SLOVENSKI STANDARD
SIST EN 14243-2:2019

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Nadomešča:
SIST-TS CEN/TS 14243:2010

Snovi iz izrabljenih avtomobilskih gum - 2. del: Granulati in praški - Metode za ugotavljanje njihovih mer in nečistoč, vključno z jeklenimi in tekstilnimi delci

Materials obtained from end of life tyres - Part 2: Granulates and powders - Methods for determining their dimension(s) and impurities, including free steel and free textile content

Materialien aus Altreifen - Teil 2: Granulate und Pulver - Methode zur Bestimmung der Abmessungen und Verunreinigungen einschließlich freier Stahl, freie Textilien und andere Verunreinigungen

Matériaux produits à partir de pneus usagés non réutilisables (PUNR) - Partie 2 : Granulats et poudrettes - Méthodes de détermination de leur(s) dimension(s) et impuretés, y compris la teneur en fils métalliques et en fibres textiles libres

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ICS:

13.030.50	Recikliranje	Recycling
83.160.01	Avtomobilske pnevmatike na splošno	Tyres in general

SIST EN 14243-2:2019 **en,fr,de**

EUROPEAN STANDARD
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EN 14243-2

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ICS 83.160.01

Supersedes CEN/TS 14243:2010

English Version

Materials obtained from end of life tyres - Part 2: Granulates and powders - Methods for determining the particle size distribution and impurities, including free steel and free textile content

Matériaux produits à partir de pneus usagés non réutilisables (PUNR) - Partie 2: Granulats et poudrettes - Méthodes de détermination de la distribution granulométrique et des impuretés, y compris la teneur en fils métalliques et en fibres textiles libres

This European Standard was approved by CEN on 19 November 2018.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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

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

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (EN 14243-2:2019) has been prepared by Technical Committee CEN/TC 366 “Materials obtained from End-of-Life Tyres (ELT)”, the secretariat of which is held by UNI.

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 August 2019, and conflicting national standards shall be withdrawn at the latest by August 2019.

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 EN 14243-1 and EN 14243-3 supersede CEN/TS 14243:2010.

EN 14243, Materials obtained from End-of-Life Tyres (ELTs), consists of the following parts:

— Part 1: General definitions related to the methods for determining their dimension(s) and impurities

— Part 2: Granulates and powders – Methods for determining the particle size distribution and impurities including free steel and free textile content

— Part 3: Shreds cuts and chips – Methods for determining their dimension(s) including protruding filaments dimensions

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

Introduction

This standard is used in conjunction with the other parts of EN 14243 series. Such series is intended to cover the testing programs needed to characterize each product category as shown on the figure below.

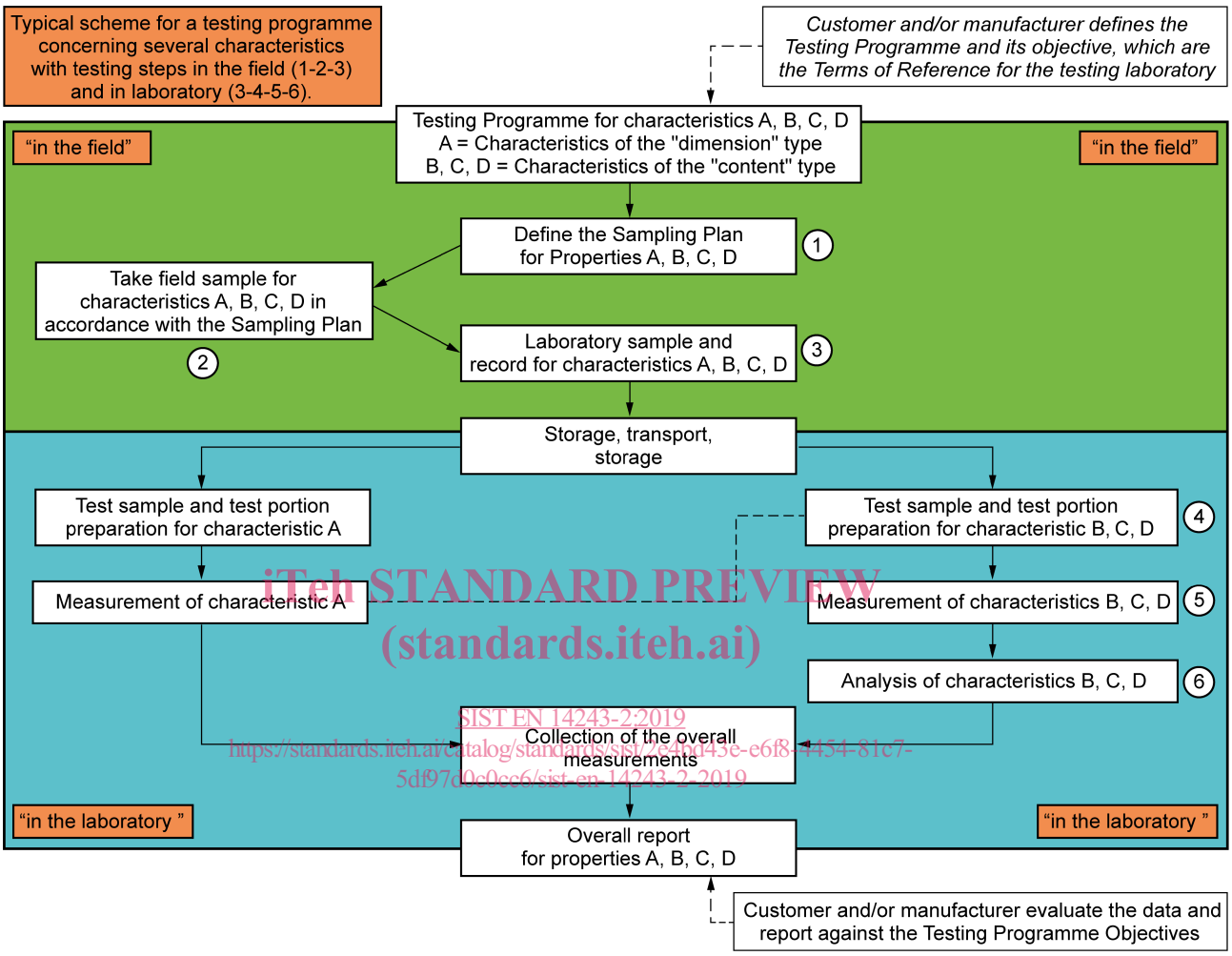

Figure 1 — Typical scheme for a testing programme concerning several characteristics with testing steps in the field and in the laboratory

End-of-life tyres consist mainly of passenger and commercial vehicle tyres, truck, earthmover and agricultural tyres manufactured for distribution in the European market that are no longer suitable for their original purpose. Products from end-of-life tyres are used as a secondary raw material finding a wide range of applications. The principal categories of materials from end-of-life tyres are defined on the basis of their dimension(s) according to EN 14243-1.

1 Scope

This standard provides test methods for the determination of the particle size distribution of granulates and powders, produced from all categories of end-of-life tyres at all steps of the treatment processes as well as for the determination of impurities (including free steel and free textile content).

The methods described in this standard include sample collection and the preparation of a representative sample based on a sampling plan for the purpose of determining particle size distribution and impurities.

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 14243-1:2019, *Materials obtained from end of life tyres — Part 1: General definitions related to the methods for determining their dimension(s) and impurities*

EN 933-1, *Tests for geometrical properties of aggregates — Part 1: Determination of particle size distribution — Sieving method*

EN 933-2, *Tests for geometrical properties of aggregates — Part 2: Determination of particle size distribution — Test sieves, nominal size of apertures*

CEN/TS 17188, *Materials obtained from end of life tyres — Sampling method for granulates and powders stored in big-bags*

ISO 565, *Test sieves — Metal wire cloth, perforated metal plate and electroformed sheet — Nominal sizes of openings*

ISO 3310-1:2016, *Test sieves — Technical requirements and testing — Part 1: Test sieves of metal wire cloth*

ISO 3310-2:2013, *Test sieves — Technical requirements and testing — Part 2: Test sieves of perforated metal plate*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14243-1:2019 apply.

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

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

4 Categories of products obtained from end-of-life tyres based mainly on their dimensions and particle size distribution

For categories and testing program, refer to EN 14243-1:2019, Clause 4.

5 Determination of particle size distribution for granulates and powders

5.1 General

Particle size and related parameters are key measurements for product classification of size-reduced materials such as granulates and powders. Particle size analysis is the first measurement of consistency and forms the basis for material grading. Before being able to obtain an accurate particle size distribution, a representative sample of the material to be tested shall be taken.

Depending on the agreed testing program between the producer and the customer, or on the producer's own will, the determination of particle size distribution specified in this clause for granulates and powders may be followed by the additional determination(s) of the free steel content and/or the free textile content and/or the other impurities as specified in Annexes A, B and C.

5.2 Sampling plan

5.2.1 Principles of sampling

The main principle of sampling is to obtain a representative sample(s) from a lot of material from which a characteristic is to be determined. If the lot is to be represented by a sample, then every particle in the lot shall have an equal probability of being included in the sample (i.e. probabilistic sampling). When these principles cannot be applied in practice, the sampler shall define a procedure as close as possible to probabilistic sampling in his judgement (i.e. judgemental sampling) and note the limitations in the sampling plan and sampling report.

Obtaining samples that are truly representative of the material produced is easier when the material is moving (for example on a conveyor belt). Therefore, sampling from moving material is to be preferred wherever possible. For granulates and powders stored in big-bags a sampling method is described in CEN/TS 17188.

NOTE The determination of properties other than particle size distribution may result in different sampling requirements. This is the case for the determination of physical properties (such as bulk density) or chemical composition.

5.2.2 Preparation of the sampling plan

A sampling plan shall be prepared before samples are taken through a specific definition of the lot size and the size and number of increments to be taken.

5.2.3 Definition of lot size

The lot size shall be defined by the producer in accordance with requested specifications and is a fixed quantity for which a characteristic is to be determined. The lot size m_{lot} may be defined by the producer as:

- a fixed quantity produced between changes in the process settings that could affect the product specifications
- a fixed quantity in a production day/shift
- a fixed quantity minimum of 100 t (10 t for powders).

The lot size is based on production quality management decisions or specific customer requirements.

5.2.4 Sampling point and apparatus

Based on health and safety assessments and producer equipment, a fixed sampling point for the collection of sample increments shall be chosen for each material fraction to be monitored. Sampling shall be carried out using a sample box or other suitable equipment. The sampling box is passed through the stream of falling material so that it uniformly cuts the full flow of falling material. The box shall be large enough so that it does not become overloaded. Automatic systems fulfilling these criteria may also be used.

5.2.5 Size of a sample increment

The sampling box shall have a capacity of not less than:

V_{min} = 0,5 dm^3 for d < 10

V_{min} = 0,05 × d for 10 ≤ d ≤ 20

where

V_{min} is the minimum capacity of the sampling box (in cubic decimetres);

d is the nominal top size in millimetres;

The sampling operator shall record the approximate capacity of the sampling device $V_{increment}$ (in cubic decimetres).

5.2.6 Number of increments

The minimum number of increments to be taken from a lot depends on the nominal top size of the material to be sampled. The material shall be assigned by the sampler to one of two groups in Table 1.

Table 1 — Classification of material according to size

Group 1	Group 2
nominal top size < 10 mm	nominal top size between 10 mm and 20 mm

For sampling from moving material:

Group 1: $n = 3 + 0{,}025 \times m_{lot}$ (size of granulates from 0,8 mm to 10 mm and powders under 0,8 mm)

Group 2: $n = 5 + 0{,}040 \times m_{lot}$ (size of granulates from 10 mm to 20 mm)

where

n is the minimum permitted number of increments rounded off to the higher nearest whole number

m_{lot} is the mass of the lot in tonnes.

Sample collection is carried out according to the sample plan and the increments are collected manually using the sampling box. Increments shall be taken at regular intervals during the production of the lot in accordance with the sampling plan. The time of increment collection is recorded in the sampling plan. Each increment taken from the lot is placed in the sampling container and at the end of the process, it constitutes the combined sample which is sent to a laboratory as laboratory sample. In case more than one laboratory sample is required, they shall be prepared in the plant in accordance with the principles of sample division of 5.4.2.

5.2.7 Visual assessment

The increments shall be assessed visually and observations on the quality should be noted as additional information and recorded according to quality management, best practice policies or specific customer requirements.

5.2.8 Sampling certificate

The sampling certificate shall include at least the following information:

a) the name of the producer;

b) kind of material: powder or granulate;

c) a unique identification number of the sample;

d) the name of the sampler;

e) the location(s), date and time of sampling;

f) Collection point of the material:

1) production with the additional information:

— nominal top size

— definition and mass of the lot size

— a unique identification number of the lot

— sampling point

— number, time and volume of increments

— V increment

2) big bag (sampling according to CEN/TS 17188);

g) weight of the combined sample sent to laboratory;

h) reference to this standard;

i) any deviation from this standard.

5.3 Storage and transport of laboratory sample(s)

Samples are to be stored in such a way that material will not be lost during transportation. The samples are to be stored dry and in a sealed sample box. The sampling certificate shall be attached.

5.4 Preparation of the laboratory sample(s) and test portion(s)

5.4.1 Principles of correct sample preparation and sample division

The main purpose of sample preparation is that the laboratory sample collected from the whole lot are reduced to one or more test samples based on sample division. The aim of sample division is therefore to homogenize and reduce the mass of the laboratory sample to make several duplicate test samples.

Each test sample shall be representative of the original sample based on the principle that the composition of the sample as taken on site shall not be changed during the steps of sample preparation for testing.

5.4.2 Test sample and test portion preparation

The increments that have been collected are mixed together in a container of suitable size to form a combined sample. In this case the combined sample is the laboratory sample.

The laboratory sample may need to be reduced to a test sample before a test portion is produced. The test sample(s) or directly the laboratory sample shall be reduced to a suitable size in order to obtain test portion(s) in such a way that sufficient material is still provided for all the tests to be performed. In particular, the calculation shall take into account the need for duplicate test portions, for extra material in case dubious results are obtained and the need for sampling with replacement. The sampling plan shall take into account such requirements. The test sample(s) (or directly the laboratory sample) shall be reduced using the principles of sample division using either:

— a riffle splitter;

— a rotary sample divider, or

— other equivalent device.

5.4.3 Apparatus for sample division

The most relevant sample division methods are based on the following apparatus:

a) Riffle splitter: a sample splitter shall have at least 12 slots and an even number with adjacent slots directing material into two different sub-samples. The width of the slots shall be at least three times the nominal top size of the material to be riffled to prevent sample bridging.