Transfer Oil S.p.A.
via sacca, 64 - 43052 - colorno - parma - italy
T +39 0521 3139 | F +39 0521 814160
info@transferoil.com | www.transferoil.com

Product Technical Data Sheet

Specification and Standards Requirements

Part number	A0937
Description	3/8 HORTITECH HARD COVER
Issue date	December 2nd, 2021

Scope

This Product Technical Data Sheet covers thermoplastic hose for use with petroleum base and synthetic hydraulic fluids within a temperature range of -40 to +100 °C (-40 to +212 °F), and water based hydraulic fluids within a temperature range -40 to +70 °C (-40 to +158 °F).

This product will meet or exceed the applicable requirements as detailed within the relevant sections specified in the current issue of the Surface Vehicle Standard SAE J517 Hydraulic Hose.

Other media may be utilized with this product. Refer to catalogue chemical resistance, and Thermoplastic Hose Installation Factors.

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1. Product Construction

Internal Tube	Thermoplastic Polyester Elastomer. Seamless, smooth continuous Polymer Extrusion without the use of mandrel or release agents.
Reinforcement	Two braided layers of Polyester yarn. High tensile polyester yarn reinforcement applied in a tension controlled maypole type braided construction.
Cover	Thermoplastic Polyester Elastomer. Smooth and seamless continuous Polymer Extrusion.
Color	Black.
Pin-pricking	Cover is perforated to allow effusion of trapped gasses for gas and volatile media applications.
Adhesion/Bonding	Bonding tube to braid, braid to cover.

2. Applicable normative

N/A

3. Application

Medium pressure hose with a black Low Friction type cover - ideal for usage on applications where lightweight - flexibility and low friction properties are required. Typical examples are horticulture applications however the inner polyester tube low friction cover make it also usable for medium pressure hydraulic (e.g. pilot).

Polyester Elastomer low friction cover - Bonded construction - Abrasion resistant - Lightweight - Limited change in length.

Greenhouse cleaning - Horticulture - Water distribution - equipment used in high humidity environments - General hydraulics

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4. Product identification

The product is identified by means of an ink jet printed description including but not limited to Manufacturer, Product type, Pressure rating, Country of manufacture, Batch reference. Hose identification is in accordance with latest issue SAE J517. Product traceability is within the Batch number. Printing is longitudinal in White on Black hose.

Standard Print Legend for Product Type:

TRANSFER OIL - EMPAS HC - A0937 - 3/8 - DN10 - WP 90 bar / 1300 psi - MADE IN ITALY - <Batch No.>

Branding logo height	4 ÷ 5	**mm**
	0,157 ÷ 0,197	**inch**
Branding text height	2,5 ÷ 4	**mm**
	0,098 ÷ 0,157	**inch**
Branding Text + Gap (distance from beginning to beginning)	700,00	**mm**
	27,559	**inch**
Branding Gap (distance from end to beginning)	408,00	**mm**
	16,063	**inch**
Branding Text Lenght (distance from beginning to end)	292,00	**mm**
	11,496	**inch**

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5. Product Dimensions, Weight and Limitations

Hose part n°	A0937	
Hose size	3/8	**inch**
	10	**DN**
	-6	**dash**
Nominal ID	9,70	**mm**
	0,382	**inch**
ID Tolerance	+/- 0,20	**mm**
	0,0078	**inch**
Nominal OD	14,30	**mm**
	0,563	**inch**
OD Tolerance	+/- 0,20	**mm**
	0,0078	**inch**
Product Weight	102	**grams per meter**
	68,000	**pounds per foot**
Max Working Pressure	90	**bar**
	1300	**psi**
Min Burst Pressure	270	**bar**
	3900	**psi**
Safety factor	3:1	
Min Bend Radius	50	**mm**
	1,969	**inch**
Max Working Temperature	100	**°C** (application dependant)
	212	**°F** (application dependant)
Min Working Temperature	-40	**°C** (application dependant)
	-40	**°F** (application dependant)

6. In Process Inspection

Transfer Oil manufacturing facilities are ISO 9001-2008 certified with a quality management system which undergoes routine assessments by an accredited third party registrar.

Internally documented inspection procedures are utilized for process control and verification at each and every process stage.

Tests are conducted, where applicable, to the latest issues SAE J517, SAE J343 specifications.

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7. Inspection Tests

The following tests are performed on each batch of hose. Each and every batch of hose shall be subjected to and comply with the requirements contained within this Product Technical Data Sheet and within the requirements of Transfer Oil Quality Management System.

Tests are performed on a representational sample of hose or hose assembly as and when applicable from the batch in question.

7.1. Visual Check

Hose will be visually examined for consistency of polymer application, cosmetic aspect, print legend, color intensity

7.2. Dimensional Check

Inside Diameter and Outside Diameter shall be measured and will conform to set parameters.

The inside diameter of the hose shall be concentric with the outside diameter of the hose within the specified limitations.

Acceptability is based on the total variation between the high and low readings for outside diameter.

Method of measurement of hose dimensions are in accordance with specifications, latest issue, SAE J517, SAE J343.

7.3. Minimum Burst Test

Unaged hose assemblies are subjected to a hydrostatic pressure increased at a constant rate so as to reach hose or hose assembly failure after a period of between 30 seconds and 60 seconds.

Tests in accordance with latest issue SAE J343.

7.4. Change in Length Test

Measurement for the determination of contraction or elongation on a previously untested and unaged hose assembly when at the specified maximum working pressure are performed on hose assembly having at least 600 mm length of free hose between hose fittings.

Hose assembly is tested for Change in Length at the Maximum Working pressure and must be within the specified limitations.

Test procedure in accordance with latest issue SAE J343.

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8. Qualification Testing

To meet the requirements for qualification samples of hose type must meet the requirements of the relevant sections SAE J517 and tested in accordance with SAE J343 and also relevant sections contained within specifications latest issue CEN855 and ISO3949.

All requirements as for Inspection Tests must be met and with the addition of but not limited to the following tests.

8.1. Oil Resistance Test

After 70 hours immersion in the specified medium at 100 °C / 212 °F the volume change of specimens taken from the hose inner tube and / or cover whichever applicable shall be within the specified limits.

8.2. Minimum Burst Test

Unaged hose assemblies are subjected to a hydrostatic pressure increased at a constant rate so as to reach hose or hose assembly failure after a period of between 30 seconds and 60 seconds.

Tests in accordance with latest issue SAE J343.

8.3. Change in Length Test

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9. Assembling specifications

The listed crimping data have been developed in Transfer Oil R&D laboratories and refer to tests carried out on thermoplastic hoses manufactured by Transfer Oil, and specific Transfer Oil approved ferrules and fittings. Such values are anyway to be considered advisory and not binding for Transfer Oil because the impossibility to consider technical variability like the swaging machine used, the set of crimping dies used, the speed of the crimping process, the tolerances of each single item involved, ect.

Hose part n°	A0937	
Ferrule part n°	SAB141	
Bore gauge part n°	N/A	
Ferrule size	3/8	**inch**
	DN 10	**DN**
	-6	**dash**
Ferrule Nominal ID	17,00	**mm**
	0,669	**inch**
Ferrule Nominal OD	22,00	**mm**
	0,866	**inch**
Ferrule Nominal length	31,00	**mm**
	1,220	**inch**
Crimping diameter	17,80	**mm**
	0,701	**inch**
Bore collapse	0,30	**mm**
	0,012	**inch**

Use the following procedures to manufacture your assemblies:

- **a.** Cut the hose to the right length taking care of making a perfectly perpendicular cut. Different instruments can be used: proper shears, automatic cutters, etc. Remove burrs and/or other residuals from the cut surface.
- **b.** Mark the ferrule length on the hose, using a permanent marker.
- **c.** Insert the ferrule onto the hose, verifying the position of the sign as for point b.
- **d.** Push the insert into the hose end. The insert must offer resistance during assembly. If necessary lubricating oil compatible with the expected application can be used. Choose the most suitable dies for the crimp OD specified and place them in the housing of the crimping machine. Position the crimping machine end run to have the automatic release when the desired OD has been achieved.
- **e.** Place the end with the assembled fittings among the dies taking care to position it so that the whole ferrule length can be crimped.
- **f.** Operate the foot lever or equivalent control unit until the deformation has achieved the desired diameter.
- **g.** Check the position of the mark as defined at point b.
- **h.** Check the diameter of the crimped ferrule.

Use the following procedures to check if the fitting has been crimped correctly:

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a. Check that the mark on the hose as per point b of the previous paragraph is visible and has left the end of the connecting ferrule proportional to the hose dimension.

b. Check by proper gauge plug that the insert clearance hole has decreased proportionally to its first dimension.

These procedures are based on practical experience, which have to be checked regularly for every kind of fitting. Other operations to improve the crimping operation such as use of spacers or positioning devices have to be separately evaluated.

10. Twin or multiline Hose

Twin or multiline hose produced by Transfer Oil are a result of the joining of two or more hoses by means of a procedure that is unique in the industry and does not undermine the hose integrity. The joining can be made between hose of the same size and specification or between different hose type and size. It is also possible to join electric cable and wires. The use of twin hoses allows simplifying of application requirements: fluid flow, connections to hydraulic and electric supply etc.

How to split a twin, or multiline hose

a. Fasten the hose in a suitable position for splitting.

b. Hold a Polyester or Nylon multifilament yarn with both hands.

c. Position the yarn at the start of the joined hoses

d. Start splitting the twin hose with an alternating movement taking care the yarn is kept in the middle of the joined hoses.

e. Proceed with splitting the joined hose until the desired point has been reached.

f. To avoid further separation of the join due to vibrations or other mechanical actions consolidate the hose with a reinforcing strip at the separation point.

g. The twin hose is now ready for the assembly operation.

How to check if the split is correct

Immediately after the separation of the hoses, check the cover integrity. If it has been accidentally cut and reinforcement is exposed it is necessary to eliminate this length of exposed reinforcement.

11. Thermoplastic hose installation factors

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.

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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, DEATH, BODILY INJURY, AND PROPERTY DAMAGE

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.

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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 HFC/HCFC). This permeation may result in high concentrations of vapors 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 minimize inherent problems. Restrain, protect or guide hose with the use of clamps if necessary to minimize 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. Additional guidelines for routing the hose assemblies for proper installation can be found in our catalogue.

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.

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.

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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 vapor 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:

a. the application is expressly approved in the Transfer Oil technical publication for the product

b. the hose is both orange in color and marked "non-conductive" (see non-conductive hoses)

c. 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.

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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.

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 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:

a. Damaged, cut or abraded cover (any reinforcement exposed).

b. Hard, stiff, heat cracked, or charred hose.

c. Cracked, damaged, or badly corroded fittings.

d. Leaks at the fitting or in the hose.

e. Kinked, crushed, flattened or twisted hose.

f. Blistered, soft, degraded, or loose cover.

Visual inspection all other

The following items must be tightened, repaired or replaced as required:

a. Leaking port conditions.

b. Clamp, guards, shields.

c. System fluid level, fluid type and any air entrapment.

d. Remove excess dirt build-up.

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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. [i]

Transfer Oil S.p.A.

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

Ugo Ferrari
Sales & Marketing Director

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