Air-under-water Method

Leak testing using the air-under-water method

Method:

The test object is pressurized underwater. The formation of bubbles at leakages is usually observed manually, less often detected with ultrasonic sensors.

Test medium:

Compressed air or nitrogen

Detectable leak rates:

> 0.05 cm^3/min

Advantages:

- Leak localization is very simple. As a result, testing can continue even on purely manual testing devices if minor leaks occur on the clamping and sealing device with increasing age.
- Often, several test objects are immersed in a liquid basin in parallel. This allows a high throughput to be achieved.
- relatively small leak rates detectable

Disadvantages:

- The test objects get wet and must be elaborately dried and possibly preserved before further use.
- The method is unsuitable for moisture-sensitive components.

- The quality of the test depends 100% on the attention and judgment of the operator.
- Completely different bubble sizes can arise due to fluctuating water quality and different leak shapes. In extreme cases, even large bubbles do not detach from the test object and are therefore not recognized by the operator.
- A quantitative evaluation of the leak size is not possible.
- The automatic documentation of the test results is impossible.
- Functions for regulated reject part handling cannot be implemented.
- Test equipment requires a high effort due to the waterproof and corrosion-resistant materials to be used.
- Ensuring consistently good water quality is complex.

Notes:

- By adding relaxing substances to the water (for example, soap, detergent), the surface tension can be reduced and the bubble size decreased. As a result, more and therefore more easily recognizable smaller bubbles rise with the same leakage.
- Water basins of air-under-water test stations must be very well lit to facilitate the detection of rising air bubbles.
- The concentrated search for rising bubbles is very strenuous for the operator. If possible, a rotating workplace organization should be created here in order to enable work cycles of a maximum of two hours in length, followed by eye-relieving activity of the same duration.
- It should be automatically monitored that the test object is actually filled with compressed air during the observation phase.
- The operator must be protected from bursting test

objects or connection hoses, especially at higher test pressures.