

SLOVENSKI STANDARD SIST EN 295-3:1996

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Keramične cevi, fazonski kosi in spoji za odvod odpadne vode in kanalizacijo - 3. del: Preskusne metode

Vitrified clay pipes and fittings and pipe joints for drains and sewers - Part 3: Test methods

Steinzeugrohre und Formstücke sowie Rohrverbindungen für Abwasserleitungen und - kanäle - Teil 3: Prüfverfahren STANDARD PREVIEW

Tuyaux et accessoires en gres et assemblages de tuyaux pour les réseaux de

branchement et d'assainissement - Partie 3: Méthode d'essai

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91.140.80	Drenažni sistemi	Drainage systems
93.030	Zunanji sistemi za odpadno vodo	External sewage systems

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Vitrified clay pipes and fittings and pipe joints for drains and sewers - Part 3: Test methods

Tuyaux et accessoires en grès et assemblages de tuyaux pour les réseaux de branchement et d'assainissement - Partie 3: Méthode d'essai

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Foreword

This part of the European Standard for vitrified clay pipes is the third of three parts which were drafted by WG2 "Vitrified clay pipes" of the Technical Committee CEN/TC 165 "Waste water engineering", Secretariat of which is held by DIN.

"Vitrified clay pipes and fittings and pipe joints for drains and sewers Part 1: Requirements" contains the complete specification, "Vitrified clay pipes and fittings and pipe joints for drains and sewers Part 2: Quality control and Sampling" contains the complete quality control. Other parts may be added later.

On drafting this standard the provisional results already available of CEN/TC 165/WG1 "General requirements on pipes, fittings, pipe joints including sealings and manholes" or other relevant working group of TC165 were taken into account. When further results are received, any necessary amendment will be made.

In accordance with the Common CEN/CENETE and ards.iteh.ai)
Rules, the following countries are bound to implement
this European Standard:
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Austria, Belgium, Denmark, Finland, France, a39545e0e1fd/sist-en-295-3-1996 Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

Vitrified clay pipes in permanent or in temporary contact with water intended for human consumption will not affect the quality of that water. Therefore this standard does not contravene the EC-Council Directives 75/440, 79/869, 80/778.

This standard takes into account the essential requirements of the EC-Council Directive for construction products (89/106) and the Draft Directive on the treatment of municipal waste water (COM (89) 518).

ISO 1431-1 1989 Rubber, vulcanised or

strain test.

thermoplastic - Resistance to ozone cracking - Part 1 : Static

the drawings of the French or German version shall be used.

1.1 Object and	field of application	ISO ·	4648 197	78 Rubber, vulcanised - Determination of dimensions of test pieces and products for test purposes
This part of this E	uropean Standard is the specification test for requirements of EN 295-1.	1.3	Symbols	
	erence is made to clauses in	A		meter of spigot moulding, in (invert conformity test).
Throughout the clapipes includes pipe	auses in this standard reference to e sections as defined in clause 1.3.8 these are suitable and permitted for	A_{L}	millimetres	overall length of sample, in (tensile strength and elongation at ypropylene sleeve couplings).
the tests.	these are suitable and perintiled for	а	Lever arm 1 resistance to	ength, in metres (bending moment est).
1.2 References EN 295-1 199	Vitrified clay pipes and fittings and pipe joints for drains and sewers: Part 1: Specification.	a _M	point of ins (invert conf	nt from inside of pipe barrel to mid side of socket fairing, in millimetres formity test).
EN 10002-1 199	0 Metallic materials - Tensile and ar testing - Part 1:Method of test (at ambient temperature).	ds.i	(crushing strength test	,
ISO 37 197	7 Rubber, vulcanised ards iteh ai/catalog/stan Determination of tensile stress 45e0e1fd/s strain properties.	295-3: dards/si: sist-en-2	Measurement of specific confe	nt from inside of pipe barrel to bigot moulding, in millimetres ormity test).
ISO/R 527 1960	6 Plastics - Determination of tensile properties	В	unobstructed	gth of external barrel of pipe d by socket shape and/or jointing n, in millimetres (crushing strength
ISO 815 1972	2 Vulcanized rubbers - Determination of compression set under constant deflection at normal and high temperatures.	B_{c}		is, in millimetres (tensile strength on at break - polypropylene sleeve
ISO 868 1985	Plastics and ebonite - Determination of indentation hardness by means of a durometer (Shore hardness).	$B_{_{\mathrm{t}}}$	moulding to point at which	m the outside surface of the spigot the internal bore of the pipe at one the outside diameter of the spigot) was measured, in millimetres primity test).
ISO 1133 1991	Plastics - Determination of melt mass flow rate (MFR) and the melt volume flow rate (MVR) of thermoplastics.	b	•	idth, in millimetres (fatigue strength
100 4 404 4	_	b_3	Specimen wi	idth, in millimetres (bending tensile

strength test).

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- CLength of narrow parallel portion of sample, in millimetres (tensile strength and elongation at break for polypropylene sleeve couplings).
- CRResistance index for jointing material.
- C, Distance from the outside surface of the spigot moulding to the internal bore of the pipe at the opposite end to B, of the diameter measured as the outside diameter of the spigot (A), in millimetres (invert conformity test).
- $C_{\rm i}$ Distance between seal and load application line for F_{7} , in metres (shear resistance test).
- С, Distance between right hand support and load line for $F_{\rm E}$, in metres (shear resistance test).
- Concentration of solution, in moles per litre с (chemical resistance tests).
- Factor for the upper (0,4) or lower (0,1) limit of C_{i} the load (fatigue strength test).
- millimetres (invert conformity test)s.iteh.ai/catalog/standards/sist/a34e5f98-3886-4454-a935-DN Nominal size - a numerical designation of size which is a convenient round number equal to or approximately equal to the bore, in millimetres

Inside diameter of socket moulding, in

Deviation from straightness of a pipe barrel, in D_{s} millimetres (straightness test).

(bending moment resistance test).

- D_{w} Width of narrow parallel portion of sample, in millimetres (tensile strength and elongation at break).
- d Distance between centres of bottom bearing strips, in metres (bending moment resistance test).
- d, Average internal diameter of pipeline, in metres (hydraulic roughness determination).
- Particle size not exceeded by 50%, 80% or 20% by mass of the material, in millimetres (abrasion

resistance test).

D

- d, Barrel internal diameter, in millimetres (bending tensile strength test).
- \boldsymbol{E} Small radius of sample, in millimetres (tensile strength and elongation at break).
- E_{\cdot} Distance from the internal surface of the socket moulding to the internal bore of the pipe at one point at which the inside diameter of the socket moulding (D) was measured, in millimetres (invert conformity test).
- F Large radius of sample, in millimetres (tensile strength and elongation at break).
- $F_{\rm n}$ Force at failure, in kilonewtons (bending tensile strength test).
- $F_{\scriptscriptstyle \rm F}$ Nominal self weight of stopper, in kilonewtons (shear resistance test).
 - Force for upper and lower limit, in kilonewtons (fatigue strength test).
- a39545e0e1fd/sistFen-295Nominal self weight of pipe, in kilonewtons (shear resistance test).

SIST EN 215,3:19 Trushing strength, in kilonewtons per metre.

- $F_{\rm s}$ Shear load, in kilonewtons (shear resistance test).
- Distance from the internal surface of the socket F_{\cdot} moulding to the internal bore of the pipe at the opposite end to E, of the diameter measured as the inside of the socket moulding (D), in millimetres (invert conformity test).
- $F_{\mathbf{w}}$ Weight of water in pipe, in kilonewtons (shear resistance test).
- Applied load, in kilonewtons (shear resistance $F_{\rm z}$ test).
- G Distance between reference lines, in millimetres (tensile strength and elongation at break).
- $G_{\mathfrak{m}}$ Mean annular gap, in millimetres (invert conformity test).
- g Acceleration due to gravity, in metres per second squared (hydraulic roughness determination).

h _x	Pressure head at point x, in metres (hydraulic roughness determination).	Q	Flow rate, in cubic metres per second (hydraulic roughness determination).
h_{y}	Pressure head at point y, in metres (hydraulic roughness determination).	S	Support span, in metres (bending moment resistance test).
IRHI	International Rubber Hardness Degrees of bearing strips/facings, in degrees IRHD (crushing strength test).	$\mathcal{S}_{_{\mathrm{f}}}$	Specimen wall thickness, in millimetres (fatigue strength test).
k _s	Hydraulic roughness, in millimetres (hydraulic roughness determination).	Sh _O	Shore hardness of test piece prior to conditioning, in degrees (resistance index test).
$L_{\scriptscriptstyle \mathrm{H}}$	Length between x and y, in metres (hydraulic roughness determination).	S _{min} & S _{ma}	Extreme values of difference in invert, in millimetres (invert conformity test).
L _N	Nominal length of pipe, in millimetres (straightness test).	S_{s}	Distance between seal and right hand support, in metres (shear resistance test).
L_{T}	Test length of pipe, in millimetres (straightness test).	SRI	Standard deviation, in millimetres (invert conformity test).
L_3	Centre line distance between supports, in millimetres (bending tensile strength test).	r ds. i N 295-3	Specimen wall thickness, in millimetres (fatigue strength test).
<i>I</i> ₄	Centre line distance between supports; inh ai/catalog/star millimetres (fatigue strength test). a39545e0e1fd/	ndards/si /sist-en-2	Specimen wall thickness, in millimetres (bending tensile strength test).
M	Bending moment resistance, in kilonewton metres (bending moment resistance test).	t	Test times, in minutes (polyurethane relaxation test).
$M_{_{ m b}}$	Bending moment, in newton millimetres (bending tensile strength test).	U	Degree of nonuniformity of particles (abrasion resistance test).
$M_{_{ m p}}$	Mean particle size, in millimetres (abrasion resistance test).	V_{o}	Volume of test piece prior to conditioning, in cubic millimetres (resistance index test).
M^1	Required bending moment resistance, in kilonewton metres (bending moment resistance test).	W	Section modulus, in cubic millimetres (bending tensile strength test).
$M_{_1}$	Test piece mass before treatment, in grammes (chemical resistance test).	W_{15}	Water addition in 15 minutes, in litres per square metre (watertightness test).
$M_{_2}$	Test piece mass after treatment, in grammes	$\boldsymbol{\alpha}_{K}$	Correction factor (bending tensile strength test).
2	(chemical resistance test).	$\alpha_{_{\boldsymbol{k}\boldsymbol{l}}}$	Correction factor (fatigue strength test).
$m_{_{o}}$	Mass of test piece prior to conditioning, in grammes (resistance index test).	β	Half the depth of a socket fairing, in millimetres (invert conformity test).
$P_{\scriptscriptstyle m b}$	Total applied load, in kilonewtons (bending moment resistance test).	Δα	Measurement of difference in invert levels, in millimetres (invert conformity test).

- Difference between m_o and the mass 14 days after conditioning, in grammes (resistance index test).
- ΔSh Difference between Sh_a and the Shore hardness after conditioning, in degrees (resistance index test).
- Stress relaxation at $t=10^{i}$ and $t=10^{i}$ minutes, in $\Delta \sigma_{i:i}$ newtons per square millimetre (polyurethane relaxation tests).
- ΔV Difference between V_{a} and the volume after conditioning, in cubic millimetres (resistance index test).
- λ Resistance coefficient (hydraulic roughness determination).
- Restoring stress at times $t=10^{i}$ minutes and
- &σ. t=10 minutes, in newtons per square millimetre (polyurethane relaxation tests).

3. Straightness test

The deviation from straightness of a pipe barrel is the maximum distance from the centre of a straight line equal to the test length spanning any concave curve on the outside of a pipe barrel to the pipe surface (D_s) as shown in figure 2. It is permissible to test for straightness using any suitable apparatus.

The test length shall be 150mm less than the nominal length of the pipe to allow for clearance at the shoulder of any socket and at any jointing material at the spigot

 L_{N} is the nominal length of the pipe

 $L_{\scriptscriptstyle
m T}$ is the test length

 $D_{\rm s}$ is the deviation from straightness

 $L_{\rm T} = L_{\rm N} - 150 {\rm mm}$

Bending tensile strength, in newtons per square σ_{bz} millimetre (bending tensile strength test).

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2. Test for squareness of ends

A whole pipe is placed horizontally on two supports, situated 75mm from each end of the barrel.

The deviation from squareness is measured as the maximum difference, at either end, between distances from any point on the end of the barrel to a plane rectangular to the line joining the points of support. Any suitable apparatus may be used. An example is given in figure 1.

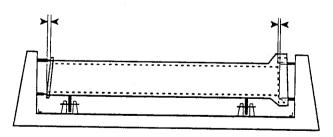


Figure 1: Measurement of squareness of ends

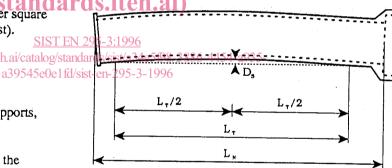


Figure 2: Straightness test method

- 4. Crushing strength test
- 4.1 General
- 4.1.1 Preconditioning

Prior to crushing strength tests, sample pipes or pipe sections shall be preconditioned.

This shall be effected by either

complete immersion in water at ambient temperature for the minimum times given in table 1. The wall thickness is the mean wall thickness of the batch.

Table 1: Preconditioning time for strength tests

Wall thickness	Minimum preconditioning time		
	Unglazed, glazed only on interior or exterior surface, salt glazed		
mm	h	h	
up to 20 >20 ≤35 >35	18 42 66	42 66 90	

or

b) by complete immersion in a water pressure tank at ambient temperature for 24 hours at a pressure of 250 kPa (2,5 bar).

An example of the pressure tank is given in figure 3.

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Figure 3 : Example of pressure tank for preconditioning

4.1.2 Testing machine

The testing machine for crushing shall be capable of applying compressive loads and shall be substantial and rigid throughout, so that the distribution of the load will not be affected by the deformation or yielding of

any part. The machine and bearers shall be designed to transmit the load in a vertical plane through the longitudinal centre lines of the bearers and pipe.

The load shall be applied to the top bearer in such a way that the combination of support, bearers and bearing strips is free to rotate in a vertical plane through the longitudinal centre lines of the top and bottom bearers.

The testing machine load shall be verified by calibration to an accuracy of 1% by an approved agency at intervals of not more than 12 months.

4.1.3 Loading

Place the pipe or pipe section not less than 300mm long between the bearer strips.

When using the rigid system described in 4.3.3 the plane of any permitted longitudinal curvature shall be approximately horizontal.

standar Apply the load to the pipe or pipe section without vibration or sudden shock, at a uniform rate between SISTEN 0,40 kl per metre of pipe per second and 0,60 kN per chaicatalog/standmetres of pipe per second, or in increments of not more a39545e0e1fd/sithan-0,50 kN per metre at the same rate, up to the point of failure or, in the case of acceptance (proof) testing, to the load corresponding to the required strength.

4.2 Bearers and bearing strips/facings

4.2.1 Bearers

The bearers shall consist of metal, teak or similar hard wood, be straight and free from knots, warping or twisting, and shall be centrally located on their supports.

The top and bottom bearers shall both have a minimum thickness of 25mm. When bearing strips are used the widths of the bearers shall be not less than those of the corresponding bearer strips, see figure 4a.

When bearing facings are used the widths shall be not less than those required to support the pipe and the width of the top bearer is given in table 2, see figure 4b.

The cross-sectional shape of the bearers shall be in accordance with figure 4. The slope of the V surface of the bottom bearer shall be between 0° and 5°.