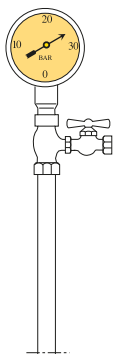


# Hydraulic testing



The contractor is responsible for analyzing and eliminating any risks during installation (especially the use of personal protective equipment).

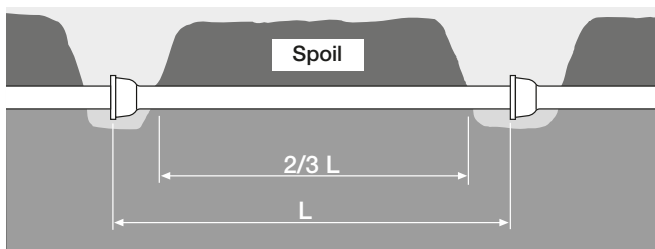
## 1 PREPARATION FOR THE TEST

### Recommendations

The recommendation is to not exceed a length of 2,000 meters.

The length of the section to be tested depends on the layout configuration and the project's technical specifications.

Depending on the type of worksite, it is better to pressurize the pipeline while leaving the joints exposed to check for leaks.



### Calculate the hydraulic forces

Developed at the ends of the main and install a suitably sized restraint system.

$$\text{Thrust } F = \text{test } P \times f(1 \text{ bar})$$

Example : DN = 150

Test P = 10 bar

Thrust F 227 daN

DN	f(1bar) daN	DN	f(1bar) daN	DN	f(1bar) daN	DN	f(1bar) daN
60	47	250	590	600	3167	1200	12370
80	75	300	835	700	4278	1400	16787
100	109	350	1122	800	5568	1500	19236
125	163	400	1445	900	7014	1600	21851
150	227	450	1809	1000	8626	1800	27612
200	387	500	2223	1100	10405	2000	34045

# Hydraulic testing

## Calculate the volume of water

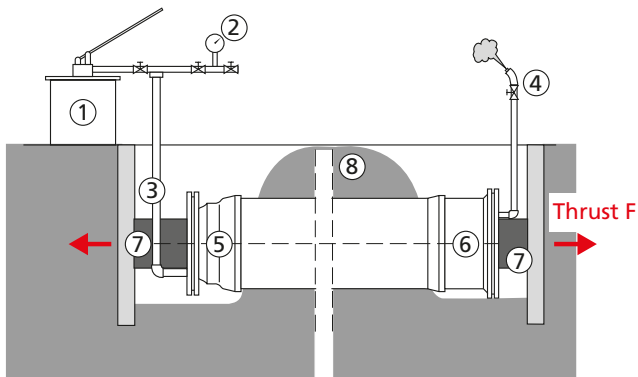
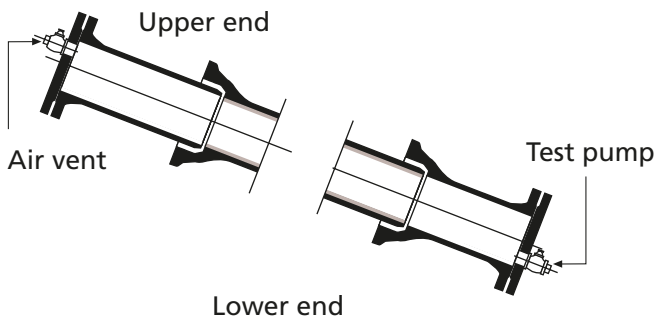
Calculation for the volume of water in m<sup>3</sup>

$$\pi \times (\text{DN}/2000)^2 \times \text{pipeline length}$$

Example: 1,850-metre section of DN 800 pipe

$$3.1415 \times (800/2000)^2 \times 1850 = 929.78 \text{ m}^3$$

**Block the ends** of the test section with blank flanges equipped with valves for water filling and air venting.

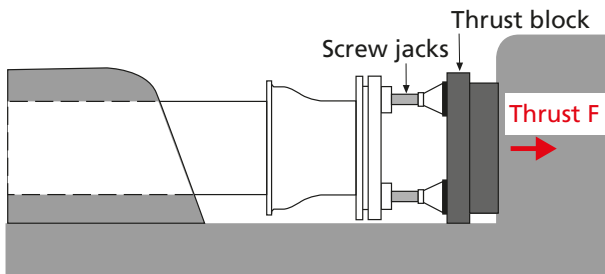


- 1 - Test pump
- 2 - Manometer
- 3 - Pump connection
- 4 - Air vent

- 5 - Lower end part
- 6 - Upper end part
- 7 - Anchor system
- 8 - Spoil

# Hydraulic testing

Pressurizing the pipe compresses the temporary end restraints. If necessary, use screw jacks to compensate for any compression.



**Absorb the forces** using timbers laid across the trench or by sheet piling (also provide lateral restraints).

**Avoid** using the end of a previously laid and hydraulically tested pipe section as a buttress.

## 2 PIPE FILLING AND TEST PREPARATION

**Gradually fill** the main from the low points.

**Increase to maximum pressure** and **leave for 24 hours** according to EN 805 before performing the test for the main to reach equilibrium (rehydration of the pipes' cement internal lining).

### Checking filling

Any air in the main must be **completely removed**.

**Check** that the air valves are functioning.

**Open** the wash-out valves to check the arrival of water.

## 3 PRESSURE TEST

With the pipes completely filled, slowly **increase** the pressure until the planned test pressure is reached.

**Keep** a constant eye on the restraints

**Apply** the defined test criteria.

The test pressure should not fall by more than 0.2 bar when maintained for one hour in accordance with EN 805.

**Empty** the main, **remove** the test equipment and, **connect** up the section.

**Flush** out the main thoroughly to remove any foreign bodies trapped during laying.

**Disinfect** before commissioning.