



NGV-CYL-SP8

EXTREME TEMPERATURE PRESSURE CYCLING MACHINE

ISO 11439 statement

Finished cylinders, with the composite wrapping free of any protective coating, shall be cycle tested, as follows:

- a) condition for 48 h at zero pressure, 65 °C or higher, and 95 % or greater relative humidity. The intent of this requirement shall be deemed met by spraying with a fine spray or mist of water in a chamber held at 65 °C;
- b) hydrostatically pressurize for 500 cycles multiplied by the specified service life in years between 20 bar and 260 bar at 65°C or higher, and 95 % or greater relative humidity;
- c) condition the cylinder and fluid at – 40 °C or lower as measured in the fluid and on the cylinder surface;
- d) pressurize from 20 bar to 200 bar for 500 cycles multiplied by the specified service life in years at – 40 °C or lower. Adequate recording instrumentation shall be provided to ensure the minimum temperature of the fluid is maintained during the low temperature cycling.

The pressure cycling rate of b) shall not exceed 10 cycles per minute. The pressure cycling rate of d) shall not exceed 3 cycles per minute unless a pressure transducer is installed directly within the cylinder.

During this pressure cycling, the cylinder shall show no evidence of rupture, leakage or fibre unravelling.

Following pressure cycling at extreme temperatures, cylinders shall be hydrostatically pressured to failure in accordance with A.12, and achieve a minimum burst pressure of 85 % of the minimum design burst pressure. For type CNG-4 designs, prior to the hydrostatic burst test the cylinder shall be leak tested in accordance with A.10

DESCRIPTION OF MACHINE

The machine includes two parts: insulated chamber and control unit. The internal surfaces of the chamber are made of stainless steel. The temperature of the chamber can be controlled at constant values in the range of -40°C to 65°C. Lower temperature is obtained by using liquid nitrogen. At higher temperature the relative humidity of 95% and greater inside the chamber can be obtained by the fine spray of water.

The tested cylinder inside can be pressurized and pressure cycled hydrostatically between 20 bar and the 200 bar at a rate of 5 to 15 cycle per minute for high temperature and 1 or 2 or 3 cycle per minute for lower temperature. For higher temperature anticorrosive liquid is used and for lower temperature anti-freezed liquid is used. The machine can pressure cycle up to 10,000 cycles.

SPECIFICATIONS

1. The machine can be used to test the CNG cylinders according to ISO11439 Annex A (normative) Test methods and criteria A.7. Extreme temperature pressure cycling.
2. The machine can be used to test the CNG cylinder of size: diameter 406.4 mm and length 1,400 mm or bigger.
3. At zero cylinder pressure the temperature of the chamber can be controlled at 65°C or higher and relative humidity of 95% or greater for not less than 48 hour.
4. The tested cylinder inside the chamber can be hydrostatically pressurized to 300 bar or more. The tested cylinder inside the test chamber can be hydrostatically pressure cycled at a rate of not less than 10 cycle per minute and for each cycle the pressure is varied between 20 bar and 200 bar. Pressure cycling can be done up to 10,000 cycles. During pressure cycling the chamber is controlled at temperature not less than 65°C and relative humidity of 95% or greater.
5. The tested cylinder inside the test chamber can be hydrostatically pressure cycled at a rate of 1 or 2 or 3 cycle per minute and for each cycle the pressure is varied between 20 bar and 200 bar. Pressure cycling can be done up to 10,000 cycles. During pressure cycling the chamber is controlled at temperature not more than -40°C
6. The machine includes two parts: insulated enclosed chamber (tank) and control unit.
7. The internal dimension of the enclosed chamber (tank) is 1.6mx1.0mx1.0m.
8. The enclosed chamber can be controlled for the temperature range of 0 to 65°C for 48 hours.
9. The machine is automatically controlled by software.
10. The machine can measure the pressure, the temperature and relative humidity during test.
11. The machine is controlled by the control software running on Windows XP Professional. The test result is reported as number or graph and printed out on the printer.
12. The machine is operated by 220-230 VAC 1 phase 50 Hz and 380 VAC 3 phase 50Hz.