



PIPETEC® TEST REPORTS

PRESSURE AND LEAK-TIGHTNESS TEST AND FLUSHING OF PIPETEC DRINKING WATER AND HEATING INSTALLATION

LEAK-TIGHTNESS TEST WITH COMPRESSED AIR / INERT GAS / FORMING GAS

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PRESSURE TEST, LEAK-TIGHTNESS TEST AND FLUSHING OF PIPETEC DRINKING WATER / HEATING INSTALLATIONS

► GENERAL

A pressure test in accordance with DIN EN 806-4 or the ZVSHK leaflet "Leak-tightness tests for drinking water installations with compressed air, inert gas or water" must be carried out for Pipetec drinking water installation systems. First it must be ensured that all installation components are freely accessible and visible, so that incorrectly installed fittings can be found, for example. The leak-tightness test

can be carried out with water only if, from the time of the leak-tightness test to commissioning of the drinking water installation, changes of the water are carried out at regular intervals, at the latest every seven days. In all other cases, it is advisable to carry out the pressure test with compressed air or inert gases.

► PRESSURE TEST WITH COMPRESSED AIR OR INERT GASES

Pressure test with compressed air or inert gases (ZVSHK leaflet "Leak-tightness tests for drinking water installations with compressed air, inert gas or water") The pressure test with compressed air or inert gases is carried out in accordance with the accepted rules of technology in two stages, the leak-tightness test and the load test. In both tests, it is necessary to wait for temperature equalisation and a steady state following application of the pressure before the test period commences. Apparatus, drinking water heaters,

fittings and pressure vessels must be separated from the pipes by air before the pressure test if their volume could affect the reliability and testing accuracy. All pipes must be sealed directly with metal stoppers, metal blanks or blind flanges that can withstand the pressure test. Closed isolation valves are not deemed to be tight seals.

► LEAK-TIGHTNESS TEST

Before the leak-tightness test, a visual inspection of all pipe connections must be carried out. The pressure gauge used for the test must have an appropriate accuracy for the pressures to be measured of 1 mbar on the display. A test pressure of 150 mbar (150 hPa) is applied to the system. With a

system volume of up to 100 litres, the test time is min. 120 minutes. The time required is extended by 20 minutes for every additional 100 litres. There must be no leaks from the connectors during the test.

► LOAD TEST

The leak-tightness test is followed by the load test. For this the pressure is increased to max. 3 bar (pipe dimensions ≤ 63 x 6 mm) or max. 1 bar (pipe dimensions ≥ 63 x 6 mm).

With a system volume of up to 100 litres, the test time is min. 10 minutes.

► LEAK-TIGHTNESS TEST REPORT

The leak-tightness test must be documented in a pressure test report by the specialist responsible, taking account of

the materials used. The leak-tightness of the system must be ensured and confirmed.



LEAK-TIGHTNESS TEST REPORT

FOR PIPETEC WATER / HEATING INSTALLATIONS. TESTING MEDIUM: COMPRESSED AIR / INERT GASES

NOTE: The accompanying explanations and descriptions in the latest technical documentation from Pipetec must be observed.

Building project: _____

Date: _____

Client represented by: _____

Responsible contractor: _____

Installation system used: Metal composite pipe system Other

System pressure: _____ bar

Ambient temperature: _____ °C

Temperature of test medium: _____ °C

Testing medium: Oil-free compressed air Nitrogen Carbon dioxide _____

Pipe volume: _____ litres

The drinking water system was

The heating system was as a complete system tested in _____ sections.

All pipes must be sealed with metal plugs, caps, metal blanks or blind flanges. Apparatus, pressure vessels and drinking water heaters must be separated from the pipes. A visual inspection of all pipe connectors and proper execution was carried out.

1) LEAK-TIGHTNESS TEST:

Test pressure: 150 mbar (150 hPa)

Test time: up to 100 litres pipe volume min. 120 minutes, +20 minutes for each additional 100 litres.
 _____ litres _____ minutes. (output volume = test time)

The test time begins after temperature equalisation and steady state have been reached.

No pressure decrease was identified during the test time.

2) LOAD TEST:

Test pressure: Pipetec installation pipe $d_a \leq 63$ mm max. 3 bar,
 Pipetec installation pipe > 63 mm max. 1 bar

Test time: 10 minutes. The test time begins after temperature equalisation and steady state have been reached.

No pressure decrease was identified during the test time.

THE PIPE SYSTEM IS LEAK-TIGHT.

 Place, date

 Signature of client

 Place, date

 Signature / stamp contractor



PRESSURE TEST AND LEAK-TIGHTNESS TEST OF PIPETEC DRINKING WATER INSTALLATIONS DIN EN 806 / ZVSHK

► PRESSURE TEST WITH WATER

Pressure test with water (DIN EN 806-4 or ZVSHK leaflet "Leak-tightness tests for drinking water installations with

compressed air, inert gas or water")

► PREPARATION FOR LEAK-TIGHTNESS TEST

In general, a visual inspection of all pipe connections must be carried out before the leak-tightness test with water. The pressure gauge must be connected to the lowest point of the installation to be tested. Only pressure gauges on which a pressure difference of 0.1 bar can be read reliably on the display may be used. The installation must be filled with filtered drinking water (particle size $\leq 150 \mu\text{m}$), bled and protected from freezing. Shut-off valves before and after heat generators and stores must be closed, so that

the test pressure does not reach the rest of the system. If there are significant differences between the ambient temperature and the water temperature ($>10 \text{ K}$), it is necessary to wait 30 minutes after application of the system test pressure to equalise the temperature. The pressure must be maintained for at least 10 minutes. There must be no pressure loss or visible indication of a leak.

► TEST OF PRESS CONNECTIONS (NOT LEAK-TIGHT IF NOT PRESS FITTED)

For an unpressed leaking connection to be identified in a leak-tightness test, Pipetec pipe systems must be tested with a pressure of 3 bar before the actual leak-tightness test is carried out. The test time should be 15 minutes.

No leak must be apparent in this time. Only then can the leak-tightness test begin with the specified test times.

► COMPLETION OF LEAK-TIGHTNESS TEST

First the test pressure must be applied to the pipe system which is 1.1 times the operating pressure (in relation to the lowest point in the system). The operating pressure as per DIN EN 806-2 is 10 bar (1 MPa). Accordingly, a test pressure of 11 bar (1.1 MPa) is required. An inspection of the tested pipe section should then be carried out to identify any leaks. After a test time of 30 minutes, the pressure must be reduced to 5.5 bar (0.55 MPa) by draining off water, which corresponds to 0.5 times the initial test pressure. The test

time at this pressure is 120 minutes. During this test time, no leaks must be apparent. The test pressure on the pressure gauge must remain constant ($D_p = 0$). If a pressure drop occurs during the test time, there is a leak in the system. The pressure must be maintained and the leak identified. The defect must be rectified and then the leak-tightness test repeated.

► PRESSURE TEST REPORT

The leak-tightness test must be documented in a pressure test report by the specialist responsible, taking account of the materials used. The leak-tightness of the system must be ensured and confirmed.

**When using Pipetec "not leak-tight if not press-fitted" press connectors, a leak-tightness test of the connectors must be carried out in advance (3 bar, 15 minutes).*



LEAK-TIGHTNESS TEST REPORT

FOR PIPETEC DRINKING WATER INSTALLATIONS. TESTING MEDIUM: WATER

NOTE: The accompanying explanations and descriptions in the latest technical documentation from Pipetec must be observed.

Building project: _____

Building section: _____

Date: _____

Client represented by: _____

Responsible contractor: _____

Installation system used: Metal composite pipe system Other

All vessels, devices and fittings, e.g. safety valves and expansion tanks, that are not suitable for the test pressure must be disconnected from the system being tested during the pressure test. The system is filled with filtered water and completely bled. A visual inspection of the pipe connectors and the locking elements on the modular fitting system has been carried out during the test. The temperature equalisation between the ambient temperature and the filling water temperature must be taken into account with an appropriate waiting period after the test pressure has been applied. The test pressure may have to be restored after the waiting time.

1) LEAK-TIGHTNESS TEST OF PRESS CONNECTORS:

(when using Pipetec System "not leak-tight if not press-fitted" press connectors)

Test pressure: 3 bar

Test time: 15 minutes

The pipe system is leak-tight (visual inspection).

2) LEAK-TIGHTNESS TEST, PART I:

Test pressure: 11 bar (1.1 MPa), corresponds to 1.1 times the operating pressure as per DIN EN 806-4

Test time: 30 minutes

The pipe system is leak-tight (visual inspection, no pressure drop on pressure gauge).

3) LEAK-TIGHTNESS TEST, PART II:

Test pressure: 5.5 bar (0.55 MPa), corresponds to 0.5 times the initial test pressure in leak-tightness test, part I

Test time: 120 minutes

The test pressure on the pressure gauge must remain constant during the test time ($D_p = 0$).

The pipe system is leak-tight.

Confirmation of the system leak-tightness

Place, date

Signature of client

Place, date

Signature / stamp contractor



FLUSHING OF PIPETEC DRINKING WATER INSTALLATIONS

For reasons of hygiene, flushing should take place only immediately before actual commissioning. The national guidelines must be observed for the flushing process. Filtered drinking water should be used as the flushing liquid (filtered as per DIN EN 13443-1). In order to ensure unrestricted operational reliability, dirt and assembly residues must be

removed from the inner surfaces of the pipes and system components, the drinking water quality ensured and corrosion damage and functional faults in fittings and equipment avoided by flushing. In principle, two flushing methods can be applied:

► FLUSHING PROCESS WITH WATER/AIR MIXTURE AS PER DIN EN 806-4

The process is based on a pulsating flow of water and air and is described in more detail in the technical regulations for drinking water installation DIN EN 806-4. Suitable flushing devices must be used for this. The flushing process

should be used when flushing with water is not expected to have an adequate flushing effect.

► FLUSHING PROCESS WITH WATER

Unless an alternative flushing process is agreed by contract or is required, Pipetec drinking water pipes are flushed using the water flushing process with the local supply pressure, as per DIN EN 806-4. The process for pipe flushing corresponds to the details in the ZVSHK leaflet "Leak-tightness tests for drinking water installations with compressed air, inert gas or water". This leaflet can be obtained from

the Zentralverband Sanitär Heizung Klima, Rathausstrasse 6, 53757 St. Augustin and applies to drinking water installations in accordance with DIN 1988 and DIN EN 806. Please see the leaflet for more details about the flushing process with water. The drinking water used for flushing must be filtered (filter as per DIN EN 13443-1).

► OTHER INFORMATION ABOUT THE FLUSHING PROCESS

Depending on the system size and pipe routing, flushing should take place in sections. The direction of flushing should move from the main shut-off valve section-by-section and line-by-line (current flushing section) from the closest to the furthest line. Flushing takes place floor-by-floor starting from the end of the riser.

- For each floor and individual supply pipe, the tapping points are fully opened in succession floor-by-floor (for minimum number, see flushing report) for at least 5 minutes.
- On each floor, the tapping points are opened fully, starting with the tapping point furthest away from the riser.
- In order to protect sensitive fittings (e.g. solenoid valves, pressure flushers, thermostatic fittings) and equipment (e.g. drinking water heaters) from damage caused by flushed foreign material, these components should be fitted only after flushing and adapters should be used beforehand.

- Fine strainers in front of fittings that cannot be dismantled or bypassed must be cleaned after flushing,
- Aerators, jet controls, flow restrictors, shower heads and handheld showers must be disassembled during flushing with any fittings already installed.
- For flush-mounted thermostatic fittings and other sensitive fittings that cannot be disassembled during flushing, the installation instructions of the manufacturer must be followed.
- All maintenance fittings, floor shut-off valves and isolation valves (e.g. corner valves) must be fully opened.
- Pressure reducers must be fully opened and re-adjusted after flushing.
- After a flushing period of 5 minutes at the flushing point opened last, the tapping points can be closed in reverse order.

► FLUSHING REPORT

The flushing process must be documented by the specialist responsible.



FLUSHING REPORT

FOR PIPETEC DRINKING WATER INSTALLATIONS. FLUSHING MEDIUM: WATER

Building project: _____

Date: _____

Client represented by: _____

Responsible contractor: _____

Installation system used: Metal composite pipe system Other

Table: Guide value for the minimum number of tapping points to be opened in relation to the largest nominal width of the distribution pipe.

Largest external diameter d_a [mm] of the distribution pipe in the current flushing section	32	40	50	63	75	90	110
Minimum number of tapping points to be opened $d = 15$ mm	2	4	6	8	12	18	28

On each floor, the tapping points are opened fully, starting with the tapping point furthest away from the riser.

After a flushing period of 5 minutes at the flushing point opened last, the tapping points can be closed in succession.

The drinking water used for flushing is filtered, resting pressure $p_w =$ _____ bar

Maintenance fittings (floor shut-off valves, isolating valves) must be fully open.

Sensitive fittings and devices are disconnected and replaced with adapters or bypassed with flexible pipes.

Aerators, perlators, flow restrictors were disconnected.

Integrated dirt strainers and dirt traps in front of taps were cleaned after water flushing.

Flushing was carried out starting with the main shut-off tap in sections in succession up to the tapping point furthest way.

Flushing of the drinking water system has been carried out properly.

Place, date

Signature of client

Place, date

Signature / stamp contractor