

I. Regulations for environmental protection (TA LÜFT).

Regulations for environmental protection of reference in Europe is the "TA LUFT" point 3.1.8.4 of 27.02.1986, the requirements established by the German government.

Comparable legislation have meanwhile been developed or adopted in other European countries.

For the North American continent, it appeared in 1990: "Clean Air Act.

A/ Description of requirements TA LUFT :

All component manufacturers, suppliers of fittings are required to comply with the behavior of their products in terms of leakage to outside the legal provisions in force, even to develop and propose optimal solutions in terms technical and commercial. Extreme tightness, reliability, long-term security but also the possibility to check these criteria are always the basic requirements to be met fittings and piping accessories today.

B/ Technical Guideline for the fight against air pollution. (TA LUFT)

Technical Guideline for the fight against air pollution specifies the maximum permissible limits for emissions of dust, fumes or gases produced during processing, transport or transfer of dusty products, liquid or gaseous.

These provisions aim to curb the increasing pollution of the atmosphere and prevent any inconvenience or risk to the health of those directly involved. Very low limit values have been set for example for emissions of high-risk products, such as carcinogenic materials, heavy metals and organic materials are particularly dangerous

Examples :

Cd,Hg,Ti,Co,NO	< 0.2mg/m ³
As, Co, Ni, Se	< 0.1mg/m ³
Pb, Sb, F, CN	< 5.0mg/m ³

The emission limits are implemented through the mass flow rates authorized by steps to reduce odors to abide by the requirements for the construction and operation.

When handling organic substances specific passages of the stems and fittings must be sealed by a bellows, followed by a gland in security or equivalent measures.

For ball valves, the maximum allowable leakage rate with products at particular risk is 0.03 gh-1 (analysis of leakage rate of sealing elements EKEP, 35 (82) No. 12 S.575, done by Deutsche Gesellschaft für und Mineralölwissenschaften kohlechemie ev, a German research on mineral oils and the chemistry of carbon).

Given these maximum leakage rates, an emission rate of Helium (He) $4.99 \cdot 10^{-2} \text{ bar} \cdot \text{cm}^3 \cdot \text{s}^{-1}$ is considered eligible, as well as the tightness of the valve stem bellows monitoring, a gland security.

TEST METHODOLOGY

Ta Luft (requirement)

_Type test for PS4, PN4, PY4, PZ4, PP4..P(x)4

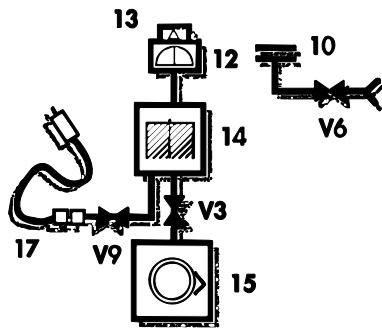
(x)= Depend of seat material

II. Technical Description of Measure Sniffing Leak.

A mass spectrometer with helium, with a sniffer is used to detect leaks from sealing systems of the Stem.

TESTEUR ASM 142 ALCATEL

1 / Operating principle:



- V3 - Valve
- V6 - Valve air admission
- V9 - Valve detection
- 10 - Connector of testing valve
- 12 - Analyse cell
- 13 - Preamplificator
- 14 - Pump molecular
- 15 - Pump of purge
- 17 - Connector of detection

ASM 142

Specification technicals :

	Range of mesure (Hélium)		Pressure test (entry)	
	Mbar.l / s	Pa. m ³ / s	mbar	Pa
Mode Big Leake	1.10 ⁻⁹ à 1	1.10 ⁻¹⁰ à 0.1	10	1000
Mode single Leake	1.10 ⁻¹¹ à 3.10 ⁻⁴	1.10 ⁻¹² à 3.10 ⁻⁵	5.10 ⁻¹	50
Mode sniffing	1.10 ⁻⁷ à 1.10 ⁻¹	1.10 ⁻⁶ à 1		
Answer delai :	< 0.5 s			

Helium pumping speed at the entrance:

Mode Big Leake (mini pressure)	1.1 l/s
Mode single Leake (mini pressure)	1.3 l/s

Characteristic of the rough pump:

Speed of the roughing pump (air)	10 m ³ /h
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Analyse (Spectro) :

Principe de la cellule d'analyse	Spectrometry magnetic at T= 180°
Filament de la cellule d'analyse	2 filaments tungstène séparés
Sensibilité de la cellule d'analyse	3.10 ⁻⁴ A/mbar
Courant d'émission	0.2 à 2 mA

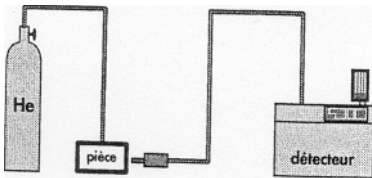
Display and setting range:

Display range of inlet pressure	10 ³ à 10 ⁻³ mbar
	10 ⁵ à 10 ⁻³ Pa

TEST METHODOLOGY**Ta Luft (requirement)****_Type test for PS4, PN4, PY4, PZ4, PP4..P(x)4****(x)= Depend of seat material****2/ Sniffing method:**

The test piece is pressurized with helium. The detector, via a probe LTR (Long Distance sniffing), just collect the helium escaping from the room.

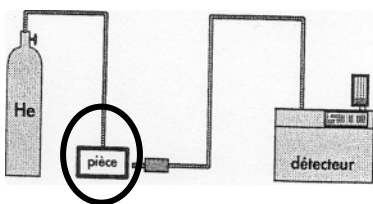
The sniffer probe is moved along the items likely to leak.

**1/ Test by par location**

The leak can be localized

The signal provided by the analyzer is not a direct measure of the leak. The sniffer probe captures only one part of the flow helium escaping from the room depending on the distance between the crack tip of the probe.

The piece is placed in an envelope in which there is a sniffer probe. The leak is not localized

**2/ Global test**

The resulting helium leak, gradually accumulates inside the envelope.
The detector measures the concentration.

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(x)= Depend of seat material

III. Application :

The valves are then clamped under pressure of 1 bar of helium and half-open position in order to check the gland.

To be sure of the result, the valves are checked at the flanges and the central body.

The tests were performed:

- Brand new valve
- At 100 cycles
- At 500 cycles
- At 1000 cycles

For working, the valves are mounting with to an actuator.

Cycles = 1 x open + 1 x closed.

IV. Ball Valves type have similairy gland packing seal :

As PS4 (3pcs Ball valve):

1. DN08-DN10 -DN15
2. DN20-DN25
3. DN32-DN40
4. DN50
5. DN125-DN150

We have 5 glands packing seal type design.

TEST METHODOLOGY**Ta Luft (requirement)****_Type test for PS4, PN4, PY4, PZ4, PP4..P(x)4****(x)= Depend of seat material****V. Table statements:**

For this test by sniffing at Helium (He).

It is considered permissible values below 4.99. 10⁻³ mbar. 1 / S.

Type PS4	1420 10/05/01AM	1846 10/05/01PM	2170 11/05/01 AM		
1 / DN15	1.4 10 ⁻⁶	1.3 10 ⁻⁶	1.7 10 ⁻⁶		
2 / DN20	1.2 10 ⁻⁶	1.1 10 ⁻⁶	9.4 10 ⁻⁷		
3 / DN32	2.0 10 ⁻⁶	1.7 10 ⁻⁶	2.1 10 ⁻⁶		
4 / DN50	1.9 10 ⁻⁶	2.1 10 ⁻⁶	4.7 10 ⁻⁶		
5 / DN125	1.3 10 ⁻⁶	1.1 10 ⁻⁶	9.1 10 ⁻⁷		

- Pressure Helium (He) : **3.9 bar**
- Cycle per mn : **1/mn**

The results of this day 11:45 (11/05/2001) relieved the pressure gauge is 3.6 bar

A loss of 0.3 bar for 3 days

Nota : There are some leaks at fittings, the tester displays 10⁻⁷.