

1. Introduction

During the leak test in accordance with the vacuum method (spray test), the entire unit of a component which has been joined by welding, flanging and/or gluing is checked for its leak rate. This means that all suspected leak points such as weld seams, flange connections, adhesive joints, throughputs etc. are individually specified and analysed for their leak rates.

2. Measuring procedure

2.1 Preparation

The test object must be dry both inside and out, free of rust, dirt, scale, oil, other contaminants and loose parts. Openings still present (flange connections, weld-on connections etc.) are to be closed with a suitable auxiliary flange. A light lubrication of the sealing rings with vacuum grease is permitted.

The test item is raised to the start pressure of the leak indicator by an additional pump combination, according to the operating instructions (GA). The leak indicator is directly connected according to the size and outgasing of the test item, at partial current or restricted (preliminary test).

2.2 Safety information (danger of implosion)

The parts or components to be tested are to be designed for an underpressure of $p = -1$ bar.

Glass containers must **always** be surrounded by wire protective screens or perforated plates for the test.

2.3 Test set up

The principle test set up is shown in Figure 2.3.

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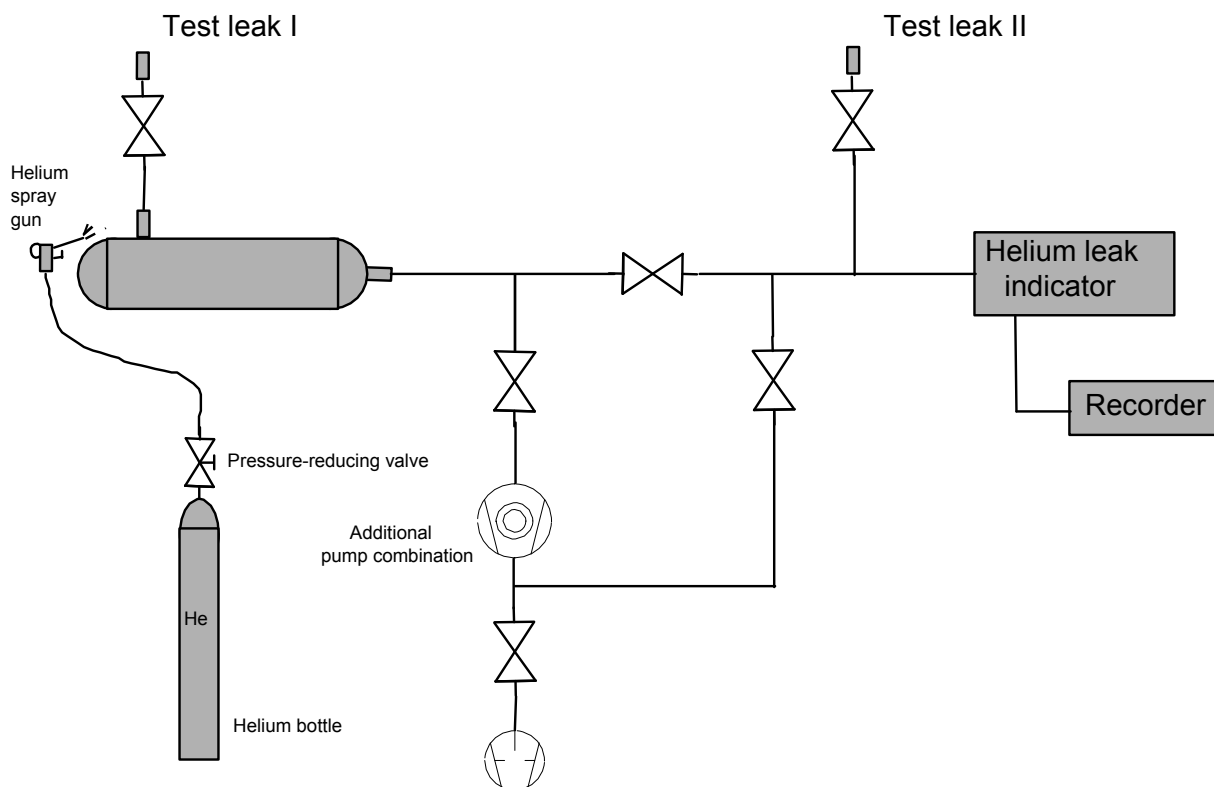


Fig. 2.3: Spray test set up

The test item is either directly connected to the helium leak indicator or, in the case of larger components, indirectly connected via an additional pump combination (see point 2.1). This additional pump combination reduces the pump time and shortens the response time for larger components.

Depending on the size and outgasing rate of the test item, the test takes place directly or in partial current. Each suitable test leak is connected to Position I and II. The size of the test leak is to be approximately adapted to the permitted leak rate.

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2.4 Calibration

After pressure stabilisation, the helium leak indicator is calibrated to its specified sensitivity by opening test leak II.

The response time and the proof sensitivity of the test set up is determined by opening test leak I.

2.5 Performing the test

The test object is to be sprayed top down. The distance should be approx. 2-5 mm. The testing speed should not be higher than 2 cm/s. A He gas flow must be clearly visible on the spray gun.

3. Detection limits

The detectable leak sizes of tested components are, depending on the leak indicator used, between

$$10^{-3} \text{ and } 10^{-11} \frac{\text{mbar} \cdot l}{s}$$

Leak rates

$$> 10^{-3} \frac{\text{mbar} \cdot l}{s}$$

can also be determined by the partial current method.

For high sealing requirements it may be necessary to capture the time course of the leakage with a recorder. Then an analysis and separation of permeation e.g. by seals and real leaks can be undertaken.

4. Analysis

The results of the leak search are documented

- in the test log book (only components, assemblies)
- in the works test certificate (only components, assemblies)
- in the system test instructions (only systems)
- in the quality inspection certificate according to DIN 55350-18-4.2.2 (vacuum test record for systems)