

English Version

Materials obtained from end-of-life tyres - Determination
of the specific surface area of powders - Method based on
krypton adsorption

Matériaux produits à partir de pneus usagés non
réutilisables - Détermination de la surface spécifique
des poudrettes - Méthode fondée sur l'adsorption de
krypton

Materialien aus Altreifen - Bestimmung der
spezifischen Oberfläche von Mehlen - Verfahren
basierend auf Kryptonadsorption

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European foreword

This document (CEN/TS 17510:2020) 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.

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Introduction

Specific surface area (A_s) is a parameter of great importance when it comes to physical characterization of materials such as granulates and powders from rubber materials. Like other physical characteristics, specific surface area could influence the performance of materials in its different applications.

Depending on the type of sample to be characterized, several different methods can be used for the determination of the specific surface area, generally based on different physical principles. The most widespread and useful method used in materials characterization is gas adsorption, either through gravimetric or volumetric methods.

For very low surface area samples the traditional volumetric method of nitrogen adsorption at 77 K or Argon at 87 K shows some important limitations. Alternatively, for absolute areas as low as $0,05 \text{ m}^2\text{g}^{-1}$ the suitable method for A_s determination is krypton adsorption at 77 K.

1 Scope

This document specifies a method for the determination of low specific surface area of powders ELTs rubber by measuring the amount of physically adsorbed krypton gas and applying the theoretical multipoint Brunauer, Emmett and Teller (BET) method.

This document defines a specific method for powders taking into account that, in order to obtain an accurate value of specific surface area, a representative sample of the material to be tested is taken according to the principle that every particle of the sample that represents the lot have an equal probability of being included in the sample.

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*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14243-1:2019 and the following 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 <https://www.iso.org/obp>

3.1

adsorption

enrichment of the adsorptive gas at the external and accessible internal surfaces of a solid material

[SOURCE: ISO 15901-2:2006]

3.2

adsorbate

adsorbed gas

[SOURCE: 15901-2:2006]

3.3

adsorptive

gas or vapour to be adsorbed

[SOURCE: ISO 15901-2:2006]

3.4

adsorbent

solid material on which adsorption occurs

[SOURCE: ISO 15901-2:2006]