

Täitematerjalide mehaaniliste ja füüsikaliste omaduste katsetamine. Osa 6: Terade tiheduse ja veeimavuse määramine

Tests for mechanical and physical properties of aggregates - Part 6: Determination of particle density and water absorption

EESTI STANDARDI EESSÕNA

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NATIONAL FOREWORD

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English Version

Tests for mechanical and physical properties of aggregates - Part 6: Determination of particle density and water absorption

Essais pour déterminer les caractéristiques mécaniques et physiques des granulats - Partie 6 : Détermination de la masse volumique réelle et du coefficient d'absorption d'eau

Prüfverfahren für mechanische und physikalische Eigenschaften von Gesteinskörnungen - Teil 6: Bestimmung der Rohdichte und der Wasseraufnahme

This European Standard was approved by CEN on 8 May 2013.

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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.

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Foreword

This document (EN 1097-6:2013) has been prepared by Technical Committee CEN/TC 154 "Aggregates", the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by January 2014, and conflicting national standards shall be withdrawn at the latest by January 2014.

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.

This document supersedes EN 1097-6:2000.

Annex J provides details of significant changes between this European Standard and the previous edition.

This standard forms a part of a series of tests for mechanical and physical properties of aggregates. Test methods for other properties of aggregates are covered by the following European Standards:

- EN 932 (all parts), *Tests for general properties of aggregates*
- EN 933 (all parts), *Tests for geometrical properties of aggregates*
- EN 1367 (all parts), *Tests for thermal and weathering properties of aggregates*
- EN 1744 (all parts), *Tests for chemical properties of aggregates*
- EN 13179 (all parts), *Tests for filler aggregate used in bituminous mixtures*

The other parts of EN 1097 include:

- *Part 1: Determination of the resistance to wear (micro-Deval)*
- *Part 2: Methods for the determination of resistance to fragmentation*
- *Part 3: Determination of loose bulk density and voids*
- *Part 4: Determination of the voids of dry compacted filler*
- *Part 5: Determination of the water content by drying in a ventilated oven*
- *Part 7: Determination of the particle density of filler — Pycnometer method*
- *Part 8: Determination of the polished stone value*
- *Part 9: Determination of the resistance to wear by abrasion from studded tyres — Nordic test*
- *Part 10: Determination of water suction height*

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,

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1 Scope

This European Standard specifies the reference methods used for type testing and in case of dispute, for the determination of particle density and water absorption of normal weight and lightweight aggregates. Other methods may be used for other purposes, such as factory production control, provided that an appropriate working relationship with the reference method has been established. For convenience, some of these other methods are also described in this standard.

The reference methods for normal weight aggregates specified are:

- a wire basket method for aggregate particles retained on the 31,5 mm sieve (Clause 7, except for railway ballast which uses Annex B);
- a pycnometer method for aggregate particles passing the 31,5 mm test sieve and retained on the 4 mm test sieve (Clause 8);
- a pycnometer method for aggregate particles passing the 4 mm test sieve and retained on the 0,063 mm test sieve (Clause 9).

In Clauses 7, 8 and 9, three different particle density parameters (oven-dried particle density, saturated and surface dried particle density and apparent particle density) and water absorption are determined after a soaking period of 24 h. In Annex B, the oven-dried particle density parameter is determined after soaking in water to constant mass.

The wire basket method may be used as an alternative to the pycnometer method for aggregate particles passing the 31,5 mm test sieve and retained on the 4 mm test sieve. In case of dispute, the pycnometer method described in Clause 8 should be used as the reference method.

NOTE 1 The wire basket method can also be used for single aggregate particles retained on the 63 mm sieve.

NOTE 2 The pycnometer method described in Clause 8 can be used as an alternative for aggregates passing the 4 mm sieve but retained on the 2 mm sieve.

The reference method for lightweight aggregates (Annex C) is a pycnometer method for aggregate particles passing the 31,5 mm test sieve and retained on the 4 mm test sieve. Three different particle density parameters and water absorption are determined after pre-drying and a soaking period of 24 h.

Three other methods for normal weight aggregates can be used to determine the pre-dried particle density:

- a wire basket method for aggregate particles passing the 63 mm test sieve and retained on the 31,5 mm test sieve (A.3);
- a pycnometer method for aggregate particles passing the 31,5 mm test sieve and retained on the 0,063 mm test sieve (A.4);
- a pycnometer method for aggregate particles passing the 31,5 mm test sieve, including the 0/0,063 mm size fraction (Annex G).

NOTE 3 If water absorption is less than about 1,5 %, the apparent particle density can be assessed using the pre-dried particle density method as defined in Annex A.

The quick method in Annex E can be used in factory production control to determine the apparent particle density of lightweight aggregates.

Guidance on the significance and use of the various density and water absorption parameters is given in Annex H.

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 932-1, *Tests for general properties of aggregates — Part 1: Methods for sampling*

EN 932-2, *Tests for general properties of aggregates — Part 2: Methods for reducing laboratory samples*

EN 932-5, *Tests for general properties of aggregates — Part 5: Common equipment and calibration*

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

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

apparent particle density

ρ_a

ratio obtained by dividing the oven-dried mass of an aggregate sample by the volume it occupies in water including the volume of any internal sealed voids but excluding the volume of water in any water accessible voids

Note 1 to entry: For lightweight aggregates the symbol $\rho_{L,a}$ is used.

3.2

constant mass

mass determined after successive weighings at least 1 h apart not differing by more than 0,1 %

Note 1 to entry: In many cases constant mass can be achieved after a test portion has been dried for a pre-determined period in a specified oven at (110 ± 5) °C. Test laboratories can determine the time necessary to achieve constant mass for specific types and sizes of sample dependent upon the drying capacity of the oven used.

3.3

oven-dried particle density

ρ_{rd}

ratio obtained by dividing the oven-dried mass of an aggregate sample by the volume it occupies in water including the volume of any internal sealed voids and the volume of any water accessible voids

Note 1 to entry: For lightweight aggregates the symbol $\rho_{L,rd}$ is used.

3.4

pre-dried particle density

ρ_p

ratio obtained by dividing the pre-dried mass of an aggregate sample by the volume it occupies in water including the volume of any internal sealed voids but excluding the volume of water in any water accessible voids

Note 1 to entry: Test conditions in terms of pre-drying of the test sample and the shorter immersion period differ from the ones for apparent particle density.

Note 2 to entry: Pre-dried particle density is a rapid test.