

Cryogenic and high pressure nitrogen for valve tests

To comply with the latest international standards designed to cut down the quantities of organic compounds and chemical substances released to the atmosphere, it has become necessary to verify the tightness of valve bodies through a high pressure test, commonly referred to as Fugitive Emission (FE) test. Additional cryogenic tests carried out at temperatures as low as -196°C make it possible to widen the range of quality checks.



SIAD S.p.A., a leader in the field of industrial gases, has developed the technology necessary for FE tests to be conducted according to the most stringent standards and technical specifications drawn up by the users, and especially by major oil companies. Cryogenic tests are performed in dedicated chambers that are filled with liquid nitrogen so as to reach the desired temperature. According to some specifications, the test must be conducted by submerging the valve body in liquid nitrogen, at a temperature of ca -196°C .

The testing process is controlled and managed by means of a system fitted out with a PLC to enable the tank to be filled with liquid nitrogen at a predetermined rate up to a desired level.

SIAD is able to determine and design the appropriate equipment to meet any specific requirements and testing conditions.



Valve undergoing a cryogenic test

Besides the “external” temperature of the valve, the system also measures the temperature of the test chamber and the temperature inside the valve metal body. The control and management of the gases, or gas mixtures, to check the tightness of a valve is obtained by means of mixers equipped with gas boosters so as to reduce the time to reach the desired operating pressures. Nitrogen and helium are the gases used most commonly for these tests. The gaseous nitrogen entering the booster can be supplied either from bundles of cylinders or from a system equipped with a

cryogenic pump and an evaporation system working at high pressure (up to 400 barg) and fed from a liquid nitrogen storage tank.

If helium and/or a nitrogen-helium blend has to be used, the gas feed system uses a dedicated line, also fitted out with a gas booster to provide the appropriate pressure for the testing process.

The use of a cryogenic pump to feed the system with high pressure nitrogen gas ensures the flow rates needed to greatly reduce the time it takes to apply the required testing pressure to the valves.



The testing “tank”



Inspecting a valve submerged in liquid nitrogen

Plant Scheme

The components of a system as standardised by SIAD may be summarised as follows:

- storage tank for nitrogen use in either liquid or gaseous form;
- high pressure nitrogen gas feed system, complete with cryogenic pump and high pressure vaporizer;
- skid for connecting the helium cylinders and the relative control instruments;
- control system to set the parameters governing the injection of the gas mixture into the valve body;
- “bunker” for positioning the valve to be tested;
- sniffer to detect leaks and be able to certify the results of the test.

For further information, please contact: **www.siad.com**
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Nitrogen storage and feed system



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