

Orderer:

MFC S.r.l.
Via Tito Speri, 32B

IT-25065 Lumezzane (BS)

Certificate and test report Nr. J144CON

Coupling system for solar thermal applications.
Test according to SPF test procedure: Test class A1



Fast coupling system for corrugated stainless steel pipes

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1. Description of the sample

1.1 Product information and technical description

Manufacturer:	MFC S.r.l. - 25065 Lumezzane (Italy)
Model:	Fast coupling system for corrugated stainless steel pipes
Tested sample:	MFC 5051-Cu22
Connection Type:	Corrugated stainless steel pipe to copper pipe
Application range	Pipework connections for solar thermal installation.
Nominal diameter:	DN16 x Ø22mm
Description of sample:	Metallic coupling system for connecting corrugated stainless steel tubes to standard copper pipework.
Materials	Brass CW614N (CuZn39Pb3) - EN12164
Heat transfer media	Ethylene or Propylene glycol / Water
Application limitations	not specified

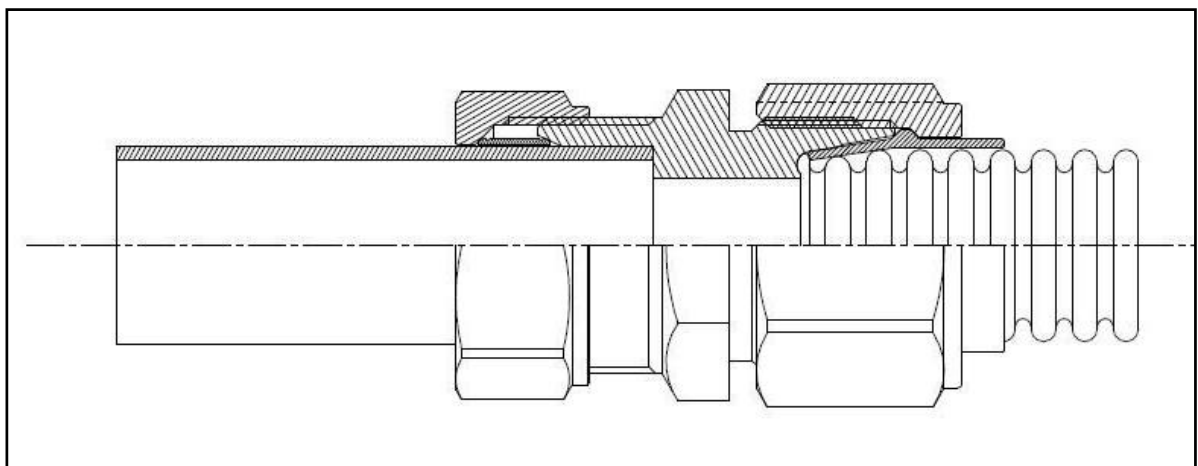


Fig. 1 Cross section of the mounted fitting system

2. Test methods and results

2.1 General remarks

The test procedure is intended to assess the resistance of the connection system against the assumed thermal load encountered during the lifetime of a typical solar installation with state-of-the-art solar collectors (selective absorber coating, solar glazing). The test concerns only the “fast coupling system for corrugated stainless steel pipes connectors”, i.e. only the connection of the corrugated stainless steel tube. Different couplings are available to connect corrugated s/s tubes to copper tubes, soldered spigots, corrugated tubes, and other male or female standard connection components. As long as the tested “fast coupling system for corrugated stainless steel pipes connectors” is used, the test J144 is valid for all these types as it concerns only the connection of the corrugated tube.

Three identical pipe-work samples including a corrugated stainless steel tube have been tested. The samples have been assembled by the manufacturer in a professional manner.

The test procedure does not cover the corrugated tube itself. The connector system is not intended to be used as compensator between solar thermal collectors.

2.2 Test procedure and test parameters

Test according to SPF standard. Test Class A1 reduced to the thermal loads. The 500 thermal shocks represent the stagnation cycles to be expected during the lifetime of a solar thermal system

Three pipe work samples are tested in parallel. None of the samples is allowed to fail for passing the test. During the test procedure the samples are flowed through with glycol at a pressure of 10 bars maximum. The test samples were installed without any static misalignment (installation tolerance) and the SPF test procedure is reduced to the thermal shocks. No further static or dynamic mechanical loads are applied during the whole test procedure.

The test procedure is made up of 500 thermal shocks as follows:

The temperature of the fluid (and hence the fitting) is increased up to the maximum temperature of $T_{\text{high}}=180^{\circ}\text{C} (\pm 5^{\circ}\text{C})$. Upon thermal stabilisation of the whole system a thermal shock is triggered and the samples are flushed with fluid at the lower temperature level $T_{\text{low}} < 80^{\circ}\text{C}$. The decay time of the shock is in the range of 5 seconds.

The time required for one complete temperature cycle is approx. 30 minutes.

These thermal shocks represent the thermal loads that occur during the filling procedure of a drained collector system.

2.3 Photographs of test samples



Figure 2: (before test start)

For the installation the corrugated s/s tube is inserted from the left side. The brass sleeve is then pressed on the end of the corrugated tube by fixing the nut.



Figure 3: (before test start)

Ready installed coupling system.

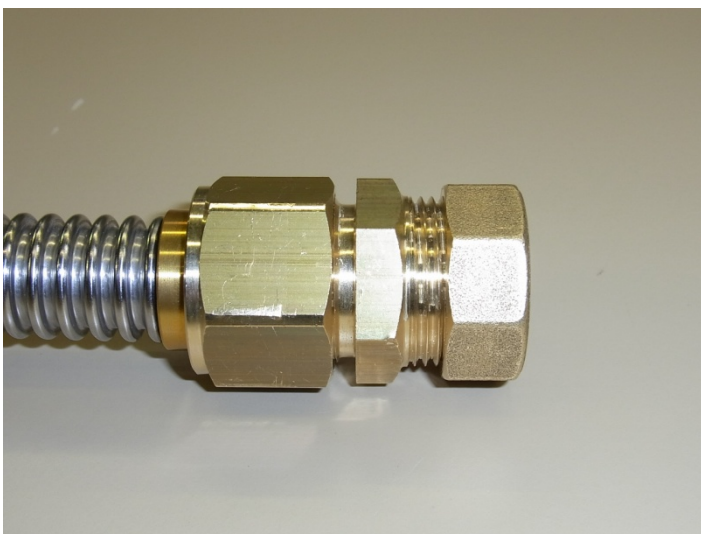


Figure 4: (before test start)

Ready installed coupling system.



Figure 5: (before test)
Test samples on test stand before the test start



Figure 6: (after test)
Samples installed on the test rig. No leakage or any other problems have been observed.



Figure 7: (after test)
Sample P1 opened. No visible signs of deterioration that could indicate reduced lifetime or leakage

2.4 Notes

The test results and the certificate are valid for fluids in the liquid phase. The behaviour of the fitting for vaporous heat transfer media as well as evaporation and condensation effects are not assessed with the present test procedure.

The fittings must be used together with corrugated stainless steel tubes which are able to absorb the mechanical movements caused by thermal elongations, mechanical misalignment and similar.

2.5 Result

No leakage, deficiency and no other failures have been observed during the test. The “fast coupling system for corrugated stainless steel pipes” is therefore considered as suitable for the use in solar thermal installations.

The “fast coupling system for corrugated stainless steel pipes” in the tested dimension therefore fulfils the requirements of the SPF test procedure class A1 and is certified under the SPF number J144CON.

The certificate is valid for 5 years.

3 Remarks

This report must not be copied except in full.
The test results only refer to the tested sample.

Rapperswil, 27.05.2011



Dr. Andreas Bohren
Head SPF Testing



August Thrier
Responsible for the testing