

// THERMOPLASTIC HOSE INSTALLATION FACTORS

The specifications and particular conditions of use also determine the limits for the correct use of Transfer Oil products. Accordingly, Transfer Oil can neither declare nor guarantee that any item will be suitable for a given applications: it is the business of users to apply their knowledge of the relevant details and carry out such tests as may be needed to ensure the selection of the item best suited for the particular requirements, eliminating risks to themselves, to the product, and to third parties.

Users are strongly advised in their own interest, before making any final decision on the item, to consult the full range of information supplied in the Transfer Oil technical literature, catalogues, website and appendixes.

To eliminate any element of doubt, the Transfer Oil sales department will obviously be at the customer's disposal to provide further information and respond to any request for clarification.



Important note for users

Hose assemblies require caution in use not only to provide long service life but also to guard against potentially dangerous failure. Serious injury, death and destruction of property can result from the rupture or blowing-apart of a hydraulic hose assembly that is damaged, worn out, badly assembled or installed incorrectly. Users should follow good maintenance practices. Avoid expensive downtime by establishing a program of inspection, testing and replacement of hose assemblies before failure occurs; taking into account factors including: severity of application, frequency of equipment use, past performance of hose assemblies. Document your maintenance, inspections and testing.

Only properly trained persons should inspect, test or service hose assemblies and this training should be updated regularly. Users should carefully observe the precautions listed below as well as following closely our recommendations for the selection of hose and couplings. In addition, care should be taken not to go below the minimum bend radius listed for each hose size and type. Maximum operating pressure should not exceed the pressures listed. Instruction for assembling fittings to different hoses should be followed carefully to ensure the safe performance of the complete assembly.

By following the recommendations on hose assembly routing and installation, improved safety and longer service life of any hose installation will result.

Hydraulic fluid under pressure can be potentially dangerous!!

An explosive burst or stream of escaping fluid can cause damage to equipment as well as serious injury to persons nearby.

Salient information

Highly pressurized fluid escaping from a small pinhole can be almost invisible and, yet, exert extreme force capable of penetrating the skin and other body tissues, causing possible severe injury.

Hot fluids or chemicals can cause severe burns. Pressurized fluids, if released uncontrolled, can exert a tremendous explosive force. Some hydraulic fluids are highly flammable.

Precautions

Always position a shield between you and any pressurized hydraulic lines when working next to them or shut the pressure off.

Wear safety glasses.

Do not use your hands to check for leaks. Do not touch a pressurized hydraulic hose assembly with any part of your body, if fluid punctures the skin, even if no pain is felt, a serious emergency exists.

Obtain medical assistance immediately. Failure to do so can result in loss of the injured body part or death.

Stay out of hazardous areas while testing hose assemblies under pressure. Use proper safety protection.

If an injury or reaction occurs, get medical attention right away.

Use only non conductive thermoplastic hoses where electrical conductivity is not desired: for instance, equipment working on electric power lines.

TRANSFER OIL hose and fitting are designed, engineered and tested to be used together in an assembly.

The use of TRANSFER OIL fittings on other manufactures hose or the use of TRANSFER OIL hose with other manufactures fittings may result in the production of unreliable or unsafe assemblies.

Hydraulic hose (and hose assemblies) has a limited life dependent on service conditions to which it is applied.

Subjecting hose (and hose assemblies) to conditions more severe than the recommended limits significantly reduce service life. Exposure to combinations of recommended limits (i.e. continuous use at maximum rated working pressure,



maximum recommended operating temperature and minimum bend radius) will also reduce service life.

WARNING!

FAILURE TO FOLLOW PROPER SELECTION, INSTALLATION AND MAINTENANCE PROCEDURES MAY RESULT IN PREMATURE FAILURES, BODILY INJURY, AND DAMAGE TO PROPERTY.

Pressure

After determining the system pressure for an hydraulic system, hose selection must be made so that the recommended maximum operating pressure specified by a given hose, is equal or greater than the maximum system pressure. Continuous use at maximum temperatures together with maximum pressures should always be avoided. Continuous use at or near the maximum temperature rating will cause a deterioration of physical properties of the tube and cover of most hose. This deterioration will reduce the service life of the hose.

Pressure surges which exceed the maximum working pressure (pressure relief valve setting) affect the service life of system components, including a hose assembly and therefore need to be taken into consideration. Hoses used for suction lines must be selected to ensure the hose will withstand the negative pressure of the system.

Burst pressure

These are test values only and apply to hose assemblies that have not been used and have been assembled for less than 30 days.

High pressure gas

High pressure gaseous systems especially over 15 bar or 250 psi are very hazardous and should be adequately protected from external shock and mechanical or chemical damage. They should also be suitably protected to prevent whiplash action in the event of failure.

TRANSFER OIL Thermoplastic hose is not recommended for high pressure pure oxygen charging applications.

Temperature

Care must be taken to ensure that the operating temperature of the fluid being conveyed and ambient temperatures do not exceed the limitations of the hose. Special care must be taken when routing near hot manifolds or molten metal.

Fluid compatibility

Hose selection must assure compatibility of the hose tube, cover, reinforcement, and fittings with the fluid used. Additional caution must be observed in hose selection for gaseous applications. Some fire resistant fluids require the same hose as petroleum oil. Some use a special hose.

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, solvents and other media, 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. Even though the fluid compatibility is acceptable, 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 sufficient drying capacity in the system or other appropriate system safeguards should be selected and used.

Routing

Attention must be given to optimum routing to minimise inherent problems. Restrain, protect or guide hose with the use of clamps if necessary to minimise risk or damage due to excessive flexing, whipping or contact with other moving parts or corrosives. Determine hose lengths and configurations that will result in proper routing and protection from abrasion, snagging or kinking and provide leak resistant connections.

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.

Environmental conditions including but not limited to ultraviolet light, heat, ozone, moisture, water, salt water, chemicals, and air pollutants can cause degradation and premature failure and, therefore, must be considered.

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 part of the body.
Atomic radiation	Atomic radiation affects all materials used in hose assemblies. Since the long-term effects may be unknown, do not expose hose assemblies to atomic radiation.
Mechanical loads	External forces can significantly reduce hose life. 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 adaptors may be required to ensure no twist is put into the hose. Unusual applications may require special testing prior to hose selection.
External pressure	In certain applications, such as in autoclaves or under water, the external environmental pressures may exceed the fluid pressure inside the hose. In these applications, consider the external pressures, and, if necessary, consult the manufacturers.
Abrasion	While a hose is designed with a reasonable level of abrasion resistance, care must be taken to protect the hose from excessive abrasion which can result in erosion, snagging, and cutting of the hose cover. Exposure of the reinforcement will significantly accelerate hose failure.
Proper end fitting	Care must be taken to ensure proper compatibility exists between the hose and coupling selected based on the manufacturer's recommendations.
Hose-assembly fabrication	Persons fabricating hose assemblies should be trained in the proper use of equipment and materials. The manufacturers' instructions must be followed. Properly assembled fittings are vital to the integrity of a hose assembly. Improperly assembled fittings can separate from the hose and may cause serious injury or property damage from whipping hose, or from fire or explosion of vapour expelled from the hose.
Length	When establishing proper hose length, motion absorption, hose length changes due to pressure, as well as hose and machine tolerances must be considered.
Specifications and standards	When selecting hose and fittings, government, industry and manufacturer's specifications and recommendations must be reviewed as applicable.
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 in which electrical conductivity or non-conductivity is a factor. For application 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 in which the non-conductive hose is to be used must be consulted to be certain that the hose and fittings that are selected are proper for the application. Do not use any TRANSFER OIL hose or fitting for any application requiring non-conductive hose, including but not limited to applications near high voltage electric lines, unless: <ul style="list-style-type: none"> • the application is expressly approved in the TRANSFER OIL technical publication for the product • the hose is both orange in colour and marked "non-conductive" (see non-conductive hoses) • the manufacturer of the equipment on which the hose is to be used specifically approves the particular TRANSFER OIL hose and fitting for such use. The electrical conductivity or non-conductivity of hose and fittings is dependant 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,



manufacturing methods (including moisture control), how the fittings contact the hose, age and amount of deterioration of damage or others changes, moisture content of the hose at a particular time, and other factors.

Static-electric discharge

Fluid passing through hose can generate static electricity resulting in static-electric discharge. This may create sparks that can puncture hose. If this potential exists, select hose with sufficient conductivity to carry the static-electric charge to the ground.

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 avoid sharp bending at the hose/fitting juncture.

Twist angle and orientation

Hose installations must be such that relative motion of machine components does not produce twisting.

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, a contact with other mechanical components. Care must be taken to ensure such restraints do not introduce additional stress or wear points.

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.

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.

Unintended uses

Hose assemblies are primarily designed for the internal forces of conducted fluids. Do not pull hose or use it for purposes that may apply external forces for which the hose or fittings were not designed.

Cutting of thermoplastic hoses with steel braid reinforcement

We recommend the use of smooth circular saw blades as a suitable tool for cutting thermoplastic hoses. The use of jagged or toothed blades may cause a cut of poor quality, causing a significant flaring, with consequent difficulties in inserting the ferrule. Blades need to be kept sharp at all times.

Storage

Reference for Storage and Maintenance should be made to ISO 8331 Rubber and plastics hose and hose assemblies - Guide to selection, storage, use and maintenance.

Hoses should be stored inside, not outside, and on a shelf, not on the floor.

Hoses should be stored away from sunlight, strong artificial light or strong heat sources.

Hoses should not be stored in contact with, or close to, certain products, or their vapours, particularly solvents, oils, greases, acids, disinfectants.

If the hose assembly is to be cleaned before use than water only is to be recommended. Use of chemical cleaners may affect the product depending on the type used.

Hose should be stored in the original packaging until required.

Thermoplastic hose should not be stored in contact with other products.



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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 be established and followed to include the following as a minimum:

Visual inspection hose/fitting

Any of the following conditions require immediate shut down and replacement of the hose assembly:

- Damaged, cut or abraded cover (any reinforcement exposed).
- Hard, stiff, heat cracked, or charred hose.
- Cracked, damaged, or badly corroded fittings.
- Leaks at the fitting or in the hose.
- Kinked, crushed, flattened or twisted hose.
- Blistered, soft, degraded, or loose cover.

Visual inspection all other

Any of the following conditions require immediate shut down and replacement of the hose assembly:

- Leaking port conditions.
- Clamp, guards, shields.
- System fluid level, fluid type and any air entrapment.
- Remove excess dirt build - up.

Replacement intervals and Storage

Specific replacement intervals must be considered based on previous service life, government or industry recommendations, or when failures could result in unacceptable downtime, damage, or injury risk.

Reference for Storage and Maintenance should be made to ISO 8331 Rubber and plastics hose and hose assemblies - Guide to selection, storage, use and maintenance. Hoses should be stored inside, not outside, and on a shelf, not on the floor. Hoses should be stored away from sunlight, strong artificial light or strong heat sources. Hoses should not be stored in contact with, or close to, certain products, or their vapours, particularly solvents, oils, greases, acids, disinfectants. If the hose assembly is to be cleaned before use than water only is to be recommended. Use of chemical cleaners may affect the product depending on the type used. Hose should be stored in the original packaging until required. Thermoplastic hose should not be stored in contact with other products.

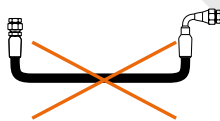
CORRECT ASSEMBLY INSTALLATION

Satisfactory performance and appearance depend upon proper hose installation. Excessive length destroys the trim appearance of an installation and adds unnecessarily to the cost of the equipment. Hose assemblies of insufficient length to permit adequate flexing, expansion or contraction will cause poor power transmission and shorten the life of the hose.

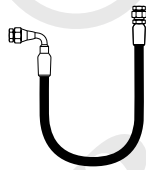
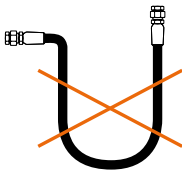
The diagrams below offer suggestions for proper hose installations to obtain the maximum in performance and economy.



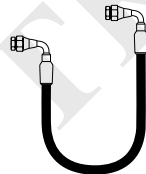
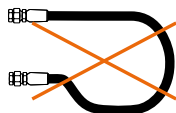
Since hose may change in length under the surge of high pressure, provide sufficient slack for expansion and contraction.



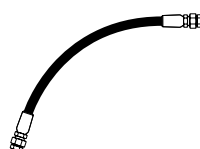
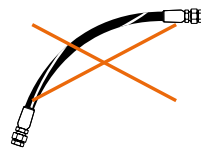
Hose should exit coupling in a straight position rather than side loaded. The minimum bend radius must not be exceeded to avoid kinking of hose and flow restriction.



Where the radius falls below the required minimum, an angle adapter should be used to avoid sharp bends in hose.



Avoid sharp twist or bend in hose by using proper angle adapters.



Hose is weakened when installed in twisted position. Also, pressure pulses in twisted hose tend to fatigue wire and loosen fitting connections. Design so that machine motion produces bending rather than torsion.

