DRAFT FOR DEVELOPMENT

DD ENV
1453-2:2001

Plastics piping systems with structured wall pipes for soil and waste discharge (low and high temperature) inside buildings — Unplasticized poly(vinyl chloride) (PVC-U) —

Part 2: Guidance for the assessment of conformity

ICS 23.040.20; 91.140.80

National foreword

This Draft for Development is the official English language version of ENV 1453-2:2000. It is specifically intended to give guidance for the assessment of conformity to BS EN 1453-1:2000 of unplasticized poly(vinyl chloride) (PVC-U) structured-wall piping system components and their joints.

(No existing British Standard was superseded by BS EN 1453-1:2000).

There is no British Standard corresponding to ENV 1453-2:2000. The publication of this DD ENV does not imply that its use is mandatory. Unless any specific aspects of ENV 1453-2 are called up on a normative basis in EN 1453-1, this DD ENV is available for optional use in conjunction with any other existing procedures for such purposes. The intention is to enable the published European Standards and associated documents to be applied on a consistent and trial basis where industry specifiers choose to specify them.

The UK participation in its preparation was entrusted by Technical Committee PRI/88, Plastics piping systems and components (previously PRI/61) to Sub-committee PRI/88/1, Thermoplastics piping for non-pressure applications (previously PRI/61/1), which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

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

The responsible UK technical committee offers the following advice in respect of the contents of this standard.

Attention is drawn to the fact that the requirements drafted in EN 1453-1:2000 are appropriate only to components installed strictly inside the building structure, since they contain no specific requirements for weather resistance and the requirements for impact resistance are less stringent than those which were contained in BS 4514:1983.

Subcommittee PRI/88/1 would therefore welcome any comments to assist the further development of this draft for future use.

Cross-references

The British Standards which implement these international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled "International Standards Correspondence Index", or by using the "Find" facility of the BSI Standards Electronic Catalogue.

Warning This Draft for Development, which is identical with ENV 1453-2:2000, does not necessarily detail all the precautions necessary to meet the requirements of the Health and Safety at Work etc. Act 1974 and subsequent legislation. Attention should be paid to any appropriate safety precautions and the test methods should be operated only by trained personnel.

A Draft for Development does not purport to include all the necessary provisions of a contract. Users of such Drafts are responsible for their correct application.

Compliance with a Draft for Development does not of itself confer immunity from legal obligations.

This Draft for Development is not to be regarded as a British Standard.

This Draft for Development, having been prepared under the direction of the Sector Committee for Materials and Chemicals, was published under the authority of the Standards Committee and comes into effect on 15 April 2001

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ENV 1453-2

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English version

Plastics piping systems with structured wall pipes for soil and waste discharge (low and high temperature) inside buildings - Unplasticized poly(vinyl chloride) (PVC-U) - Part 2: Guidance for the assessment of conformity

Systèmes de canalisations en plastique avec des tubes à paroi structurée pour l'évacuation des eaux-vannes et des eaux usées (à basse et à haute température) à l'intérieur du bâtiment - Poly(chlorure de vinyle) non plastifié (PVC-U) - Partie 2: Guide pour l'évaluation de la conformité

Kunststoff-Rohrleitungssysteme mit Rohren mit profilierter Wandung und glatten Rohroberflächen zum Ableiten von Abwasser (niedriger und hoher Temperatur) innerhalb von Gebäuden - Weichmacherfreies Polyvinylchlorid (PVC-U) - Teil 2: Empfehlungen für die Beurteilung der Konformität

This European Prestandard (ENV) was approved by CEN on 10 August 2000 as a prospective standard for provisional application.

The period of validity of this ENV is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the ENV can be converted into a European Standard.

CEN members are required to announce the existence of this ENV in the same way as for an EN and to make the ENV available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the ENV) until the final decision about the possible conversion of the ENV into an EN is reached.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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

Ref. No. ENV 1453-2:2000 E

Contents

Foreword

This European Prestandard has been prepared by Technical Committee CEN/TC 155 "Plastics piping systems and ducting systems", the secretariat of which is held by NEN.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this European Prestandard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

This document is currently submitted to the Formal Vote.

This prestandard can be used to support elaboration of national third party certification procedures for products conforming to EN 1453-1.

This prestandard is a Part of a System Standard for plastics piping systems of a particular material for a specified application. There are a number of such System Standards.

System Standards are based on the results of the work undertaken in ISO/TC 138 "Plastics pipes, fittings and valves for the transport of fluids", which is a Technical Committee of the International Organisation for Standardisation (ISO).

They are supported by separate standards on test methods to which references are made throughout the System Standard.

The System Standards are consistent with general standards on functional requirements and on recommended practice for installation.

EN 1453 consists of the following Parts, under the general title "*Plastics piping systems with structured wall pipes for soil and waste discharge (low and high temperature) inside buildings – Unplasticized poly(vinyl chloride) (PVC-U)*".

– *Part 1: Specifications for pipes and the system ;*

– *Part 2: Guidance for the assessment of conformity (ENV) ;*

This Part of EN 1453 includes a bibliography.

Introduction

The System Standard, of which this is Part 2, specifies the requirements for a piping system and its pipes when made from unplasticized poly(vinyl chloride) (PVC-U). The piping system is intended to be used for soil and waste discharge.

For material and pipes, requirements and characteristics for fitness for purpose (mainly for joints) are covered in Part 1 of EN 1453. Recommended practice for installation is given in ENV 13801.

This Part of EN 1453 covers procedures and recommendations for the assessment of conformity of materials, pipes, joints and assemblies and is intended to be used by certification bodies, inspection bodies, testing laboratories and manufacturers.

1 Scope

This European Prestandard gives guidance for the assessment of conformity to be included in the manufacturer's quality plan as part of the quality system.

This prestandard includes :

a) Requirements for materials, pipes, joints and assemblies given in EN 1453-1 ;

b) Requirements for the manufacturer's quality system ;

NOTE 1 It is recommended that the quality system conforms to EN ISO 9001 or EN ISO 9002, as applicable.

c) Definitions and procedures to be applied if third party certification is involved.

NOTE 2 If third party certification is involved, it is recommended that the certification body is accredited to EN 45011 or EN 45012, as applicable.

This Part of EN 1453 is applicable to piping systems with structural-wall pipes made from unplasticized poly(vinyl chloride) (PVC-U) in the field of soil and waste discharge systems (low and high temperature) inside buildings (application area code "B").

2 Normative references

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

EN 1453-1:2000, *Plastics piping systems with structured-wall pipes for soil and waste discharge (low and high temperature) inside buildings — Unplasticized poly(vinyl chloride) (PVC-U) — Part 1: Specifications for pipes and the system.*

ISO 2859-1, *Sampling procedures for inspection by attributes — Part 1 : Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection.*

3 Definitions, symbols and abbreviations

For the purposes of this prestandard, the definitions, symbols and abbreviations given in EN 1453-1:2000, apply together with the following :

3.1 Definitions

3.1.1
certification body
impartial body, governmental or non-governmental, possessing the necessary competence and responsibility to carry out certification of conformity according to given rules of procedure and management

3.1.2
inspection body
impartial organization or company, approved by a certification body as possessing the necessary competence to verify and/or to carry out initial type testing, audit testing and inspection of the manufacturer's factory production control in accordance with the relevant European Standard

3.1.3
testing laboratory
laboratory which measures, tests, calibrates or otherwise determines the characteristics of the performance of materials and products

3.1.4
quality system
organizational structure, responsibilities, procedures, processes and resources for implementing quality management (see EN ISO 8402)

3.1.5
quality plan
document setting out the specific quality practices, resources and sequence of activities relevant to a particular product or range of products

3.1.6
type testing (TT)
tests performed to prove that the material, component, joint or assembly is capable of conforming to the requirements given in the relevant standard

3.1.6.1
preliminary type testing (PTT)
type testing carried out by or on behalf of the manufacturer

3.1.6.2
initial type testing (ITT)
type testing carried out by, or on behalf of a certification body for certification purposes

3.1.7
batch release test (BRT)
test performed by the manufacturer on a batch of components which has to be satisfactorily completed before the batch can be released

3.1.8
process verification test (PVT)
test performed by the manufacturer on materials, components, joints or assemblies at specified intervals to confirm that the process continues to be capable of producing components conforming to the requirements given in the relevant standard

NOTE Such tests are not required to release batches of components and are carried out as a measure of process control.

3.1.9
audit test (AT)
test performed by, or on behalf of a certification body to confirm that the material, component, joint or assembly continues to conform with the requirements given in a System Standard and to provide information to assess the effectiveness of the quality system

3.1.10
indirect test (IT)
test performed by the manufacturer different from that specified for that particular characteristic, having verified its correlation with the specified test

3.1.11
witness testing (WT)
testing accepted by the certification body for initial type testing and/or audit testing, which is carried out by, or on behalf of the manufacturer and supervised by a representative of the certification body, qualified in testing

3.1.12
material
defined type of polymer or additive or constituent thereof

3.1.13
compound (blend)
recipe which defines types of polymer, additives or constituents at specified dosage levels.

3.1.14
material batch or compound batch
clearly identifiable quantity of a particular material or compound

3.1.15
production batch
clearly identifiable collection of units, manufactured consecutively under the same conditions, using material or compound conforming to the same specification

3.1.16
lot
clearly identifiable sub-division of a batch for inspection purposes

3.1.17
sample
one or more units of product drawn from a batch or lot, selected at random without regard to quality

NOTE The number of units of product in the sample is the sample size

3.1.18
inspection level
relationship between the lot or batch size and the sample size (see ISO 2859-1)

3.1.19
group
collection of similar components from which samples are selected for testing purposes

3.2 Abbreviations

NOTE For reasons of avoiding misunderstanding the following abbreviations are kept the same in each languages. For the same reason the terms are given in the three languages.

AT E : audit test
F : essai d'audit
D : Überwachungsprüfung

BRT E : batch release test
F : essai de libération de campagne de fabrication
D : Freigabeprüfung einer Charge

IT E : indirect test
F : essai indirect
D : indirekte Prüfung

ITT E : initial type testing
F : essai de type initial
D : Erst-Typprüfung

PTT E : preliminary type testing
F : essai de type préliminaire
D : vorausgehende Typprüfung

PVT E : process verification test
F : essai de vérification du procédé de fabrication
D : Prozessüberprüfung

TT E : type test
F : essai de type
D : Typprüfung

WT E : witness testing
F : essai témoin
D : Prüfung unter Aufsicht

4 Requirements

4.1 General

4.1.1 Materials, pipes, joints and assemblies shall conform to the requirements given in EN 1453-1:2000.

4.1.2 Pipes and/or assemblies shall be produced by the manufacturer under a quality system which includes a quality plan. The quality system should conform to EN ISO 9001 or EN ISO 9002, as applicable.

4.2 Testing and inspection

4.2.1 Material specification

For the purposes of this prestandard the material specification consists of a recipe/compound which defines types of PVC and additives and their dosage levels.

The dosage level of ingredients of a material shall not exceed the tolerance bands given in Table 1. If any level exceeds the dosage band or if a type is changed, this variation in formulation constitutes a change in material.

The values of the parts *X* added to 100 parts by mass of PVC shall be specified by the manufacturer in his quality plan.

Table 1 — Material specification

Ingredients	Type	Band
PVC resin	K value : ± 3 units	X_1 = 100 parts
Type of stabiliser or master batch	Pb Ca-Zn Sn Ca-Sn Others	X_2 : ± 25 %
Lubricants	All	X_3 : ± 50% for $X_3 \leq 0,2$ X_3 : ± 0,1 part for $X_3 > 0,2$
Fillers	$CaCO_3$ Others	X_4 : ± 3 parts X_5 : ± 25%
Impact modifiers	All	X_6 : ± 1 part
Flow agents	All	X_7 : ± 25% for $X_7 \leq 2$ X_7 : ± 0,5 part for $X_7 > 2$
Pigments	No requirements	-
Others	To be separately specified by the manufacturer	$X_{8.1}$: ± 25 % ……. $X_{8.n}$: ± 25 %
External reprocessable and recyclable material	With an agreed specification [1)]	$\leq X_9$ [2)]
External reprocessable and recyclable material	Not covered by an agreed specification	$\leq X_{10}$ [3)]

1) The specifications shall be declared by the manufacturer to the certification body.

2) See limitations in A.2.2.2 of EN 1453-1:2000.

3) See limitations in A.2.3.1 of EN 1453-1:2000.

4.2.2 Grouping

For the purposes of this prestandard the following groups shall apply for TT, PTT, ITT, PVT and AT.

Three size groups, each comprising a group of nominal sizes DN, are designated as follows:

Size group 1 : 32 to 63

Size group 2 : 75 to 180

Size group 3 : 200 to 315

4.2.3 Type tests (TT)

4.2.3.1 General

Type tests shall demonstrate that the products conform to all requirements for the characteristics given in Tables 2 and 3 as applicable.

In addition, relevant type tests shall be carried out whenever there is a change in design, in material and/or in the production method, other than routine in-process adjustments, and to extensions of the product range as indicated in Tables 2 and 3 as applicable.

Table 2 — Characteristics of pipes that require type testing (TT)

Characteristics	References to paragraphs and tables of EN 1453-1:2000	Testing relevant to [1]				Sampling procedure (minimum sampling)
		N	D	M	E	
PVC content [2]	4.1	+	-	+	-	one calculation/material
Appearance	5.1	+	-	-	+	once/size group
Colour	5.2	+	-	-	+	once/size group
Geometrical characteristics	6.2 and 6.3 Tables 1 to 7	+	+	-	+	once/size
Impact resistance (round the clock method)	7.1 – Table 8	+	-	+	+	once/size group/material once/material
Impact resistance [3] (staircase method)	7.2 – Table 10	+	-	+	+	once/size group/material once/material
Vicat softening temperature	8 – Table 11	+	-	+	-	once/material
Longitudinal reversion	8 – Table 11	+	-	-	+	once/size group
Degree of gelation	8 – Table 11	+	-	+	+	once/size group/material once/material
Marking	12 – Table 13	+	-	-	+	once/size

1) N : new system
D : change of design (only for sockets)
M : change of material
E : extension of the product range (except the products already covered by the scheme of a minimum sampling procedure).

2) Done by calculation using Table 1.

3) Only for pipes intended also to be installed at temperature below –10 °C. If this test is required, the round-the-clock method is not necessary.

Table 3 — Characteristics for fitness for purpose of the system that require type testing

Characteristics	References to paragraphs and tables of EN 1453-1:2000	Testing relevant to [1]				Sampling procedure (minimum sampling)
		N	D	M	E	
Water tightness	9 – Table 12	+	+	-	+	once/size group/joint design [2]
Air tightness	9 – Table 12	+	+	-	+	once/size group/joint design [2]
Elevated temperature cycling	9 – Table 12	+	+	+	-	once/material/joint design [2]
1) See note 1 in Table 2.						
2) Joint design at least includes: seal design, groove geometry and seal hardness (± 5 IHRD).						

4.2.3.2 Preliminary type testing (PTT)

The manufacturer shall demonstrate that the products conform to all requirements for all characteristics given in Tables 2 and 3 as applicable.

4.2.3.3 Initial type testing (ITT)

If third party certification is involved, the certification body shall assess the conformity of a product to all requirements for the characteristics given in Tables 2 and 3 as applicable.

The assessment shall be performed by validation or testing, using the sampling procedure given in Tables 2 and 3 as applicable and grouping according to 4.2.2 in an approved testing laboratory or by witness testing.

Validated preliminary test data including long-term characteristics, supplied by the manufacturer and traceable to material or compound and process, shall be taken into account for initial type testing.

4.2.4 Batch release tests (BRT)

Those characteristics specified in EN 1453-1:2000 and listed in Table 4 shall be batch release tested with the minimum sampling frequency as given in this table.

The manufacturer shall specify a batch or a lot size in his quality plan.

A batch or lot shall only be released for supply when all the relevant tests and inspections have been carried out at least once at the specified frequencies and the requirements have been conformed to.

If a product fails in respect of any characteristic given in Table 4, the batch or lot shall be rejected or the retest procedures shall be performed for the characteristic on which the product failed.

The retest procedure shall conform to Table 4 and shall conform to procedure A as follows.

Procedure A

Find the last product which conforms to the requirements as specified in EN 1453-1:2000.

Release all products produced before that point and reject the products produced after that point.

If the retest requirements are conformed to then release the batch or lot. If they are not conformed then reject the batch or lot.

Procedures for dealing with rejected products shall be detailed in the manufacturer's quality plan.

Table 4 — Characteristics of pipes and minimum sampling frequencies BRT and retesting procedure

Characteristics	Reference to paragraphs and tables of EN 1453-1:2000	Minimum sampling frequency per production line	Retest procedure
Appearance/colour	5	once/8 h	A
Mean outside diameter	6.2.1 – Table 1	once/8 h and starting up	A
Wall thickness	6.2.5 – Tables 2 and 3	once/8 h and starting up	A
Length of pipe	6.2.3	once/8 h and starting up	A
Chamfer [1)]	6.2.4	once/8 h and starting up	A
Socket dimensions [2)]	6.3 – Tables 4 to 7	once/8 h and starting up	A
Impact resistance (round the clock method)	7.1 – Tables 8 and 9	once/24 h [3)]	A
Impact resistance (staircase method) [4)]	7.2 – Table 10	once/24 h [3)]	A
Longitudinal reversion	8 – Table 11	once/24 h	A
Degree of gelation	8 – Table 11	once/24 h and starting up	A
Marking	12.2 – Table 13	once/8 h	A

1) If a chamfer is required.

2) For dimensions which are influenced by the process, otherwise only at start up.

3) Once/8 h when external reprocessable or recyclable material not covered by an agreed specification (see A.2.3.1 of EN 1453-1:2000) is used.

4) If this test is carried out, the round the clock method is not necessary.

4.2.5 Process verification tests (PVT)

Those characteristics specified in EN 1453-1:2000 and listed in Table 5, shall be process verification tested with the minimum sampling frequency as given in this table, if not type tested or audit tested in the same period.

If the product does not conform to the requirements in respect of any characteristic given in Table 5, the retest procedure detailed in the manufacturer's quality plan shall be performed. The certification body shall be informed.

If the retest procedure does not confirm conformity of the product with the requirements, then the process shall be investigated and corrected in accordance with the procedures given in the manufacturer's quality plan.

Table 5 — Characteristics and minimum sampling frequencies for PVT

	Characteristics	References to paragraphs and tables of EN 1453-1:2000	Minimum sampling frequency
Pipes	Vicat softening temperature	8 – Table 11	once/year/material currently used
System	Watertightness	9 – Table 12	once/2 years/size group/socket design/series [1)]
	Airtightness	9 – Table 12	once/2 years/size group/socket design/series [1)]
	Elevated temperature cycling	9 – Table 12	once/2 years/size group/socket design/series
1) Joint design at least includes : seal design, groove geometry and seal hardness (± 5 IHRD).			

4.2.6 Audit tests (AT)

If third party certification is involved, those characteristics specified in EN 1453-1:2000, and listed in Table 6 are intended to be audit tested with the minimum sampling frequency as given in this table.

Table 6 — Characteristics and minimum sampling frequencies for AT

	Characteristics	References to paragraphs and tables of EN 1453-1:2000	Minimum sampling frequencies
Pipes	PVC content [1)] Vicat softening temperature	4.1 8 – Table 11	once /year
	Appearance/colour Geometrical characteristics Impact resistance (round the clock method) Impact resistance (staircase method) [2)] Longitudinal reversion Degree of gelation Marking	5 6.2 7.1 – Table 8 7.2 – Table 10 8 – Table 11 8 – Table 11 12 – Table 13	once/year/size group/series
System	Water tightness	9 – Table 12	once/year one dimension/series
	Air tightness	9 – Table 12	once/year one dimension/series
	Elevated temperature cycling	9 – Table 12	once/2 years joint type/series
1) Done by calculation using Table 1. 2) Only for pipes intended also to be installed at temperature below –10 °C. If this test is required, the round-the-clock method is not necessary.			

NOTE 1 The sizes, types and classes selected for tests should be primarily those which have not previously been selected for audit testing. Samples should be preferably taken from the largest volume of production per group.

NOTE 2 It is expected that audit testing will be carried out over at least two visits each year.

NOTE 3 PVT and audit testing can be combined.

4.2.7 Indirect tests (IT)

Generally testing shall be performed according to the test methods referred to EN 1453-1:2000.

For the purposes of this prestandard indirect testing may be used for BRT characteristics as given in Table 4.

Indirect testing shall not be applied to TT, PVT and AT.

The indirect test method used and the correlation or safe relationship of the indirect testing to the specified testing shall be documented in the manufacturer's quality plan and the IT shall be agreed by the certification body. The continuing validity of the indirect testing shall be checked at regular intervals.

In cases of dispute the BRT as specified in Table 4 shall be used.

NOTE Indirect testing can be used to reduce the frequency of the specified BRT, but it is not intended to replace these tests completely.

4.2.8 Inspection records and test records

Unless otherwise specified all records of BRT shall be maintained for a minimum of 2 years and all other records for a minimum of 4 years.

Bibliography

ENV 13801, *Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure — Thermoplastics — Recommended practice for installation*

EN 45011, *General requirements for bodies operating product certification systems (ISO/IEC Guide 65:1996)*

EN 45012, *General requirements for bodies operating assessment and certification/registration of quality systems (ISO/IEC Guide 62:1996)*

EN ISO 8402, *Quality management and quality assurance — Vocabulary (ISO 8402:1994)*

EN ISO 9001, *Quality systems — Model for quality assurance in design, development, production, installation and servicing (ISO 9001:1994, including Technical Corrigendum 1:1995)*

EN ISO 9002, *Quality systems — Model for quality assurance in production, installation and servicing (ISO 9002:1994, including Technical Corrigendum 1:1995)*

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