BS EN 295-4:2013

BSI Standards Publication

Vitrified clay pipe systems for drains and sewers

Part 4: Requirements for adaptors, connectors and flexible couplings

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National foreword

This British Standard is the UK implementation of EN 295-4:2013. It supersedes BS EN 295-4:1995 and, together with BS EN 295-1:2013, BS EN 295-2:2013, BS EN 295-5:2013, BS EN 295-6:2013, and BS EN 295-7:2013, it supersedes BS EN 295-10:2005, which is withdrawn.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.

A list of organizations represented on this committee can be obtained on request to its secretary.

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

Published by BSI Standards Limited 2013.

ISBN 978 0 580 70649 3

ICS 23.040.50; 91.140.80; 93.030

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 28 February 2013.

Amendments issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 295-4

February 2013

ICS 93.030

Supersedes EN 295-10:2005, EN 295-4:1995

English Version

Vitrified clay pipe systems for drains and sewers - Part 4: Requirements for adaptors, connectors and flexible couplings

Systèmes de tuyaux en grès vitrifié pour les collecteurs d'assainissement et les branchements - Partie 4: Exigences applicables aux adaptateurs, raccords et assemblages souples

Steinzeugrohrsysteme für Abwasserleitungen und -känale - Teil 4: Anforderungen an Übergangs- und Anschlussbauteile und flexible Kupplungen

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 295-4:2013: E

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Foreword

This document (EN 295-4:2013) 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 295-4:1995 and together with EN 295-1:2013, EN 295-2:2013, EN 295-5:2013, EN 295-6:2013 and EN 295-7:2013 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 version are listed below:

— reaction to fire added;

— Annex ZA added.

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* (the present document)

— *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*

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 adaptors and connectors made from vitrified clay and/or other suitable materials for use with vitrified clay pipes and fittings 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.

Adaptors and connectors include insertable fittings, sealing rings for cut pipes and heat-shrinkable sleeves.

This standard also applies for metal banded flexible couplings and adaptors and specifies requirements for rubber, polyurethane, stainless steel and other components used for them.

NOTE 1 The specifiers/purchasers can select adaptors, connectors and flexible couplings according to their requirements.

NOTE 2 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 295-5:2013, *Vitrified clay pipe systems for drains and sewers — Part 5: Requirements for perforated pipes and fittings*

EN 295-6:2013, *Vitrified clay pipes systems for drain and sewers — Part 6: Requirements for components of manholes and inspection chambers*

EN 295-7:2013, *Vitrified clay pipe systems for drains and sewers — Part 7: Requirements for pipes and joints for pipe jacking*

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 1427, *Bitumen and bituminous binders — Determination of the softening point — Ring and Ball method*

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

EN ISO 527-1, *Plastics — Determination of tensile properties — Part 1: General principles (ISO 527-1)*

EN ISO 527-2, *Plastics — Determination of tensile properties — Part 2: Test conditions for moulding and extrusion plastics (ISO 527-2)*

EN ISO 868, *Plastics and ebonite — Determination of indentation hardness by means of a durometer (Shore hardness) (ISO 868)*

EN ISO 1183-1, *Plastics — Methods for determining the density of non-cellular plastics — Part 1: Immersion method, liquid pyknometer method and titration method (ISO 1183-1)*

EN ISO 9445-1:2010*, Continuously cold-rolled stainless steel — Tolerances on dimensions and form — Part 1: Narrow strip and cut lengths (ISO 9445-1:2009)*

ISO 3302-1:1996*, Rubber — Tolerances for products — Part 1: Dimensional tolerances*

ISO 4587, *Adhesives — Determination of tensile lap-shear strength of rigid-to-rigid bonded assemblies*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
adaptors
special items, made from vitrified clay and/or other suitable materials, to join together vitrified clay pipes and fittings of different jointing systems or to join them to items of other pipeline materials

3.2
connectors
any special item made from vitrified clay and/or other suitable materials for making connections to existing pipe systems, manholes, inspection chambers and building works

3.3
metal banded flexible couplings and adaptors
rubber sleeves, with or without rubber bushes or shear bands, with adjustable stainless steel tension bands by which they are secured to the pipe ends

4 Symbols and abbreviations

d_1 pipe inside diameter (mm)

d_3 spigot outside diameter (mm)

d_4 internal diameter of socket or fairing (mm)

l_2 manufacturer's stated outside barrel length (mm)

OD outside diameter

5 Requirements for adaptors, connectors and flexible couplings

5.1 Materials, manufacture, water absorption and appearance

5.1.1 Vitrified clay

For material, manufacture, water absorption and appearance, all vitrified clay elements of adaptors and connectors shall comply with EN 295-1:2013, 5.1.

5.1.2 Rubber sealing materials

Rubber sealing materials shall comply with EN 681-1.

5.1.3 Polyurethane sealing materials

Polyurethane sealing elements shall be in accordance with EN 681-4 for which factory production control shall be in accordance with EN 295-2:2013, 5.3.10.

5.1.4 Other materials

All other materials for adaptors and connectors shall comply with the material requirements of A.3.1, C.2, if applicable. Otherwise they shall comply with the declared specification for the material, which shall have requirements for long term behaviour and comply with thermal cycling stability according to EN 295-1:2013, 6.6 and long term thermal stability according to EN 295-1:2013, 6.7.

5.1.5 Manufacture

Adaptors and connectors shall be free from such defects as would impair their function when in service.

5.2 Internal diameter

The minimum internal diameter of adaptors and connectors used with pipes and fittings according to EN 295-1:2013, EN 295-5:2013, EN 295-6:2013 or EN 295-7:2013 shall be as specified in EN 295-1:2013, 5.2.

5.3 Length

The nominal length of vitrified clay adaptors and connectors, where appropriate, shall be declared in metres. The length shall be measured to the nearest whole millimetre. The tolerance on the declared nominal length shall be from – 1 % to + 4 %, or ± 10 mm, whichever is the larger.

5.4 Angles

Adaptors and connectors which include branches shall have preferred nominal angles of 45° and 90°. The preferred nominal angle of surface rodding points is 45°. The tolerance on the declared angle shall be ± 5° of the nominal value.

5.5 Squareness of ends and joint interchangeability

For adaptors which are straight fittings, the squareness of end shall be in accordance with EN 295-1:2013, 5.4.

The joint interchangability of adaptors and connectors to vitrified clay pipelines shall be in accordance with EN 295-1:2013, 6.4.

5.6 Bond strength of adhesive for fixing fired vitrified clay parts together

The bond strength of the adhesive shall be in accordance with EN 295-1:2013, 5.12.

5.7 Tightness

The tightness of adaptors and connectors shall be in accordance with EN 295-1:2013, 5.19.

5.8 Chemical resistance

5.8.1 Vitrified clay

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 %.

5.8.2 Other materials

All other materials for adaptors and connectors shall comply with the material requirements of A.3.1 or C.2, if applicable. Otherwise they shall comply with the declared specification for the material and shall comply with the requirements for chemical and physical resistance to effluent according to EN 295-1:2013, 6.5.

5.9 Requirements for joint assemblies

5.9.1 Vitrified clay pipeline systems

Adaptors and connectors used in joint assemblies shall meet the requirements of EN 295-1:2013, Clause 6, where applicable.

5.9.2 Vitrified clay pipelines to other materials

5.9.2.1 Adaptors and connectors used in joint assemblies connecting vitrified clay pipelines to pipelines of other materials which do not undergo significant diametral deflection under shear test load (e.g. concrete, cast iron, ductile iron, steel and fibre-cement), shall meet the requirements of EN 295-1:2013, 6.2, 6.5, 6.6 and 6.7.

5.9.2.2 Adaptors and connectors used in joint assemblies connecting vitrified clay pipelines to pipelines of materials which undergo significant diametral deflection under shear test load (e.g. PVC-U, PE, PP and GRP), shall also meet the requirements of EN 295-1:2013, 6.2, 6.5, 6.6 and 6.7 with the exception that, for 6.2.3, when the shear load is applied to the flexible pipe, the applied load shall be that required to produce a diametrical deflection of (3 ± 0,5) % on the external diameter.

5.9.3 Metal banded flexible couplings and adaptors

Metal banded flexible couplings and adaptors shall meet the additional performance requirements specified in Annex A.

5.9.4 Connectors, insertable fittings and sealing rings

Connectors, insertable fittings and sealing rings shall meet the additional performance requirements specified in Annex B.

5.9.5 Heatshrinkable sleeves

Heatshrinkable sleeves shall meet the additional performance requirements specified in Annex C.

6 Common requirements for adaptors, connectors and flexible couplings

6.1 Reaction to fire

Where the use of adaptors or connectors made of vitrified clay, is subject to national regulatory requirements on reaction to fire, their reaction to fire performance shall be declared. Adaptors or connectors made of vitrified clay are classified as Class A1 without the need for testing in accordance with the relevant Commission decision[1)].

1) Commission Decision 96/603/EC of 4 October,1996 (OJEU L267 of 19.10.1996), as amended by both Commission Decision 2000/605/EC of 26 September, 2000 (OJEU L258 of 12.10.2000) and Commission Decision 2003/424/2003 of 6 June, 2003 (OJEU L144, 12.6.2003).

NOTE 1 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 adaptors and connectors made of vitrified clay 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, adaptors, connectors and flexible couplings made of rubber, polyurethane or other materials are embedded all-round in material of Class A1 and only a negligible area of joint material 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 sealing rings, flexible couplings and adaptors 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

Adaptors, connectors and flexible couplings 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.

Durability of tightness is ensured by meeting requirements of EN 295-1:2013, 6.5, 6.6 and 6.7.

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: Standard number (EN 295-4);

— Block 3: Individual item block,

  — Block 3.1: Nominal size(s) DN and OD size range, where appropriate,

  — Block 3.2: Length, where appropriate,

  — Block 3.3: Joint system, where appropriate (e.g. system F).

Example of the designation of a coupling according to EN 295-4 for a pipe DN 150 and an OD size range 175 mm to 190 mm:

EXAMPLE Coupling – EN 295-4 – DN 150 – OD 175 - 190

8 Marking

Adaptors and connectors shall be marked at least with:

— EN 295-4;

— manufacturer's identification;

— date of manufacturing;

— nominal size(s) (DN....) or OD size range;

— joint system according to EN 295-1 if appropriate;

— other applicable pipe system if appropriate;

— type of coupling if applicable (Annex A);

— recommended assembly torque and assembly tool if appropriate (Annex A).

Marking shall be indelible and wherever practicable impressed.

NOTE 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:

a) initial type testing; and

b) factory production control by the manufacturer, including product assessment.

9.2 Initial type testing

Vitrified clay pipes, fittings and joints shall be subjected to initial type testing according to the relevant subclauses and tables of EN 295-2:2013, 5.2, to show conformity with this European Standard.

9.3 Factory production control (FPC)

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

Annex A
(normative)

Metal banded flexible couplings and adaptors

A.1 General

This annex specifies additional material and performance requirements for metal banded flexible couplings and adaptors. They are used for connecting vitrified clay pipes and fittings together or to pipelines of other materials.

Metal banded flexible couplings and adaptors consist of rubber sleeves, with or without rubber bushes, with adjustable stainless steel tension bands by which they are secured to the pipe ends. They can also incorporate shear bands. Adaptors can incorporate an abrupt change of section.

Only minimum dimensions are specified in Table A.1 and Table A.2. Manufacturers can use dimensions greater than these to suit the specific application. Manufacturer's instructions for installation shall be followed.

A.2 Types of metal banded flexible couplings and adaptors

A.2.1 Type 1 couplings (without shear bands)

Type 1 couplings shall comprise moulded or extruded rubber sleeves with adjustable stainless steel tension bands by which they are secured to the pipe ends without shear band.

A.2.2 Type 2 couplings (with shear bands)

Type 2 couplings shall comprise moulded or extruded rubber sleeves with adjustable stainless steel tension bands by which they are secured to the pipe ends and shear bands to give resistance to shear loads. An example of a typical Type 2 coupling is shown in Figure A.1.

Type 2A couplings are used where the ends of the jointed pipes comply with EN 295-1:2013, 5.4, with a maximum separation of 10 mm. For larger separations and tolerances on squareness of ends and other applications, Type 2B couplings are required.

Key

1 pipe 1

2 adjustor

3 tension band

4 shear band

5 moulded vulcanised rubber

6 pipe 2

d_3 outside diameter

b width of sleeve

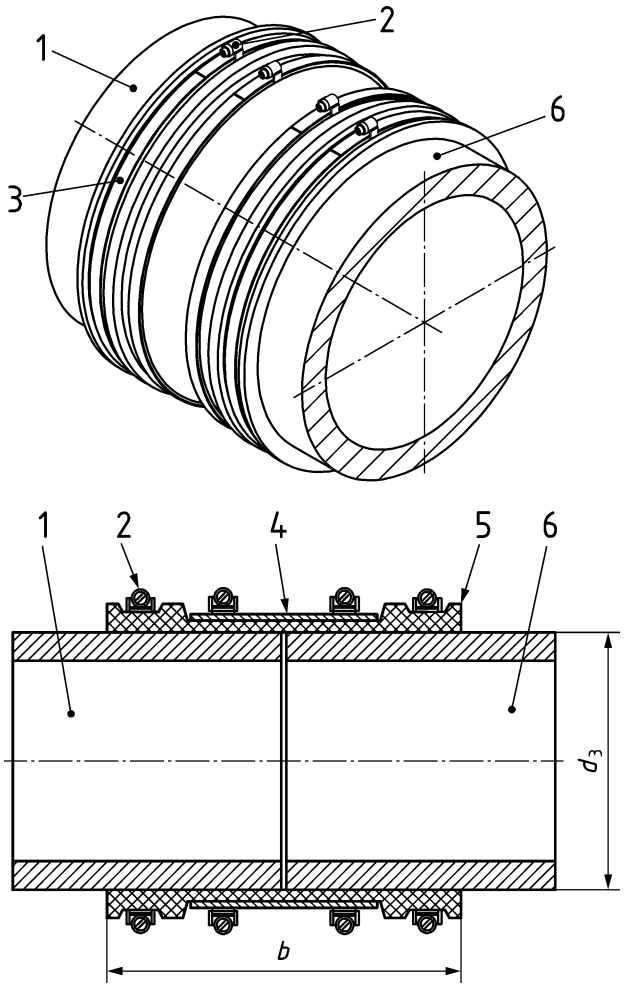


Figure A.1 – Example of Type 2 coupling

A.2.3 Metal banded adaptors

Metal banded adaptors shall comprise moulded or extruded stepped rubber sleeves with adjustable stainless steel tension bands by which they are secured to pipes of different outside diameters.

A.2.4 Bushes

Bushes are used with couplings to compensate for variations between the outside diameters of pipes which cannot be satisfactorily joined by a coupling alone or by an adaptor and shall comprise moulded or extruded and joined rubber sections.

A.3 Requirements

A.3.1 Materials

A.3.1.1 Stainless steel

Stainless steels used for tension bands, shear band clamps and adjustor units shall be either 1.4307, 1.4301, 1.4404, 1.4401 or 1.4571 according to EN 10088-2:2005, Table 3, or have equivalent or greater corrosion resistance.

A.3.1.2 Rubber

Rubber used in coupling and adaptor bodies and bushes shall comply with EN 681-1.

A.3.2 Dimensions and tolerances

A.3.2.1 Moulded rubber

The tolerances on the manufactured dimensions of moulded rubber components are those set up in ISO 3302-1:1996, Class M3.

A.3.2.2 Extruded rubber

The tolerances on the manufactured dimensions of extruded rubber components are those set up in ISO 3302-1:1996, Class E3.

A.3.2.3 Adaptors and Type 1 couplings

Dimensions of rubber and metal components shall be in accordance with the declared specifications.

A.3.2.4 Type 2 couplings

Minimum dimensions of the rubber and metal components shall comply with Table A.1 for Type 2A couplings or Table A.2 for Type 2B couplings. Tolerances on stainless steel thicknesses are those set up in EN ISO 9445-1:2010, Table 1, normal grade.

Table A.1 — Minimum dimensions of Type 2A couplings

Dimensions in millimetres

Nominal Coupling size [a]	Width of sleeve	Thickness under tension band	Width of shear band	Specified thickness of shear band	Width of tension band	Specified thickness of tension band
Up to 400	102	3,0	32	0,4	12	0,6
401 to 1 000	160	3,5	32	0,5	12	0,6

[a] Maximum outside diameter of the pipe which can be used with a metal banded flexible coupling or adaptor.

Table A.2 — Minimum dimensions of Type 2B couplings

Dimensions in millimetres

Nominal Coupling size[a]	Width of sleeve	Thickness under tension band	Width of shear band	Specified thickness of shear band	Width of tension band	Specified thickness of tension band
Up to 200	120	7,0	54	0,35	12	0,6
201 to 300	150	7,5	78	0,35	12	0,6
301 to 1 000	185	9,0	97	0,75	12	0,6

[a] Maximum outside diameter of the pipe which can be used with a metal banded flexible coupling or adaptor.

A.3.3 Performance requirements

A.3.3.1 General

When fitted according to the manufacturer's instructions, couplings and adaptors shall not damage or distort the pipes to which they are connected. All stainless steel parts shall be edge dressed and free from sharp edges.

A.3.3.2 Adaptors and Type 1 couplings

When used according to the manufacturer's/supplier's recommendations, couplings shall meet the requirements of 5.9, using an internal pressure. Adjustors, tension bands, welds and any other means of fixing shall not exhibit obvious signs of physical distress or degradation after the tests.

A.3.3.3 Type 2 couplings

When used according to the manufacturer's/supplier's recommendations, couplings shall meet the requirements of 5.9, using an internal pressure, with the following exceptions:

— in the arrangement of the shear load tests, the vertical movement of the free pipe in the assembly shall not be restricted to a maximum of 6 mm by a stop and shall be tested only for its resistance to shear, and

— the shear load shall be 25 N/mm nominal pipe size.

The torque shall be applied with a torque wrench in accordance with A.3.4.2.1. For these tests, the tension bands shall be tightened to the manufacturer's recommended torque.

Adjustors, tension bands, shear bands, welds and any other means of fixing shall not exhibit obvious signs of physical distress or degradation after the tests.

A.3.3.4 Tension band assemblies

The tension band assembly (tension band and adjustor(s)) for nominal coupling sizes of less than 600 mm shall stand a minimum torque of 17 Nm when tested in accordance with the test method in A.3.4.2, where a lever device such as a ratchet spanner is required or recommended for tightening. For nominal coupling sizes of 600 mm to 1 000 mm, the minimum torque shall be 17 Nm or 1,25 times the manufacturer's recommended torque, whichever is the greater.

Where a lever device is not required or recommended for tightening for couplings of less than 300 mm nominal size, the tension band assembly shall stand a minimum torque of 10 Nm when tested in accordance with the test method in A.3.4.2.

After application of the test torque, there shall be no visible damage or distortion of any part of the assembly.

A.3.4 Testing

A.3.4.1 Watertightness

Watertightness shall be tested according to the requirements of either A.3.3.2 or A.3.3.3, as applicable, with tension bands tightened in accordance with A.3.3.4 using the following method.

Tests shall also be carried out on one joint assembly including a coupling with a bush, using pipes of different sizes, in which the larger pipe has an outside diameter of 300 mm or less, and on another in which the larger pipe has an outside diameter greater than 300 mm.

The smaller pipe in the assembly shall have an outside diameter of ($90\ ^{0}_{-10}$) % of the outside diameter of the larger pipe, for assemblies in which the outside diameter of the larger pipe is 300 mm or less, and ($95\ ^{0}_{-5}$) % of the outside diameter of the larger pipe for assemblies in which the outside diameter of the larger pipe is greater than 300 mm.

A.3.4.2 Tension band strength

A.3.4.2.1 Apparatus

A cylindrical former of the appropriate outside diameter which will not distort under the applied load from the bands shall be used. A torque wrench capable of applying a torque of at least 17 Nm or, where applicable, 1,25 times the manufacturer's recommended torque if greater than 17 Nm. Where a lever device is not recommended for tightening, the recommended application tool shall be attached to a torque wrench capable of applying a torque of at least 10 Nm.

The torque wrench force shall be verified by calibration to an accuracy of 3 % at intervals of not more than 12 months.

A.3.4.2.2 Procedure

The tension band assembly shall be placed on the former. The adjustor units shall be tightened with the aid of the recommended application tool until the appropriate torque specified in A.3.3.4 is achieved.

The tension band shall be left for a minimum of 30 min and then loosened. The above procedure shall be repeated and the tension band assemblies visually inspected for damage or distortion.

Annex B
(normative)

Connectors, insertable fittings and sealing rings

B.1 General

This annex gives details of:

— connectors, which provide flexible connections between pipelines and manholes or pipes built-in to fixed structures;

— insertable fittings for flexible connections to pipelines;

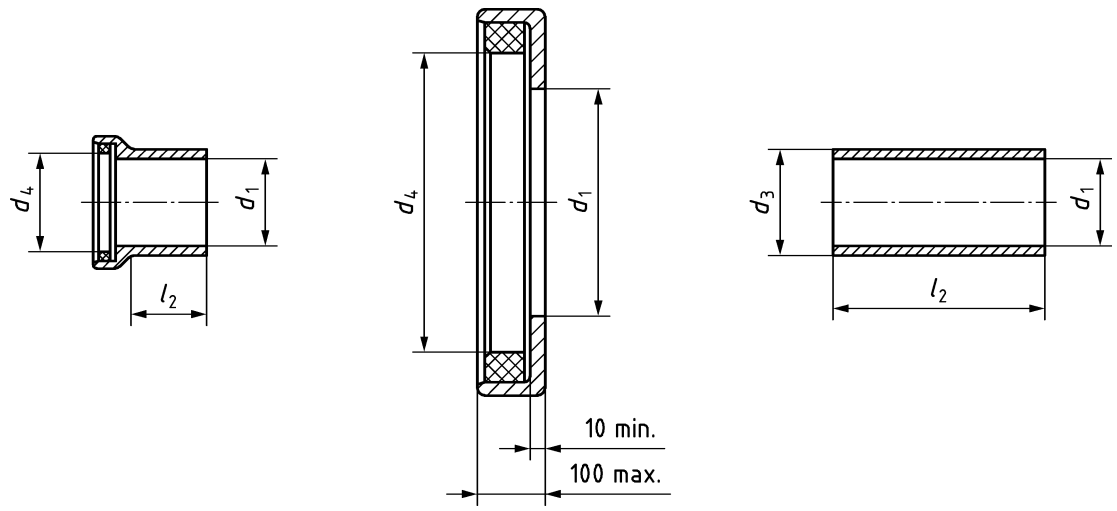
— sealing rings for flexibly jointing cut pipes in socket controlled dimensional jointing systems.

Individual dimensional details shall be in accordance with the manufacturer's declared specification and the manufacturer's instructions for installation shall be followed.

B.2 Connectors

Connectors shall be made from vitrified clay or other suitable materials and appropriate jointing materials meeting the requirements of 5.1. At least the built-in length of the connector shall not be glazed. Examples are given in Figure B.1.

Dimensions in millimetres



NOTE See EN 295-1:2013, Table 13 for the appropriate values of d_4 and Table 14 for appropriate values of d_3 and DN for the chosen dimensional jointing system and crushing strength. l_2 is the manufacturer's stated outside barrel length.

Figure B.1 — Vitrified clay connector

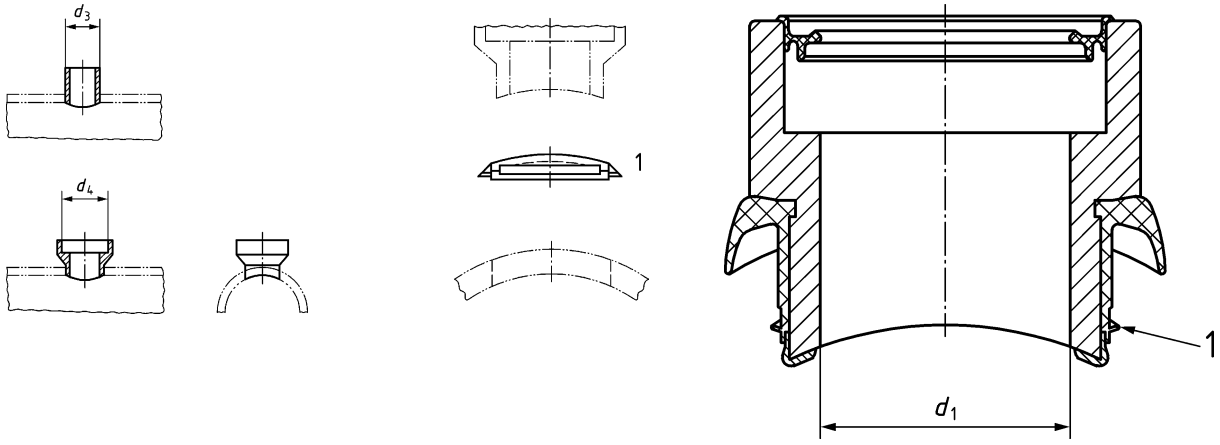
B.3 Insertable fittings

These are used for connectors to pipelines which shall be selected according to the main pipe and the connecting pipe. Manufacturer's instructions shall be followed. Examples are given in Figure B.2.

The manufacturer shall supply suitable rubber sealing rings. Materials used shall meet the requirements of 5.1.

Individual dimensional details of components shall be in accordance with the manufacturer's declared specifications. Dimensional tolerances of the rubber are those set up in ISO 3302-1:1996, Class E3 or M3, as applicable.

Dimensions in millimetres



Key

1 sealing ring, d_1 internal diameter of bore, d_3 outside diameter of pipe or spigot
d_4 internal diameter of socket

Figure B.2 — Examples insertable fitting with rubber sealing ring

B.4 Sealing rings for cut pipes

These are for use when pipes with a socket controlled dimensional jointing system are cut to a shorter length, thereby losing their spigot joint fairings and/or sealing elements. They may include an encapsulated steel ring as shown in the example in Figure B.3.

Materials used shall meet the requirements of 5.1.

Individual dimensional details of components shall be in accordance with the manufacturer's declared specifications. Dimensional tolerances of the rubber shall be those set up in ISO 3302-1:1996, Class E3 or M3, as applicable.

Key

1 steel insert

d_3 outside diameter of pipe/spigot

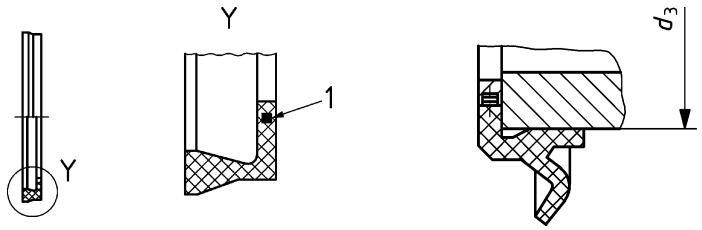


Figure B.3 — Rubber sealing ring for cut pipes

B.5 Performance requirements

Joint assemblies incorporating the connectors and fittings specified in this annex shall meet the performance requirements of 5.9.1 or 5.9.2, as appropriate to the item.

Annex C
(normative)

Heatshrinkable sleeves

C.1 General

This annex specifies additional requirements for heatshrinkable sleeves of radiation crosslinked polyethylene for connecting vitrified clay pipes and fittings together or to other pipeline systems.

The manufacturer's installation procedure shall be strictly followed.

NOTE The performance of joints made using heatshrinkable sleeves relies on good workmanship.

Heatshrinkable sleeves may be formed in two ways. They may be either a tube, in one piece, or a wrap-around sheet which is held in place with a stainless steel fastener or an adhesive polypropylene pad.

The sleeve is shrunk into place using a soft yellow flame which is moved over the whole surface of the sleeve until the crystalline melting point is achieved. This heating both melts the attached sealant or adhesive and shrinks the sleeve, so that the sleeve follows the contours of the joint profile and seals the joint. The sleeve shall not be burnt or otherwise damaged during application.

C.2 Materials and manufacture

The sleeve shall be manufactured from radiation crosslinked polyethylene.

The inside surface of the sleeve shall be coated with either a bitumen sealant in accordance with EN 1427 or a hot melt adhesive in accordance with ISO 4587.

Where stainless steels are used for fasteners, they shall be either 1.4307, 1.4301, 1.4404, 1.4401 or 1.4571 according to EN 10088-2:2005, Table 3 or have equivalent or greater corrosion resistance.

The sleeve and the sealant or adhesive shall meet the requirements of Table C.1 before heat treatment.

Table C.1 — Material requirements

Requirement	Standard	Unit	Sleeve	Sealant
Tensile strength	EN ISO 527-1 EN ISO 527-2	N/mm^2	≥ 17	—
Elongation at break	EN ISO 527-1 EN ISO 527-2	%	> 350	—
Modulus of elasticity	EN ISO 527-1 EN ISO 527-2	N/mm^2	> 150	—
Elongation at break after ageing in air at (150 ± 2) °C for 7 d	EN ISO 527-1 EN ISO 527-2	%	> 300	—
Hardness	EN ISO 868	Shore D	60 ± 7	—
Density	EN ISO 1183-1	g/cm^3	1,0 ± 0,05	0,93 + 0,05
Shear strength	ISO 4587	N/mm^2	—	> 0,15
Softening point	—	°C	—	>80

C.3 Dimensions

The minimum wall thickness of the sleeve shall be 1,2 mm before shrinkage and without adhesive. The minimum length of the sleeve shall be as shown in Table C.2.

Table C.2 — Length of sleeve

DN of larger pipe	Sleeve length (mm)
≤ 200	1,1 DN
$> 200 \leq 400$	0,85 DN
> 400	0,60 DN

C.4 Performance requirements

Sleeves shall be tested in a joint assembly using two pipes of different outside diameters within 10 % of the limits of the maximum performance declared for that sleeve. The joint assembly shall be formed with at least a 5 mm gap between the pipes, and with level inverts before deflection, as shown in Figure C.1. The joint assembly shall meet the performance requirements of 5.9.1 or 5.9.2 as applicable using an internal pressure.

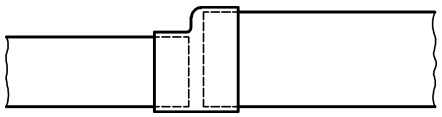


Figure C.1 — Joint assembly for tests

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", 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 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 construction products for the uses indicated in Tables ZA.1.1 to ZA.1.4 and shows the relevant clauses applicable.

The scope of this annex is defined by Tables ZA.1.1 to ZA.1.4 of this standard and is the same as Clause 1.

Table ZA.1.1 — Relevant clauses and intended uses for adaptors, connectors and insertable fittings

Construction products: Connectors, insertable fittings **Intended uses:** Buried drain or 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.			
Essential characteristics	**Requirement clauses according to**	**Levels and/or classes**	**Notes**
Reaction to fire	EN 295-4:2013, 6.1	A1 to F	A1 classified without the need for testing (CWT)
Dimensional tolerances, as:			
— Internal diameter	EN 295-4:2013, 5.2	–	measured according to the requirement clause against the declared nominal value; expressed as “Pass” or “Fail”
— Length	EN 295-4:2013, 5.3		measured according to the requirement clause against the declared nominal value; expressed as “Pass” or “Fail”
— Angle	EN 295-4:2013, 5.4		measured according to the requirement clause against the declared nominal value; expressed as “Pass” or “Fail”
— Squareness of ends	EN 295-4:2013, 5.5		measured according to the requirement clause; expressed as “Pass” or “Fail”
— Joint inter-changeability	EN 295-4:2013, 5.5		measured according to the requirement clause against the declared system; expressed as “Pass” or “Fail”
Tightness: Gas and liquid [a], against:			
— Watertightness	EN 295-1:2013, 6.2	–	tested as joint assembly; expressed as “Pass” or “Fail”
Release of dangerous substances	EN 295-4:2013, 6.3	–	see 6.3
Durability of tightness, against:			
— Chemical resistance to effluent	EN 295-1:2013, 6.5	–	tested according to EN 295-3:2012, Clause 23 and expressed as "Pass" or "Fail"
— Thermal cycling stability	EN 295-1:2013, 6.6	–	tested according to EN 295-3:2012, 24.1, and expressed as "Pass" or "Fail"
— Long term stability	EN 295-1:2013, 6.7	–	tested according to EN 295-3:2012, 24.2, and expressed as "Pass" or "Fail"
[a] For continuous working under low pressure, the test pressure used shall be declared.			

Table ZA.1.2 — Relevant clauses and intended uses for sealing rings for cut pipes

Construction products: Sealing rings for cut pipes **Intended uses:** Buried drain or 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.			
Essential characteristics	**Requirement clauses according to**	**Levels and/or classes**	**Notes**
Reaction to fire	EN 295-4:2013, 6.1	A1 to F	A1 classified without the need for testing (CWT)
Dimensional tolerances, as:			
— internal diameter	EN 295-4:2013, 5.2	–	measured according to the requirement clause; against the declared nominal value; expressed as “Pass” or “Fail”
— Joint inter-changeability	EN 295-4:2013, 5.5		measured according to the requirement clause against the declared system; expressed as “Pass” or “Fail”
Release of dangerous substances	EN 295-4:2013, 6.3	–	see 6.3
Tightness: Gas and liquid [a], as:			
— Watertightness	EN 295-1:2013, 6.2	–	tested as joint assembly; expressed as “Pass” or “Fail”
Durability of tightness, against:			
— Chemical resistance to effluent	EN 295-1:2013, 6.5	–	tested according to EN 295-3:2012, Clause 23 and expressed as "Pass" or "Fail"
— Thermal cycling stability	EN 295-1:2013, 6.6	–	tested according to EN 295-3:2012, 24.1, and expressed as "Pass" or "Fail"
— Long term stability	EN 295-1:2013, 6.7	–	tested according to EN 295-3:2012, 24.2, and expressed as "Pass" or "Fail"
[a] For continuous working under low pressure, the test pressure used shall be declared.			

Table ZA.1.3 — Relevant clauses and intended uses for metal banded flexible couplings, metal banded adaptors and bushes

Construction products: Metal banded flexible couplings, metal banded adaptors and bushes **Intended uses:** Buried drain or 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.			
Essential characteristics	**Requirement clauses according to**	**Levels and/or classes**	**Notes**
Reaction to fire	EN 295-4:2013, 6.1	A1 to F	F, not tested due to end use situation
Dimensional tolerances for: — Moulded rubber — Extruded rubber adaptors and Type 1 couplings — Type 2 couplings	EN 295-4:2013, A.3.2	–	measured according to the requirement clause against the declared nominal value for Type 1 couplings or the nominal coupling size of Type 2A or Type 2B; expressed as “Pass” or “Fail”
Tightness: Gas and liquid [a] as:			
— Watertightness	EN 295-4:2013, A.3.3.2 or A.3.3.3	–	tested according to A.3.4; expressed as “Pass” or “Fail”
Release of dangerous substances	EN 295-4:2013, 6.3	–	see 6.3
Durability of tightness, against:			
— Chemical resistance to effluent	EN 295-1:2013, 6.5	–	tested according to EN 295-3:2012, Clause 23, and expressed as "Pass" or "Fail"
— Thermal cycling stability	EN 295-1:2013, 6.6	–	tested according to EN 295-3:2012, 24.1, and expressed as "Pass" or "Fail"
— Long term stability	EN 295-1:2013, 6.7	–	tested according to EN 295-3:2012, 24.2, and expressed as "Pass" or "Fail"
[a] For continuous working under low pressure, the test pressure used shall be declared.			

Table ZA.1.4 — Relevant clauses and intended uses for heat-shrinkable sleeves

Construction products: Heat-shrinkable sleeves **Intended uses:** Buried drain or 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.			
Essential characteristics	**Requirement clauses according to**	**Levels and/or classes**	**Notes**
Reaction to fire	EN 295-4:2013, 6.1	A1 to F	F, not tested due to end use situation
Dimensional tolerances, as:	EN 295-4:2013, C.3	–	
— Wall thickness of sleeve			expressed as “Pass” or “Fail”
— Length of sleeve			measured according to the requirement clause against the declared nominal value; expressed as “Pass” or “Fail”
Tightness: Gas and liquid [a] as:			
— Airtightness	EN 295-4:2013, C.4	–	tested according to EN 295-3:2012, Clause 16; expressed as “Pass” or “Fail”
Release of dangerous substances	EN 295-4:2013, 6.3	–	see 6.3
Durability of tightness, against:			
— Chemical resistance to effluent	EN 295-1:2013, 6.5	–	tested according to EN 295-3:2012, Clause 23, and expressed as "Pass" or "Fail"
— Thermal cycling stability	EN 295-1:2013, 6.6	–	tested according to EN 295-3:2012, 24.1, and expressed as "Pass" or "Fail"
— Long term stability	EN 295-1:2013, 6.7	–	tested according to EN 295-3:2012, 24.2, and expressed as "Pass" or "Fail"
[a] 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 adaptors, connectors and flexible couplings

ZA.2.1 System of attestation of conformity

The systems of attestation of conformity of the adaptors, connectors and flexible couplings, indicated in Tables ZA.1.1 and ZA.1.2 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 — System of attestation of conformity

Products	Intended uses	Level(s) or class(es)	Attestation of conformity systems
Fittings and joints	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 Adaptors, connectors and flexible couplings are considered to be under the scope of 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 are 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). After installation it is assured that only a negligible area of joint material would be exposed to fire inside the pipeline and the outside of the pipeline will be buried.

The attestation of conformity of the products according to Tables ZA.1.1 to ZA.1.4 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 connectors, adaptors and flexible couplings 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 essential Characteristics of Tables ZA.1.1 to ZA.1.4, as relevant	9.3
	Initial type testing by the manufacturer	Applicable characteristics of Tables ZA.1.1 to ZA.1.4, as relevant	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 European Economic Area (EEA) shall prepare 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, etc.), and a copy of the information accompanying the CE marking;

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

— provisions to which the product conforms (i.e. Annex ZA of this European Standard);

— particular conditions applicable to the use of the product (i.e. 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 to be used.

ZA.3 CE marking and labelling

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 symbol shall be in accordance with Directive 93/68/EC and shall be shown on the product 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 (i.e. adaptor, connector or flexible coupling):

— name or identifying mark of the manufacturer (see Note 1 in ZA.2.2);

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

— number of this standard (i.e. EN 295-4).

Figure ZA.1 gives an example of CE marking on the product.

CE	*CE conformity marking, consisting of the "CE"-symbol given in Directive 93/68/EEC.*
AnyCo Ltd,	*Manufacturer's name or identifying mark.*
13	*Last two digits of the year in which the marking was affixed.*
EN 295-4	*No. of European Standard.*

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

ZA.3.3 CE marking on the accompanying documents

In addition to the CE marking on the product, the following information shall accompany the CE-marking symbol given in the commercial documents, accompanying the products (i.e. adaptors, connectors or flexible couplings):

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

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

c) number of this standard and the year of its publication (i.e. EN 295-4:2013);

d) description of the product and its intended use:

   1) designation of the product:

      i) nominal size(s),

      ii) length, where appropriate,

      iii) joint system, where appropriate;

e) performance of the following characteristics, listed in Table ZA.1.1 to ZA.1.4, 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) dimensional tolerances: internal diameter, length, angle, squareness of ends and joint inter-changeability, expressed as "Pass" to measurement requirements, where applicable;

   3) tightness (gas and liquid) dealt with jointly by:

      i) watertightness of adaptors, connectors, insertable fittings, sealing rings for cut pieces and flexible couplings;

      ii) airtightness of heat-shrinkable sleeves;

f) release of dangerous substances, where 6.3 applies;

g) durability of tightness

   — against chemical and physical resistance to effluent,

   — against thermal cycling stability,

   — against long term 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 in the commercial documents accompanying the products (*e.g. adaptor and connectors)*.

CE	*CE marking, consisting of the "CE"-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 295-4:2013 Manhole connector for drains and sewers buried in ground **DN 150 – 0,3 – F**	*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 Essential Characteristics*
Dimensional tolerances, as: Pass	
— Internal diameter Pass	
— Length Pass	
— Squareness of ends Pass	
— Joint inter-changeability Pass	
— Watertightness	
Release of dangerous substances NPD	
— Chemical and physical resistance to effluent Pass	
— Thermal cycling stability Pass	
— Long term thermal stability Pass	

Figure ZA.2 — Example of CE marking on the accompanying documents, for a connector

Bibliography

[1] 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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