

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 Industrial Hose Products Division website: www.safehose.com

⚠ 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.

Critical Applications (Continued)

Anhydrous Ammonia (NH₃) 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.”

⚠️ 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.safehose.com.
- 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.

Critical Applications (Continued)

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.safehose.com. 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 in any CNG application, including fuel dispensing, on-board vehicle fuel lines, and fuel transfer.

Critical Applications (Continued)

Petroleum Transfer Hose

- Do not use for oil or fuel delivery or transfer service when submerged in, or on the surface of 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."

⚠️ 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.safehose.com. 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.

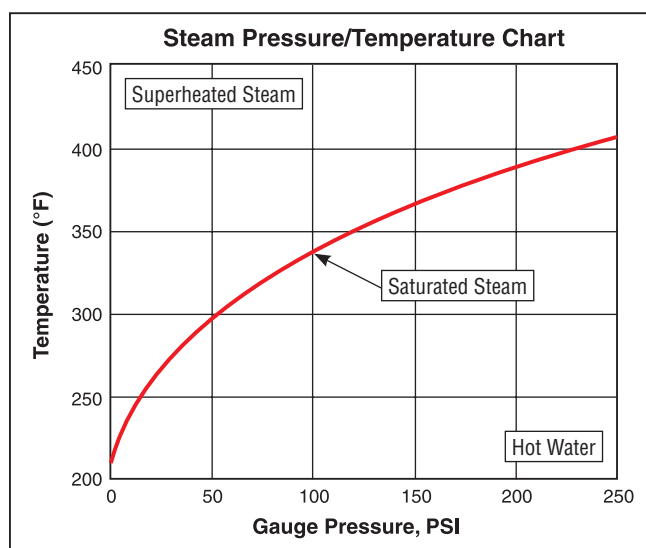
The chart at the right represents the three forms of water when subjected to various combinations of heat and pressure. The red line represents the point at which hot water becomes saturated steam. The area below the red line is hot water; the area above the red line is superheated steam.

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.



Critical Applications (Continued)

PVC/Thermoplastic Hose and Tubing

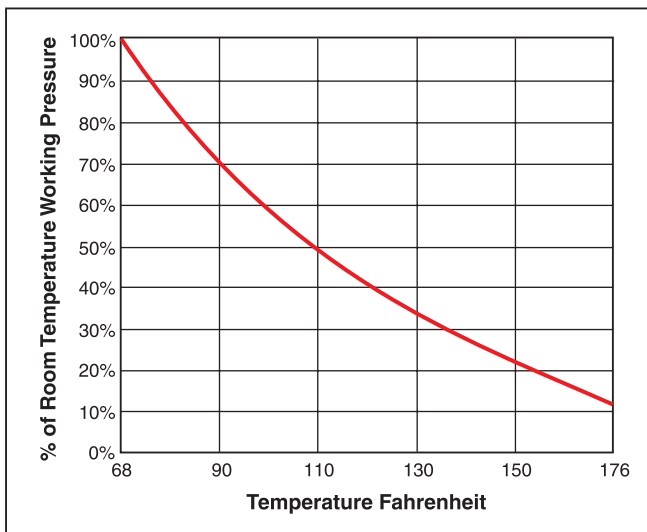
Thermoplastic polymer compounds are designed to resist deterioration when exposed to a wide range of commercial chemicals and environmental conditions. The resistance to attack is based on many factors, including temperature, pressure, chemical concentration, exposure to ultraviolet light, velocity of 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.

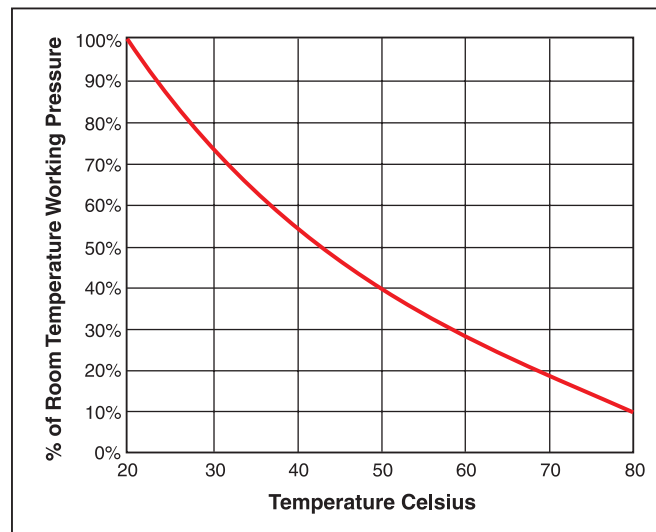
Effects of Elevated Temperatures on PVC/Thermoplastic Hose and Tubing

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 (pages 395-397) and the Parker User Responsibility Statement on the inside front cover of in this catalog.

California Proposition 65

The Safe Drinking Water and Toxic Enforcement Act (Proposition 65) was adopted by the State of California in November, 1986. Proposition 65 was intended to protect citizens and the sources of drinking water from chemicals known to cause cancer, birth defects or other reproductive harm, and to inform citizens about exposure to such chemicals. It provides restrictions for exposure to, and use of certain chemicals which have been determined by the State of California to cause cancer or reproductive toxicity. Proposition 65 requires businesses operating in and marketing products into California to apply warnings to any product containing specifically listed chemicals. An exception applies to sellers who have test data verifying the product is below Proposition 65 minimum exposure levels.

Exposure as defined in Proposition 65 can be from direct contact such as dermal transfer, ingestion, or inhalation; from indirect contact such as ingestion of drinking water contained or transferred by a finished good; or ingestion of a residual substance transferred to the consumer after handling a finished good.

As of January 2010, the allowable limits for lead were revoked, so that any trace amounts of lead required compliance with the statute. This affected all products typically containing brass or steel, including hoses containing wire and Parker-fabricated hose assemblies incorporating fittings. For example, a bulk hose which meets government or industry food, beverage or sanitary requirements would typically meet the exposure limits set forth in Proposition 65, and not require a warning/notification. However, when an assembly that incorporates that hose is fabricated using a brass or steel fitting, the finished good assembly would require the appropriate warning/notification.

The Parker Hannifin Industrial Hose Products Division has instituted a division-wide policy to label all products manufactured in, shipped to, or with the possibility of being shipped to California with the required Proposition 65 warning language. There are hundreds of chemicals on the Proposition 65 list and most Parker products contain one or more of the listed chemicals. For example, rubber, brass, steel and most machined metals contain minuscule amounts of the listed chemicals. Consequently, Parker is placing the warning on products to ensure compliance with the California law.

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