

## CRYOGENIC TESTING CAPABILITIES

The cryogenic valve test centre at Metso Valve technology center at Helsinki is one of the largest and most advanced dedicated valve test facilities in Europe.

It offers customer inspectors the possibility of witnessing potentially hazardous testing operations through shockproof windows in the comfort of a protected, air controlled control room built to the latest safety standards, using a fully computer controlled and logged testing system.

All internationally recognized low temperature/ cryogenic and critical valve test standards can be carried out professionally with maximum efficiency and safety. In addition, test programs can be customized to suit customers' own specific requirements.

Up to 56" size ball valves and 100" size high performance tripple eccentric disc valves from Metso product range can be accommodated. As an additional service to customers this facility can also be utilized to test the products of other manufacturers by special agreement.



### Benefits provided by the Cryo Test Facility

- Assured performance of cryogenic valves and guaranteed trouble-free production in customers' process.
  - Minimizes time wasted in trouble-shooting during plant start-up.
  - Provides reliable on-time test records.
  - Assures maximum safety during an inspection.
- Acceptance testing of standard production valves
  - representative samples (for example 1 of 10) of isolation and/or control valves are selected for test to an agreed procedure or recognized standard to confirm performance in accordance with the requirements of the intended applications.
  - Depending on the duty, some critical valves may be subjected to 100% testing, which can also verify operating time at cryogenic temperatures.

### What valves should be tested

Valves can be among the most critical components in any hydrocarbon process. They are also often required to function in the most extreme conditions. This is especially true of Blow Down or Emergency Shut Down (ESD) valves in LNG service and this facility provides the possibility to measure and verify the performance of such valve under cryogenic conditions using helium or nitrogen as a test gas.

Typical examples of the applications of cryogenic testing would be as follows:

- Type testing of prototype valves - usually consists of an extended and lengthy test program often applying the most stringent leakage rate criteria for type approval purposes.

### Customer service

Metso provides customers with a full sizing service for all cryogenic valve applications. With more than 30 years experience of developing, testing and supplying valves for low temperature and cryogenic service, Metso can offer customers the benefit of considerable practical expertise in valve selection, testing and problem solving.

## Test facility specification

### Test temperatures:

- 196 °C with liquefied nitrogen.
- 150 - 0 °C with liquefied or gaseous nitrogen.
- 79 - 0 °C with Dry Ice (CO<sub>2</sub>).

### Test pressures:

- 0 - 150 bar with Helium at temperatures below 0 °C.
- 0 - 180 bar with Helium at ambient.
- 0 - 180 bar with Nitrogen gas at ambient.
- On request test pressures up to 200 barg are possible with nitrogen or helium.

### Valve sizes:

- Ball valves ASME 150 - ASME 600, sizes up to 56".
- Butterfly valves ASME 150 - ASME 600 4" - 100".

### Valve actuation:

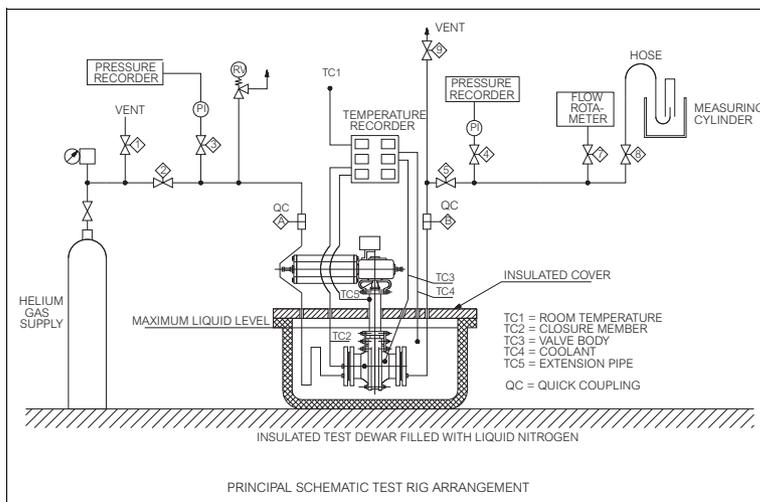
Normally by pneumatic actuators with solenoid valves or Metso positioners.

### Leakage tests:

Seat leakage is measured with calibrated flow rotameter. External leakage is measured with a helium mass spectrometer.

Except for cryogenic testing, our facilities are used for high pressure gas tests at ambient. We also offer our services in metal cooling.

## PRINCIPAL TEST RIG ARRANGEMENT



Common international test standards are utilized: A typical test cycle includes around 9 - 10 steps. All the valves tested must be clean, dry and grease-free.

1. Pre-test at ambient with low pressure helium or nitrogen.
2. Cooling period with continuous temperature monitoring.
3. Preliminary cycle test with non pressurized valve.
4. Low pressure seat leakage test with helium.
5. Seat leakage tests with 1-6 test pressures.
6. Opening/closing torque measuring.
7. Body shell leakage test with helium.
8. Measurement of cycle time tests at cryogenic temperature, if required.
9. Warming-up period.
10. Visual inspection at ambient.

Subject to change without prior notice.

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