threaded Fittings should be considered where there is a potential for accidental uncoupling.

3.0 HOSE AND FITTINGS ASSEMBLY AND INSTALLATION INSTRUCTIONS

3.1 **Component Inspection:** Prior to assembly, a careful examination of the Hose and Fittings must be performed. All components must be checked for correct style, size, catalog number, and length. The Hose must be examined for cleanliness, obstructions, blisters, cover looseness, kinks, cracks, cuts or any other visible defects. Inspect the Fitting and sealing surfaces for burrs, nicks, corrosion or other imperfections. Do NOT use any component that displays any signs of nonconformance.

3.2 **Hose and Fitting Assembly:** Do not assemble a Parker Fitting on a Parker Hose that is not specifically listed by Parker for that Fitting, unless authorized in writing by the engineering manager or chief engineer of the appropriate Parker division. Do not assemble a Parker Fitting on another manufacturer's Hose or a Parker Hose on another manufacturer's Fitting unless (i) the engineering manager or chief engineer of the appropriate Parker division approves the Assembly in writing or that combination is expressly approved in the appropriate Parker literature for the specific Parker product, and (ii) the user verifies the Assembly and the application through analysis and testing. For Parker Hose that does not specify a Parker Fitting, the user is solely responsible for the selection of the proper Fitting and Hose Assembly procedures. See instruction 1.4.

To prevent the possibility of problems such as leakage at the Fitting or system contamination, it is important to completely remove all debris from the cutting operation before installation of the Fittings. The Parker published instructions must be followed for assembling the Fittings on the Hose. These instructions are provided in the Parker Fitting catalog for the specific Parker Fitting being used, or by calling 1-800-CPARKER, or at www.parker.com.

3.3 **Related Accessories:** Do not crimp or swage any Parker Hose or Fitting with anything but the listed swage or crimp machine and dies in accordance with Parker published instructions. Do not crimp or swage another manufacturer's Fitting with a Parker crimp or swage die unless authorized in writing by the engineering manager or chief engineer of the appropriate Parker division.

3.4 **Parts:** Do not use any Parker Fitting part (including but not limited to socket, shell, nipple, or insert) except with the correct Parker mating parts, in accordance with Parker published instructions, unless authorized in writing by the engineering manager or chief engineer of the appropriate Parker division.

3.5 **Field Attachable/Permanent:** Do not reuse any field attachable Hose Fitting that has blown or pulled off a Hose. Do not reuse a Parker permanent Hose Fitting (crimped or swaged) or any part thereof. Complete Hose Assemblies may only be reused after proper inspection under section 4.0. Do not assemble Fittings to any previously used hydraulic Hose that was in service, for use in a fluid power application.

3.6 **Pre-Installation Inspection:** Prior to installation, a careful examination of the Hose Assembly must be performed. Inspect the Hose Assembly for any damage or defects. DO NOT use any Hose Assembly that displays any signs of nonconformance.

3.7 **Minimum Bend Radius:** Installation of a Hose at less than the minimum listed bend radius may significantly reduce the Hose life. Particular attention must be given to preclude sharp bending at the Hose to Fitting juncture. Any bending during installation at less than the minimum bend radius must be avoided. If any Hose is kinked during installation, the Hose must be discarded.

3.8 **Twist Angle and Orientation:** Hose Assembly installation must be such that relative motion of machine components does not produce twisting.

3.9 **Securement:** In many applications, it may be necessary to restrain, protect, or guide the Hose to protect it from damage by unnecessary flexing, pressure surges, and contact with other mechanical components. Care must be taken to insure such restraints do not introduce additional stress or wear points.

3.10 **Proper Connection of Ports:** Proper physical installation of the Hose Assembly requires a correctly installed port connection insuring that no twist or torque is transferred to the Hose when the Fittings are being tightened or otherwise during use.

3.11 **External Damage:** Proper installation is not complete without insuring that tensile loads, side loads, kinking, flattening, potential abrasion, thread damage or damage to sealing surfaces are corrected or eliminated. See instruction 2.10.

3.12 **System Checkout:** All air entrapment must be eliminated and the system pressurized to the maximum system pressure (at or below the Hose maximum working pressure) and checked for proper function and freedom from leaks. Personnel must stay out of potential hazardous areas while testing and using.

3.13 **Routing:** The Hose Assembly should be routed in such a manner so if a failure does occur, the escaping media will not cause personal injury or property damage. In addition, if fluid media comes in contact with hot surfaces, open flame or sparks, a fire or explosion may occur. See section 2.4.

3.14 **Ground Fault Equipment Protection Devices (GFEPDs): WARNING! Fire and Shock Hazard.** To minimize the danger of fire if the heating cable of a Multitube bundle is damaged or improperly installed, use a Ground Fault Equipment Protection Device. Electrical fault currents may be insufficient to trip a conventional circuit breaker.

For ground fault protection, the IEEE 515: (www.ansi.org) standard for heating cables recommends the use of GFEPDs with a nominal 30 milliampere trip level for "piping systems in classified areas, those areas requiring a high degree of maintenance, or which may be exposed to physical abuse or corrosive atmospheres".

4.0 TUBE AND FITTINGS ASSEMBLY AND INSTALLATION INSTRUCTIONS

4.1 **Component Inspection:** Prior to assembly, a careful examination of the Tube and Fittings must be performed. All components must be checked for correct style, size, material, seal, and length. Inspect the Fitting and sealing surfaces for burrs, nicks, corrosion, missing seal or other imperfections. Do NOT use any component that displays any signs of nonconformance.

4.2 **Tube and Fitting Assembly:** Do not assemble a Parker Fitting with a Tube that is not specifically listed by Parker for that Fitting, unless authorized in writing by the engineering manager or chief engineer of the appropriate Parker division. The Tube must meet the requirements specified to the Fitting.

The Parker published instructions must be followed for assembling the Fittings to a Tube. These instructions are provided in the Parker Fitting catalog for the specific Parker Fitting being used, or by calling 1-800-CPARKER, or at www.parker.com.

4.3 **Related Accessories:** Do not preset or flange Parker Fitting components using another manufacturer's equipment or procedures unless authorized in writing by the engineering manager or chief engineer of the appropriate Parker division. Tube, Fitting component and tooling must be check for correct style, size and material. Operation and maintenance of Related Accessories must be in accordance with the operation manual for the designated Accessory.

4.4 **Securement:** In many applications, it may be necessary to restrain, protect, or guide the Tube to protect it from damage by unnecessary flexing, pressure surges, vibration, and contact with other mechanical components. Care must be taken to insure such restraints do not introduce additional stress or wear points.

4.5 **Proper Connection of Ports:** Proper physical installation of the Tube Assembly requires a correctly installed port connection insuring that no torque is transferred to the Tube when the Fittings are being tightened or otherwise during use.

4.6 **External Damage:** Proper installation is not complete without insuring that tensile loads, side loads, flattening, potential abrasion, thread damage or damage to sealing surfaces are corrected or eliminated. See instruction 2.10.

4.7 **System Checkout:** All air entrapment must be eliminated and the system pressurized to the maximum system pressure (at or below the Tube Assembly maximum working pressure) and checked for proper function and freedom from leaks. Personnel must stay out of potential hazardous areas while testing and using.

4.8 **Routing:** The Tube Assembly should be routed in such a manner so if a failure does occur, the escaping media will not cause personal injury or property damage. In addition, if fluid media comes in contact with hot surfaces, open flame or sparks, a fire or explosion may occur. See section 2.4.

5.0 HOSE AND FITTING MAINTENANCE AND REPLACEMENT INSTRUCTIONS

5.1 Even with proper selection and installation, Hose life may be significantly reduced without a continuing maintenance program. The severity of the application, risk potential from a possible Hose failure, and experience with any Hose failures in the application or in similar applications should determine the frequency of the inspection and the replacement for the Products so that Products are replaced before any failure occurs. Certain products require maintenance and inspection per industry requirements. Failure to adhere to these requirements may lead to premature failure. A maintenance program must be established and followed by the user and, at minimum, must include instructions 5.2 through 5.7

Parker Safety Guide, Parker Publication No. 4400-B.1 (Continued)

5.2 **Visual Inspection Hose/Fitting:** Any of the following conditions require immediate shut down and replacement of the Hose Assembly:
- Fitting slippage on Hose;
- Damaged, cracked, cut or abraded cover (any reinforcement exposed);
- Hard, stiff, heat cracked, or charred Hose;
- Cracked, damaged, or badly corroded Fittings;
- Leaks at Fitting or in Hose;
- Kinked, crushed, flattened or twisted Hose; and
- Blistered, soft, degraded, or loose cover.

5.3 **Visual Inspection All Other:** The following items must be tightened, repaired, corrected or replaced as required:
- Leaking port conditions;
- Excess dirt buildup;/
- Worn clamps, guards or shields; and
- System fluid level, fluid type, and any air entrapment.

5.4 **Functional Test:** Operate the system at maximum operating pressure and check for possible malfunctions and leaks. Personnel must avoid potential hazardous areas while testing and using the system. See section 2.2.

5.5 **Replacement Intervals:** Hose assemblies and elastomeric seals used on Hose Fittings and adapters will eventually age, harden, wear and deteriorate under thermal cycling and compression set. Hose Assemblies and elastomeric seals should be inspected and replaced at specific replacement intervals, based on previous service life, government or industry recommendations, or when failures could result in unacceptable downtime, damage, or injury risk. See section 1.2. Hose and Fittings may be subjected to internal mechanical and/or chemical wear from the conveying fluid and may fail without warning. The user must determine the product life under such circumstances by testing. Also see section 2.5.

5.6 **Hose Inspection and Failure:** Hydraulic power is accomplished by utilizing high pressure fluids to transfer energy and do work. Hoses, Fittings and Hose Assemblies all contribute to this by transmitting fluids at high pressures. Fluids under pressure can be dangerous and potentially lethal and, therefore, extreme caution must be exercised when working with fluids under pressure and handling the Hoses transporting the fluids. From time to time, Hose Assemblies will fail if they are not replaced at proper time intervals. Usually these failures are the result of some form of misapplication, abuse, wear or failure to perform proper maintenance. When Hoses fail, generally the high pressure fluids inside escape in a stream which may or may not be visible to the user. Under no circumstances should the user attempt to locate the leak by “feeling” with their hands or any other part of their body. High pressure fluids can and will penetrate the skin and cause severe tissue damage and possibly loss of limb. Even seemingly minor hydraulic fluid injection injuries must be treated immediately by a physician with knowledge of the tissue damaging properties of hydraulic fluid.

If a Hose failure occurs, immediately shut down the equipment and leave the area until pressure has been completely released from the Hose Assembly. Simply shutting down the hydraulic pump may or may not eliminate the pressure in the Hose Assembly. Many times check valves, etc., are employed in a system and can cause pressure to remain in a Hose Assembly even when pumps or equipment are not operating. Tiny holes in the Hose, commonly known as pinholes, can eject small, dangerously powerful but hard to see streams of hydraulic fluid. It may take several minutes or even hours for the pressure to be relieved so that the Hose Assembly may be examined safely.

Once the pressure has been reduced to zero, the Hose Assembly may be taken off the equipment and examined. It must always be replaced if a failure has occurred. Never attempt to patch or repair a Hose Assembly that has failed. Consult the nearest Parker distributor or the appropriate Parker division for Hose Assembly replacement information.

Never touch or examine a failed Hose Assembly unless it is obvious that the Hose no longer contains fluid under pressure. The high pressure fluid is extremely dangerous and can cause serious and potentially fatal injury.

5.7 **Elastomeric seals:** Elastomeric seals will eventually age, harden, wear and deteriorate under thermal cycling and compression set. Elastomeric seals should be inspected and replaced.

5.8 **Refrigerant gases:** Special care should be taken when working with refrigeration systems. Sudden escape of refrigerant gases can cause blindness if the escaping gases contact the eye and can cause freezing or other severe injuries if it contacts any other portion of the body.

5.9 **Compressed natural gas (CNG):** Parker CNG Hose Assemblies should be tested after installation and before use, and at least on a monthly basis per instructions provided on the Hose Assembly tag. The recommended procedure is to pressurize the Hose and check for leaks and to visually inspect the Hose for damage and to perform an electrical resistance test.

Caution: Matches, candles, open flame or other sources of ignition shall not be used for Hose inspection. Leak check solutions should be rinsed off after use.

6.0 **HOSE STORAGE**

6.1 **Age Control:** Hose and Hose Assemblies must be stored in a manner that facilitates age control and first-in and first-out usage based on manufacturing date of the Hose and Hose Assemblies. Unless otherwise specified by the manufacturer or defined by local laws and regulations:

6.1.1 The shelf life of rubber hose in bulk form or hose made from two or more materials is 28 quarters (7 years) from the date of manufacture, with an extension of 12 quarters (3 years), if stored in accordance with ISO 2230;

6.1.2 The shelf life of thermoplastic and polytetrafluoroethylene hose is considered to be unlimited;

6.1.3 Hose assemblies that pass visual inspection and proof test shall not be stored for longer than 2 years.

6.1.4 **Storage:** Stored Hose and Hose Assemblies must not be subjected to damage that could reduce their expected service life and must be placed in a cool, dark and dry area with the ends capped. Stored Hose and Hose Assemblies must not be exposed to temperature extremes, ozone, oils, corrosive liquids or fumes, solvents, high humidity, rodents, insects, ultraviolet light, electromagnetic fields or radioactive materials.

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Safety Overview

It is important to employ safe practices in the use of industrial hose due to the number of potentially dangerous applications encountered and products conveyed, and the number of people that may be involved or exposed. Strictly observe these simple practices to help avoid accidents:

- **Training:** Train all operators thoroughly.
- **Evaluation:** Evaluate the application to determine the hose assembly performance requirements.
- **Selection:** Select the most appropriate hose and couplings for the application; ensure that the couplings are compatible with the media and hose, and securely attached to the hose.
- **Service:** Regularly inspect and maintain both the hose and couplings while in service.

Industrial Hose Assemblies

Coupling Compatibility and Maximum Working Pressure Rating

NOTE: This advisory does not apply to hose, hose couplings, hose assemblies and related accessories manufactured by any other Parker Fluid Connector Division worldwide. Products from other Parker divisions must be assembled and applied in strict compliance with their respective catalog instructions, Safety Guide precautions, and other statutory, industry and regulatory requirements.

Safety issues may develop due to the misunderstanding of the relationship between the maximum working pressure ratings of industrial hose assembly components, as well as how to obtain a maximum working pressure rating for a fabricated industrial hose assembly.

It is important to recognize that the pressure rating of any hose assembly is that of the lowest rated component. The three components of an industrial hose assembly that are subject to a maximum working pressure rating are the hose, the coupling/coupling end connection, and the hose-to-coupling attachment device. Many OEM- and distributor-fabricated assemblies incorporate the three components manufactured by different companies: These components are not designed and tested together as a compatible system. Confusion may occur because the hose is often boldly marked with its maximum rated working pressure while the coupling and/or attachment device are generally unmarked or difficult to read. Therefore, the pressure rating for the assembly may incorrectly be assumed to be the pressure rating of the hose.

Parker has tested, qualified and validated a group of specific hoses and specific couplings. When fabricated according to Parker-specified procedure and criteria, Parker certifies the assembly pressure rating to be equal to that of the hose. These hose, coupling and attachment specifications are available online in the CrimpSource® section of the Parker Hose Products Division website: www.parker.com/crimpsource.

⚠ **WARNING! When using components or assembly procedures not prescribed in the CrimpSource® specifications, the working pressure of the hose assembly may be less than the working pressure of the hose. Couplings and attachment devices that fall into this category are inserts/stems and bands or clamps; inserts and crimped brass ferrules; screw-together reattachable couplings; internally expanded couplings; and swaged couplings. Coupling end connections may also fall into this category. For these items, contact the hose or coupling manufacturer to determine the maximum working pressure rating of a specific hose or coupling and end connection. To determine an attachment device rating, test and validate the entire assembly.**

⚠ **WARNING! When using components or assembly procedures not prescribed in the CrimpSource® specifications, it is the responsibility of the assembler to ensure the integrity and compatibility of the components and to inform the end user of the assembly's maximum working pressure rating by permanently marking the assembly with that rating.**

Critical Applications

While many industrial hose applications are potentially dangerous, some are of particular concern because their danger may not be readily apparent. This is especially true for applications involving untrained or inexperienced operators.

Aircraft Fueling Hose

Use only API/NFPA qualified hose for aircraft fueling applications. Aircraft fueling hose incorporates high grade rubber compounds that dissipate static charges and will not contaminate fuel.

Note: To avoid fuel contamination do not use gasoline dispenser or farm pump hose to fuel aircraft.

Anhydrous Ammonia (NH_3) Hose

Many accidents involving anhydrous ammonia occur due to selection of an incorrect hose for the application. Anhydrous ammonia hose must be specially designed and compounded to handle the media, with a perforated cover to prevent gas build-up amidst the layers of hose. Refer to ARPM publications IP-14 "Specifications for Anhydrous Ammonia Hose" and IP-11-2 "Manual for Use, Maintenance, Testing and Inspection of Anhydrous Ammonia Hose."

Critical Applications (Continued)

⚠ **WARNING! Use ONLY anhydrous ammonia hose for anhydrous ammonia service. Contact with anhydrous ammonia in its liquid or gaseous (vapor) phase will burn skin, eyes and lungs, causing serious bodily injury or death.**

- Do not use anhydrous ammonia hose for LPG service. It may fail suddenly and quickly. Anhydrous ammonia hose and LPG hose are frequently used in proximity and may be accidentally switched.
- Use only Parker permanent crimp couplings when fabricating anhydrous ammonia hose assemblies. Refer to CrimpSource® at www.parker.com/crimpsource.
- Do not use with couplings containing o-rings, which may dry out, crack and fail over time. Do not use with male swivel couplings or other couplings containing hidden o-rings.

Anhydrous ammonia hose is designed to allow a limited amount of permeation of gas through the wall of the hose when in service, and staining of the hose cover in the pin-pricked areas does not necessarily indicate leakage for a hose in service. However, a visible gas mist escaping through the hose is an indication of leakage. To verify the integrity of a hose in service, perform a hydrostatic test on the assembly; immediately remove from service any that fail the test.

NOTE: For non-agricultural or refrigeration applications, contact Parker.

Chemical Hose

A chemical hose system failure could cause the release of poisonous, corrosive, or flammable material resulting in property damage, serious bodily injury or death. All reputable manufacturers of chemical hose recommend specific hose constructions to handle various chemicals. Refer to the chemical guides in this catalog, or contact Parker for technical assistance before using or recommending a hose product. Refer to ARPM publication IP-11-7 "Manual for Maintenance, Testing, and Inspection of Chemical Hose."

Handling

- Use care to prevent mishandling. Crushing or kinking of the hose can cause severe damage to the reinforcement.
- Use proper hose suspension equipment when lifting or dragging a hose to ensure that the recommended curvature is not exceeded. Avoid sharp bends at the end fittings and at manifold connections.

Operation

- Use safety precautions such as wearing eye or face protection, rubber gloves, boots, and other types of protective clothing.
- Monitor pressures and temperatures to ensure that the hose is not exposed to conditions above specified limits.
- Do not allow chemicals to contact the exterior of the hose or allow hose to lie in a pool of chemicals since the hose cover may not have the same level of corrosion resistance as the tube. Corrosive materials that come into contact with the reinforcing material will cause reduced service life and premature hose failure.

Temperature

Do not use chemical hose at pressures or temperatures exceeding those as specified for the product. Many chemical resistance guides are based on temperatures of 70°F (21°C). Elevated temperatures can change the chemical resistance ratings. Many chemicals will become more aggressive as temperatures increase, reducing the ability of hose compounds to withstand them. Contact Parker for chemical compatibility data at elevated temperatures. If no data exists, end users are required to perform compatibility testing at the desired temperature.

Couplings

- At any operating temperature, couplings attached with bands or clamps may reduce the working pressure of the hose assembly to less than the maximum rated working pressure of the hose. Refer to the NAHAD Industrial Hose Assembly Guidelines.
- At operating temperatures of 125°F and above, install only permanently attached couplings.
- Do not use internally expanded couplings with chemical hoses incorporating thermoplastic tubes. Refer to chemical hoses that incorporate a MXLPE tube.

Gasoline Dispenser Hose

Millions of consumers operate gasoline pumps every day, increasing the concern for the safe use of dispensing equipment, including the hose. Since gasoline dispenser hoses are subject to frequent abuse, hose selection must include consideration of the rigors of the application. For maximum service life, select only the highest quality, most thoroughly tested UL listed hose and establish a regular inspection and maintenance program. Refer to ARPM publication IP-11-8 "Manual for Maintenance, Testing, and Inspection of Petroleum Service Station Gasoline Dispensing Hose and Hose Assemblies."

Note: To avoid fuel contamination do not use gasoline dispenser or farm pump hose to fuel aircraft.

LP Gas (Propane) Hose

Many accidents involving LP Gas occur due to selection of an incorrect hose for the application. LP Gas hose must be specially designed and compounded to handle the media, with a perforated cover to prevent gas build-up amidst the layers of the hose.

⚠ **WARNING! Use ONLY LP Gas hose for LP Gas service. LP Gas possesses volatile characteristics that may produce fire or explosions causing property damage, serious bodily injury or death.**

- Do not use LP Gas hose for anhydrous ammonia service. It may fail suddenly and quickly. Anhydrous ammonia hose and LPG hose are frequently used in proximity and may be accidentally switched.
- Use only Parker permanent crimp couplings when fabricating LP Gas hose assemblies. Refer to CrimpSource® at www.parker.com/crimpsource. Couplings attached with bands or clamps may reduce the working pressure of the hose assembly to less than the maximum rated working pressure of the hose. Refer to the NAHAD Industrial Hose Assembly Guidelines.
- Do not use with couplings containing o-rings, which may dry out, crack and fail over time. Do not use with male swivel couplings or other couplings containing hidden o-rings.
- Do not use with screw-together reattachable couplings (except hose Series 7233/7243).

LP Gas hose is designed to allow a limited amount of permeation of LP Gas through the wall of the hose when in service. The permeation is apparent when the hose is moist or in water, and bubbles may be perceived as leakage. However, a legitimate propane leak creates a frosting or icing on the surface of the hose or coupling. To verify the integrity of a hose in service, perform a hydrostatic test on the assembly; immediately remove from service any hose that fails the test. In the transfer of LP Gas, the allowable permeation rate is controlled by the Underwriters Laboratories Standard UL21 for LP Gas Hose.

Department of Transportation (DOT) and LP Gas Hose

LP Gas hose assemblies installed on on-road vehicles must meet DOT requirements. Parker factory assemblies 3/4" ID and larger undergo pressure testing as standard procedure (smaller sizes are tested per customer request), one of the fittings is etched with a unique DOT certification number, and a document incorporating the identical certification number accompanies each assembly. Metal DOT identification bands are also available/attached for an additional charge at customer request. Contact Parker.

NOTE: When using LP Gas hose in a mobile application such as delivery or service vehicles, the inspection procedures detailed in DOT regulation 49CFR 180.416 must be strictly followed.

Natural Gas and LP Gas Hose

The molecules of natural gas are small, enhancing their ability to permeate through standard rubber or PVC hose constructions. The permeation process is more rapid as the working pressure increases, and natural gas accumulates with potentially dangerous consequences. Series 7132, 7132XTC, 7170, 7231, 7232, 7233 and 7243 LP Gas hoses may be used for natural gas service to a 350 psi maximum, but ONLY under ALL of the following conditions:

- Use only in a well-ventilated environment: Outdoors, or indoors with significant continuous air movement.
- Do not use LP Gas hose to replace fixed/rigid pipe where that material is more appropriate due to reduced permeation, overall strength and durability. Use rigid pipe, non-permeable tubing or hose with barrier constructions to convey natural gas whenever possible.

Compressed Natural Gas (CNG) and LP Gas Hose

- Do not use LP gas hose for CNG engine applications in on-road vehicles, or for high pressure CNG dispenser/transfer applications (typically 2900 psi or greater). In other applications—where CNG is regulated to pressures within the rating of the hose—apply guidelines for natural gas applications stated above. Always review and adhere to all applicable government and industry regulations and standards prior to installing LP gas hose in a CNG or natural gas application.

Petroleum Transfer Hose

- Do not use for oil or fuel transfer service in or on open water. Hose damage or failure may result in spillage and environmental damage. Use hose specifically designed for this application.
- Do not immerse in fuel. The hose cover compound may not be of sufficient grade to resist attack by the fuel. Use hose specifically designed for this application.

Steam Hose

Water changes to hot water and phases of steam when subjected to heat and pressure. The greater the pressure, the higher the temperature required to achieve and maintain a steam phase. If steam escapes, dangerous quantities of heat may be released very suddenly. Refer to ARPM publication IP-11-1 “Guide for Use, Testing and Inspection of Steam Hose.”

Critical Applications (Continued)

⚠ WARNING! Use ONLY steam hose for steam service. Hot water, low pressure steam and high pressure steam may escape explosively and will scald skin, eyes and lungs, which may lead to severe bodily injury or death.

- Many steam systems incorporate detergents or rust inhibitors which may attack steam hose. Prior to using a steam hose with detergents or rust inhibitors, refer to the chemical guides in this catalog, or contact Parker.
- Parker recommends using permanent crimp couplings when fabricating steam assemblies. Refer to CrimpSource® at www.parker.com/crimpsource. Couplings attached with bands or clamps may reduce the working pressure of the hose assembly to less than the maximum rated working pressure of the hose. Refer to the NAHAD Industrial Hose Assembly Guidelines.
- Drain steam hose after each use to reduce the possibility of hose popcorning while in service.

The chart at the right represents the three forms of water when subjected to various combinations of heat and pressure. The red line represents the point at which hot water becomes saturated steam. The area below the red line is hot water; the area above the red line is superheated steam.

Welding Hose

Many accidents involving welding hose occur due to selection of an incorrect hose for the application. Welding hose must be specially designed and compounded to handle the media, with rubber compounds able to handle fuel gas and oxygen. Due to the extreme volatility of gases, the varying compatibility of gases with the various grades of hose, and the rough environment of many welding applications, it is crucial to select the correct welding hose. Refer to ARPM publications IP-7, "Specifications for Rubber Welding Hose" and IP-11-5, "Guide for Use, Maintenance and Inspection of Welding Hose." Also refer to the Compressed Gas Association publications E-1, "Standard for Rubber Welding Hose and Hose Connections for Gas Welding, Cutting and Allied Processes" and Safety Bulletin SB-11 "Use of Rubber Welding Hose."

⚠ WARNING! Welding gases possess volatile characteristics that may produce fire or explosions causing property damage, serious bodily injury or death. Use Grades R and RM ONLY with acetylene fuel gas; do not use with any other fuel gases.

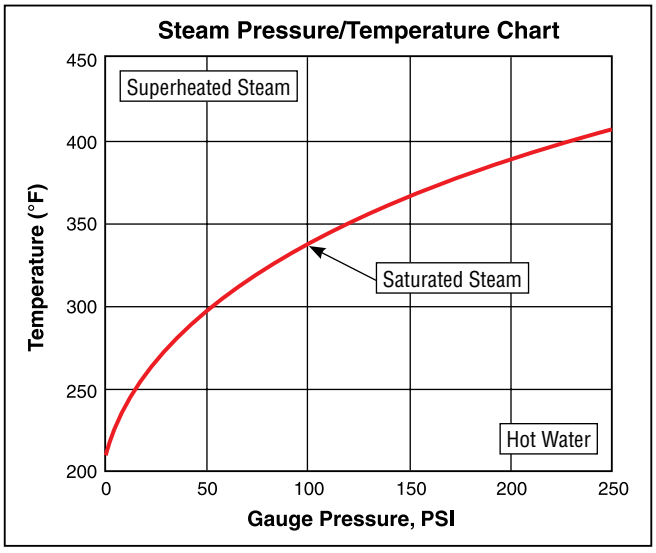
- Replace all assemblies that show signs of abrading, abuse, age, damage or fatigue. Do not attempt to re-couple, repair or splice hose assemblies.
- Fabricate hose assemblies using only crimped-on ferrules at least one inch long to ensure coverage and support of the coupling stem inside the hose.
- Couplings attached with bands or clamps may reduce the working pressure of the hose assembly to less than the maximum rated working pressure of the hose. Refer to the NAHAD Industrial Hose Assembly Guidelines.

PVC / Thermoplastic Hose and Tubing

Thermoplastic polymer compounds are designed to resist deterioration when exposed to a wide range of commercial chemicals and environmental conditions. The resistance to attack is based on many factors, including temperature, pressure, chemical concentration, exposure to ultraviolet light, velocity of the media and duration of exposure/service (intermittent or constant). The user is solely responsible for making the final selection of the hose and tubing, and meeting all endurance, maintenance, performance, safety and warning requirements of the application.

NOTE: The rated maximum working pressures listed in this catalog for thermoplastic hose and tubing are based upon a pressure test temperature of 68°F (20°C) unless stated otherwise.

⚠ WARNING! As temperature increases or decreases, burst pressure, safe working pressure, coupling retention properties, and other safety characteristics of the hose or tubing can significantly decrease. Failure to consider how temperature and other conditions affect hose and tubing performance may cause property damage, serious bodily injury or death.



Industry Publications

Listed below are the titles of publications issued by the Association for Rubber Products Manufacturers (ARPM). Information concerning the latest edition, prices, ordering procedure, etc., may be obtained by contacting them as shown below:

Association for Rubber Products Manufacturers (ARPM)
7231 Shadeland Station Way, Suite 285
Indianapolis, IN 46256

Phone: 317-863-4072
Fax: 317-913-2445
Web: www.arpminc.com

Publication Number	Title
IP-2	Hose Handbook
IP-7	Specifications for Rubber Welding Hose
IP-8	Specifications for Rubber Hose for Oil Suction and Discharge
IP-14	Specifications for Anhydrous Ammonia Hose
IP-11	Complete Set of Hose Technical Bulletins
IP-11-1	Technical Bulletin – Guide for Use, Testing and Inspection of Steam Hose
IP-11-2	Technical Bulletin – Manual for Use, Maintenance, Testing and Inspection of Anhydrous Ammonia Hose
IP-11-4	Technical Bulletin – Manual for Maintenance, Testing and Inspection of Oil Suction and Discharge Hose
IP-11-5	Technical Bulletin – Guide for Use, Maintenance and Inspection of Welding Hose
IP-11-7	Technical Bulletin – Manual for Maintenance, Testing and Inspection of Chemical Hose
IP-11-8	Technical Bulletin – Manual for Maintenance, Testing and Inspection of Petroleum Service Station Gasoline Dispensing Hose and Hose Assemblies

Basic Hose Constructions

Construction Elements

A hose is generally composed of three elements, each with an important role in the overall performance of that hose. The three elements are:

The Tube must be compatible with and able to contain the media being conveyed. Many different materials are used for tube construction, depending upon the media the hose is designed to transmit.

The Reinforcement is the strength member of the hose. It enables the hose to withstand internal and external pressure and abuse. The reinforcement may be applied by several methods, and consists of synthetic yarns, wire or a combination of these. If suction or vacuum capability is a requirement, a helix wire may be part of the reinforcement.

The Cover protects the reinforcement from abuse or damage. The cover is usually a rubber compound selected for its resistance to the environment, although, in some cases (Series 7243) the reinforcement will also act as the cover. Typical considerations in selecting a cover stock are the need to resist abrasion, ozone, weather and sunlight, chemical or oil spillage, etc.

Construction Methods

Several methods are used to manufacture Parker hose. Application factors such as size and pressure requirements determine the selection of any particular hose style. The following is a description of the various construction methods employed by Parker.

Non-Mandrel

Non-mandrel hose is constructed by passing long lengths of extruded tube material through a machine which adds the reinforcement in braided or spiraled layers. In this method, the hose is not built on a mandrel, therefore lengths are not restricted to the lengths of the mandrels.

Typical Size Range: 1-1/2" ID and smaller

Typical Uses: Air, water or general purpose service where operating conditions are not severe

Advantages: Economy and long lengths

Disadvantages: Requires wider ID and OD tolerance range than mandrel made hose, limited pressure capabilities

Rigid Mandrel

Hose produced by this method is supported on a rigid metal mandrel and is handled horizontally during production. While a rigid mandrel limits the hose length, it ensures good control of the inside diameter. It also offers sufficient support to the tube that either wire or textile reinforcement may be applied at high tensions, which is necessary in high pressure constructions. After the cover is applied, the hose may be wrapped with nylon tape for curing, giving the familiar "wrapped" finish to the cover.

Typical Size Range: 3/4" ID and larger

Typical Uses: Air, chemical and petroleum transfer, LPG, steam, water

Advantages: Close tolerances on inside diameter, high pressure ratings, good length stability

Disadvantages: Higher cost than non-mandrel; lengths restricted to length of mandrels

Flexible Mandrel

The flexible mandrel method combines the long-length advantage of non-mandrel hose with the close inside diameter tolerances and high pressure ratings of rigid mandrel hose. This is achieved by building the hose on a long length mandrel made of flexible plastic or rubber.

Typical Size Range: 1-1/2" ID and smaller

Typical Uses: High pressure, air, water, LPG

Advantages: Long lengths, close tolerances on I.D., higher pressure ratings than non-mandrel produced hose

Disadvantages: Higher cost than non-mandrel hose; not available in ID sizes as large as rigid mandrel hose

(Continued)

Wrapped Ply – Machine Built

The wrapped ply construction is the oldest method of making hose, applying all hose components (tube, reinforcement and cover) in spiral strips on a rigid mandrel. After a tube is in place on the mandrel, layers or plies of bias cut fabric reinforcement are wrapped around the tube. The cover is applied and the hose is wrapped in nylon tape prior to curing. This process is capable of producing a hose for suction service when a helix wire(s) is incorporated.

Size Range: 1/2" through 30" ID

Typical Uses: Air; suction and discharge service for chemicals, dry materials, oil and water, conduit

Advantages: Good inside diameter tolerances, many special constructions available without large minimum production runs, special ends available, wide size range

Disadvantages: Higher cost compared to non-mandrel and flex mandrel; pressure and length limitations

Wrapped Ply – Hand Built

Wrapped ply hose may be hand built when the diameter is too large for the building machine or where special built-in ends are desired. The plies are laid on by an operator rather than an automated machine process, allowing hand-forming of built-in ends.

Size Range: 1/2" through 60" ID

Typical Uses: Oil suction and discharge, sand suction, acid suction and discharge

Advantages: Special ends can be built into the hose; wide size range; special constructions available in small quantities

Disadvantages: Relatively expensive due to high labor content

Age Control of Hose (Shelf Life)

The Parker warranty takes precedence over guidelines established by other industry organizations regarding the recommended shelf life of industrial hose. To achieve maximum shelf life, employ proper storage and handling practices and techniques, such as:

- Storage in the original shipping container such as a box, coil, or reel. Hose stored on a reel or in a coil should have its plastic wrapping kept intact.
- Storage in temperatures of 100°F (38°C) or less.
- Avoidance of ozone (electrical discharges or fields), water, extreme humidity, corrosive chemicals and ultraviolet radiation (direct sunlight).
- Use on a first-in, first-out (FIFO) basis determined by the manufacturing date on the hose.

For further information pertaining to age control of hose, contact Parker or refer to the current ARPM Hose Handbook, IP-2.

Electrical Properties of Rubber Hose

Electrical Conductivity

Industrial hoses generally fall into three categories: conductive, nonconductive, or somewhere in-between. Because of its unique properties, it is possible for rubber to be nonconductive at low voltage and conductive at high voltage. When using a hose in an application that has electrical resistance requirements (low electrical resistance for conductive applications or high electrical resistance for nonconductive applications), always select a hose that is specifically designed to meet the specific need. Since conductivity or nonconductivity is not a consideration for many applications, electrical resistance ratings do not exist for many hoses.

Conductive Hose

Static electricity is generated by the flow of material (even some liquids) through a hose. As the material flows, molecules collide and generate friction, which creates minute amounts of electrical charge (excess electrons). The charge accumulates potential energy at the delivery end of the hose (coupling/nozzle). The amount of charge increases with material volume and linear velocity, coarseness of the material, and length of the hose. If not properly grounded, the accumulated charge (potential energy) will seek its own ground. The charge will be attracted to external materials in proximity (such as a steel storage container); if not properly grounded, the electrons may arc (jump) to the external material, igniting volatile materials in the hose, or in proximity to the hose.

Electrically conductive wires and conductive rubber components are used in hose to prevent static electricity build-up and discharge as a spark. Electrical engineers differ in opinion on the effects of static electricity and the means of dissipating it. In handling gasoline and other petroleum-based liquids, recognized national associations and companies have conflicting opinions on the need for conductive hoses. Until a consensus is reached among all associations, laboratories and users, and a standard practice is established, it is essential that the user determine the need for static bonded hose based on (a) the intended use of the hose, (b) instructions from the company's safety division, (c) the insurer, and (d) the laws of the localities and states in which the hose will be used.

Some types of hose include a helical or static wire(s). This wire can be used for electrical continuity provided that proper contact is made and maintained between it and the hose couplings.

Nonconductive Hose

Nonconductive hose constructions are those that resist the flow of electrical current. In some specific applications, especially around high voltage electrical lines, it is imperative for safety that the hose be nonconductive. Unless the hose is designed particularly to be nonconductive and is so branded, do not conclude that it is nonconductive. Many black rubber compounds are inherently and inadvertently conductive. Nonconductive hose is usually made to a qualifying standard that requires it to be tested to verify the desired electrical properties. The hose is frequently (but not necessarily) non-black in color and clearly branded to indicate it is designed for nonconductive applications.

NOTE 1: Parker industrial hose generally uses the non-conductivity standard originally developed by Alcoa Aluminum: A minimum resistance of one megaohm per inch at 1,000 volts D.C.

NOTE 2: SAE has a separate standard for nonconductivity for high pressure hydraulic applications. Part of the standard requires that nonconductive hose feature an orange cover.

NOTE 3: Nonconductive hoses contain little/no conductive rubber compounds, static wires, helical wires, or wire reinforcement. Therefore, a nonconductive hose would not be recommended for an application requiring an "anti-static/static dissipating/conductive" hose.

⚠ **WARNING! Unless a hose is described as, or specifically and clearly branded to be conducting or nonconducting, assume that the electrical properties are uncontrolled.**

Force to Bend / Minimum Bend Radius

The amount of force required to bend a hose and the minimum bend radius are important factors in hose design and selection. The minimum bend radius is defined as the radius to which the hose can be bent in service without damaging or appreciably shortening the life of the product, and is measured to the inside of the curvature of the bend. The bend radius for a given application must be equal to or greater than the rated minimum bend radius. Bending the hose to a smaller bend radius than minimum may kink the hose and result in premature failure.

Perhaps more important in determining flexibility, the force-to-bend is defined as the amount of force required to induce bending around a specified radius. The less force that is required, the easier the product is to maneuver in the field. Different hose constructions may require significantly different forces to attain the same minimum bend radius. Generally, the preferred hose is the more flexible hose, provided all other properties are essentially equivalent.

Oil and Fuel Resistance

Rubber compounds are available in different formulations, blends and grades. Compounds are selected by hose design engineers based on the intended application of the hose. For instance, a hose recommended for multipurpose applications that may include hydraulic or lubrication oil service generally contains a lower grade of tube compound. Conversely, a hose recommended for a more rigorous application, such as highly refined fuel service, contains a higher grade of compound, often within the same compound family.

Rubber hose is used to convey petroleum products both in the crude and refined stages. The aromatic content of refined gasoline is often adjusted to control the octane rating. The presence of aromatic hydrocarbons in this fuel generally has a greater effect on rubber components than do aliphatic hydrocarbons. Aromatic materials in contact with rubber tend to soften it and reduce its physical properties. For long-lasting service, the purchaser of fuel hose should inform the hose manufacturer of the aromatic content of the fuel to be handled so that the proper tube compound can be recommended for the specific application.

The effect of oil on rubber depends on a number of factors that include the type of rubber compound, the composition of the oil, the temperature and duration of exposure. Rubber compounds can be classified to their degree of oil resistance based on their physical properties after exposure to a standard test fluid. In this ARPM classification, the rubber samples are immersed in IRM 903 oil at 212°F (100°C) for seventy hours. (See ASTM Method D-471 for a detailed description of the oil and the testing procedure.) As a guide to users of hose in contact with oil, the oil resistance classes and a corresponding description are listed on the next page.

General Formula for Minimum Hose Length (given hose bend radius and degree of bend required)

$$\frac{\text{Angle of Bend}}{360^\circ} \times 2\pi r = \text{Minimum length of hose to make bend.}$$

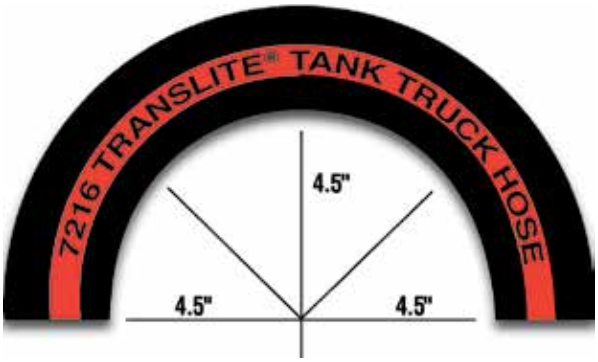
r = Given bend radius of hose.

Example: To make a 90° bend with 2" I.D. hose.
Given r = 4.5 inches.

$$\frac{90}{360^\circ} \times 2 \times 3.14 \times 4.5$$

.25 x 2 x 3.14 x 4.5 = 7" (minimum length of hose to make bend without damage to hose)

The bend radius for a given application must be equal to or greater than the rated minimum bend radius. Bending the hose to a smaller bend radius than minimum may kink the hose and result in premature failure.



The minimum bend radius is measured to the inside of the curvature.

General Formula for Minimum Hose Length (allowing relief from couplings)

Overall Length (OAL) = (2 x Length of Coupling) + (2 x Hose OD) + (Angle/360) x 2 π r

Physical Properties After Exposure to Oil

Class	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%

The above ARPM guideline does not imply compatibility with all oil based fluids. There are many grades of rubber compounds that meet ARPM Class A oil resistance requirements. Some compound grades will be fine for multipurpose applications, while higher grades would be required for more rigorous applications.

Oil resistant hoses for multipurpose service tend to be more economical than hoses specifically designed and recommended for highly refined fuel service. These multipurpose hoses, even if they feature an ARPM Class A tube, are not necessarily recommended for use with highly refined fuels. Furthermore, many chemical resistance charts represent data developed from testing of a typical grade of compound used for that family of fluids. For example, "nitrile" may show compatibility with gasoline, but the nitrile that was tested is likely the nitrile used in gasoline dispenser hose, as opposed to the nitrile commonly used in multipurpose hose.

When selecting a hose for highly refined fuels such as aviation fuel, biodiesel, diesel, ethanol, gasoline or kerosene, be guided by the hose manufacturer's recommendation to use a hose designed and manufactured for that specific application and/or fluid. Contact Parker for further information.

Suction and Vacuum

Hose is constructed with high adhesion between the tube and the carcass to prevent tube separation. Most hose is used for pressure service; however, some applications require the hose to resist collapse in suction and vacuum service. Such hose is subjected to crushing forces because the atmospheric pressure outside the hose is greater than the internal pressure. The hose can collapse and restrict the flow unless the hose is constructed to resist these pressure differentials. The most common method of preventing hose collapse is to build a helical member(s) (wire or thermoplastic) into the hose body. The size and spacing of the helix depends on the size of the hose and the pressure differential. In applications approaching a perfect vacuum, most of the plies of reinforcement are applied over the helix.

Suction hose must be specifically designed for the service for which it is used. Each element—tube, reinforcement, size, spacing, and location of the helix—must be carefully considered. While suction hose is generally used to convey liquids, vacuum hose carries air under a partial vacuum. Vacuum hose is reinforced to resist collapse and maintain its shape under rough handling and/or mechanical abuse. It does not require the heavy construction of suction hose because the dry materials generally conveyed are much lighter in weight than liquids and the vacuum is usually less than for normal suction service.

Coupling Thread Compatibility

Industrial hose couplings have threads which are usually one of the various “pipe” threads. All pipe threads are commonly referred to by the generic name of Iron Pipe Thread or IPT. There are several different types of IPT threads and you must know specifically what they are to ensure compatibility with mating threads.

IPT Thread Compatibility Chart

Description	Seal	Thread (Female)	Compatible Threads (Male)
American Standard Tapered Pipe Thread	Thread Seal (with Sealing Compound)	NPT	NPT NPTF
American Standard Tapered Dryseal Pipe Thread	Thread Seal (Dryseal)*	NPTF	NPTF NPT
American Standard Straight Pipe Thread for mechanical joints (includes 2 female types, depending on sealing method, and one male type compatible with both females)	Washer or Mechanical Ground Joint	NPSM	NPSM NPT NPTF
American Standard Straight Pipe Threads for hose couplings and nipples	Washer	NPSH	NPSH NPT NPTF

*When NPTF Threads are used more than once, they require sealing compound after the first use.

In addition, there are various other thread types that may be found on industrial hose couplings. These types are generally not compatible with any other thread types:

Type	Description	Seal
GHT	Garden Hose Thread	Washer seal
API	American Petroleum Institute Thread	Thread seal
JIC (37°)	Joint Industry Council	Mechanical seal
SAE (45°)	Society of Automotive Engineers	Mechanical seal
NF	Welding Hose Threads-Left Hand and Right Hand	Mechanical seal
CHT	Chemical Hose Thread (for booster hoses)	Gasket seal

Dimensions of 150-Lb. Steel Flanges ASA

Nominal Pipe Size (in.)	Diameter of Bolt Circle (in.)	Number of Bolts	Diameter of Bolts (in.)	Diameter of Bolt Holes (in.)	Flange O.D. (in.)	*Weight (Lbs.)
1	3-1/8	4	1/8	5/8	4-1/2	2
1-1/2	3-7/8	4	1/2	5/8	5	3
2	4-3/4	4	5/8	3/4	6	5
2-1/2	5-1/2	4	5/8	3/4	7	8
3	6	4	5/8	3/4	7-1/2	10
3-1/2	7	8	5/8	3/4	8-1/2	12
4	7-1/2	8	5/8	3/4	9	13
5	8-1/2	8	3/4	7/8	10	15
6	9-1/2	8	3/4	7/8	11	19-1/2
8	11-3/4	8	3/4	7/8	13-1/2	30
10	14-1/4	12	7/8	1	16	41
12	17	12	7/8	1	19	65
14	18-3/4	12	1	1-1/8	21	85
16	21-1/4	16	1	1-1/8	23-1/2	93
18	22-3/4	16	1-1/8	1-1/4	25	120
20	25	20	1-1/8	1-1/4	27-1/2	155
24	29-1/2	20	1-1/4	1-3/8	32	210

*Weights shown for sizes up through 24" are for threaded flanges.

Note: 125-Lb. flange dimensions are same as dimensions of 150-Lb. flanges except thickness and weight.

Dimensions of 300-Lb. Steel Flanges ASA

Nominal Pipe Size (in.)	Diameter of Bolt Circle (in.)	Number of Bolts	Diameter of Bolts (in.)	Diameter of Bolt Holes (in.)	Flange O.D. (in.)	*Weight (Lbs.)
1	3-1/2	4	5/8	3/4	4-7/8	3
1-1/2	4-1/2	4	3/4	7/8	6-1/8	6-1/2
2	5	8	5/8	3/4	6-1/2	7
2-1/2	5-7/8	8	3/4	7/8	7-1/2	10
3	6-5/8	8	3/4	7/8	8-1/4	14
3-1/2	7-1/4	8	3/4	7/8	9	16
4	7-7/8	8	3/4	7/8	10	24
5	9-1/4	8	3/4	7/8	11	31
6	10-5/8	12	3/4	7/8	12-1/2	36
8	13	12	7/8	1	15	56
10	15-1/4	16	1	1-1/8	17-1/2	80
12	17-3/4	16	1-1/8	1-1/4	20-1/2	110
14	20-1/4	20	1-1/8	1-1/4	23	164
16	22-1/2	20	1-1/4	1-3/8	25-1/2	220
18	24-3/4	24	1-1/4	1-3/8	28	280
20	27	24	1-1/4	1-3/8	30-1/2	325
24	32	24	1-1/2	1-3/8	36	490

*Weights shown for sizes up through 24" are for threaded flanges.

Media Compatibility

Media Compatibility

A complete listing of industry standards is available in the Introduction section.
See the pages immediately following the Table of Contents for a complete index by series, and by product application and name.

Due to continual product improvements, Parker reserves the right to alter specifications without prior notice.

Chemical Guides Introduction

The Chemical Guides in this section are offered as a general indication of the compatibility of the various compounds incorporated in Parker hose with the chemicals, fluids and media listed. The basis for the ratings includes actual service experience, the advice of various polymer suppliers, and the considered opinion of our chemists. When in doubt, a sample of the compound should always be tested with the particular chemical and temperature it is to handle.

Some of the variables that affect the resistance of a compound to a chemical attack are:

1. **Temperature of the Media Transmitted:** Higher temperatures increase the affect of chemicals on compounds. The amount of increase depends upon the polymer and the chemical. A compound quite suitable at room temperature might fail very quickly at higher temperatures. Working pressures in this catalog are recommended in accordance with ARPM design safety factors at ambient temperatures. Do not operate outside hose temperature limits. Even within hose temperature limits, end fittings and hose size can affect performance at higher temperatures.

2. **Service Conditions:** A rubber compound usually swells when exposed to a chemical. Within a given percent of swell, a hose tube may function satisfactorily if the hose is in a static condition, but may fail quickly if the hose is subject to flexing.

3. **The Grade or Blend of the Rubber Compound:** Basic polymers are sometimes mixed or blended to enhance a particular property for a specific service. As an example, the nitrile used as the tube material for Parker aircraft fueling hose varies in its makeup from the nitrile used in the tube of Day-Flo® Special Purpose hose. Consequently, the reaction to a particular chemical may therefore be somewhat different. When in doubt, a sample of the compound should always be tested with the particular chemical it is going to handle.

Names and General Properties of Hose Materials

Refer to the guides on the following pages for specific applications.

Common Name	ASTM Designation D1418-64	Composition	General Properties	Primary Hose Elements
Butyl / Chlorobutyl	IIR	Isobutene-Isoprene	Very good weathering resistance, low permeability to air. Good physical properties. Poor resistance to petroleum based fluids.	Tube / Cover
Chlorinated Polyethylene (CPE)	CM	Chloropolyethylene	Good long term resistance to UV and weathering. Good oil and chemical resistance. Excellent flame resistance. Good low temperature impact resistance.	Tube
Cross Linked Polyethylene (XLPE)	XPE	Cross Linked Polyethylene	Excellent resistance to most solvents, oils and chemicals. Do not confuse with chemical properties of standard polyethylene.	Tube
EPDM	EPDM	Ethylene Propylene Diene	Good general purpose polymer. Excellent heat ozone, and and weather resistance. Not oil resistant.	Tube / Cover
Epichlorohydrin	ECO	Ethylene Oxide Chloromethyl	Excellent oil and ozone resistance. Fair flame resistance and low permeability to gases. Good low temperature properties.	Tube / Cover
Ethyl Vinyl Acetate (EVA)		Ethylene Vinyl Acetate	Good abrasion and chemical resistance. Lightweight.	Tube / Cover
FKM	FKM	Fluorocarbon Rubber	Excellent high temperature resistance, particularly in air or oil. Very good chemical resistance.	Tube / Cover
Fluorinated Ethylene Propylene / Polytetra-Flouroethylene	FEP / PTFE	Fluorinated Ethylene Propylene / Polytetra-Flouroethylene	Excellent chemical, solvent, and heat resistance, inert to most materials. Smooth anti-adhesive surface – easily cleaned.	Tube
Modified XLPE (MXLPE)		Proprietary	Excellent chemical resistance with good heat properties.	Tube
Natural Rubber	NR	Isoprene	Excellent physical properties, including abrasion resistance. Not oil resistant.	Tube
Neoprene	CR	Chloroprene	Excellent weathering resistance. Good oil resistance. Good physical properties.	Tube / Cover
Nitrile / Buna-N	NBR	Nitrile-Butadiene	Excellent oil resistance. Good physical properties.	Tube / Cover
Nylon		Nylon	Excellent chemical resistance. Good temperature resistance.	Tube
Poly Vinyl Chloride (PVC)		Poly Vinyl Chloride	Good abrasion, chemical and weathering resistance. Lightweight. Poor oil and temperature resistance.	Tube / Cover, Tubing
Poly Vinyl Chloride / Polyurethane (PVC/PU)		Poly Vinyl Chloride/ Polyurethane Blend	Good abrasion, chemical and weathering resistance.	Tube / Cover
Polyurethane (PU)	AU	Polyurethane	Good abrasion, chemical and weathering resistance.	Tube / Cover
SBR	SBR	Styrene-Butadiene	Good physical properties, including abrasion resistance. Not oil resistant. Poor weathering and ozone resistance.	Tube / Cover
TPV		Thermoplastic Vulcanizate	Excellent chemical and ozone resistance. Good flexibility. Lightweight.	Tube, Tubing
Ultra-High Molecular Weight Polyethylene (UHMWPE)	UHMW	Ultra-High Molecular Weight Polyethylene	Excellent chemical and heat resistance.	Tube

Refined Fuel / Hose Compatibility Table

LEGEND

A: Acceptable for use with the designated fuel, and can be interchanged/used with other "A" media in the same row.
D: Acceptable for use with the designated fuel, but only for DEDICATED service with that designated fuel.
Not interchangeable/for use with any other fuel—prior to or subsequnt to—use with the dedicated fuel.
X: Not acceptable for use with the designated fuel in any application.

NOTES: "A" or "D" ratings do not imply compliance with government or industry regulations or specifications in any application.

Series	Tube	Av Gas	Non-Regulated Gasoline Service	Ethanol			Diesel Fuel	Biodiesel	
				To E100	To E15	To E85		To B20	To B100
389	Nitrile	D	A	D	A	A	A	A	X
395	Nitrile	D	A	D	A	A	A	A	X
397	Nitrile	D	A	D	A	A	A	A	A
7094/7095	Nitrile	X	X	X	X	X	X	X	X
7102	Nitrile	D	A	D	A	A	A	D	X
7107	Nitrile	X	X	X	X	X	X	X	X
7107 (2" only)	Nitrile	D	A	D	A	A	A	D	X
7114	Nitrile	D	A	D	A	A	A	D	X
7124	Nitrile	D	D	D	A	A	A	D	X
7134/7187	Nitrile	X	X	X	X	X	X	X	X
7137	Nitrile	X	X	X	X	X	X	X	X
7165	Nylon	D	A	A	A	A	A	A	A
7174	Nitrile	D	D	D	A	A	A	D	X
7175	Nitrile	D	D	D	A	A	A	D	X
7204	Nitrile	D	A	A	A	A	A	A	X
7208E	Nitrile/SBR	X	X	X	X	X	X	X	X
7212	Nitrile	X	A	X	A	D	A	D	X
7213E	Nitrile/SBR	X	X	X	X	X	X	X	X
7216/7217	Nitrile	D	A	D	A	A	A	D	X
7216E	Nitrile	D	A	D	A	A	A	D	X
7219	Nitrile	D	A	A	A	A	A	A	X
7234	Chloroprene	X	X	D	X	X	X	X	X
7280	Nitrile	D	D	D	A	A	A	D	X
7282	Nitrile/THV Barrier	D	D	D	A	A	A	D	X
7301	Chloroprene	X	X	D	X	X	X	X	X
7311N/7311NXT	Nitrile	D	A	D	A	A	A	D	X
7331/7331XT	Nitrile	D	A	D	A	A	A	D	X
7396/7397	Nitrile	D	A	D	A	A	A	D	X
7705	Nitrile	A	A	A	A	A	A	A	A
7775	Nitrile	D	A	D	A	A	A	D	D
7776	Nitrile	D	A	D	A	A	A	D	D
7776CT	Nitrile	D	A	D	A	A	A	D	D
7777	Nitrile	D	A	D	A	A	A	D	D
SS107/SS107R	Nitrile	D	A	D	A	A	A	D	D
SS269	Nitrile/SBR	X	X	X	X	X	X	X	X
SWC325	Nitrile	D	A	D	A	A	A	D	D
SW387	Nitrile	D	A	D	A	A	A	D	D
SW569	Nitrile	D	D	D	D	D	D	D	D
SWC316/SWC316R	Nitrile	D	A	D	A	A	A	D	D
SWC609/SWC609R	Nitrile	D	A	D	A	A	A	D	D

Some biodiesel, diesel fuel and gasoline hoses must also meet industry or government standards for regulated applications, such as SAE engine fuel lines or UL gasoline dispenser service. The user is solely responsible for making the final determination if an industry or government (local, state or federal) standard or regulation applies to the application. Contact Parker for more information.

Hose and Chemical Table

Refer to "Names and General Properties of Hose Materials" table.

⚠WARNING! The following data is based on tests and believed to be reliable; however, the tabulation should be used as a guide **ONLY,** since it does not take into consideration all variables, such as elevated temperatures, fluid contamination, concentration, etc., that may be encountered in actual use. All critical applications should be tested. Refer to the Safety & Technical Information section of this catalog for safety, handling and use information.

*****Refer to the PVC and Thermoplastic Temperature/Pressure chart in this section.**

Thermoplastic hose and tubing achieve their optimum physical properties at room temperature, 68°F (20°C). As thermoplastic materials are exposed to increased ambient temperatures, they soften and their physical properties change. For hose and tubing, heat sharply reduces the available working pressure and coupling retention. In all cases, test the product in a controlled, secure and safe environment, and consider all operating conditions prior to use.

NOTES:
- Data for PVC/thermoplastic materials based on 68°F unless otherwise noted.
- Data for other materials based on 70°F unless otherwise noted.

Key: E = Excellent • G = Good • C = Conditional • Blank = No Data • X = Not Recommended

Chemical Or Material Conveyed	CPE	CSM	Chlorobutyl	Chloroprene	EPDM	EVA***	FEP/PTFE	FKM	MXLPE	Natural	Nitrile	Nylon	PU***	PVC***	PVC/PU***	SBR	TPV***	UHMWPE	XLPE
Acetal		C	G	C	G		E	X	G	C	X					C		E	E
Acetaldehyde		X	E	X	E	G	E	X		X	X	E	X	X	X	X	G	G	E
Acetamide		G	E	G	E		E	G	E	C	E					X		E	E
Acetate Solvents		X	C	X	E	C	E	X	G	C	X		C	X	X	X		E	E
Acetic Acid, 10%	E	E	E	G	E	E	E	E		G	G	X	X	E	G	G	E	E	E
Acetic Acid, 30%		G	G	C	E	E	E	C	G	X	X			G	G	X		E	E
Acetic Acid, 50%	E	E	G	C	E	C	E	G		X	C	X	X	G	G	G	C	E	G
Acetic Acid, 80%						C							X	C	C				
Acetic Acid, Glacial	E	C	G	C	G	X	E	X		X	X	X	X	C	C	C	G	E	E
Acetic Acid, Vapors						G							X	G	G				
Acetic Anhydride	E	E	G	G	G	C	E	X		C	X	X	X	X	X	X	E	G	E
Acetic Ester		X	G	X	E		E	X	G	X	X					X		E	E
Acetic Ether		C	G	X	E		E	X	G	X	X					X		E	E
Acetic Oxide		E	G		G		E	X		X			G				G		E
Acetone	G	X	E	X	E	C	E	X		X	X	E	X	X	X	C	G	E	C
Acetone Cyanohydrin		C	E	G	E		E	X		C	X		X			E	E	G	E
Acetonitrile		G	E	E	E		E	X		G	X	E					X		
Acetophenone		X	G	X	E		E	X		X	X		X			X	G	X	X
Acetyl Acetone	G	X	E	X	E		E	X		X	X		X			X	G	E	E
Acetyl Chloride	E	X	X	X	C		E	G		X	X	X	X			X	G	G	G
Acetyl Oxide	E	E	G	G	G		E	X		C	X		X			X	E	E	E
Acetylene	G	C	E	E	E	X	E	E		G	E	E	G	C	C	C	C	E	E
Acetylene Dichloride		X	C	X	C		E	G		X	X	E						X	
Acetylene Tetrachloride		X	X	X	X		E	E		X	X		X			X	X		
Acrolein		G	E	C	E		E	X		G	C		X			C	C	X	E
Acrylic Acid	E	G	X	X	X		E	X		X	X		X			X			X
Acrylonitrile	E	C	X	X	E		E	X		C	X	E	X	C	C	C	G	C	C
Di(2Ethylhexyl) Adipate		X	E	X	G		E	C		X	X								
Adipic Acid		G	X	E	E	E	E	E		E	E		E	G	G	E	G		E
Air		E	E	E	E		E	E	E	E	E					E		E	E
Air, +300°F	G	G	G	G	G		E	E		X	G		G			X	E	X	
Alcohol, Aliphatic		E	E	E	E		G	C	E	E	E					G		E	E
Alcohol, Aromatic		X	X	C	X		E	E	G	C	C					X		E	E
Alk-Tri		X	X	X	X		E	E		X	X		X			X	X		E
Allyl Alcohol		E	E	E	E	E	E	G		E	E	C	X	X	X	G	G	E	E
Allyl Bromide		X	X	X	X		E	G		X	X					X		G	G
Allyl Chloride	G	X	X	X	X	C	E	G		X	G	G	X	X	X	G		E	G
Alum	E	E	E	E	E	E	E	E	E	E	E	G	G	E	E	G	E	E	E
Alum, Papermakers							E	E										G	
Aluminum Acetate	E	G	E	C	E		E	E	E	C	C		X			G	E	E	E
Aluminum Chloride	C	E	E	E	E	G	E	E	E	E	E	X	G	E	E	E		E	E
Aluminum Fluoride	X	E	E	E	E	G	E	E		G	E	G	C	G	G	E	E	E	E
Aluminum Formate		X	G	E	E		E	X		X	X		X			E		E	
Aluminum Hydroxide		E	E	E	E	G	E	E		E	E	G	G	E	E	G	E	E	

*****Refer to the PVC and Thermoplastic Temperature/Pressure chart in this section.**

(Continued on the following page)

Hose and Chemical Table (Continued)

Refer to *Names and General Properties of Hose Materials* table.

Key: E = Excellent G = Good C = Conditional
Blank = No Data X = Not Recommended

Chemical Or Material Conveyed	CPE	CSM	Chlorobutyl	Chloroprene	EPDM	EVA***	FEP/PTFE	FKM	MXLPE	Natural	Nitrile	Nylon	PU***	PVC***	PVC/PU***	SBR	TPV***	UHMWPE	XLPE
Aluminum Nitrate						E							C	E	E				
Aluminum Nitrate (AQ)	E	E	E	E	E		E	E		E	E		C			E	E	E	E
Aluminum Oxychloride						G								E	E				
Aluminum Phosphate		E	E	E	E		E	E	E	E	E					E		E	E
Aluminum Sulfate	E	E	E	E	E	E	E	E	E	E	E	E	G	E	E	E	E	E	E
Alums, NH3-CR-K	G	E	E	E	E		E	E		E	E	X	G			E	E	E	E
Amines, Mixed		X	G	G	G			X		G	X		X			C		E	
Amino Xylene	X	X	G	X	E		E	X		X	X		X			X	G		
Aminobenzene	G	X	G	X	G		E	E		X	X	C	X			X	G		
1-Aminobutane		C	X	X	C		E	X		X	C		X			X			
Aminodimethylbenzene	C	C	G	X	X		E	X		X	X					X			
Aminoethane		C	G	X	E		E	X		C	X		X			C			
2-Aminoethanol		G	E	G	G		E	X		G	X		C			X			
1-Aminopentane	C	X	G	E	E		E	X		G	C		C			G	C		
O-Aminotoluene	G																		
Ammonia (AQ)						E						E	X	C	C			E	C
Ammonia Anhydrous												G						E	E
Ammonia Gas												C						E	
Ammonia Gas, Dry						E							X	C	C				
Ammonia Liquid		E	E	E	E	E	E	E	E	G	G		X	X	X	G		E	E
Ammonia Water		G	G	G	E		E	G	E	G	C					G		E	E
Ammonium Carbonate		E	E	E	E	E	E	E	E	E	C	G	E	E	E	E		E	E
Ammonium Chloride	G	E	E	E	E	E	E	E	E	E	E		G	E	E	E	E	E	E
Ammonium Fluoride, 25%						G							C	X	X				
Ammonium Hydroxide	E	E	E	E	E		E	E		G	E	G	X				E	E	E
Ammonium Hydroxide, 28%						E							C	C	C				
Ammonium Metaphosphate		E	E	E	E	E	E	E	E	E	E		G	E	E	E		E	E
Ammonium Nitrate	G	E	E	E	E	E	E	E	E	E	E	G	G	E	E	E	E	E	E
Ammonium Persulfate		E	E	E	G	E	E	E	E	E	X		G	E	E	X		E	E
Ammonium Phosphate		E	E	E	E	E	E	E	E	E	E		G	G	G	E		E	E
Ammonium Phosphate, Dibasic	E	E	E	E	E		E	E		E	E	C				E	E	E	E
Ammonium Phosphate, Neutral						E							G	E	E				
Ammonium Sulfate	E	E	E	E	E	E	E	E	E	E	E	G	E	E	E	G		E	E
Ammonium Sulfide		E	E	E	E	E	E	E	E	E	E		E	E	E	E		E	E
Ammonium Sulphite		E	E	E	E		E	E		E	E		X			E			E
Ammonium Thiocyanate		E	E	E	E	E	E	E	E	E	E		G	E	E	E		E	E
Ammonium Thiosulphate		E	E	E	E		E	E		E	E	E	X			E	E		E
Amyl Acetate	X	X	C	X	E	X	E	X		X	X	G	X	X	X	X	G	E	C
Amyl Acetone		X	G	X	G		E	X		X	X					X			E
Amyl Alcohol	E	E	E	E	E	G	E	E		E	E	E	X	C	C	G	E	E	E
Amyl Amine		C	G	C	C		E	X		C	C					G			
Amyl Borate		C	E	E	E		E	E	C	E	E					E		E	E
Amyl Bromide		X	X	X	C		E	G		X	X								
Amyl Chloride	C	X	X	X	X	X	E	E		X	X	E	C	X	X	X	X	X	X
Amyl Chloronapthalene		E	E	E	E		E	E	C	E	E					E		E	E
Amyl Ether		C	X	X	X		E			X	X								
Amyl Napthalene		E	E	E	E		E	E	C	E	E					E		E	E
Amyl Oleate		E	G	E	G		E	C	G	E	E					E		E	E
Amyl Phenol		E	E	E	E		E	E	C	E	E					E		E	E
Anethol	X	X	X	X	X		E	G		X	X	G				X		G	G
Aniline	X	X	E	X	G	X	E	G		X	X	C	X	X	X	X	G	E	E
Aniline Chlorohydrate						X							X	X	X				
Aniline Dyes	X	G	G	C	G		E	G		G	X	X	X			G	G	E	E
Aniline Hydrochloride		X	G	X	G	X	E	G	E	G	G		X	X	X	C		E	E
Aniline Oil	G	X	G	X	C		E	C		X	X		X			X			
Animal Fats		C	C	C	G		E	E		X	E	E	C			X	C	E	E

***Refer to the PVC and Thermoplastic Temperature/Pressure chart in this section.

(Continued on the following page)

Hose and Chemical Table (Continued)

Refer to *Names and General Properties of Hose Materials* table.

Key: **E = Excellent G = Good C = Conditional**
Blank = No Data X = Not Recommended

Chemical Or Material Conveyed	CPE	CSM	Chlorobutyl	Chloroprene	EPDM	EVA***	FEP/PTFE	FKM	MXLPE	Natural	Nitrile	Nylon	PU***	PVC***	PVC/PU***	SBR	TPV***	UHMWPE	XLPE
Animal Grease		X	X	C	C		E	E	E	X	E					X		E	E
Animal Oils		X	C	X	C	C	E	E	E	X	E		G	C	C	X		E	E
Ansul Ether		X	X	X	C		E	X	G	X	X					X		E	E
Anthraquinone						E								E	E				
Anthraqunonesulfonic Acid						E							X	E	E				
Antifreeze		E	E	E	E		E	E	E	E	E					E		E	E
Antimony Chlorides		G	E	X	E		E	E			G	C	E						E
Antimony Pentachloride		X	X	X	X		E	E	E	X	G					X		G	G
Antimony Trichloride						E							E	E	E				
Apple Juice or Sauce														E					
Aqua Regia	G	X	X	X	C	X	E	E		X	X	X	X	C	C	X	X	G	X
Argon		X	G	G	E		E	E		X	E	E	E			E		E	E
Aromatic Hydrocarbons		X	X	X	X		E	E		X	X			X		X			
Arquad		E	E	E	E		E	E	E	E	E					E		E	E
Arsenic Acid	E	E	E	E	E		E	E		E	E	E	X			E	E	E	E
Arsenic Acid, 80%						G							X	E	E				
Arsenic Chloride		X	X	E	X		E	X		X	C					X		X	X
Arsenic Trichloride		X	X	E	X		E	X		X	E					X		X	X
Arylsulfonic Acid													X	C	C				
Asphalt	G	X	X	C	X	X	E	E		X	G	E	G	C	C	X	G	E	X
ASTM Fuel A	E	G	X	G	X		E	E		X	E	E	G	C	C	X	X	G	G
ASTM Fuel B	G	G	X	X	X		E	E		X	X	E	G	X	X	X	X	G	G
ASTM Fuel C	C	X	X	X	X		E	E		X	G	E	X	X	X	X	X	G	G
ASTM Oil #1		G	X	E	X		E	E		X	E	E	E	C	C	X	X	E	E
ASTM Oil #2		C	X	E	X		E	E		X	E					X			
ASTM Oil #3		C	X	G	X		E	E		X	E		X	C	C	X			
ASTM Oil #4		X	X	X	X			E		X	G		X			X		E	E
Automatic Transmission Fluid		C	X	G	X		E	E		X	E	G	G			X	X	E	E
Aviation Gasoline		X	X	X	X		E	E		X	E		X			X		E	E
Banana Oil	X	C	X	X	E		E	X		X	X	G	X			X	G	E	X
Barium Carbonate		E	E	E	E	E	E	E	E	E	E		E	E	E	E		E	E
Barium Chloride	G	E	E	E	E	E	E	E	E	E	E	G	E	E	E	E		E	E
Barium Hydroxide	G	E	E	E	E	E	E	E	E	E	E	G	E	E	E	E		E	E
Barium Sulfate		E	E	E	E	E	E	E		E	E		E	E	E	E		E	E
Barium Sulfide		E	E	E	E	E	E	E	E	E	E		E	E	E	G		E	E
Beer		E	E	G	E		E	E		E	E	E	G	E		E	E	E	X
Beet Sugar Liquors	G	E	E	G	E	E	E	E		E	E	G	X	E		E	E	E	E
Benzal Chloride			G				E				X	E						E	E
Benzaldehyde	C	X	G	X	E	C	E	X		X	X	E	X	X	X	X	X	E	E
Benzene	C	X	X	X	X	X	E	G		X	X	G	X	X	C	X	X	G	E
Benzene Carboxylic Acid	G	X	E	E	X		E	E		X	X		X			X	E		
Benzene Sulphonic Acid		G	X	G	X		E	E	E	X	X					X		E	E
Benzine		X	X	G	X		E	E		X	E	G	C			X	G		E
Benzine Solvent		C	X	X	X		E	E		X	E					X			
Benzoic Acid		X	X	G	X	G	E	E	G	X	X	E	X	G	G	X	E	E	E
Benzoic Aldehyde		X	G	X	E		E	X	E	X	X					X		E	E
Benzol	C	X	X	X	X	X	E	G		X	X	G	X	X	C	X	X	G	E
Benzotrichloride		X	X	X	E		G	E		X	X					X		G	G
Benzyl Acetate		G	E	E	E		E	X		X	X		X			E		E	E
Benzyl Alcohol	E	G	G	G	G		E	E		X	X	C	X			X	X	E	E
Benzyl Chloride	X	X	X	X	X		E	E		X	X		X			X	X	E	E
Benzyl Ether		X	G	X	C		E	X		X	X		G			X			
Bismuth Carbonate						E							E	E	E				
Black Liquor						E								E	E				
Black Sulfate Liquor	C	G	G	G	G		E	E		G	G	C	X			G	E	E	
Blast Furnace Gas		C	C	E	C		E	E	E	C	C					C		E	E

***Refer to the PVC and Thermoplastic Temperature/Pressure chart in this section.**

(Continued on the following page)

Hose and Chemical Table (Continued)

Refer to *Names and General Properties of Hose Materials* table.

Key: **E = Excellent G = Good C = Conditional**
Blank = No Data X = Not Recommended

Chemical Or Material Conveyed	CPE	CSM	Chlorobutyl	Chloroprene	EPDM	EVA***	FEP/PTFE	FKM	MXLPE	Natural	Nitrile	Nylon	PU***	PVC***	PVC/PU***	SBR	TPV***	UHMWPE	XLPE
Bleach Solutions		G	G	X	G		E	G	E	X	X	C	X			X		G	G
Bleach, 12.5% Active CL						G							C	G	G				
Borax Solution	C	E	E	E	E		E	E		E	E	G	E			E	E	E	E
Bordeaux Mixture		E	E	E	E		E	E	E	G	E					G		E	E
Boric Acid	X	E	E	E	E	E	E	E		E	E	G	E	E	E	E	E	E	E
Boron Trifluoride						E							E	E	E				
Brake Fluid DOT #3	E	G	E	C	E		E	X		X	X	E	X	X	X	E	G		
Brine	G	E	E	E	E	E	E	E		E	E	G	G	E	E	E	E	E	E
Bromacil					E														
Bromic Acid						G							X	E	E				
Bromine		C	X	X	X		E	E	G	X	X					X		X	G
Bromine Water		E	C	G	C	X	E	E		X	C		X	X	X	X		E	E
Bromine, Liquid						X							X	X	X				
Bromobenzene	X	X	X	X	X		E	E		X	X		X			X		C	C
1-Bromobutane		X	X				E	G		X	X								
Bromochloromethane	X	X	X	X	G		E	C		X	X								
Bromoethane		X	X	X	X		E	E		C	G		X			X			
3-Bromopropene		X	X	X			E	G		X	X								
Bromotoluene	X	X	X				E	G		X						X			X
Bugdioxane																			E
Bunker Oil		X	X	X	X		E	E		X	E		G			X		E	E
Butadiene		X	X	X	X	X	E	G		X	X		X	C	C	X		E	E
N-Butanal		C	G	C	G		E	X		X	X		C						
Butane		X	X	C	X	X	E	E		X	E	E	X	C	C	X		E	E
Butanoic Acid		C			G		E	G											
Butanol (Butyl Alcohol)	G	E	G	E	G		E	E		E	E	G	X			E	G	E	E
Butanol, Primary						G							C	X	X				
Butanol, Secondary						G							C	X	X				
Butanone	G	X	E		E		G				X	G	X				X	E	E
Butoxyethanol		X	E	X	E		E			X	C		E						
Butter		E	E	G	E			E		C	E			C		C			
Butyl Acetate	C	X	X	X	X	X	X	X		X	X	G	X	X	C	X		E	E
Butyl Acrylate		X	X	X	X		E	X		X	X							G	G
Butyl Alcohol (Butanol)	G	E	G	E	G	E	E	E		E	E	G	C	C	C	E	G	E	E
Butyl Aldehyde		C	G	C	G		E	X					C				G	E	E
Butyl Amine		C	C	X	C		E	X	E	G	C					C		E	E
N-Butylamine		X	X	X	C		E	X		X	X		X			X			
T-Butyl Amine		X			G														
Butyl Benzene		X	X	X	X			E		X	X					X		E	E
N-Butylbenzene		X					E	E		X	X								E
Butyl Benzyl Phthalate		X	E				E	C		X						X		E	E
Butyl Bromide		X	X	X	X			G		X	X					X		G	G
N-Butylbromide		X	X				E	G		X	X								G
Butyl Butyrate		X	C	X	G			C		X	X					X		G	G
N-Butylbutyrate		X	E	X	E		E	E		X	X					X			
N-Butylcarbinol	E	E	E	E	E		E	E		E	G	E	X			E	E		
Butyl Carbitol		C	E	C	E		E	G		X	C					X		E	G
Butyl Cellosolve		X	E	X	G		E	X		X	C			X	X	X	E	E	E
Butyl Chloride		X	C				E	E		X								C	G
Butyl Ether		X	X	X	X		E	X		X	X		G			X		E	E
Butyl Ether Acetaldehyde		X	G				E	X		X		X						E	E
Butyl Ethyl Acetaldehyde		X	C	X	X			X		X	X					X		E	E
Butyl Ethyl Ether		X	X				E			X	G							E	E
Butyl Oleate		X	G	X	G		E	E		X	X					X			
Butyl Phenol						X								C	C				
Butyl Phthalate		X	G		E		E	C		X						X			E

***Refer to the PVC and Thermoplastic Temperature/Pressure chart in this section.**

(Continued on the following page)

Hose and Chemical Table (Continued)

Refer to *Names and General Properties of Hose Materials* table.

Key: E = Excellent G = Good C = Conditional
Blank = No Data X = Not Recommended

Chemical Or Material Conveyed	CPE	CSM	Chlorobutyl	Chloroprene	EPDM	EVA***	FEP/PTFE	FKM	MXLPE	Natural	Nitrile	Nylon	PU***	PVC***	PVC/PU***	SBR	TPV***	UHMWPE	XLPE
Butyl Stearate		X	X	X	X		E	E		X	G		G			X		E	E
Butylene		X	X	C	X		E	E		X	E	G	C	C	C	X			
Butyraldehyde		X	G	X	C		E	X	G	X	X		X			X		E	E
Butyric Acid		C	G	X	G		E	G		X	X		G			X		E	E
Butyric Acid, 20%						X							C	C	C				
Butyric Anhydride		G	C				E			C	C								E
Butyuraldehyde							E	X	G									E	E
Cadmium Acetate		E	E				E			X								E	E
Calcium Acetate		C	E	G			E	X		E	G		X			X		E	E
Calcium Aluminate		E	E				E	E		E	E								E
Calcium Bichromate		C	E				E												G
Calcium Bisulfate		E	G	E	G		E	E	E	C	E					C		E	E
Calcium Bisulfide				C	X		E	E			E	G	C			G			
Calcium Bisulfite		E	E	E	E	E	E	E	E	E	E		E	E	E	E		E	E
Calcium Carbonate		E	E	E	E	E	E	E	E	E	E		E	E	E	E		E	E
Calcium Chlorate						E							G	E	E				
Calcium Chloride	G	E	E	E	E	E	E	E		E	E	E	E	E	E	E		E	E
Calcium Hydroxide	G	G	E	E	E	E	E	E		E	E	E	E	E	E	E		E	E
Calcium Hypochlorite	G	E	E	C	E	G	E	E		X	X	X	X	E	E	X		C	C
Calcium Nitrate		E	E	E	E	E	E	E		E	E	E	X	E	E	E		E	E
Calcium Sulfate		E	E	E	E	E	E	E	E	E	E		E	E	E	E		E	E
Calcium Sulfide	X	E	E	E	E		E	E		X	E	E	E			X		E	E
Calcium Sulfite		E	E	E	E		E	E	E	E	E					E		E	E
Caliche Liquor		E	E	E	E		E	E	E	E	E					E		E	E
Cane Sugar Liquors		E	E	E	E	G	E	E	E	E	E			E		E		E	E
Caprilic Acid		G	C				E			C	C							E	E
Carbamide		E	G	G			E			E	G								
Carbitol		G	E	C	G		E	G		X	G	E	X			G		E	E
Carbitol Acetate		X	G	X	G			X		X	X					X		E	E
Carbolic Acid	G	X	G	X	X		E	E		X	X	X	X			X	X	E	E
Carbon Bisulfide		X	X	X	X	X	E	E		X	X			X	X	X			
Carbon Dioxide		G	G	G	G		E	G		G	E	E	E			G		E	E
Carbon Dioxide (AQ)						E							E	E	E				
Carbon Dioxide Gas, Wet						E							E	E	E				
Carbon Disulfide		X	X	X	X		E	X		X	X	X	X			X		E	C
Carbon Monoxide	G	E	E	E	E	G	E	E		C	E	E	G	E	E	G	E	E	E
Carbon Tetrachloride	C	X	X	X	X	X	E	E		X	C	X	X	X	C	X	X	G	E
Carbon Tetraflouride		X	X	X	X		E			X	C					X		C	C
Carbonic Acid	X	E	E	G	E	G	E	G		E	G	G	E	C	G	G	X		E
Casein						E							E	E	E				
Castor Oil	G	E	G	E	G	C	E	E		E	E	G	G	E	E	E	C	E	E
Catsup														E					
Caustic Potash		E	E	G	E	C	E	C	E	E	E		C	E	E	G		E	E
Caustic Soda			E	E	E	G	E	G				G	C	E	E		E		
Cellosolve		G	E	X	E	C	E	C	E	G	X		G	C	G	G		E	E
Cellosolve Acetate		X	G	X	G		E	X		X	X	G	X			X		E	E
Celluguard		X	E	E	E		E	E		E	E	G	E			E			
Cellulube		X	G	X	E			C		C	X					X		E	E
Cetylic Acid	G	C	G	G	G		E	E		E	E	C	E			G	E		
China Wood Oil	C	E	X	E	X		E	E		X	E	G	C			X			
Chloracetic Acid						X							X	E	E				
Chloral Hydrate						C							G	E	E				
Chlordane		C	X	C	X			E		X	G	G	C			X			
Chloric Acid, 20%													X	E	E				
Chlorinated Hydrocarbons		X	X	X	X	X	E	E		X	X		X	X	X	X			
Chlorinated Solvents	X	X	X	X	X		E	E		X	X	X	X			X		X	G

***Refer to the PVC and Thermoplastic Temperature/Pressure chart in this section.**

(Continued on the following page)

Hose and Chemical Table (Continued)

Refer to *Names and General Properties of Hose Materials* table.

Key: **E = Excellent G = Good C = Conditional**
Blank = No Data X = Not Recommended

Chemical Or Material Conveyed	CPE	CSM	Chlorobutyl	Chloroprene	EPDM	EVA***	FEP/PTFE	FKM	MXLPE	Natural	Nitrile	Nylon	PU***	PVC***	PVC/PU***	SBR	TPV***	UHMWPE	XLPE
Chlorine Dioxide		C	X	X	X			E		X	X					X		G	G
Chlorine Gas		X	X	X	X		E	E		X	X					X			
Chlorine Gas, Dry						X							X	G	G				
Chlorine Gas, Moist						X							X	C	C				
Chlorine Water Solutions		X	X	X	X		E	C	E	X	X					X		G	E
Chlorine Water, 2%						G							C	G	G				
Chlorine Water, Saturated						E								C	C				
Chloroacetic Acid		G	G	X	G		E	G		X	X	X	X			X	X	E	E
Chloroacetone		X	X	C	E		E	X		X	X		X			X		E	E
Chlorobenzene						X	E	E	G				X	X	X			G	G
Chlorobenzene, Mono, Di, Tri		X	X	X	X		E	E	G	X	X	E	X			X	X	C	E
Chlorobutadiene		X	X	X	X			E		X	X					X		G	G
Chlorobutane		X	C				E	E		X	X		C					G	G
Chloroethylbenzene	X	X	X		X		E	E		X			G			X		E	E
Chloroform	X	X	X	X	X	X	E	G		X	X	X	X	X	X	X	X	E	C
Chloropentane		X	C				E	E		X						X		E	E
Chlorophenol		X	X	C	X		E	E	G	X	X					X		E	E
2-Chlorophenol	G	X	X	X	X		E	E		X	X	X	X			X	X		G
2-Chloropropane		X	X	X	X		E	E		X	X	X	X			X	X		E
Chloropropanone		X	C	X	C		E	X		X	X					X			
3-Chloropropene		X	C	X	X		E	G		X	G					E			
Chlorosulfonic Acid	X	X	X	X	X		E	X		X	X	X	X			X	X	X	X
Chlorothene		X	X	X	X		E	E	E	X	X					X		G	G
Chlorotoluene		X	X	X	X		E	E		X	X	E	X			X		G	G
Chlorox		G	G	G	G		E	E		X	G	X	X			X		E	G
Chlorsulfonic Acid						X							X	C	C				
Chrome Alum						E							E	E	E				
Chrome Plating Solutions		X	X	X	X					X	X					X			
Chromic Acid	X	X	G	X	X		E	E		X	X	X	X			X	X	X	E
Chromic Acid, 50%						C							X	C	C				
Chromium Trioxide	X	X	G	X	X		E	E		X	X	X	X			X	X		
Cider						E								E					
Cinnamene		X	X	X	X		E	G		X	X		C			X			
Citric Acid	X	E	E	E	E	E	E	C		E	E	G	E	E	E	E	E	E	E
Coal Oil		C	X	G	X		E	E		X	E	E	C				X	E	C
Coal Tar		X	X	C	X	X	E	E		X	G		C	X	X	X	X	E	E
Coal Tar Naphtha		X	X		X		E	E		X	X		X			X			E
Cobalt Chloride		E	E	E	E			E		E	E					E		E	E
Coconut Oil		C	G	C	G	C	E	E		X	E		C	G	E	X		E	E
Cod Liver Oil		G	E	G	E		E	E	E	X	E					X		E	E
Coke Oven Gas		X	X	X	X		C	E		X	X	C	X			X			E
Coolanol		G	X	G	X			E		X	E		X			X			
Copper Arsenate		E	E	E	E		E	E	E	E	E					E		E	E
Copper Chloride	X	G	E	G	E	E	E	E		G	E	X	G	E	E	E		E	E
Copper Cyanide		G	E	E	E	E	E	E		E	E	X	E	E	E	E		E	E
Copper Fluoride, 2%						E							E	E	E				
Copper Hydrate		G	E				E	C		C	G							E	
Copper Hydroxide		G	E				E	C		C	G					G			E
Copper Nitrate		E	E	E	E					E	E					E			
Copper Nitrate						E	E	E	E				E	E	E			E	E
Copper Sulfate	X	E	E	E	E	E	E	E		G	E	G	G	E	E	G		E	E
Copper Sulfide		E	E	E	E		E	E		C	E					E		E	E
Corn Oil		G	G	C	X		E	E		X	E	G	E	E		X	E	E	E
Cottonseed Oil	G	G	C	C	C	E	E	E		X	G	E	E	G	E	X		E	E
Creosote (Coal Tar)		X	X	X	X		E	E		X	G	X	C			X		E	E
Creosote (Wood)		C	X	G	X		E	E		X	E					X		E	

***Refer to the PVC and Thermoplastic Temperature/Pressure chart in this section.**

(Continued on the following page)

Hose and Chemical Table (Continued)

Refer to *Names and General Properties of Hose Materials* table.

Key: **E = Excellent G = Good C = Conditional**
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Chemical Or Material Conveyed	CPE	CSM	Chlorobutyl	Chloroprene	EPDM	EVA***	FEP/PTFE	FKM	MXLPE	Natural	Nitrile	Nylon	PU***	PVC***	PVC/PU***	SBR	TPV***	UHMWPE	XLPE
Cresols		X	X	X	X	X	E	E		X	X	X	X	X		X	X	E	G
Cresote						X								X	X				
Cresylic Acid		X	X	X	X		E	G		X	X	X	X			X		E	G
Cresylic Acid, 50%						X							X	X	C				
Crotonaldehyde		X	E	X	E		E	X		X	X		X			C		E	E
Crude Oil, Sour						X							E	C	C				
Crude Oil, Sweet						X							E	C	C				
Cumene		X	X	X	X		E	E		X	X		X			X		E	E
Cupric Carbonate		E	E	E			E	E		C	E							E	E
Cupric Chloride		E	E	G	E		E	E	E	C	E					C		E	E
Cupric Hydroxide		G	E				E	C		C	G								
Cupric Nitrate		E	E	E	E		E	E	E	G	E					C		E	E
Cupric Sulfate		E	E	E	E		E	E		G	E	G	X			E		E	E
Cutting Oil		G	X	G	X		E	E		X	E		E			X			
Cyclohexane		X	X	X	X	C	E	E		X	G	E	G	X	X	X	X	E	E
Cyclohexanol		G	X	G	X	E	E	E		X	G	E	C	X	X	X	X	E	E
Cyclohexanone		X	X	X	C	E	E	X		X	X	E	X	X	X	X	X	E	X
Cyclopentane		X	X	E	X		E	E		X	G							E	E
Cyclopentanol		X	X					G		X	G					X		E	E
Cyclopentanone		X	X				E	X		X	X								E
Cyclopentyl Alcohol		X	X					G		X	G					X		E	E
P-Cymene	X	X	X	X	X		E	E		X	X		X			X		E	E
DDT In Deionized Kerosene		X	X	C	X		E	E	G	X	E	E	G			X		E	E
Decahydronapthalene		X	X	X	X		E	E		X	X	E	X			X	X		
Decahydroxynapthalene	C																		
Decalin		X	X	X	X		E	E	X	X	X	G	X			X	X	X	E
Decane		X	X	X	X			A		X	G					X		E	E
1-Decanol		E	X	X	X		E	G		X	E		E			X			E
Decyl Alcohol		E	X	X			E	G		X	E							E	E
Decyl Aldehyde		X	C				E	X		X								E	E
Decyl Butyl Phthalate		X	E				E	C		X	X							E	E
Decyl Carbinol		E	E				E	G		E	E								
Developing Fluid, Photo		E	G	E	G		E	E		E	E	E				G		E	E
Dextrin						E							E	E	E				
Dextron		X	X	G	X			E		X	E		G			X			
Dextrose						E							E	E					
Diacetone Alcohol		X	E	X	E		E	X		X	X		X			X		E	C
Diacetylmethane	G	X	E	X	E		E	X		X	X		X			X	E		
Diallylphthalate	G																		
Diammonium Phosphate	E	E	E	E	E		E	E		E	E	E				E			
Diamyl Napthalene		X	E				E	C		X									E
Diamyl Phenol		X	X				E	E		X	X					X			E
Diamylamine		C	E		E		E	X		G	G		X			X			
Diamylene		X	X	X			E	E		X	C	G							E
Diazo Salts						E								E	E				
Dibenzyl Ether		X	G	X	C		E	X		X	X		G			X		E	E
Dibenzylsebacate		X	G	X	G		E	G	E	C	X					X		E	E
Dibromobenzene		X	X				E	E		X								G	E
Dibromomethane		X	X	X	C		E	G		X	X						X		
Dibutyl Ether		X	X	X	X		E	X		X	X		X			X		E	E
Dibutyl Phthalate		X	C	X	E		E	C		X	X	E	X			X		E	E
Dibutyl Sebacate		X	G	X	G		E	E		X	X		X			X		E	E
Dibutylamine		X	X	X	X		E	X		X	X		X			X		E	
Dicalcium Phosphate		E	E				E	E		E	E								E
Dichloro Difluoro Methane	C	E	X	G	C		E	G		X	C	G	E			E	X		
Dichloro Ethylene		X	C	X	X		E	G				C	C				X		

***Refer to the PVC and Thermoplastic Temperature/Pressure chart in this section.**

(Continued on the following page)

Hose and Chemical Table (Continued)

Refer to *Names and General Properties of Hose Materials* table.

Key: **E = Excellent G = Good C = Conditional**
Blank = No Data X = Not Recommended

Chemical Or Material Conveyed	CPE	CSM	Chlorobutyl	Chloroprene	EPDM	EVA***	FEP/PTFE	FKM	MXLPE	Natural	Nitrile	Nylon	PU***	PVC***	PVC/PU***	SBR	TPV***	UHMWPE	XLPE
Dichloroacetic Acid		X	C				E	X		G			C					E	E
Dichlorobenzene						X								X	X				
Ortho-Dichlorobenzene		X	X	X	X		E	E		X	X	E	X			X	X		
P-Dichlorobenzene		X	X	X	X		E	E	G	X	X					X		X	X
Para-Dichlorobenzene		X	X	X	X		E	E		X	X		X			X			G
Ortho-Dichlorobenzol		X	X	X	X		E	E		X	X	E	X			X	X		X
Dichlorobutane		X	X	X	C		E	E		X	G		X			X		E	G
Dichloroethane	X	X	C	X	X		E	G		X	X	C	X			X	X		E
Dichloroethyl Ether		X	X				E			X	X					X			E
Dichloroethylene		X	X	X	X		E	E	X	X	X					X		C	C
Dichlorohexane		X	X				E	E		X								E	E
Dichloroisopropyl Ether		X	C	X	C			C		X	X					X		E	E
Dichloromethane		X	X	G	C		E	G		X	X	C				X	X	E	E
Dichloropentane		X	X	X			E	E		X	X		X			X		E	E
Dichloropropane		X	X	X			E	E		X	X							E	E
Dichloropropene							E	E										E	E
Dichlorotoluene	X																		
Diesel Oil	E	C	X	C	X		E	E		X	E	E	C	C	C	X	X	E	G
Diethanolamine		C	E		E		E			G		G				X		E	
Diethyl Benzene		X	X	X	X		E	E	G	X	X					X		E	E
Diethyl Ether		X	X	X	X	X	E	X		X	X	E	E	X	X	X	E	G	
Diethyl Ketone		X	G	X	E		E	X		X									G
Diethyl Oxalate		X	X	X	X		E			X	X								E
Diethyl Phthalate		X	E				E	C		X								E	E
Diethyl Sebacate		C	G	X	G		E	G		X	X		X			X	E		
Diethyl Sulfate		X	G	E	E		E	X		X	X		X			E			
Diethyl Triamine		C	E				E			G	G								
Diethylamine		X	G	G	G					G	C					G			
Diethylamine		C	G	G	G		E	X		G	C		C			G		E	C
Diethylbenzene		X	X	X	X		E	E		X	X		X			X		E	E
Diethylene Dioxide		X	G	X	G		E	X	E	X	X					X		E	E
Diethylene Glycol		E	E	E	E	G	E	E		E	E	E	X	G	G	E		E	E
Diethylene Oxide			X		E		E												
Diethylene Triamine		C	E		E		E			G			X			X	E	E	
Diglycolic Acid						E								E	E				
Dihydroxy Diethyl Ether		E	E	E	E		E	E	E	E	E					E		E	E
Dihydroxy Succinic Acid		E	G	C	G		E	E		E	G		E						
Diisobutyl Ketone		X	G	X	E		E	X		X	X		X			X		E	E
Diisobutylene		X	X	C	X		E	E		X	E		X			X		E	E
Diisodectyl Phthalate		X	E		E		E	C		X						X		E	E
Diisodecyl Phthalate		X	E	X	E		E	C		X	X			X					
Diisooctyl Adipate		X	E	X	E		E	C		X	X					X		E	E
Diisooctyl Phthalate		X	E		G		E	C		X								E	E
Diisopropanolamine		C	E				E			G	G								
Diisopropyl Benzene		X	X	X	X		E	E	G	X	X					X		E	E
Diisopropyl Ether		C	X	X	X		E	X		X	G		G			X			E
Diisopropyl Ketone		X	E	X	E		E	X		X	X		X			X			E
Dilauryl Ether		C	D	X	X		E	C	G	X	C					X		E	E
Dimethyl Phenols (DMP)		X	X	X	X		E	X	E	X	X					X		C	C
Dimethyl Phthalate		X	G	X	G		E	G	E	X	X		X			X	G	E	E
Dimethyl Sulfate		X	G	X	X		E	X	X	X	X					X		E	X
Dimethyl Sulfide		X	C	X	X		E	C	E	X	X					X		G	G
Dimethylamine		X	G	X	X	X	E	X			X	E	X	X	X			E	X
Dimethylaniline	C	X	X	X	G		E	X			X		X			X		G	G
Dimethylbenzene	C	X	X	X	X		X	E			X	G	X			X	X	E	
Dimethylbutane	G																		

***Refer to the PVC and Thermoplastic Temperature/Pressure chart in this section.**

(Continued on the following page)

Hose and Chemical Table (Continued)

Refer to *Names and General Properties of Hose Materials* table.

Key: **E = Excellent G = Good C = Conditional**
Blank = No Data X = Not Recommended

Chemical Or Material Conveyed	CPE	CSM	Chlorobutyl	Chloroprene	EPDM	EVA***	FEP/PTFE	FKM	MXLPE	Natural	Nitrile	Nylon	PU***	PVC***	PVC/PU***	SBR	TPV***	UHMWPE	XLPE
Dimethylcarbinol		E	E	E	G		E	E		E	G							E	
Dimethylformamide (DMF)		C	C	C	C		E	X	E	C	X					C		E	E
Dimethylketone	G	X	E	X	E		E	X			X	E	X			C	E	E	
Dinitrobenzene		X	C	C	C		E	E	G	X	X					X		E	E
Dinitrotoluene		X	X	X	X		E	G	E	X	X					X		E	E
Dioctyl Adipate (DOA)		X	E	X	G		E	C		X	X							E	
Dioctyl Phthalate (DOP)		X	G	X	G	G	E	G		X	X	E	X	X	X	X		E	E
Dioctyl Sebacate (DOS)		X	G	X	G		E	G	E	X	X					X		E	E
Dioxalanes		X	X	X	G		E	X	G	X	X		X			X		E	E
Dioxane		X	G	X	G		E	X		X	X	E	X			X		E	E
1,4 Dioxane		X	G	X	G		E	X		X	X	E	X			X	X		E
Dipentene		X	X	X	X		E	E		X	G		X			X			
Dipentylamine		C	E		E		E	X		G	G		X			X			
Diphenyl		X	X	X	X			A		X	X					X		E	E
Diphenyl Oxide		C	X	X	X			A		X	X					X		E	E
Di-P-Mentha-1,8-Diene		X	X	X	X		E	E		X	G		X			X			
Dipropyl Ketone		X	G	X	G		E	X	E	X	X					X		E	E
Dipropylamine		C	E				E			G	G								
Dipropylene Glycol		E	E				E	E		E	E								
Disodium Phosphate		E	E		E	E	E	E		E	E		E	E	E			E	E
Divinyl Benzene		X	X				E	E		X						X		E	E
Dodecyl Benzene		X	X	X	X		E	E	G	X	X					X		E	E
Dodecyl Toluene		X	X	X	X		E	E	G	X	X					X		E	E
Dowell Inhibitor	G																		
Dowfax 2A1 Solvent	E																		
Dowfax 2A1 TA	E																		
Dowfax 6A1 Solvent	G																		
Dowfax 6A1 Ta	E																		
Dowfume W 40, 100%		C	D	C	C			C		X	X					X		G	G
Dow-Per		X	X	X	X		E	E	G	X	C					X		E	E
Dowtherm A & E	X	X	X	X	X		E	E	E	X	X	X	X			X		E	E
Dowtherm S.R.I.		E	E	E	E		E	E	E	E	E					E		E	E
Dry Cleaning Fluids		X	X	X	X		E	E			C	E	X			X		G	X
Ducgkirioebaane			X																
Duro AW16, 31					X		E				E	E							
Duro FR-HD					X		E				E	E							
Epichlorohydrin		C	C	X	G		E	X	G	X	X					X		G	G
Ethanoic Acid	E	C	G	G	E		E	X		X	C	X	X			G	C	E	E
Ethanolamine		X	G	G	G		E	X		G	G	E	C			X		E	E
Ethanol (Ethyl Alcohol)	G	E	E	E	E		E	C		E	E	G	X			E	E	E	E
2 (2Aminoethylamino) Ethanol		G	E							G	G								
2 (2Ethoxyethoxy) Ethanol		X	G	X	G		E	X		X	X	E	X			X	X		
2-Ethoxyethanol		X	G	X	G		E	X		X	X		X			X	X		
Ethers	G	X	X	X	C	X	E	X		X	X	E	X	X	C	X		C	
Bis (2-Cloroethyl) Ether		X	X				E			X	X					X			
Ethyl Acetate	G	X	G	X	E	C	E	X		X	X	E	X	X	C	X	E	E	G
2-Ethoxyethyl Acetate	X	X	G	X	G		E	X		X	X	G	X			X	X		
2 (2Ethoxyethoxy) Ethyl Acetate	X	X	G	X	X		E	X		X	X		X			X	X		
Ethyl Acetoacetate		X	G	X	G		E	X		C	X					C		E	E
Ethyl Acetone		X	G	X	G		E	X		X	X					X			
Ethyl Acrylate		X	G	X	G		E	X		X	X		X	X	X	X		E	G
Ethyl Alcohol (Ethanol)	G	E	E	E	E		E	E		E	E	G	X			E	E	E	E

***Refer to the PVC and Thermoplastic Temperature/Pressure chart in this section.**

(Continued on the following page)

Hose and Chemical Table (Continued)

Refer to *Names and General Properties of Hose Materials* table.

Key: E = Excellent G = Good C = Conditional
Blank = No Data X = Not Recommended

Chemical Or Material Conveyed	CPE	CSM	Chlorobutyl	Chloroprene	EPDM	EVA***	FEP/PTFE	FKM	MXLPE	Natural	Nitrile	Nylon	PU***	PVC***	PVC/PU***	SBR	TPV***	UHMWPE	XLPE
Ethyl Alcohol, 1%-50%						G								G	G				
Ethyl Alcohol, 50%-98%						C								C	C				
Ethyl Aldehyde	E	C	G	X	E		E	C		X	X	G	X			E	E	E	E
Ethyl Aluminum Dichloride		X	X				E	G		X	X								G
Ethyl Benzene		X	X	X	X		E	E		X	X		X			X		E	X
Ethyl Benzoate		C	G	C	G			C		X	G					X		E	E
Ethyl Bromide		X	X	X	X		E	E		C	G		X			X			X
Ethyl Butanol		E	E	E	E		E	G	E	E	E							E	E
Ethyl Butyl Acetate		G	E				E	X		X	X							E	E
Ethyl Butyl Ketone		X	G				E	X		X	X								E
2-Ethyl (Butyraldehyde)		X	G				E	X		X	X								E
Ethyl Cellulose		G	G	G	G		E	X		G	G	C	G			G		E	E
Ethyl Chloride	X	C	E	X	E	X	E	E		C	E	E	C	X	X	G	X	G	C
Ethyl Dichloride		X	X	X	X		E	G	G	X	X		X			X		G	G
Ethyl Diisobutylthio-Carbamate										E						E		E	
Ethyl Ether	G	X	X	X	X	X	E	X		X	X	G	C	X	X	X		C	C
Ethyl Formate		G	G	G	G		E	E		X	X					X		E	E
Ethyl Hexanol		E	E	E	E		E	G	E	E	E					E		E	E
2-Ethyl-1-Hexanol		E	G	E	E		E	E		G	E		X			E	E		E
2-Ethylhexanoic Acid		G	C				E			C	C								
2-Ethylhexyl Acetate		G	E				E	X		X	X								
Ethyl Iodide		X	C	X	C		E	G		X	X							G	E
Ethyl Methyl Ketone		X	G	X	G		E	X	E	C	X					X		E	E
Ethyl Oxalate		X	X	X	C		E	E		C	X		E			X		E	E
Ethyl Phthalate		X	E				E			X	X							E	
Ethyl Propyl Ether		X	X	X	X			C	E	X	X					X		E	E
Ethyl Propyl Ketone		X	G	X	G		E	X	G	X	X					X		E	E
Ethyl Silicate		G	E	E	E		E	E		G	E		X			G		E	E
Ethyl Sulfate		X	G	D	G		E	X	E	X	X					X		E	E
Ethylamine		C	G	X	E		E	X		C	X	E	X			C		E	
Ethylene		C	X	G	X			E		X	E					X		E	E
Ethylene Bromide		X	X	X	X	X	E	E	G	X	X		X	E	X	X		G	G
Ethylene Chloride	X	C	C	X	X	X	E	G	G	X	X	G	X	X	X	X	X	C	X
Ethylene Chlorohydrin		C	G	G	G		E	E		C	X	E						E	E
Ethylene Diamine		G	E	E	E		E	X		G	G	E	X			G		E	E
Ethylene Dibromide		X	X	X	C		E	G		X	X		X			X		G	G
Ethylene G Monobutyl Ether		C	E	C	E		E	X		X	C		X			X			E
Ethylene G Monoethyl Acetate		X	E	X	E		E	E		C	C		X						
Ethylene G Monohexyl Ether																			E
Ethylene G Monomethyl Ether		G	E	E	G		E	X		X	C								E
Ethylene Glycol	G	E	E	E	E	E	E	E		E	E	E	G	E	E	E	E	E	E
Ethylene Oxide	X	X	X	X	C	X	E	X		X	X	E	X	X	X	X		E	G
Ethylene Trichloride		X	X	X	X		E	E	G	X	C					X		G	G
Fatty Acids		C	X	G	X	C	E	E		X	E	E	C	E	E	X	X	E	E
Ferric Bromide		E	E				E	E		E	E							E	
Ferric Chloride	X	E	E	E	E	E	E	E		E	E	X	E	E	E	E		E	E
Ferric Nitrate		E	E	E	E	E	E	E		E	E	E	E	E	E	E		E	E
Ferric Sulfate	X	E	E	E	E	E				E	E		E	E	E	E			
Ferrous Acetate		E	E				E	X		X	X								E
Ferrous Ammonium Sulfate		E	E	E	E			A		E	E					E		E	E
Ferrous Chloride		G	G	G	E	E	E	E		E	E	E	G	E	E			E	E
Ferrous Hydroxide		G	E	E	E		E	C	E	G	G					C		E	E
Ferrous Sulfate		E	E	E	E	E	E	E		E	E	G	E	E	E	E		E	E
Fish Oil		E	E	E	X		E	E		X	E					X		E	E
Fish Solubles						E							E	E	E				
Fluoboric Acid		E	G	E	E		E	E		E	E		X			E		C	C

***Refer to the PVC and Thermoplastic Temperature/Pressure chart in this section.**

(Continued on the following page)

Hose and Chemical Table (Continued)

Refer to *Names and General Properties of Hose Materials* table.

Key: E = Excellent G = Good C = Conditional
Blank = No Data X = Not Recommended

Chemical Or Material Conveyed	CPE	CSM	Chlorobutyl	Chloroprene	EPDM	EVA***	FEP/PTFE	FKM	MXLPE	Natural	Nitrile	Nylon	PU***	PVC***	PVC/PU***	SBR	TPV***	UHMWPE	XLPE
Fluorine		X	X	X	E		G	E		X	X	X	X					C	X
Fluorine Gas, Dry						X							X	X	X				
Fluorine Gas, Wet						X							X	X	X				
Fluoroboric Acid						E							E	E	E				
Fluorosilic Acid		E	E	E	E	G	E	C	E	E	E		X	E	E	G	C	C	G
Foric Acid						E							X	E	E				
Formaldehyde	G	G	E	G	E		E	E			C	G	X			C	E	E	E
Formaldehyde (40% AQ)						E								X	G				
Formalin	G	G	E	G	E		E	E			C	G	X			C	E	E	E
Formamide		E	E	E	E		E	X	E	E	E					E		E	E
Formic Acid	X	E	E	E	E	E	E	X		C	C	X	X			E	E	E	E
Freon 11		E	X	G	X			E		G	E					X		E	E
Freon 12	C	E	C	E	C	G	E	G		C	E	E	E	C	G	E	X		E
Freon 13		E	E	E	E			E		E	E					E		E	E
Freon 21		X	X	G	X			X		X	X					X		E	E
Freon 22	C	E	X	E	E		E	C		C	X	G	X			E	X		
Freon 31		G	E	E	E			X		G	X					G		E	E
Freon 32		E	E	E	E			C		E	E					E		E	E
Freon 112		G	X	G	X			E		X	G					X		E	E
Freon 113		E	X	E	X		E	G		X	E	E	G			G	X	E	
Freon 114		E	E	E	E			G		E	E					E		E	E
Freon 114B2		E	X	E	X			G		X	G					C		E	E
Freon 115		E	E	E	E			G		E	E					E		E	E
Freon 13B1		E	E	E	E			E		E	E					E		E	E
Freon 142B		E	E	E	E			X		E	E					E		E	E
Freon 152A		C	E	E	E			X		E	E					E		E	E
Freon 218		E	E	E	E			E		E	E					E		E	E
Freon 502			E	E	E			G		E	G	E				E			
Freon BF		G	X	G	X			E		X	G					X		E	E
Freon C316		E	E	E	E			E		E	E					E		E	E
Freon C318		E	E	E	E			E		E	E					E		E	E
Freon MF		B	X	C	X			E		X	E					G		E	E
Freon TA		E	E	E	E			C		E	E					E		E	E
Freon TC		E	E	E	G			E		X	E					G		E	E
Freon TF		E	E	E	E			E		C	E					G		E	E
Freon TMC		G	G	G	G			E		G	G					C		E	E
Freon T-P35		E	E	E	E			E		E	E					E		E	E
Freon T-WD 602		G	E	G	G			E		C	E					G		E	E
Fructose						E							E	E					
Fruit Juices & Pulps						E							E	E					
Fuel Oil	E	C	X	G	X	X	E	E		X	E	G	C	G	G	X		E	E
Fumaric Acid		G	X	G	X		E	E	E	E	E					E		E	E
Furaldehyde	E	C	E	C	G		E	X		X	X	C	X			X	E		
Furan		X	X	X	X		E	C		X	X		X			X			
Furfural	E	C	E	C	G	X	E	X		X	X	E	X	X	X	X	E	E	E
Furfuryl Alcohol		X	G	X	G	X	E	C		X	X	G	X			X	E	E	C
Gallic Acid		G	G	G	G	E	E	E		E	G	G	X	E	E	G		E	C
Gallotannic Acid		E	G	E	E		E	E		E	E	E	E					E	E
Gas, 100 Octane		X	X	C	X					X	E					X			
Gas, Coal				E	E			E			X	E	G						
Gas, Coke Oven													G	G	G				
Gas, Natural, Dry						X							C	C	C				
Gas, Natural, Wet						X							C	C	C				
Gasoline	E	X	X	X	X	X	E	G	G	X	E	G	C	X	X	X		G	G
Gasoline, 100 Octane							E	E				G	C				X	C	
Gasoline, Sour						X							E	C	G				

***Refer to the PVC and Thermoplastic Temperature/Pressure chart in this section.**

(Continued on the following page)

Hose and Chemical Table (Continued)

Refer to *Names and General Properties of Hose Materials* table.

Key: **E = Excellent G = Good C = Conditional**
Blank = No Data X = Not Recommended

Chemical Or Material Conveyed	CPE	CSM	Chlorobutyl	Chloroprene	EPDM	EVA***	FEP/PTFE	FKM	MXLPE	Natural	Nitrile	Nylon	PU***	PVC***	PVC/PU***	SBR	TPV***	UHMWPE	XLPE
Gelatin		E	E	E	E		E	E	E	E	E					E		E	E
Gelatine						E							E	E	E				
Glacial Acrylic Acid																			E
Gluconic Acid		G	C				E			X	C							E	
Glucose		E	E	G	E	E	E	E		E	E	E	C	E	E	E		E	E
Glue		E	G	E	E		E	C	E	G	E					G		E	E
Glycerine	E	E	E	E	E	E	E	E		E	E	E	C	E	E	E	X	E	E
Glycerol	E	E	E	E	E		E	E		E	E	E	C			E	X	E	E
Glycogenic Acid		G	C				E			X	C								
Glycolic Acid, 30%						E							X	E	E				
Glycols		E	E	E	E	E	E	E	E	E	E	E	X	E	E	E	G	E	E
Glyconic Acid		G	C				E			X	C							E	
Glycyl Alcohol	E	E	E	E	E		E	E		E	E	G	C			E	X		
Grease													E	E	E				
Grease, Petroleum Base	E	X	X	C	X		E	E		X	E	E	E			X	X	E	G
Green Liquor						E								E	E				
Green Sulfate Liquor		G	E	G	E		E	E		G	G	X	E			G		E	E
Halon 1211				E							E								
Halowax Oil		X	X	X	X		E	E	E	X	X					X		E	E
Helium		E	E	E	E		E	E		E	E	E	E			E			
1-Hendaconal	E																		
Heptachlor In Petroleum Solvents		X	X	G	X		E	E	G	X	G					X		E	E
Heptachlor In Petroleum Solvents, Water Spray		X	X	G	X			E		X	G					X		E	E
Heptaldehyde		X	X				E	X		X	E								
Heptanal		X	X				E	X		X	E							E	E
Heptane	E	G	X	G	X	X	E	E		X	E	E	G	C	G	X		E	G
Heptane Carboxylic Acid		G	C				E			X	C								
Heptanoic Acid	E																		
Heptanone	C																		
Hexadecanoic Acid	G	C	G	G	G		E	E		E	E	C	E			G	E		
Hexadecanol						X													
Hexaldehyde		C	G	E	E		E	X		X	X		G			X		E	E
Hexane		E	X	E	X		E	E		X	E	E	G	C	C	X	E	E	G
Hexanol		G	C	G	G		E	E		E	G	E	X			E		E	E
Hexanol, Tertiary						C							G	C	C				
Hexene		G	X	G	X		E	E		X	G		G			X			E
Hexyl Alcohol		G	C	G	G		E	G		E	G	E	X			E		E	E
Hexyl Methyl Ketone		X	G				E	X		X	X								E
Hexylamine		C	G				E	X		C	C								
Hexylene		X	X	G	C		E	E		X	E					X		G	G
Hexylene Glycol		E	E	E	C		E	E		E	E								
Histowax	E																		
Hydraulic Fluid, Petroleum	E	G	X	G	X		E	E	E	X	E	E				X	X	E	E
Hydraulic Fluid, Phospate Ester Base		X	E	X	E		E	X	E	X	X					X		E	E
Hydraulic Fluid, Poly Alkylene Glycol Base		E	E	E	E			E		G	E					G		E	E
Hydrazine		G	E	G	E		E	E		X	G	X				G			E
Hydrobromic Acid	X	E	E	X	E		E	E		E	X	X	X			X		E	E
Hydrobromic Acid, 20%						G							X	E	E				
Hydrochloric Acid	X	C	E	C	C		E	C	E	C	C	X	C			X	E	E	E
Hydrochloric Acid, 10%						E							X	E	E				
Hydrochloric Acid, 48%						G							X	E	E				
Hydrocyanic Acid	X	E	G	G	E		E	E		G	G	G	X			G	E	E	E

***Refer to the PVC and Thermoplastic Temperature/Pressure chart in this section.**

(Continued on the following page)

Hose and Chemical Table (Continued)

Refer to *Names and General Properties of Hose Materials* table.

Key: E = Excellent G = Good C = Conditional
Blank = No Data X = Not Recommended

Chemical Or Material Conveyed	CPE	CSM	Chlorobutyl	Chloroprene	EPDM	EVA***	FEP/PTFE	FKM	MXLPE	Natural	Nitrile	Nylon	PU***	PVC***	PVC/PU***	SBR	TPV***	UHMWPE	XLPE
Hydrofluoric Acid	X	E	G	C	C		E	G		C	C	X	X			C	X	E	E
Hydrofluoric Acid, 60%						E							X	G	G				
Hydrofluosilicic Acid	X	E	E	G	E		E	E		E	G	X	C	G	G	G		G	E
Hydrogen						C							C	C	C				
Hydrogen Bromide, Dry						E													
Hydrogen Chloride, Anhydrous	E											X						E	E
Hydrogen Chloride, Dry						E													
Hydrogen Cyanide						C							X	C	C				
Hydrogen Dioxide, 10%		G	C	X	G		E	E		G	C	X						E	E
Hydrogen Gas	C	E	E	E	E		E	E		G	E	E	E			G		E	E
Hydrogen Peroxide, 3%		C	C	C	E		E	E	E	X	C					X		E	E
Hydrogen Peroxide, 10%		E	G	X	G	G	E	E		G	C	C	G	E	E	C		G	G
Hydrogen Peroxide, 30%	X	X	X	X	C	G	E	E	E	X	X	X	C	E	E	X		E	E
Hydrogen Peroxide, 50%						X							C	E	E				
Hydrogen Peroxide, 90%	X	X	X	X	C	X	E	G		X	X	X	C	X	X	X		G	G
Hydrogen Phosphide						E								E	E				
Hydrogen Sulfide (AQ)						E								E	E				
Hydrogen Sulfide, Dry						E								E	E				
Hydrogen Sulfide, Wet	X	E	E	E	E		E	C		X	C	C	C			X		E	E
Hydroquinone		C	G	X	G	E	E	X	E	G	X		E	E	E	G		E	E
Hydroxy Benzene		C	G	X	C		E	E		X	X		C						
2-Chloro-1-Hydroxy-Benzene	C																		
Hydroxyisobutyronitrile	E																		
Hydroxytoluene	E																		
Hypochlorous Acid		E	G	G	G	C		E		G	X		C	E	E	G		E	E
Hyvar XI					E														
Iminodi-2-Propanol	E																		
Iminodiethanol	E																		
Ink Oil, Linseed Oil Base		G	G	G	G		E	E	G	X	G					X		E	E
Inks						E													
Insulating Oil		X	X	G	X		E	E	E	X	E					X		E	E
Iodine		G	G	X	G		E	E		X	G	X	X			G		E	X
Iodine in Alcohol						X							X	X	X				
Iodine Pentafluoride		X	X	X	X		E	X		X	X		X			X		C	C
Iodoform				X	X					X	E					X			
IRM-902	E	X	X	G	X		E	E		X	E	E	G			X	X	E	E
IRM-903		G	X	C	X		E	E		X	E	E	E			X	X	E	E
Iron Acetate		X	E	X	G		E	X	E	X	X					X		E	E
Iron Hydroxide		G	E	E	G		E	C	E	C	G					C		E	E
Iron Salts		E	E	E	E		E	E	E	E	E					E		E	E
Iron Sulfate		E	E	E	E		E	E	E	E	E					E		E	E
Iron Sulfide		E	E	E	E		E	E	E	E	E					E		E	E
Isobutane	G	E	E	E	E		E	G		E	G					E		E	E
Isobutyl Acetate		X	E	X	G		E	X	G	X	X					X		E	E
Isobutyl Aldehyde		X	G	X	G		E	X		C	X					X		E	E
Isobutyl Chloride		X	X	X	X		E	G	G	X	X					X		G	G
Isobutyl Ether		X	X	X	X		E	X		X	X					X		E	E
Isobutylamine		C	E				E	X		C	X								
Isobutylbromide		X	X				E	G		X	X								
Isobutylcarbinol		E	E	E	E		E	E		E	E		C						
Isobutylene		X	X	X	X		E	E	G	X	E					X		E	E
Isocyanates								G			G	G	G					E	E

***Refer to the PVC and Thermoplastic Temperature/Pressure chart in this section.

(Continued on the following page)

Hose and Chemical Table (Continued)

Refer to *Names and General Properties of Hose Materials* table.

Key: E = Excellent G = Good C = Conditional
Blank = No Data X = Not Recommended

Chemical Or Material Conveyed	CPE	CSM	Chlorobutyl	Chloroprene	EPDM	EVA***	FEP/PTFE	FKM	MXLPE	Natural	Nitrile	Nylon	PU***	PVC***	PVC/PU***	SBR	TPV***	UHMWPE	XLPE
Isomyl Acetate		X	E	X	G		E	X	G	X	X					X		E	E
Isomyl Alcohol		E	E	E	E		E	E	E	E	E					E		G	E
Isomyl Bromide		X	X	X	X		E	G		X	X					X		G	G
Isomyl Butyrate		X	C	X	C		E	X	G	X	X					X		G	G
Isomyl Chloride		X	C	X	X		E	G	G	X	X					X		G	G
Isomyl Ether		X	X	X	X		E	X		X	X					X		E	E
Isomyl Phthalate		X	E	X	G		E	C		X	X					X		E	E
Isooctane	E	G	X	G	X		E	E		X	E	E	G	C	C	X	X	E	E
Isopentane		X	X	E	X		E	E	G	X	E					X		G	G
Isopropyl Acetate		X	G	X	G		E	X		X	X	G	X	X		X		E	E
Isopropyl Alcohol (Isopropanol)		E	E	G	E	E	E	E		E	E	E	X	E	E	E		E	E
Isopropyl Amine		C	E	E	G		E	X	G	G	G					C		E	E
Isopropyl Benzene		X	X	X	X		E	E	G	X	X					X		E	E
Isopropyl Chloride		X	X	X	X		E	G		X	X					X		G	G
Isopropyl Ether		C	X	X	X		E	X		X	G	E	G			X		E	E
Isopropyl Toluene		X	X	X	X		E	E		X	X					X		E	E
Jelly														E					
Jet Fuels (JP1-JP6)		X	X	X	X		E	E		X	E	C	C	X	X	X	X	E	E
JP-4 Oil		X	X	X	X		E	E		X	E	C	C			X	X		
Kerosene	G	X	X	C	X	X	E	E		X	E	E	G	X	C	X	X	E	E
Ketones	G	C	G	X	E	C	E	X		C	X	E	X	X	X	G	X	C	X
Kraft Liquor						G								E	E				
Lacquer Solvents	C	X	X	X	X	C	E	X		X	X	E	X	X	X	X		G	G
Lacquers		X	C	X	X		E	X	E	X	X					X		G	G
Lactic Acid, 28%						E							C	E	E				
Lactic Acid, Cold	X	E	E	E	E		E	E		E	E	E	G			E		E	E
Lactic Acid, Hot		C		X	X		E	E		X	X	X				X			
Lard		G	C	G	G	G	E	E		X	E	E	C	E	E	X	E	E	E
Lauric Acid													C	E	E				
Lauryl Alcohol		E	E	E	E		E	G	E	E	E					E		E	E
Lauryl Chloride						C							E	E	E				
Lauryl Sulfate						X								E	E				
Lavender Oil		X	X	X	X		E	E		X	G		X			X		G	G
Lead Acetate		C	E	G	E	E	E	E		E	G	G	C	E	E	X		E	E
Lead Arsenate						E								E	E				
Lead Nitrate		C	E	E	E	E	E	E		E	E			E	E	E		E	
Lead Sulfamate		G	E	E	E			E		G	G					G		E	E
Lead Sulfate		E	E	G	E		E	E		E	E	G						E	E
Lead Tetra-ethyl						E								E	E				
Lemon Juice														E					
Ligroin		X	X	E	X		E	E	G	X	E					X		E	E
Lime		E	E	E	E		E	E		E	E	E	G						E
Lime Bleach		G	E	G	E		E	E		E	E	G				E			
Lime Sulfur						G								E	E				
Lime Sulfur, Wet		G	E	E	C		E	E		C	E	G						E	E
Lime Water		E	E	E	E			E		X	C					X		E	
Limonene		X	X	X	X		E	E		X	X								
Lindol		G	E	X	E			E		X	X					X		E	E
Linoleic Acid		X	X	C	X		E	G		X	G		C	E	E	X		E	E
Linseed Oil	G	G	G	E	C	C	E	E		X	E	E	G	E	E	X		E	C
Liquid Soap		E	E	E	E		E	E	E	E	E					E		E	E
Liquors, Chemical						E								E	E				
Lubricating Oils, SAE	G	X	X	C	X	X	E	E		X	E	E	E	G	G	X	X	E	X
Lye		E	E	E	E			X		E	G					G		E	E
Lye Solutions	C	E	E	E	E		E	G		E	C	G	G			G	C	E	E
Magnesium Acetate		E	E	X	E		E	X		X	X		X			X			E

***Refer to the PVC and Thermoplastic Temperature/Pressure chart in this section.**

(Continued on the following page)

Hose and Chemical Table (Continued)

Refer to *Names and General Properties of Hose Materials* table.

Key: E = Excellent G = Good C = Conditional
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Chemical Or Material Conveyed	CPE	CSM	Chlorobutyl	Chloroprene	EPDM	EVA***	FEP/PTFE	FKM	MXLPE	Natural	Nitrile	Nylon	PU***	PVC***	PVC/PU***	SBR	TPV***	UHMWPE	XLPE
Magnesium Carbonate		E	E	E	E	E	E	E	E	E	E		E	E	E	E		E	E
Magnesium Chloride	G	E	E	E	E	E	E	E		E	E	E	E	E	E	E		E	E
Magnesium Hydrate		E	E	G	E		E	G		E	G		E					E	
Magnesium Hydroxide	G	E	E	E	E	E	E	E		E	E	E	C	E	E	G		E	E
Magnesium Nitrate		E	E	E	E	E	E	E	E	E	E		E	E	E	E		E	E
Magnesium Sulfate	G	E	E	E	E	E	E	E		G	E	E	C	E	E	G		E	E
Magnesium Sulfite		E	E	E	E			E		G	E					G			
Malathion 50 In Aromatic Solvents		X	X	C	X		E	E	E	X	C					X		E	E
Maleic Acid		X	X	X	E		E	E		X	C	X	C			X		E	C
Maleic Acid (25% AQ)						E							C	E	E				
Maleic Anhydride		X	X	X	X		E	E		X	X					X			E
Malic Acid		G	X	G	X	G	E	E		E	E	X	C	E	E	G		E	E
Manganese Sulfate		E	G	E	E		E	E		G	E		E					E	E
Manganese Sulfide		E	E	G	G		E	E	E	C	E					E		E	E
Manganese Sulfite		E	E	G	G		E	E	E	C	E					E		E	E
MAPP				E	G						E					G			
Mayonnaise														E					
Mercuric Chloride		E	E	C	E	G	E	E	E	G	G		G	G	G	G		E	E
Mercuric Cyanide						G								X	X				
Mercurous Nitrate						G							G	G	G				
Mercury	G	E	E	E	E	G	E	E		E	E	E	E	G	G	E		E	E
Mercury Vapors		E	E	C	E		E	E		C	E					E			
Mesityl Oxide		X	C	X	G		E	X		X	X		X			X		E	E
Methacrylic Acid		C	G	G	G			X		X	X					X		E	E
Methallyl Alcohol		E	E				E	G		E	E	X						E	E
Methallyl Chloride	C											E						G	X
Methane		G	X	G	X		E	E		X	E		X			X		E	E
Methanoic Acid	X	E	E	E	E		E	X		C	C	X	X			E	E		
Methanol (Methyl Alcohol)	G	E	E	E	E		E	C		E	E	G	X			E	E	E	C
Methoxy Ethanol	E																		
Methoxyethoxy Ethanol	E																		
Methyl Acetate		C	G	C	G	X	E	X		X	X	E	X	X	X	X		E	E
Methyl Acetoacetate		X	G	X	G		E	X		X	X		X						E
Methyl Acetone		X	G	X	E		E	X		C	X							E	
Methyl Acetylene Propadiene				E	G						E					G			
Methyl Acrylate		X	G	C	G		E	X	E	C	X					X		E	E
Methyl Allyl Alcohol		E	E				E	G		E	E								
Methyl Allyl Chloride	C	X	X					X		X						X			G
Methyl Amyl Carbinol		E	E				E	G		E	E								E
Methyl Benzene	C	X	X	X	X		E	E		X	X	E	X			X	X	E	X
Methyl Bromide		X	C	X	C	X	E	E		X	G	E	X	X	X	X	X	G	X
Methyl Butane		X	X	X	X		E	E			E		G						
1-Bromo-3 Methyl Butane		X	X	X	X		E	G		X	X								
1-Chloro-3-Methyl Butane		X	C	X	X		E	E		X	X	E							
Methyl Butanol	E	E	E	E	E		E	E		E	E	E	X			G	E	G	E
Methyl-2-Butanol	E	E	E					F		E						E			E
Methyl-2-Butanone	X	X	G	X	C		E	X		X	X	E	X			X			E
Methyl Butyl Ketone		X	E	X	E		E	X		X	X	E	X			X		E	
Methyl Carbitol		E	E				E			X	C								E
Methyl Cellosolve		C	G	G	G		E	X		X	C	E	X			X		E	E
Methyl Chloride	C	X	X	X	X	X	E	E		X	X	C	X	X	X	X	X	E	X
Methyl Cyanide		G	E	E	E		E	X		G	C	E							
Methyl Cyclohexane		X	X	X	X		E	G		X	X					X		G	G
Methyl Ethyl Ketone (MEK)	G	X	E	X	E	C	E	X		X	X	G	X	X	X	X	C	E	G
Methyl Formate		C	G	G	G		E	C	E	C	X					C		G	G
Methyl Hexanol		E	E				E	G		E	E							E	E

***Refer to the PVC and Thermoplastic Temperature/Pressure chart in this section.

(Continued on the following page)

Hose and Chemical Table (Continued)

Refer to *Names and General Properties of Hose Materials* table.

Key: **E = Excellent G = Good C = Conditional**
Blank = No Data X = Not Recommended

Chemical Or Material Conveyed	CPE	CSM	Chlorobutyl	Chloroprene	EPDM	EVA***	FEP/PTFE	FKM	MXLPE	Natural	Nitrile	Nylon	PU***	PVC***	PVC/PU***	SBR	TPV***	UHMWPE	XLPE
Methyl-2-Hexanone	C	X	G					X		X						X			E
Methyl Isoamyl Ketone	C					C								X	X				
Methyl-4-Isopropyl Benzene	C																		
Methyl Methacrylate		X	C	X	X		E	X		X	X	C	X			X	C	G	G
Methyl Normal Amyl Ketone		X	G				E	X		X	X								E
Methyl-2-Pentanol		E	E	E	E		E	C		G	G								
Methyl-2-Pentanone	X	X	C	X	G		E	X		X	X	G	X			X	X		
Methyl-3-Penten-1-One	C																		
Methyl 1-2,4-Pentanediol	E																		
Methyl-1-Propanol		E	E	E	E		E	E		E	G		X			E			
1-Bromo-2 Methyl Propane		X	X	X			E	G		X	X								
1-Chloro-2-Methyl Propane		X	X				E	G		X	X								
3-Chloro-2-Methyl Propane	G																		
Methyl-2-Propen-1-Ol		E	E	E	E		E	C		G	G								
Methyl Propyl Ether		G	X				E			X	X								E
Methyl Salicylate			G	X	C		E	G		X	X								
Methyl Styrene	C																		
Methyl Sulfate													E	E	E				
Methyl Sulfide		X	C				E			X	X								
Methyl Sulfuric Acid						E							X	E	E				
Methyl Tertiary Butyl Ether (MTBE)	X		G	X			G	X			X					X		G	
Methylallyl Acetate		G	E				E	X		X	X								E
Methylamyl Alcohol		E	E	E	E		E	C		G	G								E
Methylated Spirit						E													
Methylene Bromide		X	X	X	X		E	C		X	X							G	
Methylene Chloride		X	X	X	C	X	E	G		X	X	C	X	X	C	X	X	E	C
Methylhexyl Ketone		X	G				E	X		X	X								E
Methylisobutyl Carbinol		E	E	E	E		E	C		G	G								C
Methylisobutyl Ketone	X	X	C	X	G		E	X		X	X	G	X			X	X	E	E
Methylisopropyl Ketone	X	X	G	X	C		E	X		X	X	E	X			X			E
Methyllactonitrile		C	E	G			E	X		C	X		X				E		
Methylphenol		C	X	X	X		E	E		X	X		X						
Methylpropyl Carbinol		E	E				E	G		E	E								
Methylpropyl Ketone		X	G	X	G		E	X		X	X					X			E
Mil-A-6091		E	E	E	E			E		E	G		X			E			
Mil-E-9500		E	E	E	E			E		E	E		X			E			
Mil-F-16884		C	X	C	X			E		X	E		C			X			
Mil-F-17111		X	X	G	X			E		X	E		C			X			
Mil-F-25558B		G	X	G	X			E		X	E		G			X			
Mil-F-25576C		C	X	C	X			E		X	E		C			X			
Mil-F-7024A		X	X	X	X			E		X	E		G			X			
Mil-G-10924B		G	X	X	X			E		X	E		G			X			
Mil-G-25013D		G	X	G	X			E		X	E		C			X			
Mil-G-25537A		G	X	G	X			E		X	E		G			X			
Mil-G-4343B		G	C	G	C			E		C	G		E			C			
Mil-G-5572		X	X	X	X			E		X	E		G			X			
Mil-G-7711A		X	X	X	X			E		X	E		E			X			
Mil-H-13910B		G	G	G	E			E		G	G		X			E			
Mil-H-19457B		X	E	X	E			C		X	X		X			X			
Mil-H-22251		G	E	G	E			E			G					G			
Mil-H-27601A		C	X	G	X			E		X	G		C			X			
Mil-H-5606B		G	X	G	C			E		X	E		G			X			
Mil-H-6083C		G	X	G	X			E		C	E		G			X			
Mil-H-8446B		C	X	G	X			E		X	G		C			X			
Mil-J-5161F		X	X	X	X			E		X	G		C			X			
Mil-J-5624G (JP-3, JP-4, JP-5)		X	X	X	X			E		X	E		C			X			

***Refer to the PVC and Thermoplastic Temperature/Pressure chart in this section.**

(Continued on the following page)

Hose and Chemical Table (Continued)

Refer to *Names and General Properties of Hose Materials* table.

Key: E = Excellent G = Good C = Conditional
Blank = No Data X = Not Recommended

Chemical Or Material Conveyed	CPE	CSM	Chlorobutyl	Chloroprene	EPDM	EVA***	FEP/PTFE	FKM	MXLPE	Natural	Nitrile	Nylon	PU***	PVC***	PVC/PU***	SBR	TPV***	UHMWPE	XLPE
Mil-L-15016		G	X	G	X			E		X	E		E			X			
Mil-L-17331D		G	X	G	X			E		X	E		E			X			
Mil-L-2104B		C	X	G	X			E		X	E		E			X			
Mil-L-21260		G	X	G	X			E		X	E		E			X			
Mil-L-23699A		C	X	C	X			E		X	G		C			X			
Mil-L-25681C		G	E	G	E			E		G	G		C			G			
Mil-L-3150A		G	X	G	X			E		X	E		G			X			
Mil-L-3545B		C	X	G	X			E		C	G		C			X			
Mil-L-4339C		X	X	X	X					X	E					X			
Mil-L-6082C		G	X	G	X			E		X	E		E			X			
Mil-L-6085A		X	X	X	X			E		X	G		C			X			
Mil-L-7870A		X	X	G	X			E		X	E		X			X			
Mil-L-9000F		C	X	G	X			E		X	E		C			X			
Mil-L-9236B		X	X	X	X			E		X	G		X			X			
Mil-O-5606								E			E								
Mil-O-7808		X	X	X	X		E	E		X	G		X			X			
Mil-P-27402		G	E	G	E						G					G			
Mil-S-3136B Type 1 Fuel		G	X	G	X			E		X	E		G			X			
Mil-S-3136B Type 2 Fuel		X	X	X	X			E		X	C		G			X			
Mil-S-3136B Type 3 Fuel		X	X	X	X			E		X	C		G			X			
Mil-S-3136B Type 4 Oil, low swell		E	X	E	X			E		X	E		E			X			
Mil-S-3136B Type 5 Oil, med swell		G	X	G	X			E		X	E		G			X			
Mil-S-3136B Type 6 Oil, high swell		X	X	X	X			E		X	E		G			X			
Mil-S-81087		E	E	E	E			E		E	E		E			E			
Milk						G								E					
Mineral Oil	G	E	X	E	X	C	E	E		X	E	E	E	G	E	X	X	E	E
Mineral Spirits		G	X	X	X		E	E		X	E	E	G			X		E	E
Mobile HFA					X		E				E	E							
Molasses						E							E	E	E				
Molten Sulfur		E	G	E	E		E	E		G	G		G					X	X
Monobutyl Ether		X	X	C	X		E	X		X	C		X			X			E
Mono-Chloroacetic Acid	X	X	G	E	C		E	G		C	X	X	X			X	X		E
Monochlorobenzene		X	X	X	X		E	E		X	X	G	X	X	X	X	X	G	X
Monochlorodifluoromethane	C	E	X	E	E		E	X		C	X	C				E	X		C
Monoethanol Amine		C	G	G	G		E	X		G	G	E	X			G		E	E
Monoethyl Amine		C	G	X	E		E	X		C	X	G	X			C			C
Monomethylamine		C	C	C	E		E	C		C	G	E							E
Monomethylether		C	E	E	E			C		G	E					G		E	E
Monovinyl Acetate		C	G	X	C			E		X	X					X		E	E
Morpholine				X	X		E				X	E							
Motor Oil		G		G	X		E	E			E	G	G					E	E
MTBE	X		G	X			G	X			X					X		G	
Muriatic Acid	X	C	C	C	C		E	C	E	C	C	X	C			X	E	E	E
Na-K					X		X				X								
Naphtha	E	X	X	X	X	X	E	E		X	E	E	C	X	C	G	X	E	E
Naphthalene	C	X	X	X	X	X	E	E		X	X	E	G	X	X	X	C	E	X
Naphthenic Acids	E	X		X	X		E	E		X	G					X			
Neatsfoot Oil		G	G	G	G		E	E	E	X	E					X		E	E
Neohexane		X	X				E	E		X	E								E
Neon Gas		E	E	E	E		E	E		E	E	E	E			E	E		
Nickel Acetate		X	E	G	E	E	E	X		E	G		X	E	E	X		E	E
Nickel Chloride	X	E	E	G	E	E	E	E		E	E	X	C	E	E	E		E	E

***Refer to the PVC and Thermoplastic Temperature/Pressure chart in this section.**

(Continued on the following page)

Hose and Chemical Table (Continued)

Refer to *Names and General Properties of Hose Materials* table.

Key: **E = Excellent G = Good C = Conditional**
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Chemical Or Material Conveyed	CPE	CSM	Chlorobutyl	Chloroprene	EPDM	EVA***	FEP/PTFE	FKM	MXLPE	Natural	Nitrile	Nylon	PU***	PVC***	PVC/PU***	SBR	TPV***	UHMWPE	XLPE
Nickel Nitrate		E	E	E	E	E	E	E		E	E	G	E	E	E			E	E
Nickel Plating Solution		G	G	C	G					E	G					X			
Nickel Sulfate	X	E	E	E	E	E	E	E		G	E	G	C	E	E	G		E	E
Nicotine						E							C	E	E				
Nicotine Acid						E							C	E	E				
Nietylene										E									
Niter Cake		E	E	E	E		E	E	E	E	E					E		E	E
Nitric Acid, 1-10%	X	G	E	G	E	G	E	X		X	X	C	X	E	G	X	E	E	E
Nitric Acid, 10%-25%	X	G	G	X	E		E	X		X	X	X	X			X		E	E
Nitric Acid, 25%-40%	X	C	C	X	G	C	E	C		X	X	X	X	G	G	X		G	G
Nitric Acid, 40%-60%	X	X	X	X	X	C	E	C		X	X	X	X	G	G	X		C	C
Nitric Acid, 70%						X							X	X	X				
Nitric Acid, Anhydrous						X							X	X	X				
Nitric Acid, Conc (16N)	X	X	X	X	X		E	E		X	X	X	X			X	X	E	G
Nitric Acid, Red Fuming	X	X	C	X	X		E	C		X	X	X	X			X	X	X	X
Nitrilotriethanol		E	G	X	E		E	X		G	C		X			G			
Nitrobenzene	C	X	G	X	X	X	E	C		X	X	C	X	X	X	X		E	X
Nitroethane		C	G	C	G		E	X		G	X		X			G	E	E	E
Nitrogen		E	E	E	E		E	E	E	E	E	E	E			E		E	E
Nitrogen Tetraoxide		X	X	X	X		E	X		X	X					X		X	X
Nitromethane		C	G	X	G		E	X		G	X	E	X			C		E	E
Nitropropane		C	E	C	G		E	X	E	C	X					C		E	E
Nitrous Oxide Gas		E	E	G	E		E	E	E	E	E	C	G			E		E	E
N-Nonyl Alcohol		E	E				E	G		E	E								
Nonanoic Acid		X	E				E			X	E								
N-Serv							E	E				E							C
Nuto H					X		E				E	E							
Nyvac Light					E		E				X	E							
Octadecanoic Acid		X	G	G	C		E	C	E	X	E					X		E	E
Cis-9-Octadecenoic Acid	X	G	X	C	C		E	E		X	E	E	G			X			E
Octane		X	X	G	X		E	E	G	X	E					X		G	G
N-Octane		X	X	C	X		E	E		X	E		X			X		G	E
Octanoic Acid		G	C				E			C	C								
2-Octanone		X	G	X	G		E	X		X	X		X			X			
Octyl Acetate		E	E				E	X		X	X							E	
Octyl Alcohol		G	G	G	G		E	G		G	G		X			G		E	E
Octyl Aldehyde		X	C				E	X		X	X								E
Octyl Amine		C	E				E	X		C	C								C
Octyl Carbinol		E	E				E	G		E	E								E
Octylene Glycol		E	E	E	E		E	E	E	E	E							E	C
Oil, Petroleum	G	G	X	G	X	G	E	E		X	E	G	G	E	E	X	C	E	E
Oils & Fats						G							E	E	E				
Oleic Acid	X	G	X	C	C	X	E	E		X	E	E	G	G	G	X		E	E
Oleum	X	X	X	X	X	X	E	G		X	X	X	X	X	X	X		X	X
Olive Oil		G	G	G	G		E	E	E	X	E	E	E			X		G	C
Orange Juice														E					
Orthoxylene	C	X	X	X	C		E	E		X	X	G	X			X	X		X
Oxalic Acid	X	E	E	G	E	G	E	E		C	G	E	C	E	E	G	E	C	C
Oxydiethanol	E											X							E
Oxygen						G							E	E	E				
Oxygen, Cold		G	E	E	E		E	E	E	G	C					C		E	E
Oxygen, Hot		X	E	E	E		E	E		G	C					C		E	E
Ozone		E	G	C	E	X	E	E		X	X	C	E	C	C	X		G	C
Paint Thinner		X	X	X	X		E	G	G	X	X	G	X			X		E	E
Palm Oil		G	E	G	G		E	E	E	X	E					X		E	E
Palmitic Acid	G	C	G	G	G		E	E		E	E	C	E			G	E	E	G

***Refer to the PVC and Thermoplastic Temperature/Pressure chart in this section.**

(Continued on the following page)

Hose and Chemical Table (Continued)

Refer to *Names and General Properties of Hose Materials* table.

Key: **E = Excellent G = Good C = Conditional**
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Chemical Or Material Conveyed	CPE	CSM	Chlorobutyl	Chloroprene	EPDM	EVA***	FEP/PTFE	FKM	MXLPE	Natural	Nitrile	Nylon	PU***	PVC***	PVC/PU***	SBR	TPV***	UHMWPE	XLPE
Palmitic Acid, 10%						E							X	E	E				
Palmitic Acid, 70%						C							X	C	C				
Papermakers Alum		E	E	E						E	E								
Para Methoxypropenyl Benzene	X	X	X				E	G		X		G							
Paraffin		X	X	E	X	C	E	E	E	X	E		E	E	E	X		X	X
Paraffin Wax		X	X	G	X			E		X	E	E	G			E		E	X
Paraformaldehyde		G	G	G	G		E	C		D	G					X		E	E
Paraldehyde		X	E	C	E		E	X		C	C								E
Paraxylene		X	X	X	X		E	E		X	C	E	C						X
Peanut Oil		G	C	G	X		E	E	E	X	E					X		E	E
Pelargonic Alcohol		E	E				E	G		E	E								E
Pentachloroethane		X	X	X			E	E		X	X								E
Pentadione	G																		
Pentamethylene		X	X	E	X		E	E		X	G								
Pentane		C	X	C	X		E	E		X	E	G	C	C	C	X		G	G
Pentanol		E	E	E	E		E	G		E	E		C						
Pentanone		X	G	X	G		E	X		X	X								E
4-Hydroxy-4-Methyl-2-Pentanone		C	E	C	E		E	X		C	X	G	X			C			E
Pentasol		E	E	E	E		E	G		E	G		X			G			E
Pentyl Acetate		X	G	X	E		E			X	X	G	X			X	X		
Pentyl Alcohol	E	E	E	E	E		E	E		E	G	E	X			E	E		
Pentyl Bromide							E	G											
Pentyl Chloride	C	X	X	X	X		E	E		X		E	C			X			G
Pentyl Ether		C					E				C								
Pentylamine		C	G	X	X		E	X		C	C								
2,4-Di-Sec-Pentylphenol	E																		
Peracetic Acid, 40%													X	X	X				
Perchlorethylene														X	X				
Perchloric Acid		E	G	E	G		E	E	B	G	X					X		E	E
Perchloric Acid, 10%						G							X	G	G				
Perchloric Acid, 70%						G							X	C	C				
Perchloroethylene	C	X	X	X	X		E	E		X	C	E	X			X	X	G	X
Perchloromethane			X	X			E			X	X								
Petrol						X								X	X				
Petrolatum		C	X	E	X			E		X	E					X		E	E
Petroleum Crude		G	X	G	X		E	E		X	E	G	E			X		E	G
Petroleum Ether		X	X	C	X	X	E	E		X	E	E	G	C	C	X		E	C
Petroleum Oils	G	G	X	G	X		E	E		X	E	G	G			X	C	E	C
Phenbo													X					E	
Phenol		X	G	X		X	E	E		X	X	X	X	X	X	X	X	E	C
Phenolsulfonic Acid		X	C				E	X		X	X		G					G	G
Phenylamine		X	E	X	G		E	E		X	X		C						
Phenylbromide		X	X	X	X		E	G		X	X		X						
Phenylbutane	C																		
Phenylchloride		X	X	X	X		E	E		X	X		X						E
Phenylethylene		X	X	X	X		E	G		X	X		C			X			
Phenylhydrazine		C	G	X	C			E		C	X			X	X	X		E	E
Phenylhydrazine Hydrochloride														C	C				
Phenylmethane		X	X	X	X		E	E		X	X		X						
Phenylmethanol		G	G	X	G		E	E		X	X	C	X			X	X	E	E
Phenylmethyl Acetate		G	E				E	X		X								E	E
Phorone		X	E	X	G		E	C	E	X	X					X		E	E

***Refer to the PVC and Thermoplastic Temperature/Pressure chart in this section.

(Continued on the following page)

Hose and Chemical Table (Continued)

Refer to *Names and General Properties of Hose Materials* table.

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Chemical Or Material Conveyed	CPE	CSM	Chlorobutyl	Chloroprene	EPDM	EVA***	FEP/PTFE	FKM	MXLPE	Natural	Nitrile	Nylon	PU***	PVC***	PVC/PU***	SBR	TPV***	UHMWPE	XLPE
Phosgene, Gas						C								C	C				
Phosgene, Liquid														X					
Phospahte Esters	G	X	E	X	E		E	C		X	X	E	X			X	E		
Phosphoric Acid, 10%	X	E	G	E	E	E					E		X	E	E	G			
Phosphoric Acid, 10%-85%	X	E	G	E	E	E	E	E		G	X	X	X			G		E	E
Phosphorous Pentoxide						G								C	C				
Phosphorous Trichloride		X	E	X	E	C	E	E		X	X			X	X	X		E	E
Phosphorus, Yellow						X								G	G				
Photographic Developers						E							C	C	C				
Photographic Emulsions						E								C	C				
Photographic Fixers						E								C	C				
Di(2Ethylhexyl) Phthalate		X	G	X	G		E	G		X	X	E	X			X			
Pickling Solution		C	C	C	C		E	G	G	C	C					C		E	E
Picric Acid						G							X	X	X				
Picric Acid, H2O Solution	X	E	C	C	C					C	C					G			
Picric Acid, H2O Solution							C	E				X	G				X		E
Picric Acid, Molten		G	C	C	C		E	C	G	C	C					C		X	X
Pine Oil		X	X	X	X		E	E		X	G		E			X		E	X
Pinene		X	X	X	X		E	E		X	G		G			X		E	E
Piperidine		X	X	X	X		E	X	C	X	X					X		G	G
Pitch		C	X	G	X		E	C	G	X	G			G	G	X		E	E
Plating Solution, Brass						C							E	E	E				
Plating Solution, Cadmium						C							E	E	E				
Plating Solution, Chrome		C	E	G	E		E	G	E	X	G					X		E	E
Plating Solution, Chromium						X							G	G	G				
Plating Solution, Copper						C							E	E	E				
Plating Solution, Gold						C							E	E	E				
Plating Solution, Judium						C							E	E	E				
Plating Solution, Lead						C							E	E	E				
Plating Solution, Nickel						C							E	E	E				
Plating Solution, Rhodium						C							E	E	E				
Plating Solution, Silver						C							E	E	E				
Plating Solution, Tin						C							E	E	E				
Plating Solution, Zinc						C							E	E	E				
Poly Chlorinated Biphenol							E	E											
Polyethylene Glycol	E	E	E	E	E		E	E	E	E	E					E		E	E
Polyol Ester				G								G	X						
Polypropylene Glycol		E	E				E	E		E	E								
Polyvinyl Acetate Emulsion (PVA)		G	E	G	E		E	C		C	C					C		E	E
Potassium Acetate		C	E	G	E		E	C		E	G	G	X			X		E	E
Potassium Acid Sulfate						G							E	E	E				
Potassium Antimonate						E							E	E	E				
Potassium Bichromate						E							E	E	E				
Potassium Bisulfate		E	E	E	E		E	E		E	E	G				G		E	E
Potassium Bisulfite		E	E	E	E	E	E	E		E	E	G	E	E	E	G		E	E
Potassium Bisulphate						E								G					
Potassium Borate, 1%						E							E	E	E				
Potassium Bromate, 10%						E							E	E	E				
Potassium Bromide						E							E	E	E				
Potassium Carbonate		E	E	E	E	E	E	E	E	E	E	E	C	E	E	E		E	E
Potassium Chlorate						E							G	E	E				
Potassium Chloride	G	E	E	E	E	E	E	E		E	E	E	E	E	E	E		E	E
Potassium Chromate		C	G	E	E		E	E		G	E	G	G			G		E	E
Potassium Chromate, 40%						E							G	E	E				
Potassium Cuprocyanide						E								E	E				
Potassium Cyanide	G	E	E	G	E	C	E	E		E	E	E	E	C	C	E		E	E

***Refer to the PVC and Thermoplastic Temperature/Pressure chart in this section.

(Continued on the following page)

Hose and Chemical Table (Continued)

Refer to *Names and General Properties of Hose Materials* table.

Key: E = Excellent G = Good C = Conditional
Blank = No Data X = Not Recommended

Chemical Or Material Conveyed	CPE	CSM	Chlorobutyl	Chloroprene	EPDM	EVA***	FEP/PTFE	FKM	MXLPE	Natural	Nitrile	Nylon	PU***	PVC***	PVC/PU***	SBR	TPV***	UHMWPE	XLPE
Potassium Dichromate	X	E	E	E	E		E	E		C	E	G	G			G		G	G
Potassium Dichromate, 49%						E							G	E	E				
Potassium Ferricyanide						E							E	E	E				
Potassium Fluoride						E							E	E	E				
Potassium Hydrate		E	E	G	G		E	C		G	G	G	G			G		E	E
Potassium Hydroxide	X	E	G	G	E		E	G		G	G	G	C			G	G	E	E
Potassium Hydroxide, 10%						E							C	E	E				
Potassium Hydroxide, 20%						E							X	E	E				
Potassium Hydroxide, 35%						G							X	E	E				
Potassium Hypochlorite						E							X	G	G				
Potassium Nitrate		E	E	E	E	E	E	E		E	E	E	E	E	E	E		E	E
Potassium Perborate						E							E	E	E				
Potassium Perchlorite						G							G	E	E				
Potassium Permanganate		X	E	X	E		E	E	E	X	X					X		E	E
Potassium Permanganate, 10%						X							G	G	E				
Potassium Permanganate, 5%		G	E	E	E		E	E		E	C	X	X			G		E	G
Potassium Persulfate						E							E	E	E				
Potassium Phosphate						E													
Potassium Silicate		E	E	E	E		E	E		E	E	G	E			E		E	E
Potassium Sulfate		E	E	E	E	E	E	E		E	E	E	E	E	E	G		E	E
Potassium Sulfide		E	E	E	E	E	E	E		G	E	E	E	E	E	G		E	E
Potassium Sulfite		E	E	E	E		E	E		G	E	E	E			G		E	E
Potassium Thiosulfate						E							E	E	E				
Power Steering Fluid													E	E	E				
Prestone Antifreeze							E	E				G	X				E	E	E
Producer Gas		G	X	G	X		E	E		X	E		E			X			
Propane						X							C	C	C				
Propanediol		E	C	C	E		E	E		E	E		G			E			
Propanetriol	E	E	E	E	E	E	E	E		E	E	G	C			E	X	E	E
Propanol (Propyl Alcohol)						E	E	E				E	X	E	E		E	E	E
1-Amino-2-Propanol		C	E				E	X		G	G								
Propanolamine	E																		
Propanone	G	X	E	X	E		E	X		C	X	E	X			C	E	E	C
Chloro-2-Propanone		X	X	C	E		E	X		X	X		X			X			
Propargyl Alcohol						E								E	E				
Propen-1-Ol							E	G										E	E
Propenediamene	E																		
Propenenitrile			X	X			E			G	X								
Propenyl Alcohol		E	E	E	E		E	G		E	E							E	E
Propenylanisole		X	X				E	G		X	X								
Propionic Acid		G	E	C	E		E	X		E	C		X			X			E
Propionitrile			E	G	E		E	X		E	X						X		
Propyl Acetate		X	G	X	E		E	X		X	X		X			X		E	E
Propyl Alcohol (Propanol)		E	E	E	E	E	E	E		E	E	E	X	E	E	E	E	E	E
Propyl Aldehyde		X	G				E	X		C	X							E	E
Propyl Benzene	C																		
Propyl Chloride		X	C				E	G		X	X							E	E
Propyl Ether	E																		
Propyl Nitrate		X	G	X	G		E	X		X	X		X			X			
Propylene		X	X	X	X		E	E		X	X		X			X			
Propylene Diamine		C	E				E			G	G								
Propylene Dichloride		X	X	X	X	X	E	G		X	X		X	X	X	X		G	G
Propylene Glycol	E	E	E	E	E	E	E	E		E	E	G	X			E	X	E	E
Prune Juice														E					
Pydraul Hydraulic Fluids		D	G	D	G		E	C	E	X	X	G	X			X		G	G
Pyranol		X	X	X	X			E		X	C					X		E	E

***Refer to the PVC and Thermoplastic Temperature/Pressure chart in this section.

(Continued on the following page)

Hose and Chemical Table (Continued)

Refer to *Names and General Properties of Hose Materials* table.

Key: **E = Excellent G = Good C = Conditional**
Blank = No Data X = Not Recommended

Chemical Or Material Conveyed	CPE	CSM	Chlorobutyl	Chloroprene	EPDM	EVA***	FEP/PTFE	FKM	MXLPE	Natural	Nitrile	Nylon	PU***	PVC***	PVC/PU***	SBR	TPV***	UHMWPE	XLPE
Pyridine		X	G	X	G		E	X	G	X	X					X		E	E
Pyroligneous Acid		G	G	G	G			E		C	C					C		E	E
Pyrrole		X	G	X	C			C		C	X					G		E	E
Quintolubric 822 Series			X	X	X			G		X	G								
Rape Seed Oil		G	E	G	G		E	E	E	X	G					X		G	G
Red Oil	X	G	X	C	C		E	E		X	E	E	G			X		E	C
Resorcinol				X	G		E	E				X	X			G	X		E
Rosin Oil		G	X	E	X			E		X	E					X		E	E
Rotenone And Water		E	E	E	E			E		E	E					E		E	E
SAE Oil #10	G	X	X	C	X		E	E		X	E	E	E			X	X		C
Salicylic Acid		E	E	X	E	E	E	E	E	E	X					G		E	E
Sea Water		E	E	G	E	E	E	E	E	E	E	E	C	E	E	E	E	E	E
Selenic Acid						G							X	E	E				
Sewage		E	G	G	E		E	E		G	E	G	X			G	G	X	E
Shortening G						E								G					
Silicate Esters		G	C	E	X		E	E		X	G	G	E			X		C	
Silicate of Soda		E	E	E	E		E	E		E	E	E						E	E
Silicic Acid						E							X	E	E				
Silicone Fluids						E													
Silicone Grease		E	E	E	E		E	E		E	E	E	E			E		G	E
Silicone Oil		E	E	E	E		E	E		C	E	E	E			E		E	E
Silver Cyanide						E							E	E	E				
Silver Nitrate		E	E	E	E	E	E	E		E	G	E	E	E	E	E		E	E
Silver Plating Solutions						E							E	E	E				
Skelly Solvent		C	X	G	X			E		X	E					X		E	E
Skydrol Hydraulic Fluids		X	E	X	E		E	X	E	X	X					X		E	E
Soap Solutions	G	E	G	G	E	G	E	E		G	E	E	E	E	E	G	E	E	E
Soda Ash	G	E	E	E	E		E	E		E	E	G	G			E		E	E
Soda Lime		G	E	G	E		E	G		E	G		C					E	E
Soda, Caustic	C	E	E	E	E		E	X		G	C	G	G			E	C	E	E
Sodium Acetate		C	E	G	E	E	E			E	G	G	X			X		E	E
Sodium Acid Sulfate						E							E	E	E				
Sodium Aluminate		E	E	E	E		E	E		G	E	G				G		E	E
Sodium Antimonate						E							E	E	E				
Sodium Arsenite						E							E	E	E				
Sodium Benzoate						E							E	E	E				
Sodium Bicarbonate		E	E	E	E	E	E	E		E	E	E	E	E	E	E		E	E
Sodium Bisulfate	X	E	E	E	E	E	E	E		E	G	C	E	E	E	G		E	E
Sodium Bisulfite		E	E	E	E	E	E	E		E	E	E	E	E	E	G		E	E
Sodium Borate		E	E	E	E		E	E		E	E	E	G			E		E	E
Sodium Bromide						E							E	E	E				
Sodium Carbonate	G	E	E	E	E	E	E	E	E	E	E	G	G	E	E	E		E	E
Sodium Chlorate						E							G	G	G				
Sodium Chloride	G	E	G	E	E	E	E	E		E	E	E	E	E	E	E	C	E	E
Sodium Chromate		C	E	C	G		E	C		X	X					X		G	G
Sodium Cyanide	G	E	E	E	E	E	E	E		E	E	E	G	E	E	E		E	E
Sodium Dichromate		G	E	G	C	E	E	E		C	E	G	G	E	E	G		E	E
Sodium Ferrocyanide						E							E	E	E				
Sodium Fluoride		E	E	E	E	E	E	E	E	E	E		E	E	E	E		E	E
Sodium Hydrate		G	E	G	E		E	G		E	G	G	C			G			E
Sodium Hydrochlorite		E	G	C	G		E	E		C	C	G	C			G			E
Sodium Hydroxide	C	E	E	G	E		E	C		E	C	G	C			G	C	E	E
Sodium Hydroxide, 10%						E							G	E	E				
Sodium Hydroxide, 35%						E							C	E	E				
Sodium Hydroxide, 50%														G					
Sodium Hypochlorite	X	G	G	C	G	E	E	C		X	X	X	C	E	E	C	C	E	G

***Refer to the PVC and Thermoplastic Temperature/Pressure chart in this section.**

(Continued on the following page)

Hose and Chemical Table (Continued)

Refer to *Names and General Properties of Hose Materials* table.

Key: E = Excellent G = Good C = Conditional
Blank = No Data X = Not Recommended

Chemical Or Material Conveyed	CPE	CSM	Chlorobutyl	Chloroprene	EPDM	EVA***	FEP/PTFE	FKM	MXLPE	Natural	Nitrile	Nylon	PU***	PVC***	PVC/PU***	SBR	TPV***	UHMWPE	XLPE
Sodium Metaphosphate		G	G	G	E		E	E		E	E	E	G			E		G	E
Sodium Nitrate	G	E	E	G	E	E	E	E		G	G	E	G	E	E	G		E	E
Sodium Nitrite		E	E	E	E	E	E	E	E	E	E		E	E	E	E		E	E
Sodium Perborate	X	G	E	G	E		E	E		G	G	G	G			G		E	E
Sodium Peroxide	X	G	E	G	E		E	E		G	G	X	X			G		E	E
Sodium Phosphate		E	E	C	E		E	E		E	E	E	E			E		E	E
Sodium Phosphate, Acid						E							U	G	G				
Sodium Silicate	G	E	E	E	E	E	E	E		E	E	E	G	E	E	E		E	E
Sodium Sulfate	G	E	E	E	E	E	E	E		G	E	E	E	E	E	G		E	E
Sodium Sulfide	G	E	E	E	E	E	E	E		G	E	E	E	E	E	G		E	E
Sodium Sulfite		E	E	E	E	E	E	E		G	E	E	E	E	E	G		E	E
Sodium Thiosulfate		E	E	E	E	E	E	E		E	E	G	E	E	E	G		E	E
Soft Drinks						G								E					
Soya Oil														E					
Soybean Oil	G	E	C	E	X		E	E		X	E	E	G	G		X		E	E
Stannic Chloride	X	C	G	C	E	E	E	E		G	E	C	G	E	E	E		E	E
Stannic Sulfide		E	E				E			E	E								E
Stannous Chloride		E	G	E	C	E	E	E		E	E	G	C	E	E	E		E	
Stannous Sulfide		E	E				E			E	E								E
Starch						E													
Stearic Acid	G	C	G	G	G	E	E	E		C	E	E	E	C	C	G	E	E	E
Stoddard Solvent	G	X	X	C	X	C	E	E		X	E	E	G	C	G	X	X	E	E
Styrene Monomer		X	X	X	X		E	G		X	X	E	C			X		G	G
Sugar Solutions		E	E	E	E	E	E	E	E	E	E					E		E	E
Sulfamic Acid		E	E	G	X		E	E		G	C		X						C
Sulfite Liquors		E	E	G	G		E	E		G	G					G		E	E
Sulfonic Acid		C	X	C	X		E	X		X	X					X		G	G
Sulfur		F	F	X	F		E	G		X	X			G	G	X		E	X
Sulfur, Molten		E	E	E	E					G	G					G			
Sulfur Chloride	G	C	X	C	X		E	E		X	C	C	C			X		E	E
Sulfur Dioxide		C	G	X	E		E	E		C	X	X				C		G	C
Sulfur Dioxide Gas, Dry						E								E	E				
Sulfur Dioxide Gas, Wet						E								C	C				
Sulfur Dioxide, Liquid						X								C	C				
Sulfur Hexafluoride		E	E	E	E		E	E	E	E	E					E		E	E
Sulfur Trioxide		B	C	C	C		E	E	G	X	C					C		D	G
Sulfur Trioxide, Dry		C	G	X	G		E	E		C	X	X	G			X		X	G
Sulfur, Molten							E	E										E	C
Sulfuric Acid, 1%-60%						G								E	E				
Sulfuric Acid, 70%						C								E	E				
Sulfuric Acid, 95%						X								X	X				
Sulfuric Acid, 95% Fuming						X								C	C				
Sulfuric Acid, 25%	X	E	G	E	E		E	E		G	E	X	X			G	E	E	E
Sulfuric Acid, 25%-50%	X	G	G	E	E		E	E		G	E	X	X			G		E	E
Sulfuric Acid, 50%-96%	X	C	X	C	G		E	E		X	C	X	X			X		E	E
Sulfuric Acid, 60% (200°F)	X		X	X	X			C			X	X				X		X	X
Sulfuric Acid, Conc. 96%-98%	X	X	X	X	X		E	G		X	X	X	X			X		E	C
Sulfuric Acid, Fuming	X	X	X	X	X		E	G		X	X	X	X			X		X	X
Sulfurous Acid, 10%	X	E	E	G	E	E	E	E		G	C	X				G		E	E
Sulfurous Acid, 10%-85%	X	E	E	C	G		E	G		G	C	X	X			C		X	E
Sulfurous Acid, 30%						X													
Sulphur Trioxide						X								E	E				
Sutan							E	F											E
Tall Oil		C	X	C	X		E	E		X	E		E			X		E	G
Tallow		C	G	G	E	E	E	E		C	E	E	E			X		E	E
Tannic Acid	X	E	E	E	E	E	E	E		E	E	G	E	E	E	G	E	E	E

***Refer to the PVC and Thermoplastic Temperature/Pressure chart in this section.**

(Continued on the following page)

Hose and Chemical Table (Continued)

Refer to *Names and General Properties of Hose Materials* table.

Key: **E = Excellent G = Good C = Conditional**
Blank = No Data X = Not Recommended

Chemical Or Material Conveyed	CPE	CSM	Chlorobutyl	Chloroprene	EPDM	EVA***	FEP/PTFE	FKM	MXLPE	Natural	Nitrile	Nylon	PU***	PVC***	PVC/PU***	SBR	TPV***	UHMWPE	XLPE
Tanning Extracts						E													
Tanning Liquors						C								E	E				
Tar, Bituminous	G	C	X	C	X		E	E	E	C	G	G	G			X		E	E
Tar, Camphor	C	X	X	X	X		E	E	E	X	X	E	G			X	C	E	X
Tartaric Acid	X	E	G	E	C	E	E	E		E	E	E	E	E	E	G	E	E	E
Tea, Brewed						G								E					
Telone 2																			E
Terpinol	E	X	C	X	C		E	E	E	X	G	G	G			X		G	G
Tertiary Butyl Alcohol		G	G	G	G		E	E		G	G		X			G		E	E
Tertiary Butyl Amine		X			G														
Tertiary Butyl Mercaptan		X	X	X	X		E	E		X	X		X			X			
Tetrachlorobenzene		X	X				E	G		X	X		G						G
Tetrachloroethane		X	X	X	X		E	E		X	X		X			X	C	C	
Tetrachloroethylene		X	X	X	X		E	E		X	C	E	X			X		G	X
Tetrachloromethane		X	X	X	X		E	E		X	X	E	C					C	X
Tetrachloronaphthalene		X	X				E	G		X	X								G
Tetraethyl Lead		X	X	C	X		E	E	G	X	G		G	G	G	X		E	E
Tetraethylene Glycol		E	E				E	E		E	E								
Tetraethylorthosilicate			E	X			E			X	X								
Tetrahydrofuran (THF)		X	G	X	X		E	X		X	X	G	X			X	X	C	X
Tetrahydrofurane						X							X	X	X				
Thionyl Chloride		X	X	X	X	X	E	G		X	X		X	X	X	X		E	
Tin Chlorides		E	G	C	E		E	E		E	E	C	G	E	E			E	E
Tin Tetrachloride		E	E	E	E		E	E	E	E	E					E		E	E
Titanium Tetrachloride		X	X	X	X		E	E		X	C		X	E	E	X		G	X
Titanium Trichloride						X													
Toluene	C	X	X	X	X	X	E	E		X	X	E	X	X	C	X	X	E	X
Toluene Diisocyanate (TDI)		X	E	X	E		E	G		C	C					C		E	E
Toluidine		X	X				E	G		X	X								
Tomato Juice						C								E					
Toxaphene		X	X	G	X			E		X	G					X		E	E
Transformer Oils, Chlorinated Phenyl Base Askerels		X	X	X	X		E	E	G	X	X					X		G	G
Transformer Oils, Petroleum Base		G	X	G	X		E	E	E	X	E		E			X		E	E
Transmission Fluid													E	E	E				
Transmission Fluids, A		X	X	C	X		E	E	E	X	G	G	E			X		A	A
Transmission Fluids, B		X	X	X	X			E		X	C					X		A	A
Tri (2-Hydroxyethyl) Amine		E	G	X	E		E	X		G	C		X			G			
Tributyl Amine		C	E				E			G	G								
Tributyl Phosphate		X	G	X	E		E	X		C	X	G	X	X	X	X		E	E
Tricetin		G	E	G	E			X		E	G					G		E	E
Trichloroacetic Acid		C	G	X	G		E	X		C	C	X	X			X		E	E
Trichlorobenzene		X	X	X		X	E	G		X	X		X	X	X	X			
Trichloroethane		X	X	X	X		E	E		X	X	E	X			X			
Trichloroethylene	C	X	X	X	X	X	E	E		X	X	G	X	X	C	X	X	C	X
Trichloromethane	X	X	X	X	X		E	E		X	X	C	X			X	X	C	C
Trichloropropane		X	X	X	X		E	E		X	X					X		E	E
Trichlorotoluene							E				X								
Tricresyl Phosphate (TCP)		X	E	C	E	X	E	E		C	X	G	X	X	X	X		E	E
Triemethyl Propane														C	C				
Triethanolamine		E	G	X	E	C	E	X		G	C	E	X	C	G	G		E	E
Triethylamine			C	G	E		E	E		G	E	E	X	G	G	X			
Triethylene Glycol		E	E				E	E		E	E								E

***Refer to the PVC and Thermoplastic Temperature/Pressure chart in this section.**

(Continued on the following page)

Hose and Chemical Table (Continued)

Refer to *Names and General Properties of Hose Materials* table.

Key: **E = Excellent G = Good C = Conditional**
Blank = No Data X = Not Recommended

Chemical Or Material Conveyed	CPE	CSM	Chlorobutyl	Chloroprene	EPDM	EVA***	FEP/PTFE	FKM	MXLPE	Natural	Nitrile	Nylon	PU***	PVC***	PVC/PU***	SBR	TPV***	UHMWPE	XLPE
Trihydroxybenzoic Acid		G	G	G	G		E	E		E	G	G	X			G		G	
Trimethyl Pentanes, Mixed	E	C	X	C	X		E	E		X	E	E	G			X	X	E	
Trimethyl Pentene	E											E						E	
Trimethylamine	E						E											E	E
Trinitrotoluene (TNT)		G	X	G	X			G		X	X					X		X	X
Triphenyl Phosphate		C	E	C	G		E	C		X	X					X		E	E
Trisodium Phosphate		E	E	E	E					E	E					E			
Tritoyl Phosphate		X	E	X	E		E	E		X	X	G	X			X		E	
Tung Oil	C	E	X	E	X		E	E		X	E	G	C			X		E	E
Turbine Oil		G	X	G	X			E		X	G					X		E	E
Turpentine		X	X	X	X	X	E	E		X	G		E	C	G	X		G	E
Ucon Hydrolube Oils		X	E	G	E		E	E	E	X	E					X		E	E
UDMH		E	E	G	E		E	X		E	G		X			X		C	C
1 Undecanol		E	E	E	E		E	G		E	E					E			E
Undecyl Alcohol		E	E	E	E		E	G	E	E	E					E		E	E
Uran		E	G	G	G			C		G	G					C		E	E
Urea		E	E	G	E	E	E	E		E	G	E	G	E	E			E	E
Urethane Formulations							E				E	E							
Uric Acid							E					G	X				E		E
Urine						E							E	E	E				
Varnish	C	X	X	X	X	X	E	E		X	G	E	C	X	X	X		E	
Vegetable Oils		G	C	C	C	X	E	E		X	E	G	E	G	G	X		E	G
Versilube F44		E	E	E	E		E	E		E	E	E	E			E			
Versilube F55		E	E	E	X		E	E		E	E	E	E			E			
Vinegar		E	E	G	E	E	E	E		G	G	C	C	E		G		E	E
Vinegar Acid	G																		
Vinyl Acetate		C	E	X	G	X	X	E		X	X		X	X	X	X		E	E
Vinyl Benzene		X	X	X	X		E	G		X	X		C			X		E	G
Vinyl Chloride														X	X				
Vinyl Chloride, Gas			X		G		E			G		E						C	E
Vinyl Cyanide	E	C	X	C	X		E	C		C	X	E	X			C	X		
Vinyl Ether		G	X				E	X		X	G							E	E
Vinyl Styrene		X	X				E	E		X						X		E	E
Vinyl Toluene		X	X				E	E		X	X							E	E
Vinyl Trichloride		X	X	X			E	E		X	X							E	E
Vital, 4300, 5310					X		E				X	E							
VM&P Naphtha		X	X	C	X		E	E		X	C								X
Water	G	E	E	G	E		E	E	E	E	E	E	E			G	E	E	E
Water, Acid						E							G	E	E				
Water, Boiling		E	E	G	E		G	G			G	X	G			G	G	X	X
Water, Demineralized						E							E	E	E				
Water, Detergent Solution		E	E	G	E		E	E	G	G	E	E	G			G		E	E
Water, Distilled						E							E	E	E				
Water, Fresh						E	E	E	E				G	E	E			E	E
Water, Potable						E								E					
Water, Salt		G	E	E	E	E	E	E	E	E	G		G	E	E	G		E	E
Water, Soda							E					E					E	E	E
Wemco C		X	X	G	X					X	E					X			
Whey						G								E					
Whiskey		E	E	E	E		E	E		E	E	E	X	C		E		E	E
White Gasoline						X							E	E	E				
White Liquor		E	G	E	C			E		E	E			E	E	E		E	E
White Oil		X	X	G	X		E	E		X	E		E			X		E	X
White Pine Oil		X	X	X	X			E		X	G					X			
Wines		E	E	E	E		E	E		E	E	E	X	G		E		E	G
Wood Alcohol		E	E	E	E		E	C		E	E		X			E		E	E

***Refer to the PVC and Thermoplastic Temperature/Pressure chart in this section.**

(Continued on the following page)

Hose and Chemical Table (Continued)

Refer to *Names and General Properties of Hose Materials* table.

Key: **E = Excellent G = Good C = Conditional**
Blank = No Data X = Not Recommended

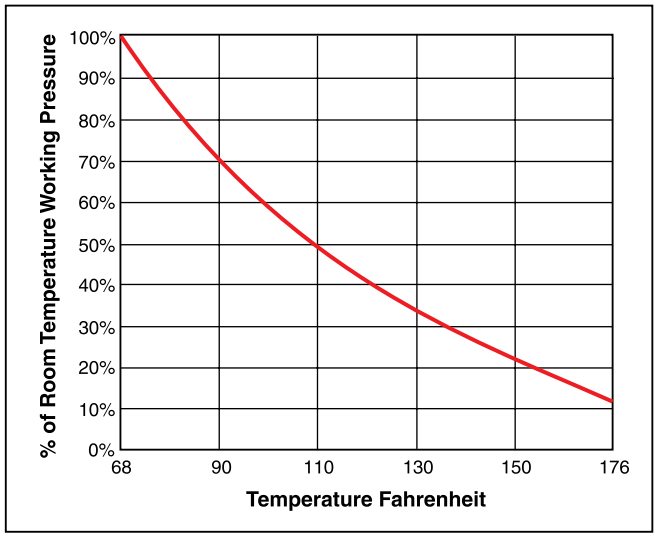
Chemical Or Material Conveyed	CPE	CSM	Chlorobutyl	Chloroprene	EPDM	EVA***	FEP/PTFE	FKM	MXLPE	Natural	Nitrile	Nylon	PU***	PVC***	PVC/PU***	SBR	TPV***	UHMWPE	XLPE
Wood Oil		C	C	G	X		E	E		X	E	G	C			X		E	E
Xenon		E	E	E	E		E	E		E	E		E			E			
Xylene, Xylol	C	X	X	X	X	X	E	E		X	X	G	C	X	C	X	X	C	X
Xylidine		X	G	X	C		E	C		X	C					X		G	G
Zeolites		E	E	E	E			E		E	E					E			
Zinc Acetate		C	E	G	E		E	C		E	G	X	X			X			E
Zinc Carbonate		E	E	E	E		E	E		E	E		E					E	E
Zinc Chloride	X	E	E	E	E	E	E	E		E	E	C	G	E	E	E		E	E
Zinc Chromate		C	E			E	E						E	E	E				G
Zinc Cyanide						E							E	E	E				
Zinc Nitrate						E							E	E	E				
Zinc Sulfate	X	E	E	E	E	E	E	E		E	E	E	G	E	E	G		E	E

***Refer to the PVC and Thermoplastic Temperature/Pressure chart in this section.**

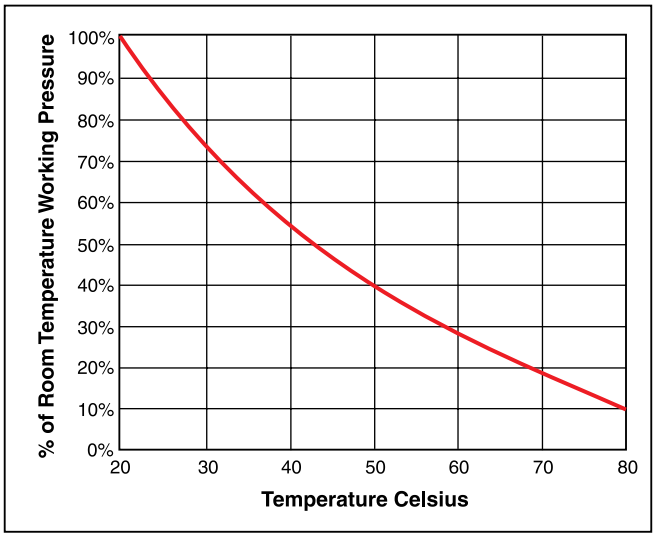
PVC and Thermoplastic Temperature / Pressure Chart

Effects of Elevated Temperatures on PVC / Thermoplastic Hose and Tubing

Thermoplastic hose and tubing achieve their optimum physical properties at room temperature, 68°F (20°C). As thermoplastic materials are exposed to increased ambient temperatures, they soften and their physical properties change. For hose and tubing, heat sharply reduces the available working pressure and coupling retention. The charts below illustrate this effect. In all cases, test the product in a controlled, secure and safe environment, and consider all operating conditions prior to use.



Example from the Fahrenheit Chart
If Working Pressure at 68°F is 200 PSI, then the WP at 110°F is 200 x 50%, or 100 PSI.



Example from the Celsius Chart
If Working Pressure at 20°C is 14 bar, then the WP at 50°C is 14 x 40%, or 5.6 bar.

For further information, refer to the Parker Safety Guide No. 4400-B.1 previously in this section and the Parker User Responsibility Statement on the inside front cover of in this catalog.

Metal/Coupling Corrosion Resistance Table

⚠WARNING! The following data has been complied from generally available sources and should not be relied upon without consulting and following the specific recommendations of the manufacturer regarding particular coupling materials.

Key: E = Excellent • G = Good • C = Conditional • Blank = No Data • X = Not Recommended

Chemical Or Material Conveyed	Aluminum	Brass	Carbon Steel	Stainless Steel 202, 302, 304, 308	Stainless Steel 316	Stainless Steel 410, 416, 430
Acetate, Solvents, Crude	C	C		E	E	G
Acetate, Solvents, Pure	E	E		E	E	E
Acetic Acid	X	X	X	G	G	G
Acetic Acid Vapors	C	X	X	G	G	X
Acetic Anhydride	G	X	X	G	G	X
Acetone	E	E	E	E	E	E
Acetylene	E	X	E	E	E	E
Alcohols	E	G	E	E	E	E
Aluminum Sulfate	X	X	X	C	G	X
Alums	C	C	X	C	G	X
Ammonia Gas	C	X	E	E	E	E
Ammonium Chloride	C	X	X	C	C	X
Ammonium Hydroxide	G	X	X	E	E	C
Ammonium Nitrate	G	X	E	E	E	E
Ammonium Phosphate		X		E	E	E
Ammonium Phosphate, Acid		C		G	E	C
Ammonium Phosphate, Neutral	C	C	X	E	E	E
Ammonium Sulfate	X	X	X	G	G	G
Asphalt	E	E	E	E	E	E
Beer	E	E	X	E	E	E
Beet Sugar Liquors	E	G	C	E	E	G
Benzene, Benzol	E	E	E	E	E	E
Benzine	E	E	E	E	E	E
Biodiesel	E	X	G	E	E	E
Borax		E	G	E	E	E
Boric Acid	E	C	C	G	E	C
Butane, Butylene	E	E	E	E	E	E
Butadiene	E	E	E	E	E	E
Calcium Bisulfate		X		G	E	X
Calcium Hypochlorite	X	X	X	C	G	C
Cane Sugar Liquors	E	E	E	E	E	E
Carbon Dioxide, Dry	E	E	E	E	E	E
Carbon Dioxide, Wet, (AQ)	E	E	G	E	E	E
Carbon Disulfide	G	C	G	E	E	G
Carbon Tetrachloride	C	E	E	E	E	E
Chlorine, Dry	X	X	G	G	E	G
Chlorine, Wet	X	C	X	X	C	X
Chromic Acid	X	X		G	G	C
Citric Acid	E	X	X	X	E	C
Coke Oven Gas	G	C	E	E	E	E
Copper Sulfate	X	X	X	E	E	E
Core Oils		E		E	E	E
Cottonseed Oil	E	C	C	E	E	E
Creosote	E	C	G	E	E	E
Ethers	E	C	C	E	E	E
Ethylene Glycol		G	G	E	E	E
Ferric Chloride	X	X	X	X	X	X
Ferric Sulfate	X	X	X	E	E	C

Chemical Or Material Conveyed	Aluminum	Brass	Carbon Steel	Stainless Steel 202, 302, 304, 308	Stainless Steel 316	Stainless Steel 410, 416, 430
Formaldehyde, 50%	G	G	C	E	E	C
Formic Acid	X	G	X	E	E	E
Freon	E	E	C	E	E	E
Furfural	E	G	E	E	E	E
Gasoline, Refined	E	E	E	E	E	E
Gasoline, Sour	C	C	E	E	E	C
Gelatin	E	C	X	E	E	X
Glucose	E	E	E	E	E	E
Glue	E	E	E	E	E	E
Glycerine or Glycerol	E	G	E	E	E	E
Hydrochloric Acid, 37%	X	X	X	X	C	X
Hydrocyanic Acid, 10%	E	X	X	E	E	X
Hydrofluoric Acid	X	X	X	X	X	X
Hydrogen	E	E	E	E	E	E
Hydrogen Fluoride		C		X	E	X
Hydrogen Peroxide	E	X	C	G	E	E
Hydrogen Sulfide, Dry	C	C	C	G	C	C
Hydrogen Sulfide, Wet	X	X	X	G	E	X
Lacquers, Lacquer Solvents	E	G	C	E	E	E
Lactic Acid	C	X	X	C	G	E
Lime, Sulfur	G	X	G	E	G	E
Linseed Oil	E	E	E	E	E	E
Magnesium Chloride	X	C	C	G	X	X
Magnesium Hydroxide	X	G	E	E	E	E
Magnesium Sulfate	C	G	G	E	E	E
Mercuric Chloride	X	X	X	X	X	X
Mercury	X	X	E	E	E	E
Milk	X	C	X	E	E	G
Molasses	G	E	G	E	E	G
Natural Gas	E	G	E	E	E	E
Nickel Chloride	X	X	X	C	G	E
Nickel Sulfate	X	C	X	G	E	C
Nitric Acid	C	X	X	G	G	G
Oleic Acid	E	C	X	G	E	G
Oxalic Acid	X	X	X	G	E	C
Oxygen	E	E	E	E	E	E
Palmitic Acid	E	E	C	G	E	C
Petroleum Oils, Sour		C		E	E	C
Petroleum Oils, Refined	E	E	E	E	E	E
Phosphoric Acid, 25%	X	X	X	C	E	C
Phosphoric Acid, 25%-50%	X	X	X	X	G	C
Phosphoric Acid, 50%-85%	X	X	X	X	G	C
Picric Acid	C	X	X	C	E	C
Potassium Chloride	X	E	C	G	C	C
Potassium Hydroxide	X	X	X	E	E	E
Potassium Sulfate	E	C	G	E	E	E
Propane	E	E	E	E	E	E
Rosin			X	E	E	E

(Continued on the following page)

Metal/Coupling Corrosion Resistance Table (Continued)

Key: E = Excellent • G = Good • C = Conditional • Blank = No Data • X = Not Recommended

Chemical Or Material Conveyed	Aluminum	Brass	Carbon Steel	Stainless Steel 202, 302, 304, 308	Stainless Steel 316	Stainless Steel 410, 416, 430
Shellac	G	G		E	E	E
Sludge Acid		X		X	C	X
Soda Ash	X	C	E	E	E	E
Sodium Bicarbonate	X	C	X	E	E	E
Sodium Bisulfate	C	X	X	E	E	C
Sodium Chloride	E	E	C	G	C	E
Sodium Cyanide	X	X	G	E	E	E
Sodium Hydroxide	X	X	X	G	G	G
Sodium Hypochlorite	X	X	X	X	X	X
Sodium Metaphosphate	E	X	X	E	E	G
Sodium Nitrate	E	C	E	E	E	E
Sodium Perborate	E	C	C	E	E	E
Sodium Peroxide	E	X	X	E	E	E
Sodium Phosphate, Acid		G	G	G	E	E
Sodium Phosphate, Alkaline		C	C	E	E	E
Sodium Phosphate, Neutral		G	C	E	E	E
Sodium Silicate	X	C	E	E	E	E
Sodium Sulfate	C	G	E	E	E	E
Sodium Sulfide		X	X	E	E	E
Sodium Thiosulfate	G	X	X	E	E	E
Stearic Acid	C	C	X	G	E	G
Sulfate Liquors		X	X	E	E	E
Sulfur	C	X	X	G	E	C
Sulfur Chloride	X	X	X	X	X	X
Sulfur Dioxide, Dry	E	E	G	E	E	E
Sulfur Dioxide, Wet	C	X		G	E	X
Sulfuric Acid , 1%-50%	C	X	X	X	G	X
Sulfuric Acid, 50%-70%	X	X	X	X	C	X
Sulfuric Acid, 70%-90%	X	X	X	X	X	X
Sulfuric Acid, 90%-98%	X	X	X	X	X	X
Sulfurous Acid	X	X	X	C	G	C
Tannic Acid	X	C	X	E	E	C
Tar	E	G	E	E	E	G
Toluene, Toluol	E	E	E	E	E	E
Trichlorethylene	E	E	C	E	E	E
Turpentine	E	E	E	E	E	E
Varnish		C	X	E	E	C
Vegetable Oils	E	G	E	E	E	E
Vinegar	X	X	X	G	E	E
Water , Acid	X	X	X	E	E	G
Water, Fresh	C	E	E	E	E	E
Water, Salt	X	X	X	G	G	C
Whiskey		G	X	E	E	C
Wines		G	X	E	E	C
Xylene, Xylol	E	E	G	E	E	E
Zinc Chloride	X	X	X	C	C	X
Zinc Sulfate	C	C	X	G	E	E

Silicone Hose and Chemical Table

⚠WARNING! The following data is based on tests and believed to be reliable; however, the tabulation should be used as a guide ONLY, since it does not take into consideration all variables, such as elevated temperatures, fluid contamination, concentration, etc., that may be encountered in actual use. All critical applications should be tested. Refer to the Safety & Technical Information section of this catalog for safety, handling and use information.

Key: E = Excellent • G = Good • C = Conditional • X = Not Recommended • I = Insufficient Data

Chemical or Material Conveyed	Rating
Acetic acid, dilute, 10%	G
Acetic acid glacial	C
Acetic acid anhydride	I
Acetone	X
Acetylene	C
Air 68°F (20°C)	E
Air 150°F (65°C)	E
Aluminum chloride 150°F (65°C)	E
Aluminum fluoride 150°F (65°C)	G
Aluminum sulfate 150°F (65°C)	E
Alums 150°F (65°C)	E
Ammonia gas, anhydrous	I
Ammonia 10%water solution	E
Ammonia 30%water solution	C
Ammonium chloride	C
Ammonium hydroxide	C
Ammonium nitrate	E
Ammonium phosphate monobasic	E
Ammonium phosphate dibasic	E
Ammonium phosphate tribasic	E
Ammonium sulfate	E
Amyl acetate	X
Amyl alcohol	X
Aniline, Aniline oil	X
Aniline, dyes	X
Asphalt	I
Barium chloride 150°F (65°C)	E
Barium hydroxide 150°F (65°C)	E
Barium sulfide 150°F (65°C)	E
Beer	E
Beet sugar liquors	E
Benzene, Benzol	X
Benzine, petroleum ether	X
Benzine, petroleum naphtha	X
Black sulfate liquor	E
Blast furnace gas	E
Borax	G
Boric acid	E
Bromine	X
Butane	X
Butyl acetate	X
Butyl alcohol, Butanol	C
Calcium bisulfate	C
Calcium chloride	E
Calcium hydroxide	E
Calcium hypochlorite	C
Caliche liquors	G
Cane sugar liquors	E
Carbolic acid, phenol	X
Carbon dioxide, dry-wet	E
Carbon disulfide	X
Carbon monoxide 140°F (60°C)	E

Chemical or Material Conveyed	Rating
Carbon tetrachloride	X
Castor oil	E
Cellosolve acetate	X
CFC-12	I
China wood oil, tung oil	X
Chlorine, dry/wet	X
Chlorinated solvents	X
Chloroacetic acid	I
Chlorosulfonic acid	X
Chromic acid	C
Citric acid	E
Coke oven gas	G
Copper chloride 150°F (65°C)	E
Copper sulfate 150°F (65°C)	E
Corn oil	E
Cottonseed oil	E
Creosote, coal tar	C
Creosote, coal tar wood	X
Creosols, cresylic acid	I
Dichlorobenzene	X
Dichloroethylene	X
Diesel fuel	X
Diethanolamine 20%	X
Diethylamine	G
Diisopropylamine	I
Dioctylphthalate	X
Ethers	X
Ethyl acetate	G
Ethyl alcohol	E
Ethyl cellulose	C
Ethyl chloride	C
Ethyl glycol	E
Ferric chloride 150°F (65°C)	E
Ferric sulfate 150°F (65°C)	G
Formaldehyde	G
Formic acid	C
Fuel oil	X
Furfural	X
Gasoline, unleaded	X
Gasoline + MTBE	X
Gasoline Hi Test + MTBE	X
Gelatin	E
Glucose	E
Glue	E
Glycerine, glycerol	E
Green sulfate liquor	E
HFC-134	I
Hydraulic fluids: Petroleum	C
Hydraulic fluids: Phosphate ester alkyl	X
Hydraulic fluids: Phosphate ester aryl	X
Hydraulic fluids: Phosphate ester blends	X
Hydraulic fluids: Silicate ester	X

Chemical or Material Conveyed	Rating
Hydraulic fluids: Water glycol	E
Hydrobromic acid	X
Hydrochloric acid	X
Hydrocyanic acid	G
Hydrofluoric acid	X
Hydrofluosilicic acid	I
Hydrogen gas 140°F (60°C)	C
Hydrogen peroxide	E
Hydrogen sulfide, dry	X
Hydrogen sulfide, wet	X
Isobutyl alcohol	E
Isopropyl alcohol	E
Isooctane	X
Kerosene	X
Lacquers	X
Lacquers solvents	X
Lactic acid	E
Linseed oil	E
Lubricating oil, crude	C
Lubricating oil, refined	C
Magnesium chloride 150°F (65°C)	E
Magnesium hydroxide 150°F (65°C)	G
Magnesium sulfate 150°F (65°C)	E
Mercuric chloride	E
Mercury	E
Methyl alcohol, methanol	E
Methyl chloride	X
Methyl ethyl ketone	X
Methyl isopropyl ketone	C
Milk	E
MTBE	I
Mineral oils	E
Natural gas	C
Nickel chloride 150°F (65°C)	E
Nickel sulfate 150°F (65°C)	E
Nitric acid, crude	X
Nitric acid, diluted 10%	C
Nitric acid, concentrated 70%	X
Nitrobenzene	C
Oleic acid	X
Oleum	I
Oxalic acid	G
Oxygen	X
Palmitic acid	X
Perchlorethylene	C
Petroleum oils and crude 200°F (95°C)	X
Phosphoric acid, crude	C
Phosphoric acid, pure 45%	C
Picric acid, molten	X
Picric acid, water solution	I
Potassium chlorite	E
Potassium cyanide	E

Chemical or Material Conveyed	Rating
Potassium hydroxide	C
Potassium sulfate	E
Propane	X
Sewage	G
Soap solution	E
Soda ash, sodium carbonate	E
Sodium bicarbonate, baking soda	E
Sodium bisulfate	E
Sodium chloride	E
Sodium cyanide	E
Sodium hydroxide to 50% at 140°F	E
Sodium hypochlorite	G
Sodium metaphosphate	E
Sodium nitrate	X
Sodium perborate	G
Sodium peroxide	C
Sodium phosphate, monobasic	X
Sodium phosphate, dibasic	X
Sodium phosphate, tribasic	X
Sodium silicate	E
Sodium sulfate	E
Sodium sulfide	E
Sodium thiosulfate, hypo	I
Soybean oil	E
Stannic chloride	G
Steam 450°F (230°C)	I
Stearic acid	E
Sulfur	G
Sulfur chloride	C
Sulfur dioxide, dry	G
Sulfur trioxide, dry	G
Sulfuric acid, 10%	X
Sulfuric acid, 11% - 75%	X
Sulfuric acid, 76% - 95%	X
Sulfuric acid, fuming	X
Sulfurous acid	X
Tannic acid	G
Tar	G
Tartaric acid	E
Toluene, Toluol	X
Trichloroethylene	X
Turpentine	X
Urea, water solution	E
Vinegar	E
Vinyl acetate	X
Water, acid mine	E
Water, fresh	E
Water, distilled	E
Whiskey and wines	E
Xylene, xylol	X
Zinc chloride	E
Zinc sulfate	E

NOTES:

NOTES:

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Parker operates Fluid Connectors manufacturing locations and sales offices throughout North America, South America, Europe and Asia-Pacific.

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fax 269 694 4614

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Wickliffe, OH
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fax 440 943 3129

Parflex Division
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Distribution Service Centers

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(FCG Kit Operations)

Canada
Milton, ONT
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Mexico
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Catalog 4800 07/2018

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