



BSI Standards Publication

# Plastics pipes and fittings — Utilisation of thermoplastics recyclates

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Part 2: Recommendations for relevant characteristics

## National foreword

This Published Document is the UK implementation of CEN/TS 14541-2:2022. Together with BS EN 14541-1:2022, it supersedes PD CEN/TS 14541:2013, which is withdrawn.

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

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

This Technical Specification has been prepared by CEN/TC 155 to stimulate the use of thermoplastics recyclates.

The UK committee, PRI/88/1, supports the use of recycled materials in the manufacture of plastic piping systems. However, the UK committee voted against this Technical Specification for the following reasons.

- The intended purpose of the document is not clearly described, which could lead to its incorrect use.
- The document covers recyclates, and the term 'recyclate' excludes 'reworked material' (as defined in BS EN 14541-1:2022). The inclusion of reworked material (in clause 5.4) is not consistent with the intended use of the document.
- The cracked round bar test (CRB) included in Annex A is not yet validated for the characterization of recyclates.

The UK committee gives the following advice concerning the Scope and contents of PD CEN/TS 14541-2:2022.

- To characterize the recyclate supplied to a manufacturer for the production of pipes and fittings, a specification is agreed between the supplier of the recyclate and the manufacturer. The relevant product standard should provide sufficient information for the supplier of the recyclate and the manufacturer to prepare an agreed specification for each grade of thermoplastic recyclate.
- PD CEN/TS 14541-2:2022 is intended to support those developing product standards in CEN TC 155 by listing characteristics and associated test methods for thermoplastics recyclates (PVC-U, PVC-C, PE, PP, and ABS). For a specific application, some or all the listed characteristics should be selected; additional characteristics may also be selected.
- PD CEN/TS 14541-2:2022 is not intended to be used directly by the supplier of the recyclate and the manufacturer of the recyclate for the preparation of an agreed specification. The relevant product standard should contain sufficient information for the supplier of the recyclate and the manufacturer to prepare an agreed specification for each grade of thermoplastic recyclate and should always be consulted.
- PD CEN/TS 14541-2:2022 covers thermoplastic recyclates, defined in BS EN 14541-1:2022 as plastics material resulting from the recycling of pre-consumer and post-consumer plastics products. This does not include reworked material (previously referred to as own reprocessed material) and clause 5.4 is therefore not applicable.

- PD CEN/TS 14541-2:2022 does not provide recommendations on the quantity or type of recyclates that are appropriate for a specific application.
- PD CEN/TS 14541-2:2022 does not cover the recycling processes or transport of materials.
- Normative statements are included in clauses 6.4 and 6.5 with respect to uncoated calcium carbonate. It should be noted that there is currently no test method for assessing the type of calcium carbonate present in recyclates.
- The cracked round bar (CRB) test included in Appendix A is a modification of ISO 18489. Research aiming to demonstrate that this modified CRB test is suitable for the characterization of batches of thermoplastics recyclates (PVC-U, PVC-C, PE, PP, and ABS) is not yet complete. Inclusion of details related to the proposed method in this (CEN/TS) document offers suppliers and manufacturers an opportunity to gain experience with the use of this method and contribute to its development. Inter-laboratory trials are needed to confirm that the test delivers reliable and consistent results. It is the opinion of the UK committee that the modified CRB test included in Annex A is not yet sufficiently stable to form part of an agreed specification or a normative test in a product standard.

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**Amendments/corrigenda issued since publication**

Date	Text affected
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English Version

## Plastics pipes and fittings - Utilisation of thermoplastics recyclates - Part 2: Recommendations for relevant characteristics

Tubes et raccords en plastique -  
Utilisation de recyclats thermoplastiques  
- Partie 2 : Recommandations pour les  
caractéristiques pertinentes

Kunststoff-Rohrleitungen und -Formstücke -  
Verwendung von thermoplastischen Rezyklaten  
- Teil 2: Empfehlungen für relevante Eigenschaften

This Technical Specification (CEN/TS) was approved by CEN on 13 March 2022 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.

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

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

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## European foreword

This document (CEN/TS 14541-2:2022) 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 shall not be held responsible for identifying any or all such patent rights.

This document, together with Part 1 of the EN 14541 series, supersedes CEN/TS 14541:2013.

The EN 14541 series consists of the following parts under the general title *Plastics pipes and fittings - Utilisation of thermoplastics recyclates*:

- *Part 1: Vocabulary*;
- *Part 2: Recommendations for relevant characteristics* (this document).

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## Introduction

The EN 14541 series is intended to give recommendations to the value chain of thermoplastics piping systems to stimulate the use of thermoplastics recyclates as defined in the European circular economy policy.

Part 1 of the EN 14541 series defines the relevant terms and definitions related to the use of thermoplastics recyclates in thermoplastics piping systems.

This document (part 2 of the EN 14541 series) is a CEN Technical Specification in which recommendations are given for product standards related to the relevant characteristics for defining (e.g. fingerprinting) commonly used thermoplastics recyclates intended to be used in thermoplastics piping systems.

This document is intended to support specification writers of product standards within CEN TC 155 in defining the relevant characteristics for thermoplastics recyclates (PVC-U, PVC-C, PE, PP, and ABS) to be specified in the relevant product standards for use in thermoplastics piping systems. The product standards should specify relevant characteristics and applicable tolerances to be included within the agreed specification. For a specific application, specification writers may specify additional characteristics.

This document introduces the Cracked Round Bar (CRB) test for slow crack growth resistance of recycled PE, PP and PVC-U material.

This document is extended, compared with the CEN/TS 14541:2013, and covers next to PE, PP and PVC-U also PVC-C and ABS.

This document is not intended as a standalone specification for use of recyclates in plastic piping systems.

Different CEN Technical Committees are dealing with recycled Plastics. In particular CEN/TC 249 "Plastics". CEN/TC 249 "Plastics" developed a series of CEN publications on 'Plastics Recycling' which consists of: EN 15343 [1], EN 15344 [2], EN 15345 [3], EN 15346 [4], CEN/TS 16010 [5] and CEN/TS 16011 [6].

Other documents touching recycling are e.g. ISO 15270 [7] and Waste Framework Directive [8].

## 1 Scope

This document provides guidance and information for drafting product standards to specify characteristics and test methods for the utilization of thermoplastics recyclates (PVC-U, PVC-C, PE, PP, ABS) in pipes, fittings and ancillaries for thermoplastics piping systems.

This document covers recyclates with an agreed specification from all sources.

NOTE 1 This document does not cover characteristics for reworked material.

NOTE 2 This document does not cover recycling processes (e.g. chemical or mechanical).

NOTE 3 This document does not define if recycled material can be used in a specific application. The possible use of recyclates will be defined in the applicable product standard.

This document provides guidance about the relevant characteristics to be included in the agreed specification for recyclates.

This document is applicable without prejudice to any existing legislation.

For the recycling process, the transport, the testing and the use of thermoplastics recyclates, National and/or European regulations (e.g. hygienic aspects) can apply.

NOTE 4 For example, threshold levels for substances of very high concern (SVHC) as defined in the REACH-legislation which can possibly be present in thermoplastic recyclates.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 14541-1, *Plastics pipes and fittings - Utilisation of thermoplastics recyclates - Vocabulary*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14541-1 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

## 4 Abbreviations

ABS	acrylonitrile butadiene styrene
CRB	cracked round bar
MFR	melt mass-flow rate
PE	polyethylene
PP	polypropylene
PVC-C	chlorinated poly(vinyl chloride)
PVC-U	unplasticized poly(vinyl chloride)