Pressure testing of drinking water pipes

Pressure testing with compressed air and inert gas

If the pressure test with drinking water falls within a period with freezing temperatures or if an extended period of time is expected between the pressure test and operation of the pipe, we do not recommend performing the pressure test with water. In addition to freezing damage, failure to completely empty the pipes in particular may impair the hygienic condition of all system parts. For this reason, we recommend performing the pressure test with compressed air or inert gases in such cases. Due to the compressibility of gases, different requirements must be considered for physical and safety reasons when performing the pressure test with compressed air or inert gas as opposed to water. The procedures described in the ZVSHK advisory leaflet "Performance of a pressure test with compressed air or inert gases" should be followed.

Leak test
The leak test is performed before the strength test at a test pressure of **150 mbar**. The manometer used must have an indication precision of 1 mbar (10 mm water column) for the pressures to be measured. The U-pipe manometers familiar from the TRGI test or the standpipes can be used for this. Components in the pipe system must be rated for the test pressures or removed before the test. After application of the test pressure, the test time for up to 100 litres of pipeline volume must be at least **120 minutes**. The test time must be increased **by 20 minutes** for every **100 litres** of pipeline volume. The leak test starts upon reaching the test pressure, in consideration of the temperature equalization.

Strength test
The strength test is combined with a visual inspection of all pipe connections to check whether the compression and screwed connections were established with a proper seal. Subjecting the system to increased pressure is limited to **max. 3 bar** for nominal widths ≤ 63 x 4.5 and **max. 1 bar** for nominal widths > 63 x 4.5 for a test period of **10 min**.

The following media can be used for the leak and load tests:
- oil-free compressed air
- inert gases, such as nitrogen and carbon dioxide
- forming gas with 5 % hydrogen in nitrogen (used to locate leaks)

Safety equipment, such as pressure reducers on compressors, must ensure that the planned test pressure is not exceeded within the line system.

Please refer to Section 11.5 for pressure test reports. They are also available for download at www.fraenkische.com.

Pressure testing with water

DIN EN 806-4, Section 6, requires pressure testing of drinking water pipes with filtered water after completion of installation but while still exposed. The pressure gauge must be connected to the lowest point in the system. Gauges that indicate a pressure difference of 0.1 bar may be used only.
Temperature equalization is required for a temperature difference of >10 K. For this reason, the temperature of the installation should match that of the testing medium. In addition, every connection point must be visually inspected for correct crimping.

Conducting the pressure test
The pressure test is performed as a leak and strength test, whereby the leak test is sufficient for smaller system components, such as connection and distribution pipes within wet rooms.

Impermeability test
The alpex connectors must be visually inspected after the system has been filled with water.

Strength test
The strength test is performed immediately after successful impermeability test with **min. 11 bar** and lasts for **30 minutes**. The test pressure indicated during the strength test must not drop during this time. There must be no leaks anywhere within the tested system.

Please refer to Section 11.5 for pressure test reports. They are also available for download at www.fraenkische.com.

11.5 Pressure test/pressure test reports

Pressure test with water or compressed air

alpex-duo and alpex L crimp fittings as well as alpex-plus push-fit fittings made of PPSU/brass must be pressure-tested after installation and before plastering or screed work.
Pressure testing can be carried out using water or compressed air and is a two-step process for all alpex connectors: Firstly, the installation is tested for leak-tightness and secondly for strength.

1. Impermeability test and visual inspection

Water
ZVSHK advisory leaflet

2. Strength test for drinking water and heating installations

Water
DIN EN 806-4

Water
DIN 18380

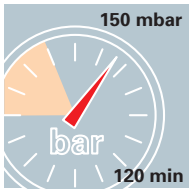
Pressure testing with water:

1. The alpex-duo / alpex L connectors must be visually inspected for leakages during and after filling the system with water.
   With the alpex-plus push-fit fitting, the green indicator shows the correct installation depth. Visual inspection required!

2. A successful impermeability test is followed by a **strength test** using water for drinking water installations according to DIN 806-4 at **min. 11 bar for 30 min** and for heating systems according to DIN 18380 at **4 to max. 6 bar for 60 min.**

VDI directive 6023 specifies that drinking water systems should be put into operation immediately after water pressure testing and subsequent flushing, i. e. without downtime, for reasons of hygiene! We recommend a pressure test using compressed air if installations are started later.

1. Impermeability test and visual inspection



Air
ZVSHK advisory leaflet

2. Strength test for drinking water and heating installations

Air
ZVSHK advisory leaflet

Pressure test using compressed air:

1. **Impermeability testing** is carried out at **150 mbar** according to the ZVSHK advisory leaflet. Test time for 100 litres of pipe volume is at least **120 minutes. Increase test time by 20 minutes** for every additional **100 litres.**

2. A successful impermeability test without pressure drop is followed by a **strength test** according to the ZVSHK advisory leaflet for drinking water installations and heating systems at **max. 3 bar** ≤ 63 x 4.5 mm and at **max. 1 bar** > 63 x 4.5 mm at a test time of **10 min.**

Note ZVSHK advisory leaflet "Impermeability Testing for Drinking Water Installations with Compressed Air, Inert Gas or Water".

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PRESSURE TEST REPORT with water as test medium for heating and drinking water

for heating and drinking water for the systems alpex-plus (16, 20, 26), alpex-duo (16, 20, 26, 32)* and alpex L (40, 50, 63, 75)*

Building project _____

Building phase _____

Customer represented by _____

Supplier represented by _____

System pressure: _____ bar Water temperature: _____ °C Difference: _____ °C

The system has been tested: ❑ **as complete system** ❑ **in sections**

Metal plugs, caps, blanking plates or blind flanges must be used to seal all pipes. Apparatuses, pressure tanks or water heaters for drinking water must be disconnected from the pipes. **The system or pipeline section to be tested must be filled with filtered water, rinsed and completely bleeded.** Visually check that all pipe connections are properly connected.
The ZVSHK advisory leaflet "Impermeability Testing for Drinking Water Installations with Compressed Air, Inert Gas or Water" and VDI 6023 Sheet 1 "Hygiene for Drinking Water Supply Systems" must be taken into consideration.

1. Impermeability test in accordance with the ZVSHK advisory leaflet

A large temperature difference (> 10 K) between the ambient temperature and the water temperature requires a 30-minute waiting period after filling to allow the temperature to equalize.
The pressure corresponds to the available supply pressure of _____bar, **but at least 1 bar and not more than 6.5 bar!**

- ☐ The visual inspection of the system has been completed.
- ☐ A manometer was used for the test.**
- ☐ No leaks were found during the test period.
- ☐ No pressure drop** was observed during the test period.

2. Strength test

☐ **Drinking water according to DIN EN 806-4**

- ☐ The drinking water system has been pressure tested at a **minimum pressure of 11 bar;** the test was performed over a **30 minute-period**
- ☐ No leaks were found over the test period
- ☐ No pressure drop was observed during the test period **

☐ **The piping system has been proven to be leak-tight**

☐ **Heating system according to DIN 18380**

- ☐ The heating system has been pressure tested using cold water with a test pressure of **min. 4 to max. 6 bar;** the test was performed over a **60 minute-period.**
- ☐ No leaks were found over the test period
- ☐ No pressure drop was observed during the test period **

Place, date _____

(Customer signature/customer representative signature) (Supplier signature/supplier representative signature)

* alpex-duo and alpex L fittings are not provided with a leak function.
** Manometers must be capable of accurately measuring the pressure to the nearest 0.1 bar.

FRÄNKISCHE

PRESSURE TEST REPORT with compressed air or inert gas as test medium for heating and drinking water

for heating and drinking water for the systems alpex-plus (16, 20, 26), alpex-duo (16, 20, 26, 32)* and alpex L (40, 50, 63, 75)*

Building project _____

Building phase _____

Customer represented by _____

Supplier represented by _____

System pressure: _____ bar Water temperature: _____ °C Difference: _____ °C

The system has been tested: ❑ as complete system ❑ in sections

Metal plugs, caps, blanking plates or blind flanges must be used to seal all pipes.
Apparatuses, pressure tanks or water heaters for drinking water must be disconnected from the pipes.
Visually check that all pipe connections are properly connected.
The ZVSHK advisory leaflet "Impermeability Testing for Drinking Water Installations with Compressed Air, Inert Gas or Water" and VDI 6023 Sheet 1 "Hygiene for Drinking Water Supply Systems" must be taken into consideration.

1. Impermeability test in accordance with the ZVSHK advisory leaflet

Test pressure 150 mbar: If the pipeline has a capacity of up to **100 litres**, the test must be conducted over a period of not less than **120 minutes.** The test time must be increased by **20 minutes for every additional 100 litres.**

Pipeline capacity: _____ litres Test time: _____ minutes

The test time will begin only after thermal equilibrium and steady state condition has been achieved.

☐ The visual inspection of the system has been completed.

☐ A manometer/U pipe was used for the test.**

☐ No pressure drop was observed during the test period.

2. Strength test

The test period will begin only after thermal equilibrium and steady state condition has been achieved.

Test pressure max. 3 bar* ≤ 63 x 4.5 mm Test period: 10 min**
Test pressure max. 1 bar* > 63 x 4.5 mm Test period: 10 min**

☐ **The piping system has been proven to be leak-tight**

Place, date _____

_____ _____

(Customer signature/customer representative signature) (Supplier signature/supplier representative signature)

* alpex-duo and alpex L fittings are not provided with a leak function.
** Manometers must be capable of accurately measuring the pressure to the nearest 1 mbar.
*** Manometers must be capable of accurately measuring the pressure to the nearest 0.1 bar.