

## Leak Detection Test for High Quality Joint

### 1. Leak detection test for high quality joints

Medical and analysis nozzles are required to have no liquid leakages as well as to have high airtightness under an extra high vacuum, especially in semiconductor industry. FUTA-Q employs diversified leak detection testing methods that can meet a wide range of requirements. Laser welding, TIG welding, or caulking area can be tested before delivering.

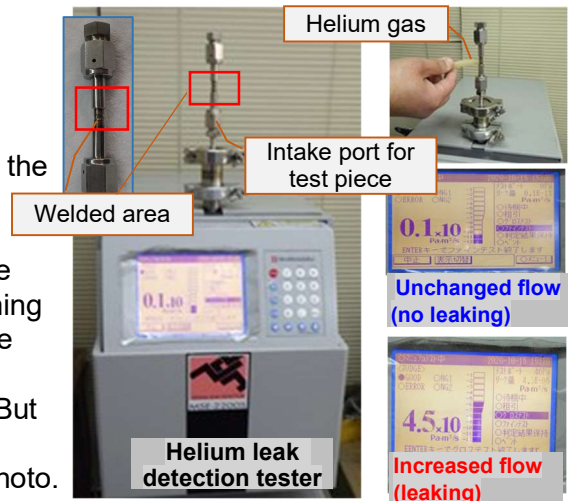
### 2. Leak detection methods in FUTA-Q

Testing methods	Features	Production
<b>Underwater bubbling method</b>	A product connected with an air pipe is submerged. Air of 0.2 MPa is sent to the product through the pipe to observe if air bubbles leak from the product.	Prototyping and volume
<b>Helium leak detection method</b>	Testing the components of semiconductor instruments or vacuum equipment uses this test method. The inside of a product is evacuated to an ultra-high vacuum to check if helium leaks into the product.	Prototyping and volume (Please refer to the following)
<b>Differential pressure method</b>	Pressurized air is sent to both a product and the master sample, and the possible pressure difference between them is monitored after a predetermined time. A defective one should have a different differential pressure from that of a non-defective one.	Volume (Please refer to the following)

### 3. Helium leak detection method

Testing a metal jointing area of a semiconductor instrument's component uses the helium leak detection method. This method can detect the minute leak of  $1 \times 10^{-9}$  Pam<sup>3</sup>/s to guarantee that the tested products have high reliability for the use under a high vacuum environment.

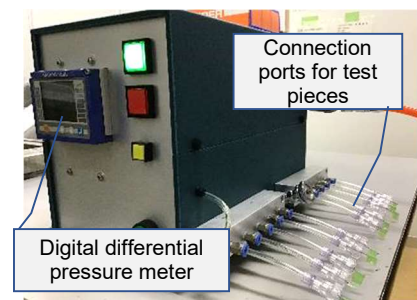
The photo right shows the testing, in which the inside of the product is evacuated. At the beginning of the test, the amount of helium flowing from the gas releasing tube is  $0.1 \times 10^{-11}$  Pam<sup>3</sup>/s, which remains the same value in case of no-leakage. But in case of the existing of a leakage, it increases which is indicated as  $4.5 \times 10^{-5}$  Pam<sup>3</sup>/s on the photo.



### 4. Differential pressure method

The leak detection tester developed by FUTA-Q for junction areas of nozzle products is on the photo. This has a master tank containing an air with a reference differential pressure for the acceptance determination.

Plural test pieces are connected with the connection ports, and the differential pressure is measured between the beginning and the end of a predetermined time.



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