

Interchangeability Test By TUV



Project: PANAM ENGINEERS LTD.,
Request for Services dated: 23.06.2007

INTERCHANGEABILITY TEST

Certificate No.10199907/118

Office : Mumbai
Date : 29.06.2007
Order Status : Complete

This certificate is issued to Panam Engineers Ltd., 203, Jaisingh Business Centre, Parsiwada, Sahar Road, Andheri East, Mumbai 400 099, to certify that the undersigned Surveyor did at the request of the above client attend at their Works on the following survey.

Components :

Quantity	Description	Panam Part No
5	1/4"OD X 3/4"NPT Male Connector	PMC-04-04-SS
5	3/8"OD X 3/8"NPT Male Connector	PMC-06-06-SS
5	1/2"OD X 1/2"NPT Male Connector	PMC-08-08-SS
5	3/4"OD X 3/4"NPT Male Connector	PMC-12-12-SS
5	1"OD X 1"NPT Male Connector	PMC-16-16-SS
5	1/4"OD Union	PU-04-SS
5	3/8"OD Union	PU-06-SS
5	1/2"OD Union	PU-08-SS
5	3/4"OD Union	PU-12-SS
5	1"OD Union	PU-16-SS
5	1/4"OD Tube Cap	PTC-04-SS
5	3/8"OD Tube Cap	PTC-06-SS
5	1/2"OD Tube Cap	PTC-08-SS
5	3/4"OD Tube Cap	PTC-12-SS
5	1"OD Tube Cap	PTC-16-SS

Scope of Survey :

- The above items were assembled in various configurations with identical fittings as stated from the manufacturer and as indicated on the attached interchangeability test report. These were assembled with suitable tube, according to PANAM fittings arrangement drawing and specification comprising of five assemblies in total.
- Each fitting was subject to hydrostatic tests to 9000psig for 5 minutes with no visible signs of leakage.
- Test equipment calibration certification verified as current.
- Upon completion of the tests each assembly was taken apart and examined with no visible signs of damage evident.
- One assembly was then rebuilt and retested with no sign of leakage evident.

It is considered that the PANAM components were totally compatible with the Swagelok fittings used in the test.

The Panam interchangeability test report is appended to this Certificate.


G. Chandrasekhar & S. V. Prabhu
Surveyors to TUV India Pvt. Ltd.



INTERCHANGEABILITY TEST REPORT

The identification of each fitting and nut were rolled marked with the respective manufacturer's name.

The components of the fittings submitted were placed in plastic bags. Marked with the manufacturer's name, the size of the fitting, arrangement.

DIA TUBE	CERTIFICATE NUMBER
1/4" - 0.049"	N9134
3/8" - 0.049"	N9135
1/2" - 0.083"	N9136
3/4" - 0.095"	N9137
1" - 0.109"	N9138

The fittings and tube lengths submitted were received as loose components i.e. The components of the fittings were not in the assembled condition.

Test Request

It was requested to test the combined use of the components of the Swagelok and Panam fittings submitted in the prescribed arrangements shown under Fittings Arrangements, prior to and after dis-assembling and subsequent re-assembling at the internal hydraulic test pressures specified below.

1/4" OD Fittings	619 BAR	9000 psig
3/8" OD Fittings	619 BAR	9000 psig
1/2" OD Fittings	619 BAR	9000 psig
3/4" OD Fittings	619 BAR	9000 psig
1" OD Fittings	619 BAR	9000 psig

TESTING

Testing was carried out as indicated below :

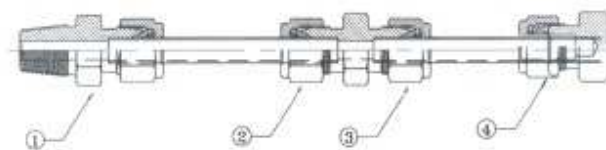
1. The fittings were assembled in two arrangements as shown under Fittings Arrangements.
2. The fittings were assembled in accordance with manufacturer's instructions.
3. The fittings arrangements were then fitted into a calibrated high pressure test rig.
4. The hydraulic pressure was raised in 2000 Psi stages to the maximum test pressures specified above under 'Test Request'.
5. At each stage the pressure was maintained for 5 minutes and the arrangements were inspected for leaks and displacements.
6. After completion of the test the fittings were dis-assembled and inspected for damage and untoward features.
7. Subsequently, the fittings were re-assembled in the arrangement they were in prior to dis-assembly, and in accordance with the above referenced instructions.

The tests were then repeated as described under '3' up to and including '6' above.





Fittings Arrangement:



Arrangement 1

	1	2	3	4
BODY	PANAM	SWAGELOK	SWAGELOK	PANAM
NUT	PANAM	PANAM	SWAGELOK	SWAGELOK
FERRULE	PANAM	PANAM	PANAM	SWAGELOK

Arrangement 2

	1	2	3	4
BODY	PANAM	SWAGELOK	SWAGELOK	PANAM
NUT	SWAGELOK	PANAM	SWAGELOK	PANAM
FERRULES	PANAM	PANAM	PANAM	SWAGELOK

Results:

Both during testing and after completion of the testing in accordance with the above mentioned testing procedure, the parts of the prescribed fittings arrangements were inspected for leaks, displacements, damage and other untoward features.

On these inspections, leaks, displacements, damage or untoward features were not found to be present on the fittings arrangements tested.

On co-relating the fittings arrangements shown above with the results of the hydraulic test it was found that the same size PANAM and Swagelok components of fittings submitted for testing were completely interchangeable.

Conclusion:

Provided, the assembly is carefully executed to the recommended instructions, then as far as could be seen, PANAM and Swagelok fittings can be interchanged.

Test Witnessed by :

G. Chandrasekhar & S. V. Prabhu

Name : G. Chandrasekhar & S. V. Prabhu
 Company : TUV India Pvt. Ltd
 Date : 29.06.2007

