

SAFETY GUIDE FOR SELECTION AND USE OF HOSE, FITTINGS AND RELATED ACCESSORIES

STOP DANGER



Failure or improper selection or improper use of hose, fittings, or related accessories can cause death, personal injury and property damage. Possible consequences of failure or improper selection or improper use of hose, fittings, or related accessories include, but are not limited to:

- Fittings blown off at high speed.
- High velocity fluid discharge.
- Explosion or burning of the conveyed fluid.
- Electrocutation from high voltage electric power lines or other sources of electricity.
- Contact with suddenly moving or falling objects that are held in position or moved by conveyed fluid.
- Dangerously whipping hose.
- Contact with conveyed fluids that may be hot, cold, toxic or otherwise injurious.
- Sparking or explosion caused by static electricity build-up.
- Sparking or explosion while paint or flammable liquid spraying.

Before selecting or using any RYCO hose or fittings or related accessories, it is essential that you read the following instructions.

1. GENERAL INSTRUCTIONS:

- 1.1 **Scope:** This safety guide provides instructions for selecting and using (including assembling, installing and maintaining) hose fittings (including all products commonly called "fittings" or "couplings" for attachment to hose), and related accessories (including crimping machines and tooling). This safety guide is to be used with the specific publications for the specific hose, fittings and related accessories that are being considered for use.
- 1.2 **Fail-Safe:** Hose and hose assemblies can and do fail. Design all systems in a fail-safe mode, so that failure of the hose or hose assembly or related accessories will not endanger persons or property.
- 1.3 **Distribution:** Provide a copy of this safety guide to each person who is responsible for selecting or using hose and fittings and related accessories. Do not select or use hose and fittings or related accessories without thoroughly understanding this safety guide.
- 1.4 **User Responsibility:** Due to the wide variety of operating conditions and uses for hose and fittings and related accessories, RYCO do not represent or warrant that any particular hose or fitting or related accessories is suitable for any specific end use. This safety guide does not analyse all technical parameters that must be considered in selecting a product. The product user, through its own analysis and testing, is solely responsible for:
 - The final selection of the hose and fitting and related accessories.
 - Assuming that requirements are met and the use presents no health or safety hazards.
 - Providing all appropriate health and safety warnings where hose and fittings and related accessories are used.
- 1.5 **Additional Questions:** Call the RYCO Technical Department if you have any questions or require any additional information.

2. HOSE AND FITTING SELECTION INSTRUCTIONS:

- 2.1 **Electrical Conductivity:** Certain applications require that a hose be non-conductive to prevent electrical current flow. Other applications require the hose to be sufficiently conductive to drain off static electricity. Extreme care must be exercised when selecting hose and fittings for these or any other applications. For applications that require hose to be electrically non-conductive, including but not limited to applications near high voltage electric lines, only special non-conductive hose can be used. The manufacturer of the equipment must be consulted to be certain that the hose and fittings selected are correct for the application. Do not use any RYCO hose or fittings for any such application unless:
 - (i) the application is expressly approved by RYCO
 - (ii) the hose is both orange colour and marked "non-conductive"
 - (iii) the manufacturer of the equipment specifically approves the particular RYCO hose and fittings.

Do not use any RYCO hose or fittings for conveying paint in airless spraying or similar applications without the written approval of RYCO in each case. A special hose and fittings assembly is required for this application. If the correct hose and fitting application is not used for this application, static electricity can build up and cause sparks that may result in an explosion and/or fire.

The electrical conductivity or non-conductivity of hose and fittings is dependent upon many factors and may be susceptible to change.

- 2.2 **Pressure:** Hose selection must be made so that the published maximum recommended working pressure of the hose is equal or greater than the maximum system pressure. Surge pressures in the system higher than the published maximum recommended working pressure will cause failure or shorten hose life.
- 2.3 **Suction:** Hoses used for suction applications must be selected to ensure that the hose will withstand the vacuum and pressure of the system.
- 2.4 **Temperature:** Be certain that fluid and ambient temperatures, both steady and transient, do not exceed the limitations of the hose. Care must be taken when routing hose near hot objects such as manifolds.
- 2.5 **Fluid Compatibility:** Hose selection must assure compatibility of the hose tube, cover, reinforcement, and fittings with the fluid media used.
- 2.6 **Permeation:** Permeation (that is, seepage through the hose) will occur from inside the hose to outside when hose is used with gases, liquid and gas fuels, and refrigerants (including but not limited to such materials such as helium, fuel, oil, natural gas or freon). This permeation may result in high concentrations of vapours which are potentially flammable, explosive, or toxic, and in loss of fluid. You must take into account the fact that permeation will occur and could be hazardous.
Permeation of moisture from outside the hose to inside the hose will also occur. If this moisture permeation would have detrimental effects (particularly but not limited to refrigeration and air conditioning systems), incorporation of appropriate system safeguards should be selected and used.
- 2.7 **Size:** Transmission of power by means of pressurised fluid varies with pressure and rate flow. The size of the components must be adequate to keep pressure losses to a minimum and avoid damage due to heat generation of excessive fluid velocity.
- 2.8 **Routing:** Attention must be given to optimum routing to minimise inherent problems.
- 2.9 **Environment:** Care must be taken to ensure that the hose and fittings are either compatible with or protected from the environment to which they are exposed including but not limited to ultraviolet radiation, sunlight, heat, ozone, moisture, water, salt water, chemicals and air pollutants.
- 2.10 **Mechanical Loads:** Consideration must be given to excessive flexing, twist, kinking, tensile or sideloads, bend radius, and vibration. Use of swivel type fittings or adaptors may be required.
- 2.11 **Physical Damage:** Care must be taken to protect hose from wear, snagging and cuts.
- 2.12 **Proper End Fittings:** See instructions 3.2 through 3.5. These recommendations may be substantiated by testing to industry standards.
- 2.13 **Length:** When establishing a proper hose length; motion absorption, hose length changes due to pressure, and hose and machine tolerances must be considered.
- 2.14 **Specifications and Standards:** When selecting hose and fittings; government, industry, and RYCO specifications and recommendations must be reviewed and followed as applicable.
- 2.15 **Hose Cleanliness:** Hose components may vary in cleanliness levels. Care must be taken to ensure that the assembly selected has an adequate level of cleanliness for the application.
- 2.16 **Fire Resistant Fluids:** Some fire resistant fluids require the same hose as petroleum oil. Some use a special hose, while a few fluids will not work with any hose at all. See instructions 1.5 and 2.5.
- 2.17 **Radiant Heat:** Hose can be heated to destruction without contact by such nearby items as hot manifolds or molten metal.
- 2.18 **Welding and Brazing:** Heating of plated parts, including hose fittings and adaptors, above 232°C (450°F) such as during welding, brazing, or soldering may emit deadly gases.
- 2.19 **Atomic Radiation:** Atomic radiation affects all materials used in hose assemblies. Do not expose hose assemblies to atomic radiation.

3. HOSE AND FITTING ASSEMBLY AND INSTALLATION INSTRUCTIONS:

- 3.1 **Pre-Installation Inspection:** Prior to installation, a careful examination of the hose must be performed. All components must be checked for correct style, size, and length. The hose must be examined for cleanliness, obstructions, blisters, cover looseness, or any other visible defects.
- 3.2 **Hose and Fitting Assembly:** Do not assemble a RYCO fitting on a RYCO hose that is not specifically listed by RYCO for that fitting. Do not assemble RYCO fittings on another manufacturer's hose or a RYCO hose on another manufacturer's fitting unless RYCO approves the assembly in writing, and the user verifies the assembly and the application through analysis and testing. See instruction 1.4. The RYCO published instructions must be followed for assembling the fittings on the hose. These instructions are provided in the RYCO catalogue.
- 3.3 **Related Accessories:** Do not crimp or swage any RYCO hose or fitting with anything but the proper RYCO swage or crimp machine and in accordance with published instructions. Do not crimp or swage another manufacturer's hose fitting with a RYCO crimp or swage machine unless authorised in writing by RYCO.
- 3.4 **Parts:** Do not use any RYCO hose fitting part unless with the correct RYCO mating parts, in accordance with published instructions, unless authorised in writing by RYCO.
- 3.5 **Field Attachable/Permanent:** Field Attachable Couplings may be reattached once only after their first use, provided that they have not been part of a hose assembly that has failed, and are in a fit condition for reuse. Do not reuse any field attachable hose coupling that has blown or pulled off a hose. Do not reuse any permanent (that is, crimped or swaged) hose fittings or any part thereof.
- 3.6 **Minimum Bend Radius:** Installation of a hose at less than the minimum listed bend radius may significantly reduce hose life.
- 3.7 **Twist Angle and Orientation:** Hose installations must be such that relative motion of machine components does not produce twisting.
- 3.8 **Securement:** In many applications, it may be necessary to restrain, protect, or guide the hose to protect it from damage. Care must be taken to ensure such restraints do not introduce additional stress or wear points.
- 3.9 **Proper Connection of Ports:** Proper physical installation of the hose requires a correctly installed port connection while ensuring that no twist or torque is transferred to the hose.
- 3.10 **External Damage:** Proper installation is not complete without ensuring that tensile loads, side loads, kinking, flattening, potential abrasion, thread damage, or damage to sealing surfaces are corrected or eliminated. See instruction 2.10.
- 3.11 **System Check-out:** After completing the installation, all air entrapment must be eliminated and the system pressurised to the maximum system pressure and checked for proper function and freedom from leaks.

NOTE: Avoid potential hazardous areas while testing.

4. HOSE AND FITTING MAINTENANCE INSTRUCTIONS:

Even with proper selection and installation, hose life may be significantly reduced without a continuing maintenance program. Frequency should be determined by the severity of the application and risk potential. A maintenance program must include the following as a minimum.

- 4.1 **Visual Inspection Hose/Fitting:** Any of the following conditions require immediate shut down and replacement of the hose assembly:
- Fitting slippage on hose
 - Damaged, cut or abraded cover
 - 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
 - Blistered, soft, degraded or loose cover
- 4.2 **Visual Inspection All Other:** The following items must be tightened, repaired or replaced as required:
- Leaking port conditions
 - Remove excess dirt build-up
 - Clamps, guards, shields
 - System fluid level, fluid type and any air entrapment
- 4.3 **Functional Test:** Operate the system at maximum operating pressure and check for possible malfunctions and freedom from leaks.
- 4.4 **Replacement Intervals:** Specific replacement intervals must be considered based on previous service life, government or industry recommendations. See instructions 1.2.