



GOMAX® hose installation factors

The specifications and particular conditions of use also determine the limits for the correct use of Gomax® 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 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.

Contents:

1) Important note for users	2
2) Salient information	2
3) Precautions	2
4) Pressure	2
5) Burst pressure.....	3
6) High pressure gas.....	3
7) Temperature.....	3
8) Insulation	3
9) Gas and Oil compatibility.....	3
10) Permeation	3
11) Routing	3
12) Environment	4
13) Refrigerant gases	4
14) Atomic radiation	4
15) Mechanical loads	4
16) External pressure	4
17) Abrasion.....	4
18) Proper end fitting	4
19) Hose assembly fabrication.....	4
20) Length	5
21) Specifications and standards	5
22) Static-electric discharge.....	5
23) Minimum bend radius	5
24) Twist angle and orientation	5
25) Securement.....	5
26) Proper connection of ports.....	5
27) External damage	5
28) Unintended uses.....	5
29) Hose and fitting maintenance	5
1. Visual inspection hose/fitting	6
2. Visual inspection all other.....	6
30) Replacement intervals	6
31) Correct assembly installation	7



1) 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 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 and temperature 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. Gas and/or oil under pressure can be potentially dangerous! An explosive burst or stream of escaping gases or oils can cause damage to equipment as well as serious injury to persons nearby.

2) Salient information

Highly pressurized gas and/or oil 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 gases / oils or chemicals can cause severe burns. Pressurized gases or oils, if released uncontrolled, can exert a tremendous explosive force. Some gas and/or oil are highly flammable.

3) Precautions

Always position a shield between you and any pressurized 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 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. GOMAX® hose and fitting (ZERO, INFINITY and QUADRA) are designed, engineered and tested to be used together in an assembly. The use of GOMAX® fittings on other manufactures hose or the use of GOMAX® hose with other manufactures fittings may result in the production of unreliable or unsafe assemblies. 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.

4) Pressure

After determining the system pressure for a 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 potential negative pressure of the system.

5) 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.

6) 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.

7) Temperature

Care must be taken to ensure that the operating temperature of the gas and/or oil 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.

8) Insulation

Where the fittings of a QUADRA capillary hose can possibly be subject to permanent condensation or icing (for example on a suction line or an evaporator), we recommend to include the hose fitting within the insulation, in order to avoid unnecessary corrosion over time.

Insulate the capillary hose up to 5 cm (2 inches) from the end of the ferrule with a rubber type insulation hose or insulation tape.

9) Gas and Oil compatibility

Hose selection must assure compatibility of the hose tube, cover, reinforcement, and fittings with the gas and/or oil 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.

10) 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 refrigerant gas). This permeation may result in high concentrations of vapours which are potentially flammable, explosive, or toxic, and in loss of gas and/or oil. Even though the gas and/or oil 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.

11) 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.



12) 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. 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.

13) 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.

14) 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.

15) 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.

16) External pressure

In certain applications, such as in autoclaves or under water, the external environmental pressures may exceed the gas and/or oil pressure inside the hose. In these applications, consider the external pressures, and, if necessary, consult the manufacturers.

17) 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.

18) Proper end fitting

GOMAX® hoses (QUADRA, INFINITY and ZERO) have been designed to be used exclusively with genuine GOMAX® fittings, accessories and tools.

Using third party fittings, accessories or tools may cause malfunctioning of GOMAX® hoses, with consequent risk of leakages of gas and/or oil, as well as damage to equipment and serious injury to persons nearby.

In the same way GOMAX® fittings, accessories and tools are designed to be used exclusively with GOMAX® hoses. Using GOMAX® fittings, accessories and tools with third party hoses may cause malfunctioning, gas and/or oil leakages, as well as damage to equipment as well as serious injury to persons nearby.

19) 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.

20) Length

When establishing proper hose length, motion absorption, hose length changes due to pressure, as well as hose and machine tolerances must be considered.

21) Specifications and standards

When selecting hose and fittings, government, industry and manufacturer's specifications and recommendations must be reviewed as applicable.

22) Static-electric discharge

Gas and/or oil passing through hose can generate static electricity resulting in the possibility of static-electric discharge. This may create sparks that can puncture hose. If this potential exists, then adequate measures should be taken to insulate the product from potential earthing points that may contact the exterior surface of the hose.

23) 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.

24) Twist angle and orientation

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

25) 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.

26) 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.

27) 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.

28) Unintended uses

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

29) Hose and fitting maintenance

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:



1. 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.

2. Visual inspection all other

The following items must be tightened, repaired or replaced as required: Leaking port conditions. Clamp, guards, shields. System fluid level, fluid type and any air entrapment. Remove excess dirt build - up.

30) Replacement intervals

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.



31) 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.

Transfer Oil S.p.A.

Tony Jakubiec – B.Sc. (Eng)
Head of Research and Development



Ugo Ferrari
Sales & Marketing Director


1

Transfer Oil S.p.A. assume no liability on mistakes nor errors appearing in catalogues, releases or other documents. Transfer Oil reserve the right to change his products without any previous notice. These changes might be made on purchased products provided.

Transfer Oil, the TO and Gomax logo are registered trade marks. No use is allowed without Transfer Oil written approval.