PD CEN/TS 13598-3:2012

BSI Standards Publication

Plastics piping systems for non-pressure underground drainage and sewerage — Unplasticized poly(vinyl chloride)(PVC-U), polypropylene (PP) and polyethylene (PE)

Part 3: Guidance for assessment of conformity

bsi.

...making excellence a habit.™

National foreword

This Published Document is the UK implementation of CEN/TS 13598-3:2012.

The UK participation in its preparation was entrusted by Technical Committee PRI/88, Plastics piping systems, to Subcommittee PRI/88/1, Plastics piping for non-pressure applications.

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

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

Published by BSI Standards Limited 2012

ISBN 978 0 580 76362 5

ICS 93.030

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

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 May 2012.

Amendments issued since publication

Amd. No.	Date	Text affected

TECHNICAL SPECIFICATION

SPÉCIFICATION TECHNIQUE

TECHNISCHE SPEZIFIKATION

CEN/TS 13598-3

April 2012

ICS 93.030

English Version

Plastics piping systems for non-pressure underground drainage and sewerage - Unplasticized poly(vinyl chloride)(PVC-U), polypropylene (PP) and polyethylene (PE) - Part 3: Guidance for assessment of conformity

Systèmes de canalisations en plastique pour les branchements et les collecteurs d'assainissement enterrés sans pression - Poly(chlorure de vinyle) non plastifié (PVC-U), polypropylène (PP) et polyéthylène (PE) - Partie 3: Guide pour l'évaluation de la conformité

Kunststoff-Rohrleitungssysteme für erdverlegte drucklose Abwasserkanäle und -leitungen - Weichmacherfreies Polyvinylchlorid (PVC-U), Polypropylen (PP) und Polyethylen (PE) - Teil 3: Empfehlungen für die Beurteilung der Konformität

This Technical Specification (CEN/TS) was approved by CEN on 14 February 2012 for provisional application.

The period of validity of this CEN/TS 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 CEN/TS can be converted into a European Standard.

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

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, 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, Turkey and United Kingdom.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. CEN/TS 13598-3:2012: E

Contents

Page

Foreword

This document (CEN/TS 13598-3:2012) has been prepared by Technical Committee CEN/TC 155 “Plastics piping systems and ducting systems”, the secretariat of which is held by NEN.

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

EN 13598, *Plastics piping systems for non-pressure underground drainage and sewerage — Unplasticized poly(vinyl chloride)(PVC-U), polypropylene (PP) and polyethylene (PE)* is composed of the three following parts:

— *Part 1: Specifications for ancillary fittings including shallow inspection chambers*;

— *Part 2: Specifications for manholes and inspection chambers in traffic areas and deep underground installations*;

— *Part 3: Guidance for assessment of conformity* (CEN/TS) (the present document).

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, 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, Turkey and the United Kingdom.

Introduction

Figures 1 and 2 are intended to provide general information on the concept of testing and organisation of those tests used for the purpose of the assessment of conformity. For each type of tests (i.e. type testing (TT), batch release test (BRT), process verification test (PVT) and audit test (AT), this document details the applicable characteristics to be assessed and the frequency and sampling of testing.

A typical scheme for the assessment of conformity of compounds, products and assemblies by manufacturers is given in Figure 1.

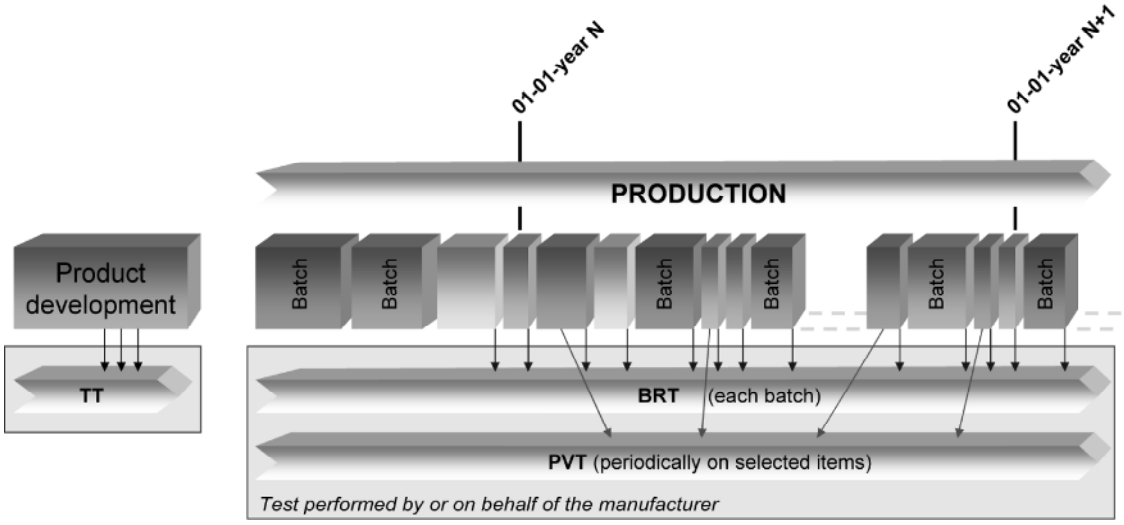

Figure 1 — Typical scheme for the assessment of conformity by a manufacturer

A typical scheme for the assessment of conformity of *compounds, formulations*, pipes, fittings, or assemblies by manufacturers, is given in Figure 2.

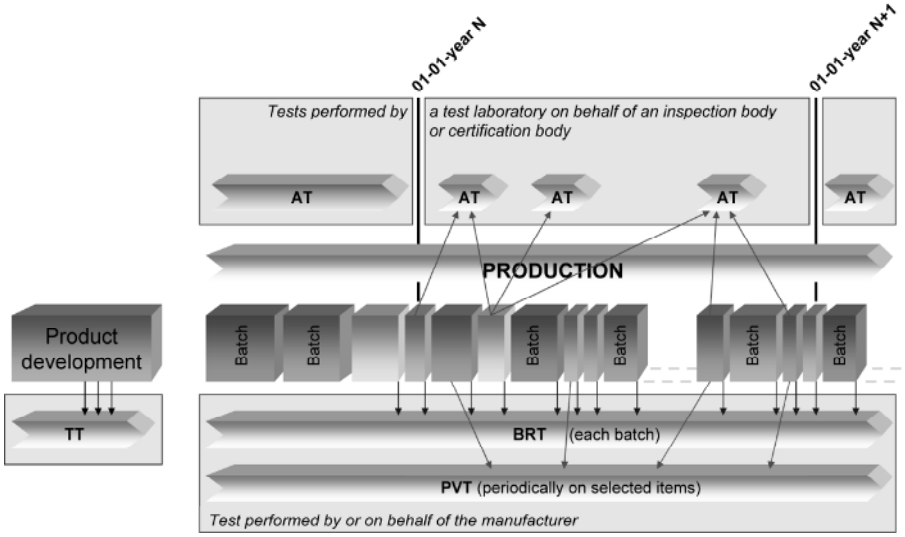

Figure 2 — Typical scheme for the assessment of conformity by a manufacturer

1 Scope

This Technical Specification gives guidance for the assessment of conformity of compounds/formulations, products and assemblies in accordance with Parts 1 and 2 of EN 13598 intended to be included in the manufacturer's quality plan as part of the quality management system and for the establishment of third-party certification procedures.

NOTE In order to help the reader, a basic test matrix is given in Annexes A and B.

In conjunction with EN 13598- 1 and -2, this Technical Specification is applicable to ancillary underground drainage fittings including manholes and inspection chambers:

— for non-pressure underground drainage and sewerage outside the building structure (application area code "U"), reflected in the marking of products by "U", and

— for non-pressure underground drainage and sewerage for both buried in ground within the building structure (application area code "D") and outside the building structure (application area code "U"), reflected in the marking of products by "UD".

2 Normative references

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

EN 1401-1:2009, *Plastics piping systems for non-pressure underground drainage and sewerage — Unplasticized poly(vinyl chloride) (PVC-U) — Part 1: Specifications for pipes, fittings and the system*

EN 13598-1:2010, *Plastics piping systems for non-pressure underground drainage and sewerage — Unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) — Part 1: Specifications for ancillary fittings including shallow inspection chambers*

EN 13598-2:2009, *Plastics piping systems for non-pressure underground drainage and sewerage — Unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) — Part 2: Specifications for manholes and inspection chambers in traffic areas and deep underground installations*

ISO 3951-1, *Sampling procedures for inspections by variables — Part 1: Specification for single sampling plans indexed by acceptance quality limit (AQL) for lot-by-lot inspection for a single quality characteristic and a single AQL*

3 Terms and definitions

For the purposes of this document, the following terms and definitions given in EN 13598-1:2010 and EN 13598-2:2009 and the following apply.

3.1
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

Note 1 to entry: A certification body is preferably compliant with EN ISO/IEC 17021 [4], 3.2.

3.2
inspection body
body that performs inspection

Note 1 to entry: A body can be an organisation, or part of an organisation.

[SOURCE: EN ISO/IEC 17020:2004 [5], 2.2]

Note 2 to entry: A inspection body is preferably compliant with EN ISO/IEC 17020:2004 [5], 3.3.

3.3
testing laboratory
laboratory which measures, tests, calibrates or otherwise determines the characteristics of the performance of materials and products

Note 1 to entry: In the context of this part of EN 13598, the compounds / formulations and products can be subjected to type testing, batch release testing, process verification testing, audit testing and/or witness testing, as applicable.

Note 2 to entry: A testing laboratory is preferably compliant with EN ISO/IEC 17025 [6].

3.4
quality management system
management system to direct and control an organisation with regard to quality

[SOURCE: EN ISO 9000:2005 [7], 3.2.3]

Note 1 to entry: An example of a quality management system is given in EN ISO 9001 [1].

3.5
quality plan
document setting out the specific quality practices, resources and sequence of activities relevant to a particular product or range of products

3.6
type testing
TT
testing performed to verify that the material, product, joint or assembly is capable of conforming to the requirements given in the relevant standard

Note 1 to entry: The type test results remain valid until there is a change in the material or product or assembly provided that the process verification tests are done regularly.

3.7
batch release test
BRT
test performed by or on behalf of the manufacturer on a product batch, which has to be satisfactorily completed before the batch can be released

3.8
process verification test
PVT
test performed by or on behalf of the manufacturer on products and assemblies at specific intervals to confirm that type test originally performed on these products and assemblies continue to be valid and that the process continues to be capable of producing products which conform to the requirements given in the relevant standard

Note 1 to entry: Such tests are not required to release batches of products and are carried out as a measure of process control.

3.9
audit test
AT
test performed by a test laboratory on behalf of an inspection body or certification body to confirm that the *compound,* product, and *assembly* continues to conform to the requirements given in the relevant standard and to provide information to assess the effectiveness of the quality management system

3.10
indirect test
IT
test performed by or on behalf of the manufacturer, different from that specified test for that particular characteristic, having previously verified its correlation with the test specified

3.11
witness test
WT
testing accepted by an inspection or a certification body for type testing and/or audit testing, which is carried out by or on behalf of the manufacturer and supervised by a representative of the inspection or certification body, qualified in testing

3.12
material
compounds/formulations grouped by families, expressed by generic names, e.g. polypropylene, stainless steel, brass or EPDM

Note 1 to entry: Definition from European Commission, Directorate-General for Enterprise and Industry, Sub-group on Product Testing Procedures (EC, DG ENT and IND, SG PTP).

3.13
compound/formulation
clearly defined homogenous mixture of base polymer with additives, i.e. anti-oxidants, pigments, stabilisers and others, at a dosage level necessary for the processing and the intended use of the final product

3.14
material batch
clearly identified quantity of a given homogeneous *compound* manufactured under uniform conditions and defined and identified by the compound/formulation manufacturer

3.15
product
underground ancillary fittings and components intended to provide a means of access to the drainage system of a clearly identified type as specified in Parts 1 and 2 intended to be a part of a the drainage system

3.16
product batch
clearly identified collection of products, manufactured consecutively or continuously under the same conditions, using the same compound/ formulation conforming to the same specification

Note 1 to entry: The product batch is defined and identified by the product manufacturer.

3.17
lot
clearly identifiable sub-division of a batch for inspection purposes

3.18
sample
one or more products drawn from the same production batch or lot, selected at random without regard to their quality

Note 1 to entry: The number of products in the sample is the sample size.

3.19
group
collection of similar products from which samples are selected for testing purposes

3.20
component
product manufactured out of a specific compound/formulation, brought to the market as part of another product or as a spare part

3.21
joint
connection between two products

3.22
assembled component
assembled final product using two or more single parts

3.23
thermoplastics fabricated fitting
fitting produced from pipe and/or from injection-moulded fittings by thermoforming, solvent-cementing or welding

3.24
sampling plan
specification of the type of sampling to be used combined with the operational specification of the entities or increments to be taken, the samples to be constituted and the measurements or tests to be made

EXAMPLE A specific plan which indicates the number of units of products or assemblies to be inspected.

3.25
product type
generic description of a product

EXAMPLE A pipe or fitting or their main parts, of the same design, from a particular compound.

3.26
base type
base of a particular design and which can have different diameter and riser connections

3.27
cavity
(moulding) space within a mould to be filled to form the moulded product

EXAMPLE That part of the injection mould which gives the form to the injection moulded product.

4 Abbreviated terms

To avoid misunderstanding, the abbreviations in this Clause are defined as being the same in each language. For the same reason, the terms are given in the three languages, English, French and German.

EXAMPLE In the French language, the abbreviation for the French equivalent of "acceptable quality level" (AQL) is NQA; however for the purposes of this part of EN 13598 (CEN/TS 13598-3), the abbreviation of the English term (AQL) is adopted.

	EN	FR	DE
AQL	acceptance quality limit	niveau de qualité acceptable	annehmbare Qualitätsgrenzlage
AT	audit test	essai d'audit	Überwachungsprüfung
BRT	batch release test	essai de libération de campagne de fabrication	Freigabeprüfung einer Charge
IT	indirect test	essai indirect	indirekte Prüfung
PVT	process verification test	essai de vérification du procédé de fabrication	Prozessüberprüfung
TT	type test	essai de type	Typprüfung
WT	witness testing	essai témoin	Prüfung unter Aufsicht

5 General

5.1 Materials, compounds/formulation, products, and assemblies shall conform to the requirements given in EN 13598-1 and -2.

5.2 Products shall be produced by the manufacturer under a quality management system which includes a quality plan (including specifications on joints and assemblies).

It is recommended that the quality management system conforms to or is no less stringent than the relevant requirements to EN ISO 9001 [1].

6 Testing and inspection

6.1 Material specification of PVC-U

For the purposes of this Document, the material specification consists of a formulation 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 manufacturers own rework material of known compound from his own production shall be allowed without limitation.

The use of external reformulated, reprocessable and/or recyclable material with agreed specification shall be considered as a change in formulation when the change in addition exceeds the tolerance bands given in Table 2.

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 — Formulation specification

Ingredients	Type	Band
PVC resin	Nominal K value: as specified	± 3 units
Type and content of stabiliser or master batch	1) Pb 2) Ca-Zn 3) Sn 4) Ca-Sn 5) others	X_1: ± 25 %
Lubricants	All	X_2: ± 50 % for $X_2 \leq 0,2$ X_2: ± 0,1 parts for $X_2 > 0,2$
Fillers	1) $CaC0_3$ 2) others	X_3: ± 3 parts X_4: ± 25 %
Impact modifiers	All	X_5: ± 1 part
Flow agents	All	X_6: ± 25 % for $X_6 \leq 2$ X_6: ± 0,5 parts for $X_6 > 2$
Pigments		**No requirement**
Others	To be separately specified by the manufacturer	X_7: ± 25 %

Table 2 — Limits of addition of PVC reprocessable and recycling material

Ingredients	Type	Band
External reprocessable and recyclable material	With an agreed specification [a]	$\leq X_8$ [b]

[a] The specifications shall be declared by the manufacturer to the certification body.
[b] See specifications in A.3 of EN 1401-1:2009.

6.2 Material specification of PP

For the purposes of this document, the material specification consists of a compound comprising a PP compound with specific trade name and additives with known dosage level.

The manufacturers own rework material of known compound from his own production shall be allowed without limitation.

Reformulated material must meet the band requirements of Annex A of EN 13598-1:2010 and Annex A or B of EN 13598-2:2009.

The use of external reformulated, reprocessable and/or recyclable material with agreed specification shall be considered as a change in formulation when the change in addition exceeds the tolerance bands given in Table 3.

Table 3 — Limits of addition of PP reprocessable and recycling material

Ingredients	Type	Band
External reprocessable and recyclable material	With an agreed specification [a]	≤ X_1
[a] The specification shall be declared by the manufacturer to the certification body.		

6.3 Material specification of PE

For the purposes of this document, the material specification consists of a compound comprising a PE compound with specific trade name and additives with known dosage level.

The manufacturers own rework material of known compound from his own production shall be allowed without limitation.

Reformulated material must meet the band requirements of Annex A of EN 13598-1:2010 and Annex A or B of EN 13598-2:2009.

The use of external reformulated, reprocessable and/or recyclable material with agreed specification shall be considered as a change in formulation when the change in addition exceeds the tolerance bands given in Table 4.

Table 4 — Limits of addition of PE reprocessable and recycling material

Ingredients	Type	Band
External reprocessable and recyclable material	With an agreed specification [a]	≤ X_1
[a] The specification shall be declared by the manufacturer to the certification body.		

6.4 Grouping

6.4.1 General

For the purposes of this document, the following groups apply.

6.4.2 Size groups

4 size groups are defined for ancillary products, inspection chambers and manholes, as given in Table 5.

For testing purposes, one individual nominal diameter, d_n, as defined in Parts 1 and 2 shall be selected from each group.

Table 5 — Size groups

Size group	Nominal outside diameter, DN/OD mm	Nominal diameter DN/ID mm
1	≤ 200	≤ 180
2	>200 and ≤ 500	> 180 and ≤ 450
3	>500 and ≤ 1 200	> 450 and ≤ 1 000
4	> 1 200	>1 000

NOTE For Inspection chamber and manholes size relates to the riser diameter. Mechanical saddles are sized by the diameter of the main pipe that they are intended to joint to. Other ancillary products are sized by their outlet diameter.

6.4.3 Fitting groups

6 groups of fittings are defined, as given in Table 6.

For testing purposes, one individual fitting shall be selected from each group.

Each group shall consist of a range of products of the same material and design.

Table 6 — Fitting groups

Fitting group	Type of fitting
1	Sealed access fittings
2	Rodding point tees
3	Rodding point covers
4	Mechanical Saddles
5	Inspection Chambers
6	Manholes

6.5 Type testing (TT)

Relevant type tests shall be carried out whenever there is a change in design, in compound /formulation and/or in the production method, other than routine in-process adjustments, and/or whenever there is an extension of the product range.

Type tests shall demonstrate that the products conform to all requirements for the characteristics given in Tables 7 and 8.

Key (to Tables 7 and 8)

N new system
D change in design
M change of compound-formulation
P change of production method
E extension of the product range (except the products already covered by the scheme of sampling procedure)
\+ test to be carried out

NOTE The manufacturer should submit intended marking details of the product to the certification body prior to approval.

Table 7 — Characteristics of EN 13598-1:2010 products that require type testing (TT)

Characteristic	Reference to clause or subclause of EN 13598-1:2010	Conditions requiring test					Sampling procedure	
		N	D	M	P	E	Manufacturer	Certification body[a]
Material	**4.1**	+		+			Once per compound/formulation	Once per compound/formulation
Appearance	**5.1**	+			+	+	Once per fitting	Once per fitting group
Colour	**5.3**	+			+	+	Once per fitting	Once per fitting group
Geometrical characteristics	**6.2 and 6.3**	+	+	+	+	+	Once per fitting	Once per size group and per fitting group
Effect of heating PVC-U injection moulded products	**8**	+	+		+	+	Once per fitting	Once per fitting group
				+			Once per size group per fittings group	Once per compound/formulation
Mechanical characteristics inspection chamber shallow								
Stiffness of riser shaft	**9**	+	+	+	+	+	Once per riser	Once per size group
Vacuum requirement of base	**9**	+	+	+	+	+	Once per fitting	Once per size group
Resistance of riser / base to vertical loading	**9**	+	+	+	+	+	Once per fitting	Once per size group
Mechanical characteristics mechanical saddles								
Resistance to vertical load	**9**	+	+	+	+	+	Once per fitting	Once size group of branch inlet per joint design[c]
Mechanical strength of saddle	**9**	+	+	+	+	+	Once per fitting	Once per size group per joint design[c] (saddle to pipe)
Mechanical characteristics rodding point covers								
Resistance to vertical loading	**9**	+	+	+	+	+	Once per fitting	Once per size group
Mechanical characteristics fabricated fittings[b]								
Mechanical strength and flexibility	**9**	+	+		+	+	Once per fitting	Once per size group per fitting group
Leaktightness of fabricated fittings	**9**	+	+		+	+	Once per fitting	Once per size group per fittings group
Performance characteristics								
Tightness of elastomeric sealing ring joints to pipes	**10**	+	+		+	+	Once per fitting per joint design[c]	Once per size group per joint design[c]
Elevated temperature resistance of UD fittings	**10**	+	+	+	+		Once per fitting per joint design[c]	Once per size group per fittings group
Tightness of fittings other than shallow inspection chambers	**10**	+	+		+	+	Once per fitting per joint design[c]	Once per size group per fittings group per joint design[c]
Watertightness of shallow inspection chambers	**10**	+	+		+	+	Once per fitting per joint design[c]	Once per size group of main channel per joint design[c]
Shear resistance of joints to rigid pipes	**10**	+	+		+	+	Once per fitting per joint design[c]	Once per size group per joint design[c]

[a] Recommended sampling procedure for a testing laboratory working on behalf of a certification body. Testing undertaken in a manufacturer laboratory shall be taken into account, provided prior acceptance by the certification body.

[b] Only for fabricated fittings made from more than one piece. A sealing ring retaining mean is not considered as a piece.
[c] Joint design at least includes: seal design, groove geometry and seal hardness (+ 5 IRHD)

Table 8 — Characteristics of EN 13598-2:2009 products that require type testing (TT)

Characteristic	Reference to clause or subclause of EN 13598-2:2009	Conditions requiring test					Sampling procedure	
		N	D	M	P	E	Manufacturer	Certification body[a]
Material for bases	**4.1**	+		+			Once per compound/formulation	Once per compound/formulation
Material for risers and cones	**4.2**	+		+			Once per compound/formulation	Once per compound/formulation
Utilisation of non virgin materials	**4.3**	+		+	+		Once per compound/formulation	Once per compound/formulation
Appearance	**5.1**	+			+	+	Once per fitting	Once per fitting group
Colour	**5.2**	+			+	+	Once per fitting	Once per fitting group
Geometrical characteristics	**6.1.1 and 6.1.2**	+	+		+	+	Once per fitting	Once per size group and per fitting group
Geometrical characteristics additional requirements	**6.2**	+	+		+	+	Once per fitting	Once per size group and per fitting group
Mechanical characteristics of bases								
Structural integrity	**7**	+	+	+	+	+	once per size group (largest size) and per design	Once per size group and per fitting group
Impact resistance	**7**	+	+	+	+		Once per fitting	Once per size group and per fitting group
Impact Strength (Drop test)[c]	**7**	+	+	+	+		Once per size per fittings group	Once per fitting group
Mechanical characteristics risers, ladders and telescopic parts								
Ring stiffness risers and telescopic parts	**7**	+	+	+	+		Once per size and design	Once per size group and per fitting group
Manhole steps and ladder strength and pull out resistance	**7**	+	+	+	+		Once per design	Once per manhole size group per design
Physical characteristics of PVC-U injection moulded components								
Effect of heating	**8**	+	+		+	+	Once per fitting	Once per fitting group
				+			Once per size group per fittings group	Once per compound/formulation
Performance characteristics of bases								
Tightness of elastomeric sealing ring joints for pipe-base connection	**9**	+	+		+	+	Once per joint size DN, per join design and per size group	Once per size group per joint design[b]
Water tightness base to riser connection	**9**	+	+		+	+	Once per joint design and per size group	Once per size group per joint design[b]
Performance characteristics of riser								
Water tightness between elements and accompanying	**9**	+	+		+	+	Once per joint size DN, per join design and per size group	Once per size group per joint design[b]

components								
Performance characteristics of telescopic parts deeper than 0,5 m, cones and other near surface components								
Water tightness of cone and telescopic parts	**9**	**+**	**+**		**+**	**+**	Once per joint design and per size group	Once per size group per joint design[b]
Load bearing capacity of cone and near surface components	**9**	**+**	**+**	**+**	**+**	**+**	Once per joint design and per size group	Once per size group

[a] Recommended sampling procedure for a testing laboratory working on behalf of a certification body. Testing undertaken in a manufacturer laboratory shall be taken into account, provided prior acceptance by the certification body.

[b] Joint design at least includes: seal design, groove geometry and seal hardness (± 5 IRHD)

[c] Optional test, for bases intended to be used in areas where installation is usually carried out at temperatures below –10 °C.

6.6 Batch release tests (BRTs)

Those characteristics specified in EN 13598 and listed in Table 9 and Table 10 shall be batch release tested with the minimum sampling frequency as given in Table 9 or Table 10, as applicable.

Table 9 — Characteristics of product to EN 13598-1:2010 and minimum sampling frequencies for BRTs

Characteristic	Reference to part, clause or subclause of EN 13598-1:2010	Minimum sampling frequency
Appearance and colour	5.1	Start up and once per shift
Wall thickness	6.2.3	Injection moulding – start of production Rotational moulding – start up and once per shift
Diameters sockets and spigots	6.2.4	Start up and once per shift
Effects of heating PVC-U only	8	Start up and once per day
Leaktightness of fabricated fittings [a]	9 and Table 5	Once per shift per fitting or AQL max[b] : 4% inspection level min S3
Marking	11.2	Start up only

[a] Only for fabricated fittings made from more than one piece. A sealing ring retaining mean is not considered as a piece.

B AQL requiremements as defined in ISO 3951-1.

Table 10 — Characteristics of product to EN 13598-2:2009 and minimum sampling frequencies for BRTs

Characteristic	Reference to part, clause or subclause of EN 13598-2:2009	Minimum sampling frequency
Appearance and colour	5	Start up and once per shift
Wall thickness Injection moulding	6.1.2	Start up only
Wall thickness of extruded product[a]	6.1.2	Start up and once per shift
Diameters of socket and spigot of injection moulded and extrusion products	6.1.2	Start up and once per 24 hours
Wall thickness rotational moulded products plus diameters of sockets and spigots	6.1.2	Start up and once per shift
Effects of heating – PVC-U only	8	Start up and once per day
Product weight – Rotational moulding only	9.2	Start up and per shift
Dimensions of ladders or steps if installed	6.2.2	Start up only
Stiffness of riser[a b]	7 – Table 4	Start up and once per week
Marking	10.1	Start of production only

[a] Only for extruded products not covered by the product standards listed in Table 1 of EN 13598-2:2009.
[b] Not for near surface components used at ≤ 1.25m depth.

The manufacturer shall specify a batch or a lot 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 met.

If a product fails in respect of any characteristic given in Table 9 or Table 10, as applicable, 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 be as follows:

Find the last product which conforms to the requirements as specified in EN 13598. Release all products produced before that point and reject the products produced after that point.

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

6.7 Process verification tests (PVTs)

Those characteristics specified in EN 13598 and listed in Table 11 and Table 12 shall be process verification tested with the minimum sampling frequency given in Table 11 and Table 12, as applicable, if not type tested or audit tested in the same period.

Table 11 — Characteristics of product to EN 13598-1:2010 and minimum sampling frequencies for PVTs

Characteristic	Reference to part, clause or subclause of EN 13598-1:2010	Minimum sampling frequency
Material	4.1	Once per 2 years per compound formulation currently used
Tightness of elastomeric sealing ring joints to pipes	10 – Table 6	Once per 2 years per size group and joint design [a]
Water tightness base to riser	10 – Table 6	Once per 2 years per size group per joint design [a]
Tightness saddles	10 – Table 6 and Annex B	Once per 2 years per pipe size group and saddle joint design [a]
[a] Joint design at least includes: seal design, groove geometry and seal hardness (± 5 IRHD).		

Table 12 — Characteristics of product to EN 13598-2:2009 and minimum sampling frequencies for PVTs

Characteristic	Reference to part, clause or sub-clause of EN 13598-2:2009	Minimum sampling frequency
Material for bases (not a listed EN 13598-2:2009, Table 1 material)	4.1.2 - Annex A and Table A.1	Once per 2 years per compound/formulation currently used
Material for risers, telescopic parts, and cones (not a listed EN 13598-2:2009, Table 1 material)	4.1.2, 4.2.2, 4.2.3 - Annex A, Table A.2 and Annex B	Once per 1 years per compound/formulation currently used
Utilisation of non-virgin materials	4.3, Annex A, Table A.2	Once per 1 year per compound/formulation currently used
Tightness of elastomeric ring sealing joints for pipe-base connection	9 – Table 6	Once per 2 years per size group and joint design [a]
Water tightness base - riser riser – riser riser – cone riser – telescopic part telescopic part to telescopic part telescopic part - cone	9 – Table 6	Once per 2 years per size group and joint design [a]
Impact resistance of base	7 – Table 3	Once per 2 years per size group
Impact strength (Cold climate only)	7 – Table 3	Once per 2 years per size group
Ladders / steps resistance to pull out	7 – Table 4	Once per design per year
Ladders / steps vertical loading	7 – Table 4	Once per design per year
[a] Joint design at least includes: seal design, groove geometry and seal hardness (± 5 IRHD).		

If the product does not conform to the requirements in respect of any characteristic given in Table 11 or Table 12, as applicable, the retest procedure detailed in the manufacturer's quality plan shall be performed. If third-party certification is involved, the certification body shall be informed.

If the retest procedure does not confirm conformity of the product to the requirements, then the process shall be investigated and corrected in accordance with the procedures given in the manufacturer's quality plan, as well as to verify the characteristics given in Table 11 and Table 12, as applicable.

A test performed as an AT does not need to be repeated as a PVT.

6.8 Audit tests (ATs)

ATs are performed if a third-party certification is involved only.

Those characteristics specified in EN 13598-1 and listed in Table 13 and Table 14 are intended to be audit tested with the minimum sampling frequency as given in Table 13 or Table 14, as applicable.

Table 13 — Characteristics of products to EN 13598-1:2010 minimum sampling frequencies for ATs

Characteristic	Reference to part, clause or subclause of EN 13598-1:2010	Minimum sampling frequency
Material	4.1	One compound / formulation per 2 years
General (appearance)	5.1	Once per year per size group per fitting group
Colour	5.3	Once per year per size group per fitting group
Dimensions	6.2	Once per year per size group per fitting group
Marking	11	Once per year per size group per fitting group
Physical characteristics of PVC-U injection moulded components		
Effect of heating – PVC only	8	Once per 2 years per size group per fittings group
Mechanical characteristics inspection chamber shallow		
Stiffness of riser shaft	9, Table 2	Once per 2 years per size group
Vacuum requirements of base	9, Table 2	Once per 2 years per size group
Resistance of riser / base to vertical loading	9, Table 2	Once per 2 years per size group
Mechanical characteristics mechanical saddle		
Resistance to vertical load	9, Table 3	Once per 2 years per size group
Mechanical strength	9, Table 3	Once per 2 years per size group
Mechanical characteristics rodding point cover		
Resistance to vertical loading	9 - Table 4	Once per 2 years
Mechanical characteristics fabricated fittings[a]		
Mechanical strength and flexibility	9, Table 5	Once per 2 years
Leaktightness of fabricated fittings	9, Table 5	Once per 2 years
Performance characteristics		
Tightness of elastomeric sealing ring joints to pipes	10, Table 6	Once per 2 years per size group per joint design [b]
Elevated temperature resistance of UD fittings	10, Table 6	Once per 3 years per size group per joint design [b]
Tightness of fittings other than shallow inspection chambers	10, Table 6	Once per 2 years per size group per joint design [b]
Water tightness of shallow inspection chambers	10, Table 6	Once per 2 years per size group per joint design [b]
Shear resistance	10, Table 6	Once per 2 years per size group per joint design [b]

[a] Only for fabricated fittings made from more than one piece. A sealing ring retaining means is not considered as a piece.

[b] Joint design at least includes: seal designs, groove geometry, and seal hardness (± 5 IRHD).

Table 14 — Characteristics of products to EN 13598-2:2009 and minimum sampling frequencies for ATs

Characteristic	Reference to part, clause or subclause of EN 13598-2:2009	Minimum sampling frequency
Material for bases (not a listed EN 13598-2:2009, Table 1 material)	4.1.2- Annex A and Table A.1	Once per 2 years per compound/formulation currently used
Material for risers, telescopic parts, and cones (not a listed EN 13598-2:2009, Table 1 material)	4.1.2, 4.2.2, 4.2.3 - Annex A, Table A.2 and annex B	Once per 1 year per compound/formulation currently used
Utilisation of non virgin materials	4.3, Annex A, Table A.2	Once per 1 year per compound/formulation currently used
General (appearance)	5.1	Once per year per size group per fitting group
Colour	5.2	Once per year per size group per fitting group
Dimensions	6.1	Once per year per size group per fitting group
Marking	10	Once per year per size group per fitting group
Bases		
Structural integrity	7, Table 3	Once per 2 years
Impact resistance, falling objects	7, Table 3	Once per 2 years per size group
Impact strength, -10 °C, drop test (if applicable)	7, Table 3	Once per 2 years per size group
Effect of heating, only PVC	8, Table 5	Once per 2 years per size group
Mass of rotation-moulded component	9.2	Once per 2 years per size group
Ladders, steps, telescopic parts and risers		
Dimensions steps and ladders, when relevant	6.2.2	Once per 2 years per size group
Ring stiffness, riser	7, Table 4	Once per 2 years per size group
Ladders or steps Vertical load, when relevant	7, Table 4	Once per 2 years per size group
Ladders or steps Horizontal pull out, when relevant	7, Table 4	Once per 2 years per size group
Performance characteristics		
Tightness pipe/base connection	9, Table 6	Once per 2 years per size group per joint design
Tightness base /riser connection	9, Table 6	Once per 2 years per size group per joint design [a]
Water tightness between elements and accompanying components	9, Table 6	Once per 2 years per size group per joint design [a]
Tightness telescopic part > 0,5 m	9, Table 6	Once per 2 years per size group per joint design [a]
Tightness cone	9, Table 6	Once per 2 years per size group per joint design [a]
Load bearing capacity of cones and near surface components	9, Table 6	Once per 5 years and per size group

[a] Joint design at least includes: seal designs, groove geometry, and seal hardness (± 5 IRHD).

The sizes, types and classes selected for tests should preferably 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.

Certification bodies may accept process verification tests (PVT) as audit tests (AT) if witnessed by them or by their agencies.

6.9 Indirect tests (ITs)

Generally, testing shall be performed using the test methods referred to in EN 13598-1 and -2.

Indirect testing may be used only for BRT characteristics as given in Table 9 and Table 10. Indirect testing shall not be used for 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. The continuing validity of the indirect testing shall be checked at regular intervals.

In cases of dispute, the BRT as specified in Table 9 and Table 10, as applicable, shall be used.

If third-party certification is involved, the IT shall be accepted by certification body.

6.10 Test records

Unless otherwise specified all records shall be maintained for a minimum of five years in accordance with the information given in the quality management system.

Annex A
(informative)

Summary of EN 13598-1 test regime

Characteristic	TT	BRT	PVT	AT
Material	+		+	+
Appearance	+	+		+
Colour	+	+		+
Geometrical characteristics	+	+		+
Marking		+		+
Physical Characteristics				
PVC-U injection moulded products	+	+		+
Mechanical characteristics inspection chamber shallow				
Stiffness of riser shaft	+			+
Vacuum requirement of base	+			+
Resistance of riser / base to vertical loading	+			+
Mechanical characteristics mechanical saddles				
Resistance to vertical load	+			+
Mechanical strength of saddle	+			+
Mechanical characteristics rodding point covers				
Resistance to vertical loading	+			+
Mechanical characteristics fabricated fittings				
Mechanical strength and flexibility	+			+
Leaktightness of fabricated fittings	+	+		+
Performance characteristics				
Tightness of elastomeric sealing ring joints to pipes	+		+	+
Elevated temperature resistance of UD fittings	+			+
Tightness of fittings other than shallow inspection chambers	+		+	+
Watertightness of shallow inspection chambers	+		+	+
Shear resistance	+			+

Annex B
(informative)

Summary of EN 13598-2 test regime

Characteristic	TT	BRT	PVT	AT
Material for bases	+		+	+
Material for risers and cones	+		+	+
Utilisation of non virgin materials	+		+	+
Appearance	+	+		+
Colour	+	+		+
Geometrical characteristics	+	+		+
Weight of rotational moulding products		+		+
Geometrical characteristics additional requirements	+	+		+
Effect of heating of PVC-U injection moulded products	+	+		+
Marking		+		+
Mechanical Characteristics of bases				
Structural integrity	+			+
Impact resistance	+		+	+
Impact Strength (Cold climate only)	+		+	+
Mechanical characteristics risers, ladders and telescopic parts				
Ring stiffness risers and telescopic parts	+	+ (ext)		+
Manhole steps and ladder strength and pull out resistance	+		+	+
Physical characteristics of PVC-U injection moulded components				
Effect of heating	+	+		+
Performance characteristics of bases				
Tightness of elastomeric sealing ring joints for pipe-base connection	+		+	+
Water tightness base to riser connection	+		+	+
Performance characteristics of riser				
Water tightness between elements and accompanying components	+		+	+
Performance characteristics of telescopic parts deeper than 0,5 m, cones and other near surface components				
Water tightness of cone and telescopic parts	+		+	+
Load bearing capacity of cone and near surface components	+			+

Bibliography

[1] EN ISO 9001, *Quality management systems — Requirements (ISO 9001)*

[2] EN 45011:1998, *General requirements for bodies operating product certification systems (ISO/IEC Guide 65:1996)*

[3] EN 45012:1998, *General requirements for bodies operating assessment and certification/registration of quality systems (ISO/IEC Guide 62:1996)*

[4] EN ISO/IEC 17021, *Conformity assessment — Requirements for bodies providing audit and certification of management systems (ISO/IEC 17021)*

[5] EN ISO/IEC 17020:2004, *General criteria for the operation of various types of bodies performing inspection (ISO/IEC 17020:1998)*

[6] EN ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025)*

[7] EN ISO 9000:2005, *Quality management systems — Fundamentals and vocabulary (ISO 9000:2005)*

This page deliberately left blank

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards -based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email bsmusales@bsigroup.com.

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Copyright

Useful Contacts:

Customer Services
Tel: +44 845 086 9001
Email (orders): orders@bsigroup.com
Email (enquiries): cservices@bsigroup.com

Subscriptions
Tel: +44 845 086 9001
Email: subscriptions@bsigroup.com

Knowledge Centre
Tel: +44 20 8996 7004
Email: knowledgecentre@bsigroup.com

Copyright & Licensing
Tel: +44 20 8996 7070
Email: copyright@bsigroup.com

bsi.

...making excellence a habit.™