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vat and business register of parma: IT 02306450343 – share capital: EUR 2.500.000 fully paid-up

Title	Assembling instructions – VHP hoses	Issue date	19 November 2015

VHP 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 shows 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.

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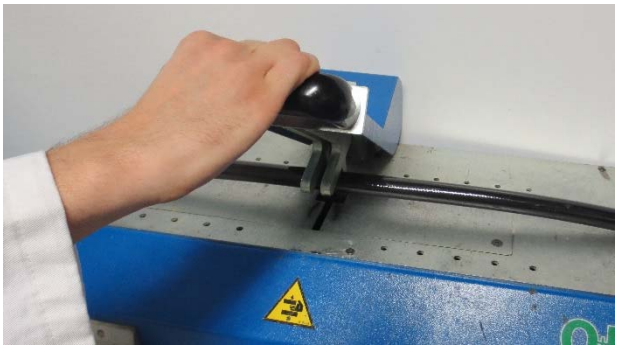
1) Preparing the assembly

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 kept sharp at all times.

Remove burrs and/or other 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) 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.

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.

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

3) 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.

None of our VHP hoses are intended to be used in applications with concentrations of oxygen above 26%, however never use lubrication oil when assembling hoses that are intended to be used with concentrations of oxygen above 26%.

WRONG USE OF LUBRICATING

CORRECT USE OF LUBRICATING

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4) 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.

5) 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.

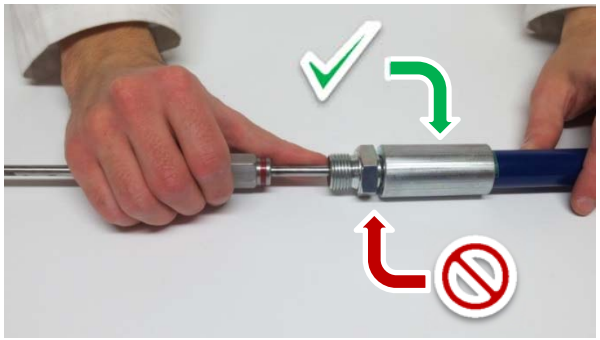
To measure that the appropriate bore collapse has been achieved, the suitable go/no-go gauge must be used. A list of the specified go/no-go gauges can be found in the table 1 of the annex or in the crimping chart available for download in the corresponding product page of our web site www.transferoil.com

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

6) Pressure testing

Transfer Oil VHP 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.

7) Annex

Table 1: Crimping details and proof pressures

041 - VHP 10000											
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
0412	DN6	SAF121	31,3	1,221	0,7	0,027	SXC821	16,0	0,624	1400	20000
0414	DN10	SAF141	36,7	1,431	0,7	0,027	SXC841	22,3	0,870	1400	20000

046 - VHP NON CONDUCTIVE											
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
0460	DN4	SAF101	19,3	0,753	0,3	0,012	SXC801	11,0	0,429	1400	20000
0461	DN5	SAF111	24,2	0,944	0,5	0,020	SXC811	12,5	0,488	1400	20000
0462	DN6	SAF121	31,3	1,221	0,7	0,027	SXC821	16,8	0,655	1400	20000
0464	DN10	SAF141	36,7	1,431	0,8	0,031	SXC841	21,6	0,842	1100	15900

040 - VHP 10000 MARINER											
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
0402	DN6	SAF121	31,3	1,221	0,7	0,027	SXC821	16,0	0,624	1400	20000
0404	DN10	SAF141	36,7	1,431	0,7	0,027	SXC841	22,3	0,870	1400	20000
0405	DN12	SAF151	46,0	1,794	1,0	0,039	SXC851	28,6	1,115	1400	20000

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080 - VHP EXTRA

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
0802	DN6	SAF121	31,3	1,221	0,7	0,027	SXC821	17,1	0,667	1400	20000

049 - HP AGGRESSIVE CHEMICALS

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
0494	DN10	SAF141	36,7	1,431	0,7	0,027	SXC841	21,9	0,854	550	8000
0495	DN12	SAF151	46,0	1,794	-	-	-	-	-	450	6500

048 - VHP AGGRESSIVE

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
0482	DN6	SAF121	31,3	1,221	0,7	0,027	SXC821	16,0	0,624	1400	20000
0483	DN8	SAF131	24,2	0,944	0,7	0,027	SXC831	19,7	0,768	1400	20000
0484	DN10	SAF141	36,7	1,431	0,7	0,027	SXC841	22,3	0,870	1400	20000
0485	DN12	SAF151	46,0	1,794	1,0	0,039	SXC851	28,0	1,092	1180	17100
0486	DN16	SAF161	44,5	1,736	1,1	0,043	SXC861	31,6	1,232	1000	14500
0487	DN20	SAF171	53,4	2,083	0,7	0,027	SXC872	35,4	1,381	900	13000
0488	DN25	SAF181	55,7	2,172	0,7	0,027	SXC881	45,1	1,759	630	9100