

Hydrotesting

Purpose of pressure test

Purpose of this test is to reveal hidden faults in the technological piping that are otherwise not detectable, in such a manner that the completed assembled pipe sections prepared for pressure test are subjected to a defined load exceeding the normal operating load but not reaching the yield point according to specifications, originating from internal overpressure.

Hydrotesting

1.1 General specifications, duration, value of pressure test

1.1.1 For the hydrotesting primarily water should be used, which may not contain corrosive or solid contaminations. Determination resp. limitation of the halogenid (chlorid, fluorid, etc.) content of the water – max. 10ppm for SS and 50ppm for CS - is essential in case of apparatuses equipment and pipelines made of austenitic material or provided with such lining.

1.1.2 For hydrotesting in justified cases other fluids (gas oil, anti-freeze fluid, distillate, etc.) may also be used.

1.1.3 Execution of hydrotesting with use of air or other gaseous medium can be made only on basis of a preliminary permit of the competent authority.

1.1.4 Duration and value of the hydrotesting are as follows:

- a) before the first putting into operation 10 minutes at value of the authorized pressure,
- b) in any other cases 5 minutes

1.1.5 In the pressure test plan the pressure values shall be defined numerically and the pressure limits accurately.

1.2 Filling-up and pressurizing specifications

1.2.1 Filling-up of pipeline and technological equipment subjected to pressure test as well as their pressurizing test should be performed as follows:

After filling the system full with water, in pressure-free state it has to be left enough time for conditioning, then provisions for its venting should be made. The deaerated system has to be pressurized according to the next point.

1.2.2 Requirements relating to the subject are as follows:

The per-minute rate of the pressure boosting may not be higher than 10 % of the authorized pressure, but it may not exceed 30 bar/minute. Boosting of the pressure can be made in one step up to 50 % and beyond that value in further 10 % steps. Between each step one minute is needed for conditioning. If boosting of the pressure is not quicker than 1 % / minute value referred to the authorized pressure then application of pressure steps is not needed (up to value of the authorized pressure) It has to be ensured that the pressure test should be interruptible at any time.

1.3 Hydrotesting with use of water resp. fluid

1.3.1 In a system set to the specified pressure test value the pressure value may not decrease. The reason of the possibly occurring pressure drop has to be defined. If this is retraceable to reduction of the temperature, the pressure drop is acceptable only if the magnitude thereof can be justified by calculation.

1.3.2 The pressure rising caused by temperature increase should be continuously monitored. For safety of the system, the pressure increase caused by warming up may not be allowed over + 5 %. The pressure exceeding the permitted value has to be reset to the specified pressure test value by blow-out of the system.

1.3.3 The pressure test is successful if during the course thereof no disorder (e.g. dripping, leak, deformation of the structural material, etc.) occurs on the welding seams, detachable joints and on surface of the structures. The pressure may not decrease at the pressure test values.

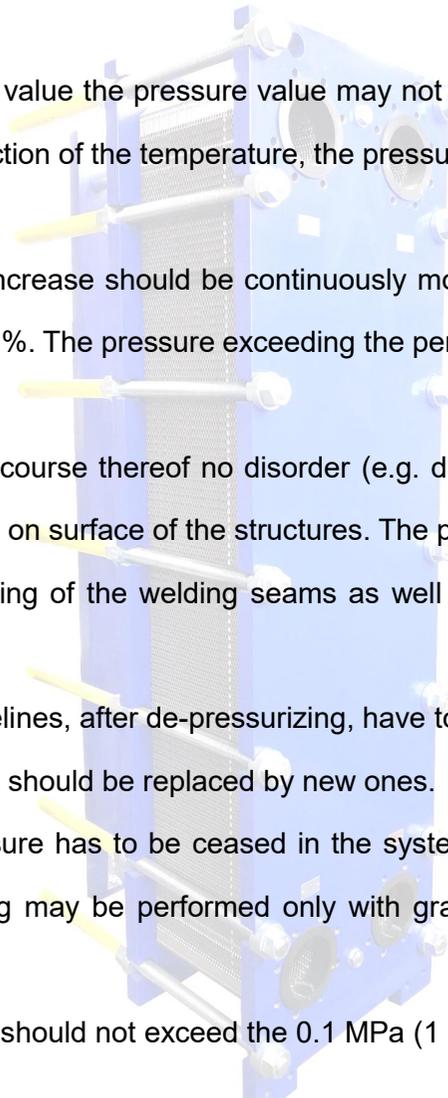
1.3.4 During execution of the pressure test, repairing of the welding seams as well as that of tightness faults on the pressurized system is prohibited.

1.3.5 Faults revealed during examination of the pipelines, after de-pressurizing, have to be repaired and the test repeated.

1.3.6 Pipes and fitting with faulty longitudinal seams should be replaced by new ones.

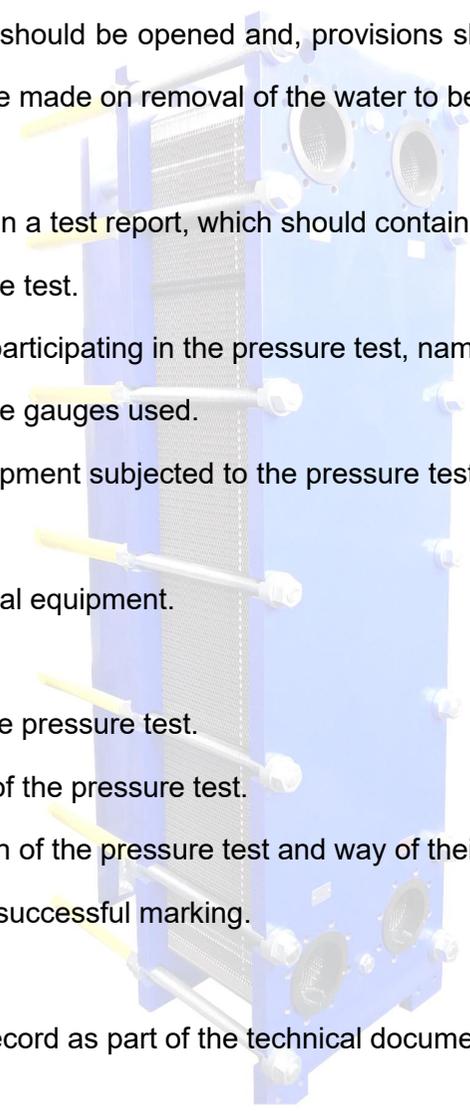
1.3.7 On completion of the pressure test the pressure has to be ceased in the system. Sudden or too quick reduction of the pressure is not permissible. For this reason the pressure releasing may be performed only with gradual opening of the needle valve or throttle-cone valve designed for this purpose.

1.3.8 The per-minute rate of the pressure reduction should not exceed the 0.1 MPa (1 bar) value. After pressure test performed with use of fluid,



on completion of the de-pressurizing the bleeders should be opened and, provisions should be made on immediate draining of the piping and, immediate drying of the same. Provisions should be made on removal of the water to be drained.

Execution of the pressure test should be recorded in a test report, which should contain the following:

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- A large, blue industrial heat exchanger, likely a plate heat exchanger, with multiple ports and a central grid. It is shown in a cutaway view, revealing internal components.
- a) Brief description of circumstances of the pressure test.
 - b) Date of the pressure test and name of persons participating in the pressure test, naming the organization delegating them.
 - c) Serial number and accuracy class of the pressure gauges used.
 - d) Accurate denomination of the technological equipment subjected to the pressure test, denomination, drawing number and revision number of the pertaining drawing.
 - e) Characteristic data of the pipeline or technological equipment.
 - f) Value and duration of the pressure test.
 - g) Temperature variation of the medium used for the pressure test.
 - h) Pressure values read out at beginning and end of the pressure test.
 - i) Disorderly phenomena observed during execution of the pressure test and way of their elimination.
 - j) Result of the pressure test, with successful or unsuccessful marking.
 - k) Signature of members of the committee.

The operator is obliged to save the pressure test record as part of the technical documentation relating to the project.

1.4 Hydrotesting with use of air resp. inert gas

In case of certain technological pipelines (e.g. motor and cylinder lubrication oil, instrument air, etc.) and in that of large-diameter pipelines transporting gaseous media, when the supporting structures are not dimensioned for fluid filling or, when the pressure system can not be filled with fluid at the site of its erection or, if due to safety reasons the system may not contain not even traces of water, gas pressure test can also be accomplished. The conditions of size and execution of the gas pressure test are identical to those of the water pressure test.

