

Leak testing with helium.



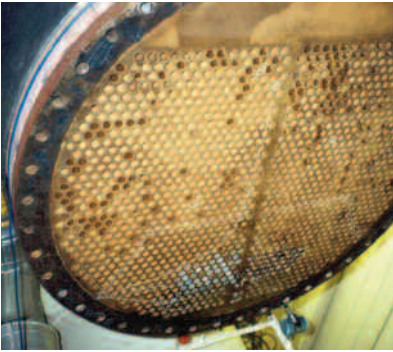
Background

Leak testing is often the final test of equipment in the manufacturing stage; during the service life leaks may occur and leak testing will be necessary. Helium leak testing has several advantages over

other leak testing techniques. To establish process dynamics helium tracing is sometimes very useful as well. KEMA has years of experience in all sorts of applications, including applications at nuclear power plants.

Service

The maximum acceptable leakage rate is $3 \cdot 10^{-4}$ mbarl/s per tube, which is assumed to be the helium leak corresponding with the smallest water leakage. If more tubes are tested simultaneously the leakage rate remains $3 \cdot 10^{-4}$ mbarl/s. The leak testing is usually executed with a maximum test pressure of $1 \cdot 10^{-1}$ mbar.



Equipment

KEMA applies the following equipment for leak testing:

- Helium leak detector with mass

spectrometer, Edwards Spectron 300E

- Helium leak detector with mass spectrometer for measuring the helium concentration in the steam side of the condenser
- Large vacuum pumps for pre-evacuation with a capacity of 175 m³/hour
- Small vacuum pumps for testing with a capacity of 25 m³/hour
- Recorder for registration of leak rate and test pressure
- Vacuum plates in several sizes
- Calibration and reference leaks.

Benefits

- Helium, being a noble gas, does not chemically react with ambient gases, fluids or solids. It is therefore extremely suitable to detect even the smallest leaks (high diffusion) and as a process tracer gas
- High accuracy as to leak size and



positioning of leaks

- Possibility to leak test a large component integrally or 'sniff' locally
- Leak testing can (mostly) take place during operation of the equipment.

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