
**Keramične cevi, fazonski kosi in spoji za odvod odpadne vode in kanalizacijo - 5.
del: Zahteve za drenažne keramične cevi in fazonske kose**

Vitrified clay pipes and fittings and pipe joints for drains and sewers - Part 5:
Requirements for perforated vitrified clay pipes and fittings

Steinzeugrohre und Formstücke sowie Rohrverbindungen für Abwasserleitungen und -
kanäle - Teil 5: Anforderungen an gelochte Rohre und Formstücke

Tuyaux et accessoires en gres et assemblages de tuyaux pour les réseaux de
branchements et d'assainissement - Partie 5: Spécifications pour tuyaux perforés et
accessoires

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Ta slovenski standard je istoveten z: EN 295-5:1994

ICS:

23.040.50	Cevi in fitingi iz drugih materialov	Pipes and fittings of other materials
93.030	Zunanji sistemi za odpadno vodo	External sewage systems

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EUROPEAN STANDARD

EN 295-5

NORME EUROPÉENNE

EUROPÄISCHE NORM

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Descriptors: Water removal, water pipelines, sewage, sumps, drainpipes, pipes, tubes, accessories, standstone products, specification, dimensions, perforating, crushing strength, flexural strength, designation, marking

English version

**Vitrified clay pipes and fittings and pipe joints for
drains and sewers - Part 5: Requirements for
perforated vitrified clay pipes and fittings**

Tuyaux et accessoires en grès et assemblages de
tuyaux pour les réseaux de branchements et
d'assainissement - Partie 5: Spécifications
pour tuyaux perforés et accessoires

Steinzeugrohre und Formstücke sowie
Rohrverbindungen für Abwasserleitungen und
-kanäle - Teil 5: Anforderungen an gelochte
Rohre und Formstücke

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard has been drafted by WG 2 "Vitrified clay pipes" (convenor: SNV) of the Technical Committee CEN/TC 165 "Waste water engineering" secretariat of which is held by DIN.

It is part of a series of seven:

Part 1 comprises the requirements, part 2 comprises the total quality control, part 3 comprises the necessary details concerning test methods, part 4 comprises requirements for special fittings and adaptors, part 5 comprises requirements for perforated pipes, part 6 comprises requirements for vitrified clay manholes and inspection shafts and part 7 comprises the requirements for pipes for jacking..

On drafting this Standard the provisional results already available of CEN/TC 165/WG 1 "General requirements on pipes, fittings, pipe joints including sealings and manholes" and as well the provisional working drafts of the interpretative documents on the basis of the Construction Products Directive were taken into account. On the approval of the standard any necessary amendments will be made.

This European Standard shall be given the status of a National Standard, either by publication of an identical text or by endorsement, at the latest by November 1994, and conflicting national standards shall be withdrawn at the latest by November 1994.

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According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

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1 Scope

This European Standard specifies requirements for perforated pipes and compatible fittings made from vitrified clay with or without sockets for the construction of french drains, land drains and drainage of waste tips. They may also be used for percolation into the ground. Fittings need not be perforated.

Where this standard provides for different strength classes or areas of perforations the specifiers/purchasers may select according to their requirements.

Preferred angles are given for bends and junctions but other values are acceptable.

2 Normative References

This European Standard incorporates by date or updated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 295-1	1991	Vitrified clay pipes and fittings and pipe joints for drains and sewers - Part 1 : requirements.
EN 295-2	1991	Vitrified clay pipes and fittings and pipe joints for drains and sewers - Part 2 : Quality control and sampling.
EN 295-3	1991	Vitrified clay pipes and fittings and pipe joints for drains and sewers - Part 3: Test methods.

prEN 295-4	1993	Vitrified clay pipes and fittings and pipe joints for drains and sewers - Part 4 : Requirements for special fittings, adaptors and compatible accessories.
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3 Definitions

For the purposes of this standard, the following definition and those given in EN 295-1 apply.

3.1 Area of perforations

Total area of holes or slots per metre length measured at the pipe bore.

4 Pipes and fittings

4.1 Materials and manufacture

Pipes and fittings shall be made from suitable clays and fired to vitrification. The clays shall be of such a quality and homogeneity that the final product is in accordance with this standard. Pipes and fittings shall be sound and free from such defects as would impair their function when in service.

Visual defects, such as missing glaze, unevenness, creasings in the transition from barrel to socket and slight surface damage are acceptable, providing the durability and flow characteristics of the pipes are unaffected.

Pipes and fittings may be unglazed or glazed on the interior and/or exterior. When glazed they need not be glazed on the jointing surfaces of the spigot and socket.

Pipes and fittings are classified as rigid (stiff).

Fittings may be completed by fixing fired parts together.

Products may be surface treated after firing.

4.2 Minimum bore

The minimum bore is given in Table 1.

Table 1 : Minimum bore

Nominal size DN	Minimum bore mm
75	72
100	96
125	121
150	146
200	195
225	219
250	244
300	293
350	341
400	390
450	439
500	487
600	585
700	682
800	780
1 000	975
1 200	1 170

Other nominal sizes > DN 150 may be manufactured to comply with this standard, providing that the minimum bore is not more than 2,5 % less than the nominal size, rounded to the nearest whole mm.

4.3 Length

Lengths of pipes and straight fittings are not specified in this standard, but the limits of tolerance on the manufacturer's stated nominal length shall be - 2 % + 5 %. The minimum limits of tolerance shall be ± 10 mm.

4.4 Deviation from straightness

When tested in accordance with clause 3 of EN 295-3 :1991, the permissible deviation from straightness of the barrel of a pipe shall not be greater than the values given in table 2, measured to the nearest whole millimetre.

Table 2 : Deviation from straightness
Dimensions in millimetres per metre nominal length

DN < 150	DN $\geq 150 < 250$	DN ≥ 250
6	5	4

4.5 Curvature and radius of bends

The preferred nominal curvatures of bends are 15°, 22,5°, 30° and 45°.

The tolerance of curvature shall be $\pm 5^\circ$ on the nominal value for bends.

The radius, measured to the neutral axis, shall not be less than the nominal size in millimetres.

4.6 Branch angle of junctions

The preferred nominal angles of junction arms are 45° and 90°. The tolerance for the branch angle shall be $\pm 5^\circ$ on the nominal value.

4.7 Perforations

4.7.1 General

The holes in perforated pipes shall be either circular or slotted, and shall be cleanly cut. They shall be positioned in rows parallel to the longitudinal axis of the pipe, the holes in each row being spaced equidistantly. The permissible deviation of the spacing between the holes in any row shall not exceed ± 20 mm. Pipes need not be perforated up to 100 mm length at their ends.

The rows shall be positioned symmetrically leaving an angle of at least 90° unperforated.

The diameter of circular holes at the pipe bore shall be not greater than 10 mm for Type A perforations and not greater than 13 mm for Type B perforations. If slots are used instead of circular holes, the width of slot at the pipe bore shall be not greater than 8 mm.

4.7.2 Area of perforations

The total area of holes measured at the pipe bore shall be either:

Type A: Not less than 3 mm² per millimetre nominal size per metre nominal length, or,

Type B: Not less than 10 000 mm² per metre nominal length.

4.8 Crushing strength (FN)

When tested in accordance with clause 4 of EN 295-3 :1991 with no perforations under the top bearer, the crushing strength (FN) of pipes or pipe sections shall be not less than the values given in Tables 3 and 4.

**Table 3 : Crushing strength (FN)
(pipes DN 75 to DN 150)**

Nominal size DN	Crushing strength FN kN/m		
	20	22	28
75	20	22	28
100	20	22	28
125	20	22	28
150	20	22	28

Higher crushing strengths may be declared for DN 75 to DN 150 pipes, provided that the increase is in steps of 6 kN/m.

**Table 4 : Crushing strength (FN) in kN/m
(pipes >DN 200)**

Nominal Size (DN)	Class L*	Class Number		
		95	120	160
200			24	32
225			28	36
250			30	40
300			36	48
350			42	56
400		38	48	64
450		43	54	72
500		48	60	80
600	48	57	72	
700	60	67	84	
800	60	76	96	
1000	60	95		
1200	60			
*Lower strength pipes				

The crushing strength of other nominal sizes other than Class L shall be calculated from the formula :

$$\text{Crushing strength} = \frac{\text{Class number} \times \text{DN (kN/m)}}{1\,000}$$

Higher crushing strengths may be declared providing that they conform to the requirements of the next higher class. Class numbers are restricted to 95, 120 and 160, thereafter in increments of 40.

NOTE : For the purpose of structural design the nominal wall thickness and/or nominal outside diameter should be declared by the manufacturer.

4.9 Bond strength of adhesive used for fixing fired clay parts together

4.9.1 Minimum bending tensile strength

Fabricated test specimens shall not fracture through the adhesive nor at the adhesive clay interface under a bending tensile stress of 5 N/mm² after full curing when made and tested in accordance with clause 7 of EN 295-3 : 1991.

4.9.2 Minimum strength after immersion

Test as in 4.9.1 but after immersion in test solutions as specified in clause 20 of EN 295-3:1991.

4.10 Chemical resistance

Vitrified clay pipes and fittings specified in this standard are resistant to chemical attack. For special circumstances of application the chemical resistance may be determined by the use of the test in clause 10 of EN 295-3 : 1991.

5 Joint assemblies

Perforated pipes may be fitted with flexible joints or used with other joints, but joints are outside the scope of this standard.

Where necessary joint material requirements are to be agreed between the manufacturer and the specifier/purchaser.

6 Sampling for tests

Sampling is specified in EN 295-2, in which the specification clause numbers refer to EN 295-1. Table 5 gives the cross-reference between the relevant corresponding clauses of EN 295-5 and EN 295-1, and the applicable EN 295-2 clause numbers.

Table 5 : Applicable sampling clauses

Requirement	EN 295-5 Clause	EN 295-1 : 1991 Clause	EN 295-2 : 1991 Clause
Minimum bore	4.2	2.2	3.2 and 3.5
Length	4.3	2.3	3.2 and 3.5
Deviation from straightness	4.4	2.5	3.2
Curvature and radius of bends	4.5	2.7	3.5
Branch angles of junctions	4.6	2.8	3.5
Crushing strength	4.8	2.9	3.2
Bond strength of adhesive	4.9	2.12	3.7 and 3.8
Chemical resistance	4.10	2.15	3.4

7 Designation

The following shall be used for the designation of perforated pipes:

- Block 1 Denomination
- Block 2 EN 295-5
- Block 3 Individual Item Block
 - 3.1 Nominal Size
 - 3.2 Strength
 - 3.3 Type

EXAMPLE : PIPE-EN 295-5-DN150-FN28-A