BRITISH STANDARD

BS EN 1905:1999
BS 2782-11: Method 1105C: 1999

Plastics piping systems — Unplasticized poly(vinyl chloride) (PVC-U) pipes, fittings and material — Method for assessment of the PVC content based on total chlorine content

The European Standard EN 1905:1998 has the status of a British Standard

ICS 23.040.20; 23.040.45; 83.140.30

National foreword

This British Standard is the English language version of EN 1905:1998.

The UK participation in its preparation was entrusted to Technical Committee PRI/61, Plastics piping systems and components, 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 committee can be obtained on request to its secretary.

This European Standard is also incorporated into BS 2782-11 *Methods of testing plastics — Part 11: Thermoplastics pipes, fittings and valves*, as Method 1105C:1999, for association with related test methods for plastics materials and plastics piping systems.

It may be used for the revision or amendment of other national standards, but it should not be presumed to apply to any existing standard or specification which contains or makes reference to a different test method until that standard/specification has been amended or revised to make reference to this method and adjust any requirements as appropriate.

Cross-references

The British Standards which implement 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 British Standard, which is identical with EN 1905:1998, does not necessarily detail all the precautions necessary to meet the requirements of the Health and Safety at Work etc. Act 1974. Attention should be paid to any appropriate safety precautions and the method should be performed only by trained personnel.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 4, an inside back cover and a back cover.

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English version

Plastics piping systems — Unplasticized poly(vinyl chloride) (PVC-U) pipes, fittings and material — Method for assessment of the PVC content based on total chlorine content

Systèmes de canalisations en plastique — Tubes, raccords et matières en poly(chlorure de vinyle) non plastifié (PVC-U) — Méthode d'évaluation de la teneur en PVC sur la base de la teneur totale en chlore

Kunststoff-Rohrleitungssysteme — Rohre, Formstücke und Werkstoff aus weichmacherfreiem Polyvinylchlorid (PVC-U) — Verfahren zur Bestimmung des PVC-Gehaltes auf der Basis des Gesamtchlorgehaltes

This European Standard was approved by CEN on 23 November 1998.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 155, Plastics piping systems and ducting systems, the Secretariat of which is held by NNI.

This standard is based on a document prepared by TC 138/SC 1 AHG, PVC Material, from the International Organization for Standardization (ISO).

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 June 1999, and conflicting national standards shall be withdrawn at the latest by June 1999.

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

This standard is one of a series of standards on test methods which support System Standards for plastics piping systems and ducting systems.

1 Scope

This standard specifies a method for assessing the poly(vinyl chloride) (PVC) content in reprocessable and recyclable unplasticized (PVC-U) materials or materials derived from PVC-U products.

In this standard, only the method for calculation of the PVC content is described, while for the determination of the chlorine content reference is made to prEN ISO 1158:1997. If the material contains or is supposed to contain chlorinated poly(vinyl chloride) (PVC-C) or chlorinated polyethylene (PE-C), an apparent PVC content is calculated.

2 Normative references

This standard 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 standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

prEN ISO 1158:1997, *Plastics — Vinyl chloride homopolymers and copolymers — Determination of chloride.*
(ISO/DIS 1158:1997)

EN ISO 3451-5:1996, *Plastics — Determination of ash — Part 5: Poly(vinyl chloride).*
(ISO 3451-5:1989)

3 Principle

An assessment of the PVC content, taking into account the presence of fillers, additives and, if applicable, other polymers, is made by calculation based on the chlorine content determined in accordance with prEN ISO 1158:1997.

NOTE It is assumed that the following test parameter is set by the standard making reference to this standard:

— the sampling procedure, applicable to pipes, fittings or material (see clause **4**).

4 Test pieces

Test pieces, appropriate to the method(s) used (see clause **5** and associated notes), shall be prepared, from samples taken in accordance with the referring standard, from a pipe, fitting or material, as applicable.

5 Procedure

5.1 Determination of chlorine content

Determine the chlorine content, m_{Cl}, in accordance with prEN ISO 1158:1997, or any other analytical method giving equivalent results.

NOTE Methods using infra-red analysis or X-ray analysis may be suitable.

In case of dispute, the method given in prEN ISO 1158:1997 shall be used.

5.2 Calculation of the PVC content or apparent PVC content

Calculate the PVC content or the apparent PVC content, in percentage by mass, m_v, using the following equation:

$$m_v = \frac{m_{Cl}}{56{,}8} \times 100$$

where

m_{Cl} is the chlorine content expressed as a percentage by mass in accordance with clause **7** of prEN ISO 1158:1997.

NOTE If the material under analysis contains PVC-C, PE-C or chlorine-free polymers, the calculated PVC content may deviate from the actual PVC content.

5.3 Determination of filler content

Determine the filler content, in percentage by mass, m_f, in accordance with EN ISO 3451-5:1996, or any other analytical method giving equivalent results.

NOTE 1 Other fillers may also be present.

NOTE 2 Methods using infra-red analysis, X-ray analysis or chemical analysis may be suitable.

In case of dispute, the method given in EN ISO 3451-5:1996 shall be used.

5.4 Validation of composition

5.4.1 Check the validity of m_v and m_f by calculating the sum of PVC, filler and additive contents, M, in percentage by mass, using the following equation:

$$M = m_v + m_f + 2$$

where

m_v is the PVC content;

m_f is the filler content.

NOTE 1 It is assumed that the combined amount of additives incorporated (e.g. pigments, stabilizers and lubricants) is at least 2 % by mass.

If $M < 97$ %, continue in accordance with **5.4.2**.

If $M \geq 97$ %, calculate the PVC content m_v, in percentage by mass, using the following equation:

$$m_v = 100 - (m_f + 2)$$

NOTE 2 In this case, PVC-C or PVC-C/ABS blends may be present. These blends are considered not to have a detrimental effect on PVC products and therefore are counted as PVC-U.

5.4.2 If $M < 97$ %, the material may contain one or more of the following:

— PE-C in large quantities;

— other (chlorine-free) polymers;

— additives in excess of 2 % by mass.

In such cases, determine by infra-red or X-ray analysis whether chlorine-free polymers or additives are present and proceed in accordance with a) or b), as applicable.

The infra-red or X-ray analysis equipment shall be calibrated in accordance with the manufacturer's instructions before testing.

a) If not more than 2 % by mass of additives and no additional polymers other than PE-C are present, calculate the PVC and PE-C contents, m_v and m_E, by solving the following simultaneous equations:

$$m_E + m_v + m_f + 2 = 100$$

$$0{,}37m_E + 0{,}57m_v = m_{Cl*}$$

where

m_{Cl*} is the chlorine content, in percentage by mass of the polymeric parts, calculated by using the following equation:

$$m_{Cl*} = m_{Cl} \times \frac{100}{100 - m_f}$$

b) If additives in excess of 2 % or other polymers are found, take the PVC content to be equal to the apparent PVC content (see **5.2**).

6 Test report

The test report shall include the following information:

a) a reference to this standard and to the referring standard;

b) a full identification of the material under test;

c) a description of the sampling procedure used;

d) identification of the analytical methods used;

e) list of the measured and calculated values in percentage by mass;

f) any factors which may have affected the results, such as any incidents or any operating details not specified in this standard;

g) the date of the test.

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