BRITISH STANDARD

BS EN 15014:2007

Plastics piping systems — Buried and above ground systems for water and other fluids under pressure — Performance characteristics for pipes, fittings and their joints

ICS 23.040.20; 23.040.45

BSI British Standards

National foreword

This British Standard was published by BSI. It is the UK implementation of EN 15014:2007.

The UK participation in its preparation was entrusted by Technical Committee PRI/88, Plastics piping systems, to Subcommittee PRI/88/2, Plastic piping for pressure applications.

This British Standard is intended as a means of demonstrating compliance with the Construction Products Directive (89/106/EEC), and affixing the CE mark.

The Essential Requirements contained in this British Standard are concepts related to the Construction Products Directive and they are not necessarily indicative of all the performance requirements or suitability for the service conditions likely to be encountered in a particular pipework application.

The CE mark indicates only that a product may legally be placed on the market in the EU. It does not indicate or guarantee inherent quality of the CE marked pipework components.

It should be noted that manufacturers are entitled to declare "No Performance Determined" against some or all of these Essential Requirements and yet still affix the CE mark to their products. Users are advised to check the background details with the manufacturer's claims for the CE marked products. Such details may be available on an appropriate Internet website or accompanying Company documentation.

Compliance with this British Standard does not necessarily mean that products bearing the CE mark are fit for a particular intended purpose.

This Standard does not replace the corresponding BS EN Product Standards (see national annex NA) which do contain detailed performance requirements for pipes, fittings and joints manufactured from particular plastics materials.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 March 2008

ISBN 978 0 580 54579 5

Amendments issued since publication

Amd. No.	Date	Comments

This British Standard makes no reference to the suitability of pipework for conveying drinking water. The legislation setting out these requirements for water supply installations in the UK is:

for installations for public water supplies:

- *the Water Supply (Water Quality) Regulations 2000, Regulation 31 (England),*
- *the Water Supply (Water Quality) Regulations 2001, Regulation 31 (Wales),*
- *the Water Supply (Water Quality) Regulations 2001, Regulation 27 (Scotland);* and
- *the Water Supply (Water Quality) Regulations 2007, Regulation 30 (Northern Ireland);* and

for installations for consumers' premises:

- *the Water Supply (Water Fittings) Regulations 1999 (England and Wales), the Water Byelaws 2000 (Scotland) and the current requirements for Northern Ireland*

A list of product standards used in conjunction with this standard is included in a national annex NA.

A list of organizations represented on PRI/88/2 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.

Compliance with a British Standard cannot confer immunity from legal obligations

blank

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 15014

October 2007

ICS 23.040.20; 23.040.45

English Version

Plastics piping systems - Buried and above ground systems for water and other fluids under pressure - Performance characteristics for pipes, fittings and their joints

Systèmes de canalisations en plastique - Systèmes enterrés et aériens pour eau et autres fluides avec pression - Caractéristiques de performance pour tubes, raccords et leurs assemblages

Kunststoff-Rohrleitungssysteme - Erd- und oberirdisch verlegte Druckrohrleitungssysteme für Wasser und andere Flüssigkeiten - Eigenschaften für die Gebrauchstauglichkeit von Rohren, Formstücken und deren Verbindungen

This European Standard was approved by CEN on 23 August 2007.

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 Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 15014:2007: E

Contents

Foreword

This document (EN 15014:2007) has been prepared by Technical Committee CEN/TC 155 “Plastics piping systems and ducting systems”, the secretariat of which is held by NEN.

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 April 2008, and conflicting national standards shall be withdrawn at the latest by July 2009.

This document 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 and support essential requirements of EU Directives.

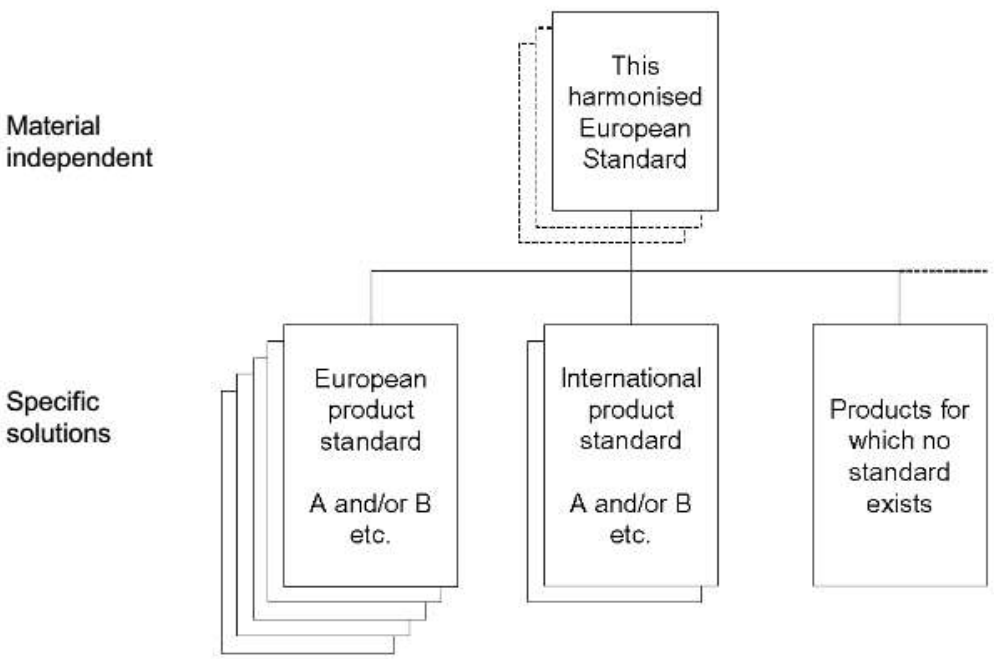
For the relationship with EU Directives, see informative Annex ZA, which is an integral part of this document.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

This European Standard contains only the performance characteristics needed to meet the essential requirements of EU Directive(s). It does not cover all characteristics of the products. These are specified in the standards listed in Annex A or in other appropriate product specifications.

This harmonised European Standard is part of a family of cluster standards addressing plastics piping systems. The relationship is shown below.



For the harmonisation of pressure plastics piping systems (this European Standard) the following applies:

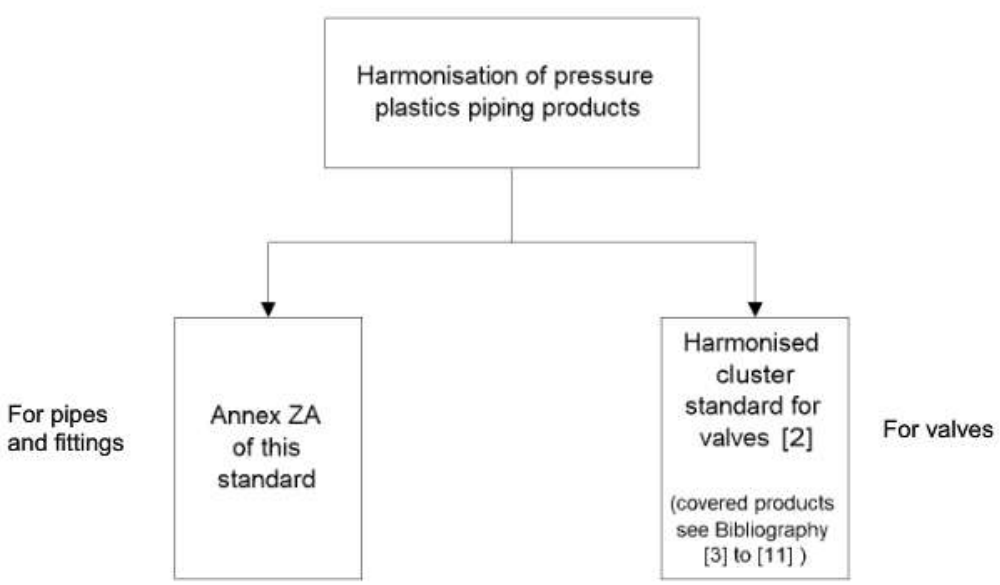


Figure 1

1 Scope

This European Standard specifies performance requirements for plastics pipes, fittings and their joints for buried or above-ground pressure applications for water for general purposes, drainage, sewerage and irrigation, as well as for any other pressure application with other fluids covered by the Construction Products Directive with the exception of drinking water distribution for human consumption. It gives associated test methods for verification and evaluation of conformity with this European Standard.

NOTE Compliance of pipes, fittings and their joints with this document does not confer a presumption of fitness of the product for the transport of water intended for human consumption within the meaning of the Directive 89/106/EEC. However, until the operation of the envisaged European Acceptance Scheme for construction products in contact with water intended for human consumption and the revision of this standard, products conforming to this standard could be used for the transport of water intended for human consumption if they conform to the relevant national, regional or local regulatory provisions or recommendations applicable in the place of use.

2 Normative references

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

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

EN 681-2, *Elastomeric seals — Materials requirements for pipe joint seals used in water and drainage applications — Part 2: Thermoplastic elastomers*

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

EN 713, *Plastics piping systems — Mechanical joints between fittings and polyolefin pressure pipes — Test method for leaktightness under internal pressure of assemblies subjected to bending*

EN 715, *Thermoplastics piping systems — End-load bearing joints between small diameter pressure pipes and fittings — Test method for leaktightness under internal water pressure, including end thrust*

EN 911, *Plastics piping systems — Elastomeric sealing ring type joints and mechanical joints for thermoplastics pressure piping — Test method for leaktightness under external hydrostatic pressure*

EN 1394, *Plastics piping systems — Glass-reinforced thermosetting plastics (GRP) pipes — Determination of the apparent initial circumferential tensile strength*

EN 1796, *Plastics piping systems for water supply with or without pressure — Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP)*

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

EN 14364, *Plastics piping systems for drainage and sewerage with or without pressure — Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP) — Specifications for pipes, fittings and joints*

EN 15012:2007, *Plastics piping systems — Soil and waste discharge systems within the building structure — Performance characteristics for pipes, fittings and their joints*

EN ISO 1167-1, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 1: General method (ISO 1167-1:2006)*

EN ISO 1167-2, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 2: Preparation of pipe test pieces (ISO 1167-2:2006)*

prEN ISO 1167-3:2005, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 3: Preparation of components (ISO/DIS 1167-3:2005)*

prEN ISO 1167-4:2006, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 4: Preparation of assemblies (ISO/DIS 1167-4:2006)*

EN ISO 3126, *Plastics piping systems — Plastics components — Determination of dimensions (ISO 3126:2005)*

EN ISO 9001:2000, *Quality management systems — Requirements (ISO 9001:2000)*

EN ISO 9080, *Plastics piping and ducting systems — Determination of the long-term hydrostatic strength of thermoplastics materials in pipe form by extrapolation (ISO 9080:2003)*

EN ISO 12162, *Thermoplastics materials for pipes and fittings for pressure applications — Classification and designation — Overall service (design) coefficient (ISO 12162:1995)*

EN ISO 13783, *Plastics piping systems — Unplasticized poly(vinyl chloride) (PVC-U) end-load-bearing double socket joints — Test method for leaktightness and strength while subjected to bending and internal pressure (ISO 13783:1997)*

EN ISO 13846, *Plastics piping systems — End-load-bearing and non-end-load-bearing assemblies and joints for thermoplastics pressure piping — Test method for long-term leaktightness under internal water pressure (ISO 13846:2000)*

ISO 161-1, *Thermoplastics pipes for the conveyance of fluids — Nominal outside diameters and nominal pressures — Part 1: Metric series*

ISO 17456, *Plastics piping systems — Multilayer pipes — Determination of long-term strength*

ISO 21004, *Plastics piping systems — Multilayer pipes and their joints, based on thermoplastics, for water supply*

3 Terms, definitions and symbols

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

3.1
nominal size (DN)
numerical designation of the size of a component, other than a component designated by thread size, which is a convenient round number approximately equal to the manufacturing dimension in millimetres (mm)

NOTE This can apply to either the internal diameter (DN/ID) or external diameter (DN/OD).

3.2
nominal outside diameter
d_n
specified diameter, in millimetres, assigned to a nominal size

3.3
nominal pressure (PN)
numerical designation used for reference purposes related to the mechanical characteristics of the component of a piping system

NOTE For plastic piping systems conveying water it corresponds to the maximum continuous operating pressure in bar, which can be sustained with water at 20 °C for thermoplastics and 35 °C for thermosetting materials, based on the minimum design coefficient.

4 Performance requirements

4.1 Reaction to fire for applications inside building

Where subject to regulatory requirements, the product shall be tested and classified in accordance with 5.1.

4.2 External pressure strength

The external pressure strength of pressure piping systems is deemed to be satisfied by the internal pressure strength as given in 4.3.

4.3 Internal pressure strength

4.3.1 Determination of nominal pressure PN

For thermoplastics materials the internal pressure strength of the pipe and fitting shall be determined in accordance with 5.2.1 and shall be declared by the manufacturer as nominal pressure PN in accordance with ISO 161-1 and including PN 25 where applicable.

The overall service (design) coefficient shall not be less than that specified in EN ISO 12162 for the relevant material.

For thermosetting materials the internal pressure strength of the pipe or fitting shall be tested in accordance with 5.2.2 and shall be declared by the manufacturer as nominal pressure in accordance with EN 1796 or EN 14364.

For multilayer pipes the internal pressure strength shall be tested and declared by the manufacturer in accordance with 5.2.3.

4.3.2 Verification of pressure strength

The verification of the internal pressure strength of pipes and fittings shall be done in accordance with 5.3.

4.4 Dimensional tolerances

The manufacturer shall declare the dimensional tolerances for the jointing of the components, either by means of:

a) reference to a specific European product standard as given in Clause 2 or in Annex A, as applicable, or

b) in the absence of a European Standard, reference to a specific European product specification published by a recognized European organization or,

c) in the absence of a) and b) reference to an International Standard, or

d) in the absence of a), b), and c), by stating the values of his own specification and associated jointing method.

Dimensions shall be measured in accordance with 5.4 and shall be within the declared tolerances.

4.5 Tightness (air and liquid)

For products in accordance with this standard, leaktightness is required. Products covered by one of the standards listed in Annex A and having passed the type testing in accordance with the assessment of conformity part, are deemed to be leaktight (for standards with separate assessment of conformity parts see Annex B).

Sealing rings (and gaskets) shall conform to EN 681-1, EN 681-2 or EN 681-4, as applicable.

Pipe connections shall be tested in accordance with 5.5. No leakage shall occur during the test period.

4.6 Durability

4.6.1 Durability of pipes and fittings

Pipes and fittings meeting the requirements of 4.3.1 are deemed to have a reasonable economic working life.

NOTE The piping components are expected to last at least the lifetime of the network where they are installed.

If the nature of the fluid is different from water or this fluid or water has a higher temperature than 20 °C (35 °C for thermosetting materials), guidance for de-rating the pressure shall be in accordance with the appropriate following standards: EN 1778 [13], EN 1452-2 [12] for PVC-U, ISO 13761[14] for PE, EN 1796 and EN 14364 for thermosetting materials and ISO 17456 or ISO 21004 for multilayer piping systems.

Instead of de-rating the pressure, a shorter lifetime may be declared.

4.6.2 Durability of elastomeric sealing joints

The tightness of elastomeric sealing joints is deemed to be durable if the sealing element conforms to EN 681-1, EN 681-2 or EN 681-4, as applicable.

4.7 Dangerous substances

Attention is drawn to NOTE 1 and NOTE 2 in ZA.1.

NOTE Mandate M/366 "Development of horizontal standardised assessment methods for harmonised approach relating to dangerous substances under the Construction Products Directive (CPD)" as issued by the European Commission, will require specifications relating to dangerous substances once applicable to the covered products.

5 Test methods

5.1 Reaction to fire for applications inside building

Classification shall be in accordance with EN 13501-1.

Mounting and fixing of pipes shall conform to Annex A in EN 15012:2007. If no pipes are available, testing of fittings may be done in form of a linear assembly, e.g. couplers.

NOTE In case where e.g. the given dimensions do not exist the choice of dimensions and the mounting and fixing should be agreed between the manufacturer and the notified body.

5.2 Determination of the nominal pressure

5.2.1 Determination of the nominal pressure PN for thermoplastics piping systems

For thermoplastics materials the nominal pressure PN shall be determined as follows:

a) determine the σ_{LPL} value in accordance with EN ISO 9080. Data provided by either the compound manufacturer or the product manufacturer may be taken into account;

b) classify the material (MRS) and calculate the design stress in accordance with EN ISO 12162;

c) calculate the PN for a chosen pipe series (SDR series) in accordance with ISO 161-1.

5.2.2 Determination of the nominal pressure PN for thermosetting piping systems

For thermosetting materials the nominal pressure PN shall be determined in accordance with the procedures given in EN 1796 or EN 14364, as applicable.

5.2.3 Determination of the nominal pressure PN for multilayer piping systems

For multilayer piping systems the nominal pressure PN shall be determined in accordance with ISO 17456.

5.3 Internal pressure strength

5.3.1 Internal pressure strength for thermoplastics products

For checking the internal pressure strength testing shall be done in accordance with the appropriate parts of EN ISO 1167 using circumferential stresses or test pressures as given in the relevant product standards in Annex A.

5.3.2 Internal pressure strength for thermosetting products

For checking the internal pressure strength testing shall be done in accordance with EN 1796 or EN 14364 using the test method given in EN 1394.

5.3.3 Internal pressure strength for multilayer piping systems

For checking the internal pressure strength testing shall be done in accordance with ISO 21004.

5.4 Dimensional tolerances

The dimensions shall be measured in accordance with EN ISO 3126.

5.5 Tightness

The leaktightness of joints shall be tested in accordance with EN 715 for joints for polyolefin pipes and with EN ISO 13846 and EN ISO 13783 for joints for other thermoplastics pipes as applicable. Joints with mechanical fittings and polyethylene pipes shall be tested according EN 911 and EN 713.

For joints for thermosetting pipes, tests referenced in EN 1796 or EN 14364 shall be applied, depending on the type of joint.

For joints for multilayer pipes, tests referenced in ISO 21004 shall be applied, depending on the type of joint.

NOTE The test parameters are set by the product standards making reference to these test standards.

Fused, cemented and adhesive joints are deemed to be leaktight when assembled in accordance with the manufacturer's instructions. Such instructions shall be made available by the manufacturer.

5.6 Durability

Piping components conforming with the requirements of this document and with a declared nominal pressure, which is determined according to 5.2 of this European Standard, shall be deemed to be durable for a reasonable economic working life.

6 Evaluation of conformity

6.1 General

The conformity of pipes and fittings with the requirements of this European Standard and with the declared values (including classes) shall be demonstrated by:

— initial type testing;

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

For the purposes of testing, pipes and fittings may be grouped into families, where it is considered that the results for one or more characteristics from any product within the family are representative for the same characteristics for all products within that family.

NOTE 1 A product may be in more than one family for different characteristics.

For type testing the following family groups apply:

a) Size groups for pipes and fittings as given in Table 1.

Table 1 — Size groups

Size group	Range of nominal diameters, d_n	
	for thermoplastics material	for thermosetting plastics
1	$d_n \leq 63$	$100 \leq d_n < 600$
2	$63 < d_n \leq 225$	$d_n \geq 600$ and $d_n \times [PN]^{0,5} \leq 3\,800$
3	$225 < d_n \leq 630$	$d_n \geq 600$ and $d_n \times [PN]^{0,5} > 3\,800$
4	$d_n > 630$	—

b) Fitting groups for thermoplastics piping components as given in Table 2.

NOTE 2 Fitting groups are currently not available for thermosetting piping components.

Table 2 — Fitting groups

Fitting group	Thermoplastics piping components
1	Bends and elbows
2	Branches
3	Other fittings

6.2 Initial type testing

6.2.1 General

Relevant type tests shall be carried out on new products and whenever there is a change in design, in material and/or in production method, other than routine in-process adjustment and extension of the product range (see Table 3). A change of supplier of a material or stabiliser does not lead to a change in performance if the chemical composition remains the same.

Material modifications within certain limits are not considered as a change of material. Guidance for these limits can be found in the standards given in Annex B.

For tests previously performed in accordance with the provisions of the standards listed in Annex A, or the recognized European specification, as applicable, (same product, same characteristic(s), same test method, same system of attestation etc.) the results may be taken into account.

All characteristics given in Clause 4 shall be subject to calculation and/or initial type testing, except 4.6.2 where the characteristics of the components used have already been determined by the component manufacturer on the basis of conformity with other product standards. However this does not relieve the manufacturer of the piping system from the responsibility of ensuring that the system conforms to the requirements of this document.

6.2.2 Initial type test requirements

The initial type testing of the characteristics according to Clause 4 shall be performed in accordance with the sampling procedure given under type tests (TT) of the applicable product specific standards for assessment of conformity as given in Annex B. If the standard does not contain one or more of the characteristics, then testing as given in Table 3 shall apply.

For products where no such standard exists Table 3 shall apply.

Table 3 — Type testing of pipes and fittings

Essential characteristics	Requirement clause of this European Standard	Testing relevant to [a]			Sampling procedure (minimum sampling)	Acceptance
		I	M	E		
Reaction to fire	4.1	+ [b]	+ [b]	—	Once/compound or formulation [c]	See classification in EN 13501-1
External pressure strength	4.2	+	+	+	See internal pressure strength	Pass/fail
Internal pressure strength	4.3.2	+	+	+	One diameter/size group/ fitting group/compound or formulation	Pass/fail
Dimensional tolerances	4.4	+	—	+	Once/size/fitting/compound or formulation	Pass/fail
Tightness of joints	4.5	+	+	+	One diameter/size group/ joint design	Pass/fail
Durability	4.6	+	+	+	Once/compound or formulation	By the classification of the long-term strength performance

[a] I is initial type test in case of new system;
M is change of material;
E is extension of the product range with new size group or fitting group.
\+ denotes testing relevant for the characteristic-occurrence-combination.

[b] Only obligatory if subject to regulatory requirements applicable in the place of use (see also Table ZA.2).

[c] In case of single burning item (SBI) test the vertical part shall be size 110 and the horizontal part size 40, which will then be representative for all dimensions.

Test reports shall be kept by the manufacturer for at least 10 years after discontinuation of the product.

6.3 Factory production control

6.3.1 General

The manufacturer shall establish, document and maintain an FPC system to ensure that the products placed on the market conform to the stated performance characteristics. The FPC system shall consist of procedures, regular inspections and tests and/or assessments and the use of the results to control raw and other incoming materials or components, equipment, the production process and the product.

If the manufacturer has the component designed, manufactured, assembled, packed, processed and labelled by subcontracting, FPC of the original manufacturer may be taken into account. However, where subcontracting takes place, the manufacturer shall retain the overall control of the component and ensure that he receives all the information that is necessary to fulfil his responsibilities according to this European Standard. The manufacturer who subcontracts all of his activities may in no circumstances discharge himself of his responsibilities to a subcontractor.

All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures. This production control system documentation shall ensure a common understanding of conformity evaluation and enable the achievement of the required component characteristics and the effective operation of the production control system to be checked.

Factory production control therefore brings together operational techniques and all measures allowing maintenance and control of the conformity of the component with its technical specifications. Its implementation may be achieved by controls and tests on raw materials and constituents, processes, manufacturing equipment and finished components, including material properties in components, and by making use of the results thus obtained.

The results of inspections, tests or assessments requiring action shall be recorded, as shall any action taken. The action to be taken when control values or criteria are not met shall be recorded and retained for the period specified in the manufacturers FPC procedures.

The specifications of all incoming raw materials and components shall be documented, and the inspection scheme for ensuring their conformity shall be established.

Manufacturers operating a quality system, which conforms to or is no less stringent than the relevant requirements of EN ISO 9001:2000 and which is made specific to products covered by this European Standard shall be deemed to satisfy the FPC requirements of this European Standard.

6.3.2 FPC requirements

The FPC of the characteristics according to Clause 4 shall be performed in accordance with the sampling procedure given under batch release tests (BRT) of the applicable product specific standards for assessment of conformity as given in Annex B. If the standard does not contain one or more of the characteristics, then testing as given in Table 4 shall apply.

For products where no such standard exists Table 4 shall apply.

Table 4 — Factory production control of pipes and fittings

Essential characteristics	Requirement clause of this European Standard	Test method	Sampling procedure (minimum sampling)	Acceptance
Reaction to fire [a]	4.1	Identification of compound or formulation	Once/batch	See classification in EN 13501-1
External pressure strength	4.2	See internal pressure strength	See internal pressure strength	Pass/fail
Internal pressure strength	4.3.2	For thermoplastics products: EN ISO 1167-1 and EN ISO 1167-2, -3, -4 as appropriate with a test pressure/stress level related to the wall thickness for pipes and the PN for fittings[b]	Once/batch	Pass/fail
		For thermosetting products: EN 1394		
		For multilayer pipes: EN ISO 1167-1 and EN ISO 1167-2, -3, -4 as appropriate with a test pressure/stress level as specified in ISO 21004		
Dimensional tolerances	4.4	EN ISO 3126 or according to the manufacturers quality plan	Once/batch	Pass/fail
Tightness of joints	4.5	Indirect testing: see dimensional tolerances	Once/batch	Pass/fail
Durability	4.6	Indirect testing: see internal pressure strength, and check of compound or formulation	Once/batch	Pass/fail

[a] Only obligatory if subject to regulatory requirements applicable in the place of use.
[b] The test parameters can be found in the relevant product standard given in Annex A.

6.3.3 FPC system requirements

6.3.3.1 Personnel

The responsibility, authority and the relationship between personnel that manages, performs or verifies work affecting product conformity, shall be defined. This applies in particular to personnel that need to initiate actions preventing product non-conformities from occurring, actions in case of non-conformities and to identify and register product conformity problems. Personnel performing work affecting product conformity shall be competent on the basis of appropriate education, training, skills and experience for which records shall be maintained.

6.3.3.2 Equipment

All weighing, measuring and testing equipment necessary to achieve, or produce evidence of, conformity shall be calibrated or verified and regularly inspected according to documented procedures, frequencies and criteria. Control of monitoring and measuring devices shall comply with the appropriate clause of EN ISO 9001:2000.

All equipment used in the manufacturing process shall be regularly inspected and maintained to ensure use, wear or failure does not cause inconsistency in the manufacturing process.

Inspections and maintenance shall be carried out and recorded in accordance with the manufacturer's written procedures and the records retained for the period defined in the manufacturer's FPC procedures.

6.3.3.3 Design process

The factory production control system shall document the various stages in the design of the products, identify the checking procedure and those individuals responsible for all stages of design.

During the design process itself, a record shall be kept of all checks, their results, and any corrective actions taken. This record shall be sufficiently detailed and accurate to demonstrate that all stages of the design phase, and all checks, have been carried out satisfactorily. Compliance with EN ISO 9001:2000, 7.3 shall be deemed to satisfy the requirements of this subclause.

6.3.3.4 Raw materials and components

The specifications of all incoming raw materials and components shall be documented, as shall the inspection scheme for ensuring their conformity. The verification of conformity of the raw material with the specification shall be in accordance with EN ISO 9001:2000, 7.4.3.

6.3.3.5 In-process control

The manufacturer shall plan and carry out production under controlled conditions. Compliance with EN ISO 9001:2000, 7.5.1 and 7.5.2 shall be deemed to satisfy the requirements of this subclause.

6.3.3.6 Traceability and marking

Individual products and product batches shall be identifiable and traceable with regard to their production origin. The manufacturer shall have written procedures ensuring that processes related to affixing traceability codes and/or markings (see ZA.3) are inspected regularly. Compliance with EN ISO 9001:2000, 7.5.3 shall be deemed to satisfy the requirements of this subclause.

6.3.3.7 Non-conforming products

The manufacturer shall have written procedures which specify how non-conforming products shall be dealt with. Any such events shall be recorded as they occur and these records shall be kept for the period defined in the manufacturer's written procedures. Compliance with EN ISO 9001:2000, 8.3 shall be deemed to satisfy the requirements of this subclause.

6.3.3.8 Corrective action

The manufacturer shall have documented procedures that instigate action to eliminate the cause of non-conformities in order to prevent recurrence. Compliance with EN ISO 9001:2000, 8.5.2 shall be deemed to satisfy the requirements of this subclause.

6.3.3.9 Handling, storage and packaging

The manufacturer shall have procedures providing methods of product handling and shall provide suitable storage areas preventing damage or deterioration.

6.4 One-off products and products produced in very low quantities

Products produced as a one-off and products produced in very low quantities (less than 20 per year) are assessed as follows.

For initial type assessment, the provisions of Table 3 apply, with the following exceptions:

— for reaction to fire the classification of other products made out of the same compound or formulation may be used;

— external and internal pressure strength shall not be tested. It is assumed that by the defined geometry this requirement is fulfilled;

— durability may not be tested. Nevertheless the manufacturer shall declare the PN of its product according to the geometrical design and the used compound or formulation.

The FPC system of one-off products and products produced in very low quantities shall ensure that raw materials and/or components are sufficient for the product; the provisions of Table 4 applying only where appropriate. The manufacturer shall maintain records allowing traceability of the product.

Annex A
(normative)

Product standards for buried and above-ground pressure piping systems in plastics materials for water for general purposes, drainage, sewerage, irrigation and other fluids

EN 1452-1, *Plastics piping systems for water supply — Unplasticized poly(vinyl chloride) (PVC-U) — Part 1: General*

EN 1452-2, *Plastics piping systems for water supply — Unplasticized poly(vinyl chloride) (PVC-U) — Part 2: Pipes*

EN 1452-3, *Plastics piping systems for water supply — Unplasticized poly(vinyl chloride) (PVC-U) — Part 3: Fittings*

EN 1452-5, *Plastics piping systems for water supply — Unplasticized poly(vinyl chloride) (PVC-U) — Part 5: Fitness for purpose of the system*

EN 1456-1, *Plastics piping systems for buried and above ground drainage and sewerage under pressure — Unplasticized poly(vinyl chloride)(PVC-U) — Part 1: Specifications for piping components and the system*

EN 1796, *Plastics piping systems for water supply with or without pressure — Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP)*

EN 12201-1, *Plastics piping systems for water supply — Polyethylene (PE) — Part 1: General*

EN 12201-2, *Plastics piping systems for water supply — Polyethylene (PE) — Part 2: Pipes*

EN 12201-3, *Plastics piping systems for water supply — Polyethylene (PE) — Part 3: Fittings*

EN 12201-5, *Plastics piping systems for water supply — Polyethylene (PE) — Part 5: Fitness for purpose of the system*

EN 13244-1, *Plastics piping systems for buried and above-ground pressure systems for water for general purposes, drainage and sewerage — Polyethylene (PE) — Part 1: General*

EN 13244-2, *Plastics piping systems for buried and above-ground pressure systems for water for general purposes, drainage and sewerage — Polyethylene (PE) — Part 2: Pipes*

EN 13244-3, *Plastics piping systems for buried and above-ground pressure systems for water for general purposes, drainage and sewerage — Polyethylene (PE) — Part 3: Fittings*

EN 13244-5, *Plastics piping systems for buried and above-ground pressure systems for water for general purposes, drainage and sewerage — Polyethylene (PE) — Part 5: Fitness for purpose of the system*

EN 14364, *Plastics piping systems for drainage and sewerage with or without pressure — Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP) — Specifications for pipes, fittings and joints*

EN ISO 10931, *Plastics piping systems for industrial applications — Poly(vinylidene fluoride) (PVDF) - Specifications for components and the system (ISO 10931:2005)*

EN ISO 15493, *Plastics piping systems for industrial applications — Acrylonitrile-butadiene-styrene (ABS), unplasticized poly(vinyl chloride) (PVC-U) and chlorinated poly(vinyl chloride) (PVC-C) — Specifications for components and the system — Metric series (ISO 15493:2003)*

EN ISO 15494, *Plastics piping systems for industrial applications — Polybutene (PB), polyethylene (PE), polypropylene (PP) — Specifications for components and the system — Metric series (ISO 15494:2003)*

ISO 8779, *Polyethylene (PE) pipes for irrigation laterals — Specifications*

ISO 9625, *Mechanical joint fittings for use with polyethylene pressure pipes for irrigation purposes*

ISO 10467, *Plastics piping systems for pressure and non-pressure drainage and sewerage — Glass-reinforced thermosetting plastics (GRP) systems based on unsaturated polyester (UP) resin*

ISO 10639, *Plastics piping systems for pressure and non-pressure water supply — Glass-reinforced thermosetting plastics (GRP) systems based on unsaturated polyester (UP) resin*

ISO 14236, *Plastics pipes and fittings — Mechanical-joint compression fittings for use with polyethylene pressure pipes in water supply systems*

ISO 16422, *Pipes and joints made of oriented unplasticized poly(vinyl chloride) (PVC-O) for the conveyance of water under pressure — Specifications*

ISO 21004, *Plastics piping systems — Multilayer pipes and their joints, based on thermoplastics, for water supply*

NOTE This listing represents the situation at the time this document was published. It can be amended once new standards are developed.

Annex B
(normative)

Standards for assessment of conformity for buried and above-ground pressure piping systems in plastics materials for water for general purposes, drainage, sewerage, irrigation and other fluids

This annex is normative as far as the assessment of conformity information contained in the listed standards and referred to in Clause 6 for the essential characteristics is concerned. Otherwise it has the status of an informative annex.

ENV 1452-7:2000, *Plastics piping systems for water supply — Unplasticized poly(vinyl chloride) (PVC-U) — Part 7: Guidance for the assessment of conformity*

CEN/TS 1456-2:2003, *Plastics piping systems for buried and above-ground drainage and sewerage under pressure — Unplasticized poly(vinyl chloride) (PVC-U) — Part 2: Guidance for the assessment of conformity*

CEN/TS 12201-7:2003, *Plastics piping systems for water supply — Polyethylene (PE) — Part 7: Guidance for the assessment of conformity*

CEN/TS 13244-7:2003, *Plastics piping systems for buried and above-ground pressure systems for water for general purposes, drainage and sewerage — Polyethylene (PE) — Part 7: Guidance for the assessment of conformity*

CEN/TS 14632:2006, *Plastics piping systems for drainage, sewerage and water supply, pressure and non-pressure — Glass-reinforced thermosetting plastics (GRP) based on polyester resin (UP) — Guidance for the assessment of conformity*

NOTE This listing represents the situation at the time this document was published. It can be amended once new standards are developed.

Annex ZA
(informative)

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

ZA.1 Scope and relevant characteristics

This European Standard has been prepared under 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 construction products covered by this annex for their intended uses indicated herein; reference shall be made to the information accompanying the CE marking.

WARNING: Other requirements and other EU Directives, not affecting the fitness for intended use, can be applicable to the construction products falling within the scope of this European Standard.

NOTE 1 In addition to any specific clauses relating to dangerous substances contained in this standard, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the EU Construction Products Directive, these requirements need also to be complied with, when and where they apply.

NOTE 2 An informative database of European and national provisions on dangerous/regulated substances is available at the Construction web site on EUROPA
(accessed through http://europa.eu.int/comm/enterprise/construction/internal/dangsub/dangmain.htm).

This annex has the same scope as Clause 1 of this standard with regard to the products covered. It establishes the conditions for the CE marking of pipes and fittings made of plastics materials intended for the use indicated in Table ZA.1 and shows the relevant clauses applicable.

Table ZA.1 — Relevant clauses

Construction Product:	Pipes and fittings made of plastics materials
Intended uses:	Buried or above-ground conveyance of drainage, sewerage and non-drinking water under pressure; vacuum-operated soil and waste conveyance

Essential characteristics	Requirement clauses of this standard	Levels and/or classes	Notes
Reaction to fire	4.1	A to F	See classification in EN 13501-1
External pressure strength	4.2	none	Pass/fail
Internal pressure strength	4.3.2	none	Pass/fail
Dimensional tolerances	4.4	none	Pass/fail
Tightness: Air and liquid	4.5	none	Pass/fail
Durability	4.6	none	Classification of long-term strength performance

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 end 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 regard 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 Procedure for attestation of conformity of plastics pipes and fittings

ZA.2.1 Systems of attestation of conformity

The systems of attestation of conformity of plastics pipes and fittings indicated in Table ZA.1, in accordance with the Decision of the European Commission (1999/472/EC and amendment 2001/596/EC) as given in Annex III of the mandate M/131 for pipes, tanks and ancillaries not in contact with water intended for human consumption, is shown in Table ZA.2 for the indicated intended uses and relevant levels or classes.

Table ZA.2 — Systems of attestation of conformity

Products	Intended uses	Levels or classes	Attestation of conformity systems
Pipes, fittings and their joints	Above-ground pressure piping systems inside building subject to reaction to fire regulations	A1[(1)], A2[(1)], B[(1)] and C[(1)]	1 [a]
		A1[(2)], A2[(2)], B[(2)], C[(2)], D and E	3 [a]
		(A1 to E)[(3)] and F	4 [a]
	Buried or above-ground pressure piping systems not subject to fire regulations	None	4 [a]
[(1)] 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). [(2)] Products/materials not covered by footnote [(1)]. [(3)] 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, as amended).			
[a] System 1: See Directive 89/106/EEC (CPD) Annex III.2 (i), without audit testing of samples. System 3: See Directive 89/106/EEC (CPD) Annex III.2 (ii), second possibility. System 4: See Directive 89/106/EEC (CPD) Annex III.2 (ii), third possibility.			

The attestation of conformity of plastics pipes and fittings indicated in Table ZA.1 shall be according to the evaluation of conformity procedures indicated in Table ZA.3, Table ZA.4 or Table ZA.5, as applicable, resulting from the application of the clauses of this European Standard indicated therein.

Table ZA.3 — Assignment of evaluation of conformity tasks for pipes, fittings and their joints under system 1

Tasks		Content of task	Evaluation of conformity clauses to apply
Tasks under the responsibility of the manufacturer	Factory production control (FPC)	Parameters related to all declared characteristics of Table ZA.1	6.3
	Initial type testing	Except for "reaction to fire", all declared characteristics of Table ZA.1	6.2
Task under the responsibility of the notified body	Factory production control (FPC)	Reaction to fire	6.3
	Initial type testing	Reaction to fire	6.2
NOTE The factory production control procedures for reaction to fire to be carried out by the manufacturer may be determined by agreement with the notified body.			

Table ZA.4 — Assignment of evaluation of conformity tasks for pipes, fittings and their joints under system 3

Tasks		Content of task	Evaluation of conformity clauses to apply
Tasks under the responsibility of the manufacturer	Factory production control (FPC)	Parameters related to all declared characteristics of Table ZA.1	6.3
	Initial type testing	Except for "reaction to fire", all declared characteristics of Table ZA.1	6.2
	Initial type testing by a notified body (laboratory)	Reaction to fire	6.2

Table ZA.5 — Assignment of evaluation of conformity tasks for pipes, fittings and their joints under system 4

Tasks		Content of task	Evaluation of conformity clauses to apply
Tasks for the manufacturer	Factory production control (FPC)	Parameters related to all declared characteristics of Table ZA.1	6.3
	Initial type testing	All declared characteristics of Table ZA.1	6.2

ZA.2.2 EC Certificate and Declaration of conformity

In case of products with system 1: When compliance with the conditions of this annex is achieved, the certification body shall draw up a certificate of conformity (EC Certificate of conformity), which entitles the manufacturer to affix the CE marking. The certificate shall include:

— name, address and identification number of the certification body;

— 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, ...);

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

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

— number of the certificate;

— conditions and period of validity of the certificate, where applicable;

— name of, and position held by, the person empowered to sign the certificate.

In addition, the manufacturer shall draw up and retain a declaration of conformity (EC Declaration of conformity) including the following:

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

— name and address of the certification body;

— 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 information, it does not need to be repeated.

— provisions to which the product conforms (i.e. Annex ZA of this EN), and a reference to the initial type test report(s) and factory production control records (if appropriate);

— particular conditions applicable to the use of the product (if necessary);

— number of the accompanying EC Certificate of conformity;

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

In case of products under system 3: 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 (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 3 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 4 Where some of the information required for the declaration is already given in the CE marking information, it does not need to be repeated.

— provisions to which the product conforms (i.e. Annex ZA of this EN), and a reference to the initial type test report(s) and factory production control records (if appropriate);

— particular conditions applicable to the use of the product, (if necessary);

— name and address of the notified laboratory(ies);

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

In case of products under system 4: When compliance with this annex is achieved, the manufacturer or his agent established in the EEA shall draw up and retain a declaration of conformity (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 5 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 6 Where some of the information required for the declaration is already given in the CE marking information, it does not need to be repeated.

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

— particular conditions applicable to the use of the product (if necessary);

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

The above mentioned declaration and certificate shall be presented in the official language(s) or language(s) accepted in the Member State in which the product is to be used.

NOTE 7 Duplication of information between the declaration and certificates should be avoided. To avoid duplication of information, cross-reference between documents may be made when one contains more information than the other.

ZA.3 CE marking and labelling

ZA.3.1 CE marking requirements

The manufacturer or his authorised representative established within the EEA is responsible for the affixing of the CE-marking. The CE-marking symbol to affix shall be in accordance with Directive 93/68/EEC and shall be shown on the pipes and fittings, or it may be on the accompanying label or on the packaging or on the accompanying commercial documents e.g. a delivery note.

The CE marking symbol may be placed alone on the product. If this option is used the CE marking symbol shall appear again in another location including the information as required in ZA.3.1 or ZA.3.2, as applicable.

The following information shall accompany the CE marking symbol (where relevant):

— identification number of the certification body (only for products under system 1);

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

— number of the EC Certificate of conformity (only for products under system 1);

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

— reference to this European Standard;

— description of the product: generic name, material, dimensions, ... and intended use (may be by code or by reference to a specification);

— information on those relevant essential characteristics listed in Table ZA.1 which are to be declared:

  — declared values and, where relevant, level or class (including “pass” for pass/fail requirements, where necessary) to declare for each essential characteristic as indicated in "Notes" in Table ZA.1;

  — “No performance determined” for characteristics where this is relevant;

  — as an alternative, a standard designation which shows some or all of the relevant characteristics (where the designation covers only some characteristics, it will need to be supplemented with declared values for other characteristics as above).

The "No performance determined" NPD option may not be used where the characteristic is subject to a threshold level. Otherwise, the 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 of destination.

Figure ZA.1 gives an example of the information to be given on the product, label, packaging and/or commercial documents.

Figure ZA.1 — Example of CE marking information

NOTE 1 The identification of the notified body is only relevant for systems 1.

NOTE 2 Reference to the Certificate number can only be made under systems 1.

In addition to any specific information relating to dangerous substances, the product should also be accompanied, when and where required and in the appropriate form, by documentation listing any other legislation on dangerous substances for which compliance is claimed, together with any information required by that legislation.

NOTE 3 European legislation without national derogations need not be mentioned.

ZA.3.2 Simplified CE marking with reference to a web site

ZA.3.2.1 General

In situations when a manufacturer wants to use a web site to provide the information required for CE marking as given in ZA.3.1 then a simplified CE marking may be used and affixed on the product itself, on a label attached to it, on its packaging or on the accompanying commercial documents.

Such simplified CE marking shall contain all information mentioned in ZA.3.1 except the information on relevant essential characteristics listed in Table ZA.1. Instead of this list of characteristics an unambiguous reference shall be used allowing the declared performances for this specific product to be obtained. The minimum rules for the proper use of a web site for the CE marking, complementing the simplified CE marking information are given in ZA.3.2.2.

These references shall be:

— address of a web site providing the information on the characteristics;

— unique, unambiguous reference, permitting the retrieval of the complete information required in ZA.3.1 belonging to the product to which the simplified CE marking is affixed. When products are modified leading to changes in performances, this shall be clearly identifiable.

In addition the following minimum information shall be specified on the simplified CE marking (where relevant):

— identification number of the certification body (only for products under system 1);

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

— number of the EC Certificate of conformity (only for products under system 1);

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

— reference to this European Standard;

— material (may be by code or by reference to a specification);

— dimensions;

— declared performance of the product: strength, level or class (where relevant);

— intended use (may be in codified format or by reference to a product specification etc.);

Figure ZA.2 gives an example of the short format information to be given on the product, label, packaging and/or commercial documents.

CE 01234	← CE conformity marking, consisting of the "CE"-symbol given in Directive 93/68/EEC. ← Identification number of the certification body (where relevant, see NOTE 1)
AnyCo Ltd **07** 01234-CPD-00234	← Name or identifying mark of the manufacturer Last two digits of the year in which the marking was affixed Certificate number (where relevant, see NOTE 2)
EN 15014	← Number of this European Standard
Pipe of PVC-U DN 250 - PN 10 P	← Name and material ← Dimension and pressure class ← Intended use (may be by code or by reference to a specification). For guidance see CEN/TR 15438:2007 [1]
www.anyco.com/ce/[Tracking reference]	← Accurate unique, unambiguous reference to the part of the website where the characteristics of Table ZA.1 are given (see NOTE 3)

Figure ZA.2 — Example of CE marking information with a link to a web site

NOTE 1 The identification of the notified body is only relevant for systems 1.

NOTE 2 Reference to the Certificate number can only be made under systems 1.

NOTE 3 The tracking reference can be by reference to e.g. "Catalogue 2007/1" or "Code and Batch number" of the product etc. It is up to the manufacturer to define its tracking reference of the product.

In addition to any specific information relating to dangerous substances, the product should also be accompanied, when and where required and in the appropriate form, by documentation listing any other legislation on dangerous substances for which compliance is claimed, together with any information required by that legislation.

NOTE 4 European legislation without national derogations need not be mentioned.

ZA.3.2.2 Minimum rules for the proper use of a web site for CE marking information

When the conditions set in ZA.3.2.1 are met, the requirements permitting the use of a web site should comply with the following provisions:

— with the unique, unambiguous reference given on the simplified label for CE marking, the complete CE marking information as given in ZA.3.1 for this specific product shall be provided;

— web site information on CE marking shall be suitably protected, preventing modification of data by external parties;

— web site information shall be dated;

— as far as the unique, unambiguous reference of the product is concerned the information shown on the simplified version of the CE marking shall be at all times coherent with the information on the web site. Changes to the CE marking information on the web site shall be reflected by a new unique, unambiguous reference of the product and consequently by a new simplified CE marking;

— web site shall allow printing the data. The print outs shall clearly reproduce all data accompanying the CE symbol as given in ZA.3.1 and the web site address;

— access to web sites, which shall allow consultation with all possible internet browsers, shall be available at all times (except for short maintenance periods);

— web site data management shall be subject to a manufacturer's procedure, ensuring that internal responsibilities as regards the data on the website are laid down.

Bibliography

[1] CEN/TR 15438:2007, *Plastics piping systems — Guidance for coding of products and their intended uses*

[2] prEN 15389:2005, *Industrial valves — Performance characteristics of thermoplastic valves when used as construction products*

[3] EN ISO 16135, *Industrial valves — Ball valves of thermoplastics materials (ISO 16135:2006)*

[4] EN ISO 16136, *Industrial valves — Butterfly valves of thermoplastic materials (ISO 16136:2006)*

[5] EN ISO 16137, *Industrial valves — Check valves of thermoplastic materials (ISO 16137:2006)*

[6] EN ISO 16138, *Industrial valves — Diaphragm valves of thermoplastic materials (ISO 16138:2006)*

[7] EN ISO 16139, *Industrial valves — Gate valves of thermoplastic materials (ISO 16139:2006)*

[8] EN ISO 21787, *Industrial valves — Globe valves of thermoplastic materials (ISO 21787:2006)*

[9] EN 1452-4, *Plastics piping systems for water supply — Unplasticized poly(vinyl chloride) (PVC-U) — Part 4: Valves and ancillary equipment*

[10] EN 12201-4, *Plastics piping systems for water supply — Polyethylene (PE) — Part 4: Valves*

[11] EN 13244-4, *Plastics piping systems for buried and above-ground pressure systems for water for general purposes, drainage and sewerage — Polyethylene (PE) — Part 4: Valves*

[12] EN 1452-2, *Plastics piping systems for water supply — Unplasticized poly(vinyl chloride) (PVC-U) — Part 2: Pipes*

[13] EN 1778, *Characteristic values for welded thermoplastic constructions — Determination of allowable stresses and moduli for design of thermoplastics equipment*

[14] ISO 13761, *Plastics pipes and fittings — Pressure reduction factors for polyethylene pipeline systems for use at temperature above 20 °C*

National Annex NA (informative)
Product standards used in conjunction with this standard

BS 5391-1:2006 *Acrylonitrile-butadiene styrene (ABS) pressure pipe – Part 1: Specification*

BS 5392-1:2006 *Acrylonitrile-butadiene styrene (ABS) fittings for use with ABS pressure pipe – Part 1: Specification*

BS EN 1452 *Plastics piping systems for water supply – Unplasticized poly(vinyl chloride) (PVC-U) – Part 1: General, Part 2: Pipes, Part 3: Fittings, Part 5: Fitness for purpose of the system*

BS EN 1456-1 *Plastics piping systems for buried and above ground drainage and sewerage under pressure Unplasticized poly(vinyl chloride) (PVC-U) – Part 1: Specifications for piping components and the system*

BS EN 1796 *Plastics piping systems for water supply with or without pressure – Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP)*

BS EN 12201 *Plastics piping systems for water supply – Polyethylene (PE) – Part 1: General, Part 2: Pipes, Part 3: Fittings, Part 5: Fitness for purpose of the system*

BS EN 13244 *Plastics piping systems for buried and above-ground pressure systems for water for general purposes, drainage and sewerage – Polyethylene (PE) – Part 1: General, Part 2: Pipes, Part 3: Fittings, Part 5: Fitness for purpose of the system*

BS EN 14364 *Plastics piping systems for drainage and sewerage with or without pressure – Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP)*

BS EN ISO 10931 *Plastics piping systems for industrial applications – Poly(vinylidene fluoride) (PVDF) – Specifications for components and the system*

BS EN ISO 15493 *Plastics piping systems for industrial applications – Acrylonitrile-butadiene-styrene (ABS), unplasticized poly(vinyl Chloride) (PVC-U) and chlorinated poly(vinyl chloride) (PVC-C) – Specifications for components and piping systems – Metric series*

BS EN ISO 15494 *Plastics piping systems for industrial applications – Polybutylene (PB), polyethylene (PE)< polypropylene (PP) – Specifications for components and piping systems – Metric series*

ISO 8779 *Polyethylene (PE) pipes for irrigation laterals – Specifications*

ISO 9625 *Mechanical joint fittings for use with polyethylene pressure pipes for irrigation purposes*

ISO 10467 *Plastics piping systems for non-pressure drainage and sewerage – Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP)*

ISO 10639 *Plastics piping systems for pressure and non-pressure water supply – Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP)*

ISO 14236 *Plastics pipes and fittings – Mechanical-joint compression fittings for use with polyethylene pressure pipes in water supply systems*

ISO 16422 *Pipes and joints made of orientated unplasticized poly(vinyl chloride) (PVC-O) for the conveyance of water – Specifications*

ISO 21004 *Plastics piping systems – Multilayer pipes and their joints, based on thermoplastics, for water supply*

NOTE This listing represents the situation at the time this document was published.

blank

BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: +44 (0)20 8996 9000. Fax: +44 (0)20 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: +44 (0)20 8996 9001. Fax: +44 (0)20 8996 7001. Email: orders@bsi-global.com. Standards are also available from the BSI website at http://www.bsi-global.com.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre. Tel: +44 (0)20 8996 7111. Fax: +44 (0)20 8996 7048. Email: info@bsi-global.com.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: +44 (0)20 8996 7002. Fax: +44 (0)20 8996 7001. Email: membership@bsi-global.com.

Information regarding online access to British Standards via British Standards Online can be found at http://www.bsi-global.com/bsonline.

Further information about BSI is available on the BSI website at http://www.bsi-global.com.

Copyright

BSI
389 Chiswick High Road
London
W4 4AL