

Industrie Service



TÜV Rheinland  
Berlin Brandenburg

# ZERTIFIKAT

At the request of  
**HAM-LET GmbH**  
we hereby certify that  
the LET-LOK tube joint system  
DN 6 to DN 25 (1/4" to 1")  
(ferrule union with metal-to-metal joint)  
consisting of 1 body, 1 nut,  
1 front ferrule, 1 rear ferrule (LET-LOK Fittings)

made by

**HAM-LET**

shall be regarded, in respect of its sealing effect,  
as a high quality seal as defined in TA-Luft.

**Basis:**

First General Administrative Order of the Federal Pollution Control Act  
(Technical Instructions for Air Pollution Control - TA Luft),  
Section 5.2.6.3 in combination with VDI 2440, Section 3.3.1.4

**This Certificate shall be valid in conjunction with  
Test Certificate No. 922-9566012 dated 6 November 2006**

**Cologne, 6 November 2006**

TÜV Rheinland Industrie Service GmbH  
TÜV Rheinland Group  
Project Management and  
In-Process and On-Site Inspection

Inspector

A handwritten signature in blue ink, written over a horizontal line. The signature is stylized and appears to be 'W. Schmidt'.

**Test Certificate**  
**on leak tests carried out on**  
**the LET-LOK Fittings tube joint system (ferrule union)**  
**made by HAM\_LET GmbH**  
**in relation to the requirements of Section 5.2.6.3 of TA-Luft**

Customer: HAM-LET GmbH  
Klausener Ring 17  
D-85551 Kirchheim

Manufacturer: HAM-LET GmbH  
Klausener Ring 17  
D-85551 Kirchheim

Test carried out at: ACCEL Instruments GmbH, Forschungsausrüstungen  
51429 Bergisch Gladbach

Test carried out on: 2 August 2006 and 31 October 2006

Requirements TA-Luft: In its version of 12 December 2002, TA-Luft, Section 5.2.6.3 requires:  
"As a rule, flange connections shall be used only in those cases where they are necessary for reasons of processing, safety of maintenance. Leakproof flange connections to VDI 2440 (11.2000) shall be used then. ...A type test to VDI 2440 is to be carried out to verify compliance with the specific leakage rate of  $10^{-4}$  hPa l/(s m)."

Item tested: LET-LOK tube joint system (ferrule union) made by HAM-LET GmbH, 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  
For type, product No., dimensions and notes see catalogue, page 11  
Sizes: DN 6 ferrule union  
DN 25 ferrule union  
  
The LET-LOK ferrule unions  $\varnothing$  8 to 22 made by HAM-LET GmbH, which are listed on the same page are deemed also covered by this test as the tube joint systems are based on the same sealing principle. The LET-LOK ferrule unions made from brass, stainless steel, Monel, Inconel are deemed also covered by this test.

Scope of test: He leak test on the LET-LOK tube joint system made by HAM-LET GmbH with the ferrule unions in new condition. The parts were screwed up by the testing laboratory. The tests were carried out on DN 6 and DN 25 sizes.

Test equipment: Leybold Heraeus Ultratest F type

Test method: Integral leakage rate measurements around the sealing system applying method B2.1, DIN EN 1779, 10.99:

The tube joint system is mounted in a testing appliance. Bostik is used to seal the inlet opening of the bell jar. Then the test sample is filled with test gas (He 4.6) until a pressure of 100 bar is reached.

The customer had closed the tube connections of the test samples by means of flat heads. One of the tube connection sides was provided with a pressure gas connection.

Test procedure: Testing of leakage rates until a steady state is reached. The tests were carried out at ambient temperature on the same lines as VDI 2440. Contrary to the requirements of VDI 2440 (pressure per unit of area 30 MPa), the pressure 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: The leakage rates of the test samples (in condition when received) of the LET-LOK tube joint system (ferrule union) made by HAM-LET GmbH are detailed below:

$$\text{DN 6: } Q_{PR} = < 2.0 \times 10^{-10} \frac{\text{mbar} \cdot \text{l}}{\text{sec}}$$

$$\text{DN 25: } Q_{PR} = < 2.0 \times 10^{-10} \frac{\text{mbar} \cdot \text{l}}{\text{sec}}$$

These leakage rates are within the range of guaranteed values for welded metal-to-metal joints.

The tube connection system (LET-LOK ferrule union) made by HAM-LET GmbH that is covered by this certificate is consequently to be regarded as equivalent in respect of its sealing effect.

It can therefore be regarded as a "high quality sealing system" as defined in Section 5.2.6.3 of TA-Luft.

Cologne, 6 November 2006  
922/WS

Inspector



W. Schledde