Content

1 Purpose

This LESER Global Standard (LGS) describes the test procedure of safety and change-over valves, in oil and grease-free version, including the applicable documentation. This test procedure ensures that the cleanliness requirements in the respective specifications are met.

2 Scope

This LGS applies to all members of the LESER quality association as defined in the global quality management manual.

3 References

3.1 Internal LESER Standards:

LGS_1200	How to quote for - Oxygen service
WI_4600.15	free of oil and grease valves

3.2 External standards and regulations:

ISO / EN / DIN / AD2000

DIN EN 10204	Metallic products, types of test certificates
DIN EN ISO 23208	Cryogenic vessels – cleanliness for the cryogenic operation

4 Standards requirements

This test procedure is used at LESER and is conform to DIN EN ISO 23208.

5 Introduction

The test procedure is a visual inspection during production to verify whether individual components of safety valves are contaminated with organic substances.
The requirements of this procedure are defined in test levels (Table 1). The test levels are defined on an order-related basis via an option code. The tests described here are based on the cleaning procedure stored in the option code and thus monitor the result of the cleaning.

6 Test procedure

6.1 Definition

This procedure is an order-related test and describes the procedure for ensuring that the requirements specified in the Option Code are met. Only test specimens that have undergone the corresponding cleaning procedure are supplied for this procedure.

6.2 Scope of testing

The subject of the test is the complete safety or change-over valve. This includes all individual parts and assemblies.

For the test method described, the depth of testing is as follows:

a. 100% of the components before assembly
b. 100% of the assembled safety / shuttle valves

6.3 Testing equipment

All tests specified in this procedure are performed exclusively in a defined test area located within the designated cleanroom. The existing environmental conditions are defined by the cleanroom conditions.

Testing equipment
The tests are performed with:

1) with an UV light that has a wavelength of 320-380nm. The light source needs to have a maximum distance of 30 cm and the intensity shall be at least 5000 µW /cm².

2) with a white light lamp. Illuminance must be at least 750 lx.

6.4 Test execution

6.4.1 Test parameters

The requirements of the test levels differ according to the option codes defined in Table 1 and are specified as follows:

Level 1

All cleaned test items are checked for contamination with particles, moisture, oils, greases by irradiation with white light. The test result found must be checked for compliance with the defined requirements (Table 1).
If a visual inspection is not possible at inaccessible points of individual test items, a wipe test must be carried out in accordance with Chapter 6.4.2. This procedure must also be used if no meaningful results are available from a visual inspection and a clear evaluation is therefore not possible.

If the test result is positive, the safety valve is released for installation or ident inspection.

If the test result is negative, the valve is cleaned again. The tests must be repeated according to the described procedure.

After successful assembly, pressure adjustment and leak test, the safety valve must be checked again in the as-delivered condition using the above method. The inspection includes:

a. the complete inlet and outlet area of the valve
b. the complete accessible surface of the valve.

Level 2:

All cleaned test items are tested in a darkroom with irradiation by UV-A and white light for contamination with particles, moisture, oils, greases. The test result found must be checked for compliance with the defined requirements (Table 1).
If a visual inspection is not possible at inaccessible points of individual test items, a wipe test must be carried out in accordance with Chapter 6.4.2. This procedure shall also be applied if no meaningful results are available from a visual inspection and a clear evaluation is thus not possible.

Fluorescent spots (e.g., ceramic) may occur on cast components due to the manufacturing process. If these spots are verified in a repeat procedure (cleaning & UV-A light testing) as non-detachable inorganic residues, the component meets the specified acceptance criteria.

If the test result is positive, the safety valve is released for assembly or Ident inspection.

If the test result is negative, a new cleaning is carried out. The tests are to be repeated according to the described procedure.

After successful assembly, pressure adjustment and leak test, the safety valve must be checked again in the as-delivered condition using the above method. The inspection includes:

a. the complete inlet and outlet area of the valve
b. the complete accessible surface of the valve.

6.4.2 Wipe test

The surfaces of the cleaned test items are to be wiped with a clean, white, lint-free cotton, linen, or paper cloth. The wipes shall then be subjected to the above test procedure. The test covers the contamination picked up by the wipes. The evaluation is based on the defined requirements according to the respective test level (Table 1).

Acceptance criteria

- Free water/humidity shall not be detectable by visual examination.
- During the irradiation with UV-A light no fluorescent spots* may be visible.
- During the irradiation with White-light no visible contamination may be visible.

* in individual cases, inorganic residues (e.g. ceramics) which cannot be removed due to the manufacturing process may appear as fluorescent dots on cast components. These residues are firmly adherent, incombustible, and therefore do not represent a source of ignition. Such residues fulfil the specified acceptance criteria after verification (renewed cleaning & UV-A light test).

Table 1

Requirements / Method	Hydrocarbon content	Foreign particles (weight)	Foreign particles (size)	Testing equipment
Level No.1 (J85)	< 500 mg/m²	< 100 mg/m²	< 1mm	White light test
Level No.2 (J92/N7D)	< 100 mg/m²	< 50 mg/m²	< 1mm	White light & UV-light test

6.4.3 Labelling

After a positive final inspection, the tested safety valve is marked with a sticker. The marking is made according to the specified option code (Table 2). Proper marking is checked for presence and proper execution during the Ident control.

Table 2

J85 + J92	Free from oil and grease
N7D	Design for Oxygen Service

This sticker does not release the plant operator from his duty / responsibility to select the materials for valves according to the local regulations.

7 Qualification of the test personnel

The test procedure described may only be carried out by qualified personnel.

The test personnel must:

a. has an LESER internal qualification,
b. be trained in the test procedure,
c. be physically fit

8 Documentation, option code

The test results are documented using the SAP system. If a test certificate according to DIN EN 10204, 3.1 is required, this is controlled with the option code M53, and the certificate is issued according to LDeF_0100.25.