SLOVENSKI STANDARD
oSIST prEN 17970:2023

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Cevi iz duktilne železove litine - Spoji za cevne sisteme iz duktilne železove litine - Odpornost proti vraščanju korenin - Zahteve in preskusne metode

Ductile iron pipes - Push-in joints for ductile iron pipe systems - Resistance against root intrusion - Requirements and test methods

Rohre aus duktilem Gusseisen und ihre Verbindungen - Widerstandsfähigkeit gegen Wurzeleinwuchs

Ta slovenski standard je istoveten z: **prEN 17970**

ICS:

23.040.10	Železne in jeklene cevi	Iron and steel pipes

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EUROPEAN STANDARD

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ICS

English Version

Ductile iron pipes - Push-in joints for ductile iron pipe systems - Resistance against root intrusion - Requirements and test methods

Rohre aus duktilem Gusseisen und ihre Verbindungen - Widerstandsfähigkeit gegen Wurzeleinwuchs

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 17970:2023) has been prepared by Technical Committee CEN/TC 203 “Cast iron pipes and fittings”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

Introduction

The test described in this document is adjusted from a standardized test method for plastic pipes to the characteristics of push-in joints for ductile iron pipe systems.

The undesired penetration of tree roots into push-in joints

— causes obstacles to flow with the resulting risks of blockages and backing-up;

— causes leakage in sewage systems with the hazards to the soil and groundwater which this entails;

— leads to high, recurring costs for root removal;

— needs the replacement or renovation of the section of sewage or drainage system affected necessary.

In this case, even after replacement or renovation, the cause often remains in effect – namely the close proximity of the tree with the route of the drainage and sewage system. Therefore, root-resistant pipe systems should be used when laying new drainage and sewage systems and replacing existing ones.

1 Scope

This document is applicable to diffusion-tight pipes, accessories and fittings in ductile cast iron to EN 598 and to cast iron pipe systems.

The document gives requirements on the contact pressure based on a risk assessment and gives a test method that simulates the penetration of a root tip into the sealing gap.

2 Normative references

EN 598:2007+A1:2009, *Ductile iron pipes, fittings, accessories and their joints for sewerage applications — Requirements and test methods*

3 Terms and definitions

No terms and definitions are listed in this document.

4 Requirements

When tested according to 5.3 and evaluated according to 5.4 the contact pressure between the sealing surfaces of socket and spigot end shall be as described in Table 1:

Table 1 — Requirements for the contact pressure based on a risk assessment

	Risk assessment	Minimum Contact pressure [bar]
1	If ductile iron pipelines are installed away from trees and a distance is maintained that makes the chance of contact between tree roots and the pipeline appear remote, a low risk of root penetration can be assumed. The risk of ingrowth can be reduced by further extensive protective measures. These include both measures in the pipeline trench (passive protective measures) and measures directly at the construction site (active protective measures), as described in DVGW GW 125.	2
2	When ductile iron pipelines are installed in environments which are characterized by a smaller distance to existing trees or where tree plantations are expected or planned, e.g. in urban places with extended green surfaces, ductile iron pipes with a higher resistance to root penetration shall be installed. The highest risk of root penetration occurs in cases where so called sponge cities where trees are planted directly in pipeline trenches, which are backfilled with coarse grained gravel or crushed rock create a water storing volume for heavy rainfalls. This stored water is directly available for the urban trees and will be evaporated by the crowns with the effect of cooling the microclimate in the vicinity of these trees.	5

5 Test method

5.1 Principle

The test method simulates the penetration of a root tip into the sealing gap which is sealed to be pressure-tight with a compressed rubber gasket.

The compressed gasket clamps four PTFE tubes (PTFE - polytetrafluorethylene) to the sealing surface so that this assembly is gas-tight. PTFE tubes which meet the following points are used (see EN 14741:2006, 5.5):

— they are suitable for sustaining at least 10 bars;

— the overall thickness of the flattened PTFE tube, measured in the centre of the specimen at two different points vertical to each other, must be between 0,16 mm and 0,24 mm;

— the overall width of the flattened tube must be between 6 mm and 10 mm.

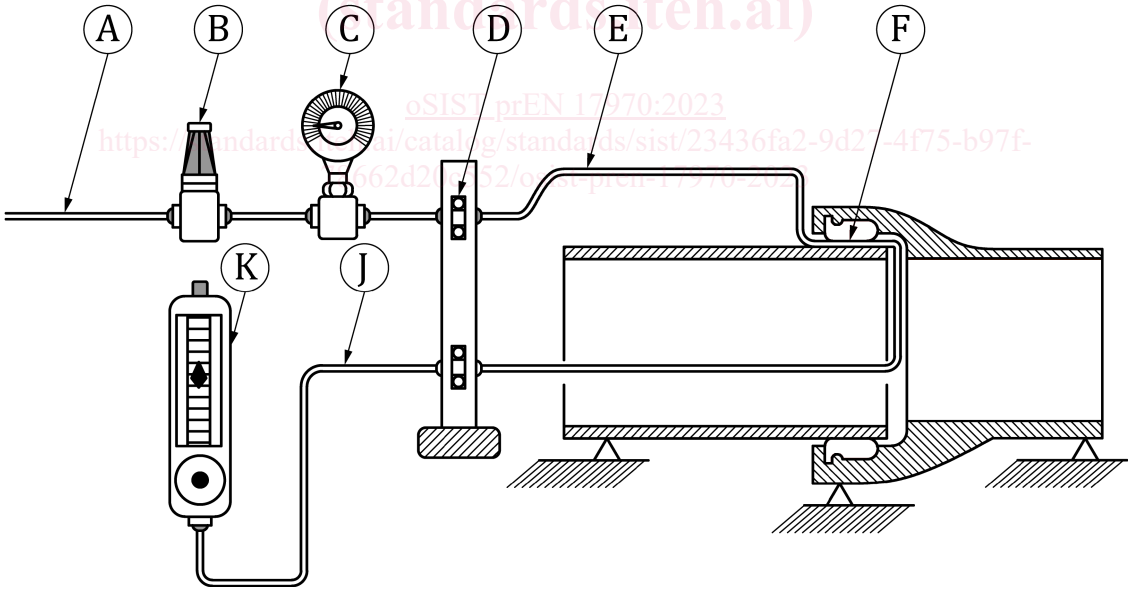
The gas pressure in the PTFE tubes is raised after increasingly long periods of time until a passage of air of 120 ml/min is reached in one of the tubes.

5.2 Preparation of the specimen

The tests are carried out on a representative basis for the DN groups of push-in joints described in EN 598: DN 200, DN 400 and DN 800. The push-in joints to be tested, each consisting of a section of pipe or fitting with a spigot end and a section of pipe or fitting with a socket, are to be selected in such a way that, in the installed condition, they offer an aligned maximum joint annulus according to EN 598:2007+A1:2009, 5.5.3.1.

5.3 Performing the test

Four PTFE tubes are positioned on an aligned mounted joint between the gasket and the surface of the spigot end (see Figure 1) at 0°, 45° and 90°, 300° (see Figure 2).



Key

A	Source of N_2 or air (purified)	E	PTFE tube
B	Pressure regulator	F	Position of the PTFE tube in the joint
C	Manometer	J	Connection tube
D	Joint	K	Flow meter

Figure 1 — Test equipment with specimen

The joint to be tested is assembled with a maximum annulus and its axis lying horizontally.

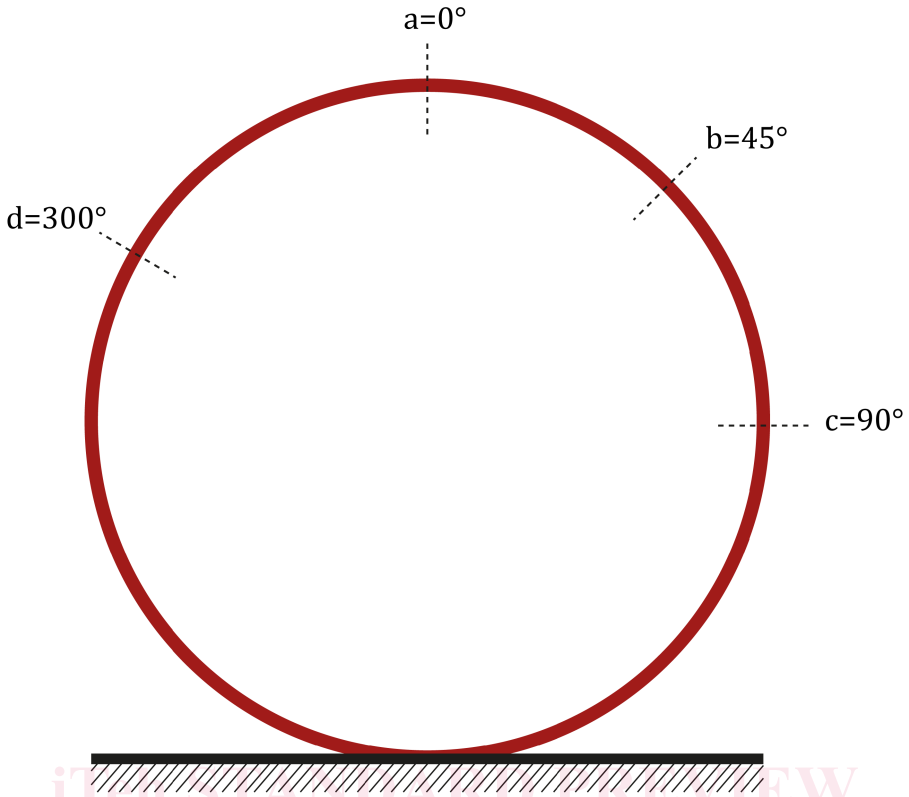


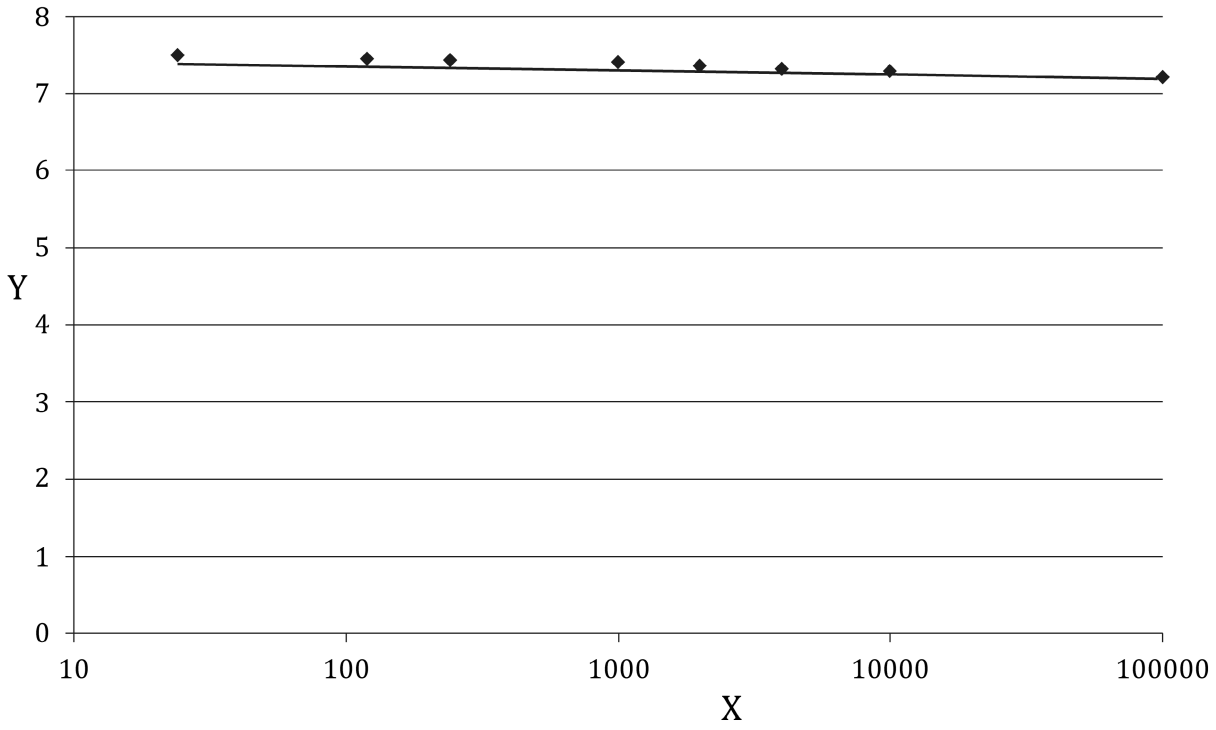
Figure 2 — Arrangement of PTFE test tubes

The pressure p of nitrogen or air required for a gas flow rate of 120 ml/min is measured and held at the specified time intervals.

The measurement values read off for the opening pressure p_t are documented after 24 h, 168 h, 336 h, 504 h, 600 h, 696 h, 862 h, 1 008 h, 1 392 h and 2 000 h. The entire test equipment is to be kept at a constant room temperature of 23 °C ± 2 °C.

5.4 Evaluation and representation of test results

Using the extrapolated regression curve of p_t, the opening pressure after 100 years can be determined. The gradient of the straight line is represented with a logarithmic timeline and determined by means of linear regression. The opening pressure for a time of 100 years is to be stated. See Figure 3.



Key

X Log time [hours]

Y Pressure [bar]

Figure 3 — Extrapolation of measurement values for the opening pressure (example)

Root resistance is said to have been achieved if the requirements in Clause 4 are met.