Report No.: **BJ-BF I.01-TA-10-02**

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Test Report

**For leak tightness tests carried out on tube joint
in relation to the requirements of Section 5.2.6.3 of TA-Luft 2002,
and reference to Sec. 3.3.1.4 of VDI 2440 Nov. 2000**

Applicant: **FITOK INCORPORATED**

Manufacturer: **FITOK INCORPORATED**

Block C, Zone E, Yingtailong Industrial Park, Dalang Street, Bao'an District, Shenzhen, Guangdong, P.R.China

Test Location: **FITOK INCORPORATED**

Testing Time: **Mar. 9 to 10, 2010**

Requirements:

TA-Luft/5.2.6.3 As a rule, flange connections shall be used only in those cases where they are necessary for reasons of processing, safety of maintenance. Leak proof flange connections to VDI 2440(11.2000) shall be used.

VDI 2440/3.3.1.4:A type test to VDI 2440 is to be verify compliance with the specific leakage rate of $1.0 * 10^{-4}$ mbar * l / (s * m).

Items tested: FITOK tube joint system(ferrule union)made by FITOK Incorporated, consisting of:

1 body made from material 316

1 nut made from material 316

1 front ferrule made from material 316

1 rear ferrule made from material 316

Type test conducted for DN3 and DN25 ferrule union,

the ferrule union DN4 to DN 22 conducted by company, which are deemed also covered by this test as the tube joint systems are based on the same sealing principle.

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Scope of test:	Helium leakage test on the as-supplied test samples according to the above-mentioned standard(s) and tests were carried out on DN3 and DN25 sizes.
Test equipment:	INFICON Leak Detector Type UL1000 Fab
Test method:	Integral leakage rate measurements around the sealing system applying method B2.1 DIN EN1779:1999

Remark: The leak detector calibration cert. is available,

The calibration cert. no.RYJ20100622 is available for pressure gauge No.D080837513

Test procedure: The tested specimens are mounted in a vacuum box and assure the tightness with fixtures. Connect the helium leak detector and apply test vacuum.

Fill the helium into the specimen until the pressure is increased to the 100 bar, 200bar and 300bar when the vacuum tightness is to less or equal $5.0X10^{-3}$ torr.

Record the max. leakage rates respectively for three stage pressures when the pressures are hold on for 3 minutes and a steady state is reached.

Remark: contrary to the requirements of VDI 2440(pressure per unit of area 30Mpa), the test per unit of area of the sealing system of the test samples was applied to the manufacturer's instructions and the tests were carried out at a differential pressure of 101 bar in lieu of the differential pressure of 1 bar specified for testing.

Test result: Leakage rates for the test specimens are detailed below:

Leakage rates at 100 bar:

DN 3: 8.35×10^{-11}mbarl / (s • m)

DN25: 0.58×10^{-11}mbarl / (s • m)

Leakage rates at 200 bar :

DN 3: 4.35×10^{-11}mbarl / (s • m)

DN25: 1.2×10^{-11}mbarl / (s • m)

Leakage rates at 300 bar:

DN 3: 3.41×10^{-11}mbarl / (s • m)

DN25: 0.39×10^{-11}mbarl / (s • m)

Appendix I: specimen drawings

Mar. 10,2010

TÜV Rheinland
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