BS EN 295-7:2013

BSI Standards Publication

Vitrified clay pipe systems for drains and sewers

Part 7: Requirements for pipes and joints for pipe jacking

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National foreword

This British Standard is the UK implementation of EN 295-7:2013. It supersedes BS EN 295-7:1996 and, together with BS EN 295-1:2013, BS EN 295-2:2013, BS EN 295-4:2013, BS EN 295-5:2013, and BS EN 295-6:2013, it supersedes BS EN 295-10:2005, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/505, Wastewater engineering.

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This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Systèmes de tuyaux et accessoires en grès pour les réseaux de branchement et d'assainissement - Partie 7: Exigences pour les tuyaux et leurs assemblages destinés au fonçage

Steinzeugrohrsysteme für Abwasserleitungen und -känale - Teil 7: Anforderungen an Rohre und Verbindungen für Rohrvortrieb

This European Standard was approved by CEN on 1 December 2012.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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Foreword

This document (EN 295-7:2013) has been prepared by Technical Committee CEN/TC 165 “Wastewater engineering”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by August 2013, and conflicting national standards shall be withdrawn at the latest by August 2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 295-7:1995 and together with EN 295-1:2013, EN 295-2:2013, EN 295-4:2013, EN 295-5:2013 and EN 295-6:2013 it supersedes EN 295-10:2005.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

The main changes with respect to the previous edition are listed below:

— nominal sizes DN 900, DN 1 200 and DN 1 400 added;

— requirements for the determination of jacking strength changed;

— requirements for the resistance to high pressure water jetting added;

— requirements for water absorption added;

— reaction to fire added;

— Annex ZA added;

— editorially revised.

The standard series EN 295 "Vitrified clay pipe systems for drains and sewers" consists of the following parts:

— *Part 1: Requirements for pipes, fittings and joints*

— *Part 2: Evaluation of conformity and sampling*

— *Part 3: Test methods*

— *Part 4: Requirements for adaptors, connectors and flexible couplings*

— *Part 5: Requirements for perforated pipes and fittings*

— *Part 6: Requirements for components of manholes and inspection chambers*

— *Part 7: Requirements for pipes and joints for pipe jacking* (the present document)

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece,

Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard specifies requirements for vitrified clay pipes and joints for pipe jacking for buried drain and sewer systems for the conveyance of wastewater (including domestic wastewater, surface water and rainwater) under gravity and periodic hydraulic surcharge or under continuous low head of pressure. Pipe jacking techniques include micro-tunnelling, pipe-eating, pipe bursting and where appropriate lining with discrete pipes.

This standard also specifies requirements for rubber, polyurethane, polypropylene, stainless steel and other materials used for joints for pipe jacking.

NOTE Corresponding provisions for the evaluation of conformity (ITT and FPC) and sampling and those for the test methods are further specified in EN 295-2 and EN 295-3, respectively.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 295-1:2013, *Vitrified clay pipe systems for drains and sewers — Part 1: Requirements for pipes, fittings and joints*

EN 295-2:2013, *Vitrified clay pipe systems for drains and sewers — Part 2: Evaluation of conformity and sampling*

EN 295-3:2012, *Vitrified clay pipe systems for drains and sewers — Part 3: Test methods*

EN 312, *Particleboards — Specifications*

EN 681-1, *Elastomeric seals — Materials requirements for pipe joint seals used in water and drainage applications — Part 1: Vulcanized rubber*

EN 681-4, *Elastomeric seals — Materials requirements for pipe joint seals used in water and drainage applications — Part 4: Cast polyurethane sealing elements*

EN 10088-2:2005, *Stainless steels — Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 295-1:2013 and the following apply.

3.1
jacking strength
declared capacity of the pipe to carry axial load without taking site conditions into account

3.2
maximum working jacking load
calculated allowable axial load on the pipe during construction, taking site conditions into account

4 Requirements for pipes for pipe jacking

4.1 Materials, manufacture, water absorption and appearance

For material, manufacture, water absorption and appearance, jacking pipes shall comply with EN 295-1:2013, 5.1.

4.2 Dimensions

4.2.1 General

Relevant dimensions of pipes or pipe sections shall be measured after grinding or cutting of ends.

4.2.2 Internal diameter

The internal diameter shall not be less than the values given in Table 1.

Table 1 — Internal diameter

Nominal size DN	**Minimum internal diameter** mm
100	96
150	146
200	195
225	219
250	244
300	293
400	390
500	487
600	585
700	682
800	780
900	878
1 000	975
1 200	1 170
1 400	1 365

Other nominal sizes can be manufactured to comply with this standard, provided that the minimum internal diameter shall be not less than 97,5 % of the nominal size, rounded to the nearest whole mm.

4.2.3 Tolerance on the declared internal diameter

The internal diameter of a pipe shall not deviate from the manufacturers declared value by an amount greater than the tolerance given in Table 2.

Table 2 — Tolerance on internal diameter

Nominal size DN	**Tolerance on declared internal diameter** mm
≤ 300	± 5
400	± 6
500	± 7,5
600	± 9
700	± 12
800	± 12
900	± 12
1 000	± 15
1 200	± 18
1 400	± 30

4.2.4 Continuity of invert

The calculated difference in invert levels between pipes shall not exceed the values given in Table 3, when measured in accordance with EN 295-3:2012, Clause 22.

If it is necessary for achieving continuity of invert, the pipe shall be marked.

Table 3 — Continuity of invert

Nominal size DN	**Continuity of invert** mm
≤ 400	4
> 400	0,01 x DN

4.2.5 External diameter

The external diameter of the barrel of a pipe shall not deviate from the manufacturers declared value by an amount greater than the tolerance given in Table 4.

Table 4 — Tolerance on external diameter

Nominal size DN	**Tolerance on declared external diameter** mm
≤ 300	$^{0}_{-10}$
400	$^{0}_{-12}$
500	$^{0}_{-15}$
600	$^{0}_{-18}$
700	$^{0}_{-24}$
800	$^{0}_{-24}$
900	$^{0}_{-28}$
1 000	$^{0}_{-30}$
1 200	$^{0}_{-36}$
1 400	$^{0}_{-60}$

4.2.6 Length

Lengths of pipes are not specified in this standard. The length shall be measured at 90° intervals around the circumference and the average value calculated. The tolerance on the measured average length shall be ± 2 mm on the manufacturer's declared nominal length.

4.2.7 Squareness of ends

When tested in accordance with EN 295-3:2012, 5.2, the maximum deviation from squareness measured at the pipe ends shall be not greater than 1 mm.

4.2.8 Deviation from straightness

When tested using a straight edge in the maximum bending plane, along the whole length of the pipe barrel which is not affected by jointing or grinding, the deviation from straightness at the mid-point shall be not greater than 5 mm.

4.3 Strength

4.3.1 Crushing strength (F_N)

When tested in accordance with EN 295-3:2012, Clause 7, the crushing strength (F_N) of pipes or pipe sections shall be not less than the values given in Table 5. Higher crushing strengths can be declared.

Table 5 — Crushing strengths

Nominal size DN	**Minimum crushing strength** (F_N) kN/m
100	40
150	52
200	64
250	80
300	96
400	100
500	100
600	100
700	100
800	100
900	100
1 000	100
1 200	100
1 400	90

4.3.2 Bending tensile strength

If it is required to determine the crushing strength where whole pipes or pipe sections are not available, for example after failure in use, a bending tensile strength test, in accordance with EN 295-3:2012, Clause 8, shall be carried out on broken pipe pieces.

The crushing strength of the pipe shall be calculated from the mean bending tensile strength of at least ten test pieces.

4.3.3 Compressive strength

The compressive strength shall be determined according to EN 295-3:2012, Clause 27. The minimum compressive strength shall not be less than 100 N/mm^2.

4.3.4 Jacking strength

The jacking strength of the pipe shall be calculated using the minimum compressive strength and the minimum annular area through which the jacking forces act. The load transferring area shall be calculated using the wall thickness at the pipe end, the type of joint, the location of sealing rings and the means of load transfer.

The minimum annular area is located either at the base of any groove holding the joint sealing ring or at the load transfer ring and shall be calculated using Formula (1).

$$A_{\min} = \frac{\pi}{4}\left(d_a^2 - d_i^2\right) \quad (1)$$

where

A_{min} is the minimum annular area in mm^2;

d_a is the minimum external diameter at the minimum cross section in mm;

d_i is the maximum internal diameter at the minimum cross section in mm.

The jacking strength of the pipe shall be calculated using Formula (2).

$$F_J = \sigma_{c,min} \times A_{min} \times 10^{-3} \quad (2)$$

where

F_J is the jacking strength, in kN;

$\sigma_{c,min}$ minimum compressive strength in N/mm^2.

4.3.5 Maximum working jacking load

The maximum working jacking load shall be calculated using the jacking strength F_J divided by the factors of safety for clay pipes used in static calculations for the jacking technique used.

NOTE 1 Factors of safety are normally agreed between manufacturers, designers, contractors and clients as appropriate.

NOTE 2 The maximum working jacking load at main and intermediate jacking stations for jacking pipes with angular deflectable joints is considered as the standard case with a continuously distributed stress value σ_0, applied at the theoretical, centrally acting resultant of the jacking force, where the stress ratio is modified by the eccentric action of the jacking load, if the resultant acts outside of the centre of the cross section. Eccentric action is identifiable by the opening of the joints on one side of the pipe. For deviations from the planned direction and at planned cornering, measurement of the deviation of individual joints from the centre should be taken into account and the calculation of the maximum working jacking load adjusted.

Where the conditions of use are known, jacking pipes can additionally be marked with the result of the standard calculation of the maximum working jacking load.

4.3.6 Fatigue strength under cyclic load

Where the resistance to fatigue under cyclic loads is required, it shall be demonstrated by testing in accordance with EN 295-3:2012, Clause 11, when test pieces shall not fail.

4.4 Watertightness

When pipes or pipe sections are tested in accordance with EN 295-3:2012, Clause 12, the water addition W_{15} needed to maintain the pressure of 50 kPa (0,5 bar) shall not exceed 0,04 l/m^2 of internal pipe surface area and shall show no visible leakage.

If pipes are required to withstand continuous working under low pressure, the test pressure and water addition W_{15} shall be declared.

4.5 Airtightness

Pipes and pipe sections shall be tested in accordance with EN 295-3:2012, Clause 16. The barrels of the pipes shall be tested under positive pressure (using one of the methods LA, LB, LC or LD) given in Table 6 or negative pressure (using either method LCU or LDU) given in Table 7. The measured change in pressure Δp from an initial air pressure p_0 shall not be greater than the values given in Table 6 or Table 7 for the appropriate test method, nominal size (DN) and testing time.

NOTE Procedures and values for positive pressure testing are consistent with EN 12889, which does not include negative pressure testing, stating that there is currently insufficient experience with the method.

Table 6 — Initial pressure, change in pressure and testing times under positive pressure

Test method	Initial pressure		Change in pressure		Nominal size DN						
					≤ 200	225	300	400	600	800	1000
	p_0 kPa	p_0 mm water gauge	Δp kPa	p_0 mm water gauge	Testing time minutes						
LA	1	100	0,25	25	5	5	7	10	14	19	24
LB	5	500	1	100	4	5	6	7	11	15	19
LC	10	1 000	1,5	150	3	4	4	5	8	11	14
LD	20	2 000	1,5	150	1,5	1,5	2	2,5	4	5	7

Table 7 — Initial pressure, change in pressure and testing times under negative pressure

Test method	Initial pressure		Change in pressure		Nominal size DN								
					≤ 225	300	400	500	600	700	800	900	1 000
	p_0 kPa	p_0 mm water gauge	Δp kPa	p_0 mm water gauge	Testing time minutes								
LCU	-10	-1 000	1,1	110	2,5	3	4	5	6	7	8	9	10
LDU	-20	-2 000	1,1	110	1	1,5	2	2,5	3	3,5	4	4,5	5

NOTE An equivalent head of water of 100 mm ≈ 1 kPa has been used in Tables 6 and 7.

4.6 Chemical resistance

When tested in accordance with EN 295-3:2012, Clause 13, the loss of material from the test piece shall be declared.

NOTE Under normal conditions of use, vitrified clay pipes are considered to be resistant to chemical attack and expected to show typical values of loss of material between 0,1 % and 0,25 %.

4.7 Hydraulic roughness

Where the hydraulic roughness is required, it shall be demonstrated by testing in accordance with EN 295-3:2012, Clause 14, and the hydraulic roughness declared.

NOTE Vitrified clay pipes for pipe jacking have a low hydraulic roughness (typically between 0,02 mm and 0,05 mm).

4.8 Abrasion resistance

Where the abrasion resistance is required, it shall be demonstrated by testing in accordance with EN 295-3:2012, Clause 15, and the mean depth of abrasion declared.

NOTE 1 Under normal conditions of use, vitrified clay pipes are considered to be resistant to abrasion and have shown typical values between 0,25 mm and 0,50 mm after 100,000 load cycle.

NOTE 2 Vitrified clay pipes for pipe jacking have a Mohs scratch hardness value of 7.

4.9 Resistance against high pressure water jetting

The jetting resistance shall be tested in accordance with EN 295-3:2012, 17.2, at 12 MPa (120 bar) using a moving nozzle and/or EN 295-3:2012, 17.3, at 280 bar using a stationary nozzle. After testing, the appearance of the pipe shall be in accordance with EN 295-1:2013, 5.1.2 and 5.1.4.

NOTE Vitrified clay pipes and fittings are considered to be resistant to high pressure water jetting when tested as specified without damage.

5 Requirements for joints for pipe jacking

5.1 Joint materials

5.1.1 Rubber sealing elements

Rubber sealing elements shall be in accordance with EN 681-1.

5.1.2 Polyurethane sealing elements

Polyurethane sealing elements shall be in accordance with EN 681-4.

5.1.3 Stainless steel sleeves

Stainless steels shall be either 1.4307, 1.4301, 1.4404, 1.4401 or 1.4571 from EN 10088-2:2005, Table 3 or have equivalent or greater corrosion resistance.

The sleeves shall be edge dressed and free from sharp edges.

When stainless steel sleeves are butt welded, the welds shall have full penetration and be continuous across the full width of the sleeves.

When filler metal is used for the welds, it shall be compatible with the stainless steel sleeve material, and in compliance with the recommendations of the stainless steel sleeve material manufacturer.

After welding, oxides shall be removed.

The internal surface of the sleeve shall be finished to provide a sealing surface.

5.1.4 Polypropylene sleeve couplings

Polypropylene sleeve couplings shall meet the requirements of EN 295-1:2013, 6.1.3.

5.1.5 Other materials

Other materials which are used with vitrified clay jacking pipes shall comply with the relevant European Standard, European Technical Approval or the manufacturers' declared specification, as applicable, which shall also include requirements for long term behaviour.

5.2 Load transfer rings

Load transfer rings are used between adjacent pipe ends in order to transfer jacking loads safely during installation.

Materials used for load transfer rings shall be in accordance with the manufacturer's declared specification and correlated to the design of the load transfer ring appropriate to the ground conditions encountered, method of construction and length of installation etc.

Materials used for load transfer rings include particle board, fibre board, polyethylene, polypropylene, rubber and polyester. If particle board is used, it shall be according to EN 312.

5.3 Watertightness of joints under deflection and shear load

5.3.1 General

Joints shall be tested to the requirements of 5.4, 5.5, 5.7 and 5.8. For the purposes of testing, a joint assembly can be formed without load transfer rings.

5.3.2 Test pressures

When tested at both internal and external pressures of 5 kPa (0,05 bar) and 50 kPa (0,5 bar), joint assemblies shall satisfy the requirements of 5.4, 5.5, 5.7 and 5.8.

If pipes are required to withstand continuous working under low pressure, the test pressure shall be agreed between manufacturer and purchaser.

A component of a joint assembly shall not be tested in more than one assembly.

5.4 Angular deflection

One pipe in a joint assembly shall be deflected by the method described in EN 295-3:2012, 21.2, by the values in Table 8 and when so deflected shall withstand the test pressures as specified in 5.3 for 5 min without visible leakage.

Table 8 — Deflection

Nominal size DN	**Minimum deflection per metre of deflected pipe length** mm
≤ 800	20
> 800	10

5.5 Shear resistance

A joint assembly shall be tested by the methods described in EN 295-3:2012, 21.3. An external load is applied to one pipe to produce a shear load at the joint of not less than 25 N/mm of nominal size.

The joint assembly shall withstand both constant pressures specified in 5.3 for 15 min without visible leakage.

NOTE Joints passing the test are considered to be resistant to root penetration.

5.6 Chemical and physical resistance to effluent

Joint assemblies shall be tested by the methods described in EN 295-3:2012, Clause 23, using all the test solutions specified. A separate joint assembly shall be used for each test solution. Each joint assembly which has been exposed to one of the test solution shall withstand both the constant internal pressures specified in 5.3 for 5 min without visible leakage.

5.7 Thermal cycling stability

Joint assemblies shall withstand cyclic temperature changes between (-10 ± 2) °C and (70 ± 5) °C without visible impairment when tested in accordance with EN 295-3:2012, 24.1.

Finally, a water tightness test using the test pressures specified in 5.3.2 shall be carried out for 15 min. After the test, the joint assembly shall show no visible leakage.

5.8 Long-term thermal stability

Joint assemblies shall withstand a long-term thermal stability test in accordance with EN 295-3:2012, 24.2, for seven days.

Finally, a water tightness test using the test pressures specified in 5.3.2 shall be carried out for 15 min. After the test, the joint assembly shall show no visible leakage.

6 Common requirements for pipes and joints

6.1 Reaction to fire

Where the use of vitrified clay pipes for pipe jacking with their joints is subject to national regulatory requirements on reaction to fire, their reaction to fire performance shall be declared. Vitrified clay pipes for pipe jacking with their joints in use are classified as Class A1 without the need for testing in accordance with the relevant Commission Decision[1)].

NOTE1 Vitrified clay, as a homogeneously distributed material for these products, is considered as material of known and stable performance with respect to the reaction to fire performance as it does not consist of any organic material and consequently does not contribute to the fire. Under this condition it may be considered as the Class A1 material.

NOTE 2 The class of reaction to fire performance of vitrified clay pipes for pipe jacking with their joints is regarded as the class for the constituent material (i.e. vitrified clay).

Conversely, where use of this product is not subject to national regulatory requirements on reaction to fire, either the Class A1 (see above) or Class F (see Note 3) may be declared.

NOTE 3 Class F according to EN 13501-1 is equivalent to "No Performance Determined" (NPD).

Considering the end use situation joint materials and load transfer rings are embedded all-round in material of class A1 and only a negligible area of joint materials and load transfer rings would be exposed to fire inside the pipe. Due to the special end use situation where it is assured that the outside of the pipeline is completely buried in the ground and wastewater flows through the inside of the pipeline during the working life of the construction, there is no relevance in relation to the reaction to fire performance and embedded joint materials and load transfer rings would not be able to ignite or to propagate fire there. Their contribution to fire spread is not of concern nor is an influence expected on the fire behaviour of the neighbouring material and the contribution to fire propagation is negligible. Similar components are at a distance of more than 200 mm. Considering these aspects, separate testing and classification of sealing rings and flexible couplings is not necessary.

6.2 Durability

Vitrified clay pipes and joints for pipe jacking for drains and sewers are products of known and stable performance for defined end use applications with respect to their established durability for which experience has been accumulated over a long period of time.

1) See Decision of the Commission 96/603/EC of 1996-10-04 (see OJEU L 267 of 1996-10-19), as twice amended by 2000/605/EC of 2000-09-26 (see OJEU L 258 of 2000-10-12) and by 2003/424/EC of 2003-06-06 (see OJEU L 144 of 2003-06-12).

Durability of crushing strength or longitudinal bending strength (as applicable) is ensured by meeting requirements of 4.1, 4.6, and 4.9.

Durability of tightness is ensured by meeting the requirements of 5.6, 5.7 and 5.8.

6.3 Dangerous substances

National regulations on dangerous substances may require verification and declaration on release, and sometimes content, when construction products covered by this standard are placed on those markets. In the absence of European harmonised test methods, verification and declaration on release/content should be done taking into account national provisions in the place of use.

NOTE An informative database covering European and national provisions on dangerous substances is available at the Construction web site on EUROPA accessed through: *http://ec.europa.eu/enterprise/construction/cpd-ds/*".

7 Designation

Where required for specification and documentation purposes, the following designation shall be used:

— Block 1: Name of product;

— Block 2: EN 295-7;

— Block 3: Individual item block:

  — 3.1 Nominal size DN,

  — 3.2 Length, in metres,

  — 3.3 Crushing strength FN in kN/m,

  — 3.4 Jacking strength FJ in MN.

Example of the designation of a vitrified clay jacking pipe according to EN 295-7 with a nominal size of 300 mm, a length of 1 m, a crushing strength of 96 kN/m and a jacking strength of 4 MN:

EXAMPLE Pipe EN 295-7 – DN 300 – 1,00 – FN 96 – FJ 4

8 Marking

All pipes shall be marked with:

— EN 295-7;

— manufacturer's identification;

— date of manufacturing;

— nominal size (DN...);

— crushing strength FN in kN/m;

— jacking strength FJ in MN.

Marking shall be indelible and wherever practicable impressed before firing.

NOTE 1 Because the marking is impressed before firing wherever practical, the marking of crushing strength is carried out as "FN" and of jacking strength as "FJ" for better legibility instead of the symbol "F_N", and "F_J", as used in the standard.

NOTE 2 Where CE marking covers some of the marking requirements of this clause, such requirements need not be repeated here.

9 Evaluation of conformity

9.1 General

Products manufactured to this standard shall be subjected to evaluation of conformity procedures as follows:

— initial type testing; and

— factory production control by the manufacturer, including product assessment.

9.2 Initial type testing

Vitrified clay pipes and joints for pipe jacking shall be subjected to Initial Type Testing according to the relevant subclauses of EN 295-2:2013, 5.2 to show conformity with this European Standard.

9.3 Factory production control (FPC)

Vitrified clay pipes and joints shall be subjected to factory production control according to the relevant subclauses of EN 295-2:2013, 5.3, to ensure that the declared performance of each stated characteristic is maintained.

Annex ZA
(informative)

Clauses of this European Standard addressing the provisions of the EU Construction Products Directive

ZA.1 Scope and relevant characteristics

This European Standard has been prepared under the mandate M/131 "Pipes, tanks and ancillaries not in contact with water intended for human consumption", as amended, given to CEN by the European Commission and the European Free Trade Association.

The clauses of this European Standard shown in this annex meet the requirements of the mandate given under the EU Construction Products Directive (89/106/EEC).

Compliance with these clauses confers a presumption of fitness of the construction products covered by this annex for the intended uses indicated herein; reference shall be made to the information accompanying the CE marking.

This annex establishes the conditions for the CE marking of the construction products for the uses indicated in Table ZA.1 and shows the relevant clauses applicable.

The scope of this annex is defined by Table ZA.1 and it is the same as in Clause 1.

Table ZA.1 — Relevant clauses and intended uses for vitrified clay pipes and joints for pipe jacking

Construction products: Vitrified clay pipes and joints for pipe jacking

Intended uses: Buried drain or sewer systems for the conveyance of wastewater (including domestic wastewater, surface water and rain water) under gravity and periodic surcharge or under continuous low head of pressure

Essential characteristics	Requirement clauses in this standard	Levels and/or classes	Notes
Reaction to fire [a]	6.1	A1 to F	A1 classified without need for testing (CWT)
Crushing strength, as [b]			
— Crushing strength	4.3.1	–	tested according to EN 295-3:2012, Clause 7; expressed as value (in kN/m)
— Jacking strength	4.3.4	–	calculated using the compressive strength; tested according to EN 295-3:2012, Clause 27; expressed as value in MN
Dimensional tolerances [b], as:			
— Internal diameter	4.2.2 and 4.2.3	–	measured according to the requirement clause against the declared nominal value; expressed as “Pass” or “Fail”
— External diameter	4.2.5		
— Length	4.2.6		
— Squareness of ends	4.2.7		measured according to the requirement clause; expressed as “Pass” or “Fail”
— Straightness	4.2.8		
— Continuity of invert	4.2.4		
Tightness: Gas and liquid and permeability, as:			
— Watertightness of pipes [b, d]	4.4	–	tested according to EN 295-3:2012, Clause 12; expressed as “Pass” or “Fail”
— Airtightness of pipes [b]	4.5	–	tested according to EN 295-3:2012, Clause 16; expressed as “Pass” or “Fail”
Watertightness of joint assemblies [c, d], as:			
— Angular deflection	5.4	–	tested according to EN 295-3:2012, 21.2; expressed as “Pass” or “Fail”
— Shear resistance	5.5	–	tested according To EN 295-3:2012, 21.3; expressed as “Pass” or “Fail”
Release of dangerous substances	6.3	–	see 6.3
Durability of crushing strength and jacking strength, against:			
— Chemical resistance	4.1 and 4.6	–	tested according EN 295-3:2012, Clause 13 and expressed as % loss
— Resistance against high pressure water jetting	4.1 and 4.9	–	tested according EN 295-3:2012, 17.1 and 17.2 and expressed as “Pass” or “Fail”
Durability of tightness, against:			
— Chemical and physical resistance to effluent	5.6	–	tested according EN 295-3:2012, Clause 23, and expressed as “Pass” or “Fail”
— Thermal cycling stability	5.7	–	tested according EN 295-3:2012, 24.1, and expressed as “Pass” or “Fail”
— Long term thermal stability	5.8	–	tested according EN 295-3:2012, 24.2, and expressed as “Pass” or “Fail”

[a] Of the constituent material, i.e. vitrified clay.

[b] For pipes only.

[c] For joints only.

[d] For continuous working under low pressure, the test pressure used shall be declared.

The requirement on a certain characteristic is not applicable in those Member States (MSs) where there are no regulatory requirements on that characteristic for the intended use of the product. In this case, manufacturers placing their products on the market of these MSs are not obliged to determine nor declare the

performance of their products with regards to this characteristic and the option "No performance determined" (NPD) in the information accompanying the CE marking (see ZA.3) may be used.

ZA.2 Procedures for the attestation of conformity of vitrified clay pipes and joints for pipe jacking

ZA.2.1 Systems of attestation of conformity

The systems of attestation of conformity of the vitrified clay pipes and joints for pipe jacking, indicated in Table ZA.1 in accordance with the Decision of the Commission 1999/472/EC of 1999-07-01 *(see OJEU L184 of 1999-07-17)*, as amended by 2001/596/EC of 2001-01-08 *(see OJEU L209 of 2001-08-02)*, as given in Annex III of the mandate M/131 for “Pipes, tanks and ancillaries not in contact with water intended for human consumption”, as amended, are shown in Table ZA.2 for the indicated intended uses and relevant level(s) or class(es).

Table ZA.2 — Systems of attestation of conformity

Products	Intended uses	Level(s) or class(es)	Attestation of conformity systems
Pipes, fittings	In installations for transport/disposal/storage of water not intended for human consumption	–	4
	In installations in areas subject to reaction to fire regulations, used for transport/disposal/storage of water not intended for human consumption	(A1, A2, B and C)* (A1, A2, B, C)**, D and E (A1 to E)***, F	1 3 4

System 1: See Directive 89/106/EEC, Annex III.2.(i), without audit testing of samples.

System 3: See Directive 89/106/EEC, Annex III.2.(ii), second possibility.

System 4: See Directive 89/106/EEC, Annex III.2.(ii), third possibility.

* Products/materials for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g. an addition of fire retardants or a limiting of organic material).

** Products/materials not covered by footnote (*).

*** Products/materials that do not require to be tested for reaction to fire (e.g. products/materials of Class A1 according to Commission Decision 96/603/EC).

NOTE 1 Vitrified clay pipes and joints for pipe jacking are considered to be covered by this decision.

NOTE 2 The attestation of conformity systems 1 and 3 with regard to installations of the products in areas subject to reaction to fire regulations as given in Table ZA.2 is not applicable because the material used for these products is deemed to satisfy requirements on the material not contributing to fire and which allows the reaction to fire performance of these products to be declared under system 4 (Class A1 without the need of testing).

The attestation of conformity of the products in Table ZA.1 shall be based on the evaluation of conformity procedures indicated in Table ZA.3 resulting from application of the clauses of this European Standard indicated therein.

Table ZA.3 — Assignment of evaluation of conformity tasks for vitrified clay pipes and joints for pipe jacking under system 4

Tasks		Content of the task	Evaluation of conformity clauses to apply
Tasks under the responsibility of the manufacturer	Factory production control (FPC)	Parameters related to the characteristics of Table ZA.1 relevant for the intended use for which performance is declared	9.3
	Initial type testing by the manufacturer	Characteristics of Table ZA.1 relevant for the intended use for which performance is declared	9.2

ZA.2.2 EC declaration of conformity

When compliance with the conditions of this annex is achieved, the manufacturer or his agent established in the EEA shall draw up and retain a declaration of conformity (i.e. EC declaration of conformity), which entitles the manufacturer to affix the CE marking. This declaration shall include:

— name and address of the manufacturer, or his authorised representative established in the EEA, and place of production;

NOTE 1 The manufacturer may also be the person responsible for placing the product onto the EEA market, if he takes responsibility for CE marking.

— description of the product (type, identification, use, ...), and a copy of the information accompanying the CE marking;

NOTE 2 Where some of the information required for the declaration is already given in the CE marking, it does not need to be repeated.

— provisions to which the product conforms (i.e. Annex ZA of this European Standard) and a reference to the ITT report(s) and factory production control records (if appropriate);

— particular conditions applicable to the use of the product (e.g. provisions for use under certain conditions);

— name of, and position held by, the person empowered to sign the declaration on behalf of the manufacturer or his authorised representative.

The above mentioned declaration shall be presented in the language or languages accepted in the Member State in which the product is intended to be used.

ZA.3 CE marking

ZA.3.1 General

The manufacturer or his authorised representative established within the EEA is responsible for the affixing of the CE marking. The CE marking symbol shall be in accordance with Directive 93/68/EEC and the accompanying information shall be shown as indicated in ZA.3.2 and ZA.3.3.

ZA.3.2 CE marking on the product

The following information shall be affixed together with the CE marking symbol on each product:

a) manufacturer’s name or identifying mark;

b) last two digits of the year in which the marking was affixed;

c) reference to this European Standard (i.e. EN 295-7);

d) description of the product and its intended use:

— nominal size(s);

e) performance of the following characteristic, listed in Table ZA.1:

— crushing strength (FN),

— jacking strength (FJ).

Figure ZA.1 gives an example of the CE marking to be given on the product (*e.g. vitrified clay pipes for pipe jacking)*.

CE	*CE conformity marking symbol given in Directive 93/68/EEC*
AnyCo Ltd 13	*Name or identifying mark of the manufacturer* *Last two digits of the year in which the marking was affixed*
EN 295-7 DN 300	*No. of European Standard* *Description of the product*
FN 96 – FJ 4	*Information on essential characteristics*

Figure ZA.1 — Example of CE marking on the product

ZA.3.3 CE marking in the accompanying documents

In addition to the CE marking on the product, the following information shall be given together with the CE marking symbol in the commercial documents (e.g. delivery note), accompanying the products:

a) name or identifying mark and the registered address of the manufacturer;

b) last two digits of the year in which the marking was affixed;

c) reference to this European Standard and its date of publication (i.e. EN 295-7:2013);

d) description of the product and its intended use:

— nominal size(s) DN,

— length, expressed in m;

e) performance of the following characteristics, listed in Table ZA.1, which are to be declared for the relevant intended uses and, where relevant, expressed as “Pass” for the pass/fail requirements (where necessary), or “NPD“ (i.e. No performance determined), namely for:

1) reaction to fire;

2) crushing strength (F_N): expressed in kN/m;

3) Jacking strength (F_J): expressed in MN;

4) dimensional tolerances, dealt with by internal diameter, external diameter, length, squareness of ends, deviation from straightness, continuity of invert, expressed jointly as "Pass";

5) tightness (gas and liquid) and permeability, dealt with jointly by:

   i) watertightness of pipes or pipe sections,

   ii) airtightness of pipes and pipe sections,

   iii) watertightness of joints, dealt with by angular deflection and shear resistance of joints;

6) release of dangerous substances, where 6.3 applies or is expressed as NPD;

7) durability;

   i) of crushing strength and jacking strength

      I) against chemical resistance,

      II) against high pressure water jetting resistance;

   ii) of tightness

      I) against chemical and physical resistance to effluent,

      II) against thermal cycling stability,

      III) against long term thermal stability.

The “No performance determined” (NPD) option may be used when and where the characteristic, for a given intended use, is not subject to regulatory requirements in the Member State(s) of destination.

Figure ZA.2 gives an example of the CE marking to be given in the commercial documents accompanying the products (*e.g. vitrified clay pipes for pipe jacking)*.

CE		*CE conformity marking symbol given in Directive 93/68/EEC*
AnyCo Ltd, (*P.O. Box 21, B-1050)* 13		*Name or identifying mark and registered address of the manufacturer.* *Last two digits of the year in which the marking was affixed*
EN 295-7:2013 Vitrified clay jacking pipe for the construction of drains and sewers buried in ground **DN 300 - 1,5**		*No. of European Standard and date of its publication* *Description of the product and its intended use and* *Designation of the product*
Reaction to fire, as class	A1	*Information on mandated essential characteristics*
Crushing strength (F_N)	96 kN/m	
Jacking strength (F_J)	4 MN	
Dimensional tolerances, as:		
— Internal diameter (296 mm)	Pass	
— External diameter (300 mm)		
— Length (1,5 m)		
— Squareness of ends		
— Straightness		
— Continuity of invert		
Watertightness (gas and liquid), as:		
— Watertightness of pipes	Pass	
— Airtightness of pipes	Pass	
Release of dangerous substances	NPD	
Durability of crushing strength and jacking strength, as		
— Chemical resistance	0,15 %	
— Resistance against high pressure water jetting	Pass	
Durability of tightness		
— Chemical and physical resistance to effluent	Pass	
— Thermal cycling stability	Pass	
— Long term thermal stability	Pass	

Figure ZA.2 — Example of CE marking in the accompanying documents

Bibliography

[1] EN 14457, *General requirements for components specifically designed for use in trenchless construction of drains and sewers*

[2] EN 12889, *Trenchless construction and testing of drains and sewers*

[3] EN 13501-1, *Fire classification of construction products and building elements — Part 1: Classification using data from reaction to fire tests*

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