

Cryo-Test.

Testing of Safety Valves
under real cryogenic conditions.



Challenging conditions are expected in LNG liquefaction and regasification plants: Low temperatures down to $-164\text{ }^{\circ}\text{C}$ / $-263\text{ }^{\circ}\text{F}$ and high pressures up to 155 bar / 2248 psi. It is important for plant operators to know that their safety valves are tight and will work reliably, even under these extreme operating conditions.

Innovative test process

Currently, there is no standard that describes a test procedure for tightness test of safety valves under cryogenic conditions; in addition, the API 527 standards do not specify how to test for these applications. Therefore, LESER, in cooperation with Messer Group GmbH, the leading international liquefied gas company, developed a new procedure to prove the tightness of safety valves at cryogenic temperatures. This procedure is based on the type test according to DIN EN 13648-1 and is carried out during the production process.

The tightness test is executed on a specially constructed test bench in the LESER manufacturing facility in Hohenwestedt and is certified with a 3.1 acceptance test certificate (DIN EN 10204). The inlet area of the safety valve is cooled down with liquid nitrogen at zero pressure to suspend heat input on the test medium. After initial discharge the test is carried out at 90 % of the set pressure with the test medium helium at below $-146\text{ }^{\circ}\text{C}$ / $-231\text{ }^{\circ}\text{F}$. Possible leakages are detected with mass spectrometer at the valve outlet.

Due to the fact that this procedure is based on the DIN EN 13648-1, LESER is using a recognized and accepted test procedure. The exact description of the test is documented in the LESER standard LDeS 0201.04.

Verification under real conditions

On the test bench, safety valves are tested up to 155 bar / 2248 psi and DN 150 / 6". With these settings, all valves that are used in LNG plants can be simulated under real conditions. Given the internal execution of this testing, LESER is also able to ensure short delivery times.

Data and Facts

Test temperature

Below $-146\text{ }^{\circ}\text{C}$ / $-231\text{ }^{\circ}\text{F}$

Set pressure

Up to 155 bar / 2248 psi

Media

Test medium: Helium

Cooling medium: Liquid nitrogen

LESER Products

Type 526, Type 441 and Type 459

Nominal sizes: DN 25 - DN 150 / 1" - 6"

Additional types and nominal sizes on request

Metal sealing (disc)

Option Code: M80

Customer benefits

- Test is executed under real operating conditions
- Cryo-tested safety valve on demand
- Proof of reliable valve function at cryogenic temperatures