



## CNG 5000 Hose range

### Assembling instructions

#### Scope

Transfer Oil is aware that hose and fittings are two semi-manufactured elements of a finished product: the “hose assembly”. The quality level of the “hose assembly” equals the LOWEST level among those declared for the hose, for the fittings and for the coupling.

The choice of original Transfer Oil fittings is therefore a primary condition for the use of Transfer Oil hose assembly. Following pages show the fittings and ferrule categories, with dimensions, and the compatible hose diameters.

Other operations to improve the crimping operation such as use of positioning devices have to be separately evaluated.

### WARNING!

**TRANSFER OIL ADVISE THAT HOSE ASSEMBLIES REQUIRE CAUTION WHEN PRODUCED AND WHEN IN USE NOT ONLY TO PROVIDE LONG SERVICE BUT ALSO TO GUARD AGAINST POTENTIALLY DANGEROUS FAILURE.**

**SERIOUS INJURY, DEATH AND DESTRUCTION OF PROPERTY CAN RESULT FROM THE RUPTURE OR BLOWING-APART OF HOSE ASSEMBLY THAT IS BADLY ASSEMBLED OR ABUSED IN APPLICATION.**

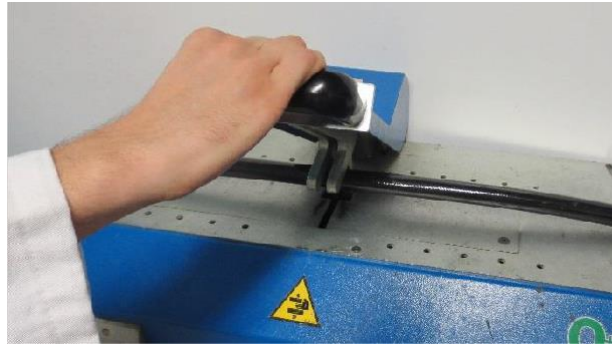
#### Contents:

Scope .....	1
1) Preparing the assembly .....	2
2) Using spring guard protection .....	3
3) Assembling the ferrule .....	4
4) Assembling the insert.....	5
5) Crimping procedure.....	6
6) Checking the bore collapse.....	7
7) Pressure testing .....	8
8) Metal tag and warning label .....	9
9) Annex.....	10
Table 1: Crimping details* and proof pressures .....	10

Extra care is taken in the preparation of this data sheet but Transfer Oil is not responsible for any inadvertent typographical errors or omissions. Information subject to change without notice. The information in this document is only accurate as of the date of publication.

## 1) Preparing the assembly

Cut the hose to the right length taking care of making a perfectly perpendicular cut. Be certain that the equipment used is a suitable hose cutting machine fit for purpose. Follow safety instructions supplied with the cutting machine. Safety glasses should always be worn when cutting any hose with rotating blade cutters.



*Cutting the hose*

The cut must be clean without excessively melting or crushing the hose.

Blades should be always kept sharp.

Remove burrs and/or another residual from the cut surface externally and internally.

Make sure that no dust, impurities or material residual from the cutting operation entered in the hose, as solid particles can contaminate the fluid and damage the pump or other components in the high-pressure circuit.

In addition, assembly flushing can be performed, depending on the degree of cleanliness required in your application and on your standard procedures.



*Use a proper tool to remove burrs and/or residual from the cut surface.*

## 2) Using spring guard protection

The use of a spring guard protection and bend restrictor over the hose will give a longer service life, significantly reducing the risk of hose kink at the fitting. Kinking the hose can be extremely dangerous as this will weaken irreparably the hose structure. As hose kinking is more prone to happen near the fitting terminations – but not only – Transfer Oil strongly recommend to use metal spring guards to limit this risk for all hose assemblies that are, or can be, subject to continuous movements, twisting and bending.

Spring guards need to be installed over the hose before mounting and permanently crimping the fitting terminations and making sure that the side with the spirals tightly packed is facing outwards as shown in the picture below.

After having suitably crimped the fitting termination (see following sections for detailed instructions), slide the spring guard over the ferrule and make sure that its outward end is raised over the ferrule enough to guarantee a suitable interference and allow the spring guard to firmly remain in place, approximately a couple of centimeters.

Transfer Oil spring guards up to 1/2" included are mandatory on both ends if the hose assembly has to fulfill the CSA requirement.



*Hose assembly with a spring guard protection.*

### 3) Assembling the ferrule

Check the ferrule insertion depth length according to Table 1 of the Annex and mark this length on the hose.

Make sure you are using the correct ferrule by cross-checking the part number engraved on the ferrule and the one indicated in the crimping chart of the hose you are assembling. Updated crimping chart can be downloaded at the corresponding product page available at our web site [www.transferoil.com](http://www.transferoil.com).

Insert the ferrule onto the hose and verify the position of the mark.

If the end of the ferrule does not match the mark, this could be a sign of incorrect cutting procedure or an incorrect ferrule utilized.

For CNG hose range use Transfer Oil genuine VHP ferrules only.



*Marking the insertion depth of the ferrule and then put insert into the hose.*

#### 4) Assembling the insert

Push the insert into the hose end. Use of a lubricating oil should not normally be required and should not automatically be used.

If required, also a rubber mallet can be used to gently tap the insert into the hose end.

However, in the event lubrication is required, this should be the smallest amount possible and applied by wet sponge to the end of the insert.

Incorrect lubricating, as it is visible in the pictures below, may cause problems at the fittings.

**Do not fully immerse the insert tail in oil!** Oil dipping of the insert can result in lubrication fluid trapped into insert tail grooves, which can be the cause of dangerous fitting blow-offs when the hose assembly is pressurized.

For CNG hose range use Transfer Oil genuine VHP inserts only.

Not every Transfer Oil VHP inserts can be used to make an assembly that has to fulfill the CSA regulations. It is possible to find the complete and updated list of CSA approved inserts on our website [www.transferoil.com](http://www.transferoil.com) in the CNG section.

#### WRONG USE OF LUBRICATING



#### CORRECT USE OF LUBRICATING



## 5) Crimping procedure

This procedure is valid for pallet swaging machines, using eight dies crimping sets.

Use the crimping diameter recommended for the hose being assembled to choose the most suitable dies available for the machine in use. You can also consult the machine user manual to identify the most suitable die set. Using inadequate dies set, for example too small, will result in irregular crimping surface and ridges, which can be the cause of dangerous fitting blow-offs, or high pressure fluid leakages, when the hose assembly is pressurized.

After having adequately set the crimping machine parameters, start crimping the ferrule making sure that the whole length is being crimped by the dies.

After having reached the target crimping diameter, slightly open the dies, and then rotate the hose by 1/16 of turn, or 22.5°, this in order to smooth the slight ridges generated during the first crimping, and crimp the ferrule again. Extra care has to be given in removing ridges and obtaining a round and uniform crimp.

**Reaching the recommended crimping diameter does not mean that the hose is adequately crimped!** The crimping diameter is purely an indication to select the optimal dies set and to set the crimping machine target parameter.

To have full evidence of a correct crimping, the bore collapse must be verified. See next section for detailed instructions. Even if the crimping diameter has been achieved but the recommended bore collapse has not been reached, it is necessary to adjust the crimping diameter in steps of 0,05 mm until the right bore collapse is exactly achieved.

Once the crimping operation is complete, check the position of the ferrule and the mark done with the felt-tip pen in the first step. If the end of the ferrule does not match the mark, reject the assembly.



*To avoid presence of ridges on the ferrule after swage, position protruding ridges central to crimping dies.*



## 6) Checking the bore collapse

After the crimping operation, as result of the compression of the ferrule crimped over the hose, the insert tail internal diameter is reduced. This reduction is defined as “bore collapse” and when in line with its target figure, it is the most reliable evidence of having achieved a suitable compression across the layers.

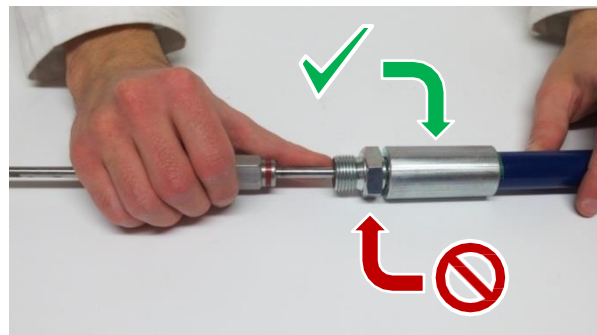
To measure that the appropriate bore collapse has been achieved, the suitable go/no-go gauge must be used. A list of the specified go/no-go gauges can be found in the table 1 of the annex or in the crimping chart available for download in the corresponding product page of our web site <http://www.transferoil.com/prodotto.aspx?idpr=44> as well as instruction for use.

Both sides of the bore gauge matching with the hose being assembled need to be introduced into the crimped end that needs to be verified:

- The go side (recognizable by the G letter engraved) of the bore gauge must slide freely through the whole length of the insert without interference as shown in picture 1.
  - If the mandrel of the gauge stops or interferes excessively inside the insert tail, the compression achieved is excessive and the assembly must be rejected.
- The no-go side (recognizable by the NG letters engraved and the red ring) of the bore gauge must stop approximately half way through the insert (see the correct position indicated by the green arrow on picture 2).
  - If the mandrel of the no-go side of the bore gauge stops before, approximately at the ferrule collar / insert shoulder as indicated by the red arrow in picture 2, the compression is achieved at the wrong area, and the assembly must be rejected.
  - If the mandrel of the no-go side of the bore gauge can slide though the whole length of the insert, then – even if the crimping diameter is correct – the compression achieved is not enough. The ferrule must be newly crimped following the procedures indicated in the earlier sections, reducing the crimping diameter in steps of 0,05 mm, and checking the bore collapse at every step. Do this until the no go side of the gauge stops in the right position and the go side can freely slide through the whole length.



1. Go side must slide through the whole length of the insert



2. The no-go side must stop half way through the insert

## 7) Pressure testing

Transfer Oil CNG hose assemblies should be pressure-tested before being delivered to the customer.

The respective test pressures are shown in Table 1 of the Annex. Pressure testing must be performed in a closed pressure test stand and with the assembly complete with all the possible protections and accessories that customer has required.

The high pressure hose assembly must be kept under test pressure for 30 to 60 seconds, accordingly with EN ISO 1402.

During pressure testing there shall be no evidence of hose leakage, leakage at the hose / coupling interface or failure of the coupling at the specified pressure. If any of these malfunctioning are observed, the hose assembly shall be rejected.

Once the test has been performed, it is recommended to check whether the fittings have warmed up during the pressure test by laying on your hand, after having thoroughly checked that there is no residual pressure in the hose assembly. A warm ferrule could be a sign of a leakage presence during the pressure test.

After the high pressure testing successfully passed, the hose assembly is ready for dispatch and no other modification to the assembly must be performed.

## WARNING!

**IN PRESENCE OF A LEAKING ASSEMBLY, THE HOSE MUST NOT BE DELIVERED TO THE CUSTOMER AS IT WOULD FAIL AFTER A SHORT PERIOD IN SERVICE WITH SERIOUS RISK OF PROPERTY DAMAGES, INJURIES OR DEATH.**

**THE LEAKING TERMINATION MUST BE CUT OFF AND THE HOSE BE RE-ASSEMBLED.**



## 8) Metal tag and warning label

If the hose assembly has to fulfill the ANSI/CSA NGV 4.2-2014 – CSA 12.52 requirement, each hose has to have a metal tag and a warning label.

On the metal tag, according with CSA specification, shall be engraved permanently the main data about the hose assembly including assembly part number and batch number, date and location of the assembly and the name of the standard.

Instructions covering proper selection, installation, inspection, maintenance, safety precaution and usage shall be provided with individual hose assembly so to reach the person who will install the hose assembly. Transfer Oil called it as warning label. English warning label should use for US countries, both English and French warning labels if the hose would be used in Canada.

On the following table it is possible to check the Transfer Oil codes related to CSA metal tags and CSA warning labels to use for each dimension of CNG assembly.

Hose part number	Metal tag	Warning label	
		English	French
<b>15R2</b>	MR295	MR285	MR286
<b>15R4</b>	MR296	MR285	MR286
<b>15R5</b>	MR297	MR285	MR286
<b>15R7</b>	MR298	MR285	MR286
<b>15R8</b>	MR299	MR285	MR286



Hose assembly with CSA metal tag and CSA warning labels



## 9) Annex

Table 1: Crimping details\* and proof pressures

Part no.	Size	Ferrule	Insertion depth		Bore collapse		GO / NO GO Gauge Part no.	Crimp OD expect		Proof pressure	
			mm	inch	mm	inch		mm	inch	bar	psi
15R2	DN6	SAF121 SAF821	31,3	1,232	0,7	0,028	SXC821	16,9	0,665	700	10000
15R4	DN10	SAF141 SAF841	36,7	1,417	0,7	0,028	SXC841	22,8	0,897	700	10000
15R5	DN12	SAF151 SAF851	46,0	1,811	0,7	0,028	SXC852	27,8	1,094	700	10000
15R7	DN20	SAF172 SAF872	50,7	1,996	1,0	0,039	SXC873	35,0	1,378	700	10000
15R8	DN25	SAF181 SAF881	53,4	2,102	1,3	0,051	SXC882	44,7	1,76	700	10000

\* use Transfer Oil genuine VHP ferrules and inserts only