

KERGTÄITEMATERJALID

Lightweight aggregates

This document is a preview generated by EVS

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 13055:2016 sisaldab Euroopa standardi EN 13055:2016 ingliskeelset teksti.	This Estonian standard EVS-EN 13055:2016 consists of the English text of the European standard EN 13055:2016.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 18.05.2016.	Date of Availability of the European standard is 18.05.2016.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 91.100.15

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:

Aru 10, 10317 Tallinn, Eesti; koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Aru 10, 10317 Tallinn, Estonia; homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

EUROPEAN STANDARD

EN 13055

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2016

ICS 91.100.15

Supersedes EN 13055-1:2002, EN 13055-2:2004

English Version

Lightweight aggregates

Granulats légers

Leichte Gesteinskörnungen

This European Standard was approved by CEN on 18 March 2016.

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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents	Page
European foreword.....	5
1 Scope	7
2 Normative references	7
3 Terms and definitions	9
4 Symbols and abbreviations	10
5 Product characteristics	10
5.1 General	10
5.2 Density	10
5.2.1 Loose bulk density	10
5.2.2 Particle density	10
5.3 Aggregate size	11
5.3.1 General	11
5.3.2 Undersize	11
5.3.3 Oversize	11
5.4 Grading	12
5.5 Content of fines in LWA	12
5.6 Grading of LWA filler	12
5.7 Particle shape	12
5.8 Water content	12
5.9 Water absorption	12
5.10 Bulk crushing resistance	12
5.11 Crushed particles	12
5.12 Resistance to disintegration	12
5.13 Freezing and thawing resistance	13
5.14 Water suction height	13
5.15 Compressibility and confined compressive strength	13
5.16 Resistance to cyclic compressive loading	13
5.17 Stiffening properties	13
5.18 Voids of dry compacted LWA filler	13
5.19 Resistance to thermal shock	13
5.20 Resistance to polishing	13
5.21 Resistance to wear by abrasion from studded tyres of coarse LWA in surface treatments	14
5.22 Affinity between LWA and bitumen	14
5.23 Resistance to fragmentation	14
5.24 Resistance to wear	14
5.25 Chemical characteristics	14
5.25.1 General	14
5.25.2 Water solubility	14
5.25.3 Chloride	15
5.25.4 Sulphur containing compounds	15
5.25.5 Loss on ignition	15
5.25.6 Water-soluble constituents	15
5.25.7 Organic contaminators	15
5.25.8 Alkali-silica reactivity of natural LWA	15

5.26	Dangerous substances	15
5.27	Thermal conductivity	16
5.27.1	General	16
5.27.2	Correction for moisture.....	16
6	Testing.....	16
6.1	Sampling and sample reduction.....	16
6.2	Quantity of test specimens	16
6.3	Preparation of test specimens for thermal conductivity testing.....	16
6.3.1	Drying	16
6.3.2	Conditioning after drying	16
6.3.3	Preparation of test specimens	16
6.3.4	Thickness of test specimens	16
7	Assessment and verification of constancy of performance - AVCP.....	17
7.1	General	17
7.2	Type testing	17
7.2.1	General	17
7.2.2	Test samples and testing.....	17
7.2.3	Shared results	18
7.2.4	Test reports	18
7.3	Factory production control (FPC).....	18
7.3.1	General	18
7.3.2	Requirements.....	18
7.3.3	The FPC system and compliance with the DoP.....	20
7.3.4	Initial inspection of factory and FPC covered under AVCP system 2+.....	21
7.3.5	Continuous surveillance of FPC covered under AVCP system 2+	21
7.3.6	Procedure for modifications.....	21
7.3.7	Prototypes and custom-made products	22
8	Designation, supply, marking and labelling	22
8.1	Designation	22
8.2	Supply	23
8.3	Marking and labelling	23
Annex A (normative) Source materials considered in the development of EN 13055 and their status in respect of the scope of the standard.....		24
Annex B (normative) Standards covering other applications of LWA.....		27
Annex C (normative) Determination of bulk crushing resistance		28
C.1	Principle.....	28
C.2	Apparatus	28
C.3	Preparation of test specimens	28
C.4	Procedure.....	29
C.4.1	Procedure 1.....	29
C.4.2	Procedure 2.....	29
C.5	Calculation and expression of results	29
C.6	Test report	29
Annex D (informative) Determination of water absorption for fine LWA		33
D.1	General	33

D.2	Principle	33
D.3	Apparatus	33
D.3.1	General	33
D.3.2	Apparatus for general purposes	33
D.3.3	Special apparatus for surface drying	33
D.4	Preparation of test specimens	34
D.5	Test procedure	34
D.6	Calculation and expression of results	34
D.7	Test report	35
Annex E (informative)	Guidance on how to convert quantities by mass to quantities by volume	36
E.1	Background	36
E.2	Example calculation	36
Annex F (informative)	Guidance on the effects of some chemical constituents of LWA on the durability of concrete, mortar and grout in which they are incorporated	37
F.1	General	37
F.2	Chlorides	37
F.3	Organic components	37
F.4	Alkali aggregate reaction	37
F.5	Sulphates	38
Annex G (informative)	Indicative test frequencies for factory production control (FPC)	39
Annex ZA (informative)	Relationship of this European Standard with Regulation (EU) No 305/2011	42
ZA.1	Scope and relevant characteristics	42
ZA.2	System of Assessment and Verification of Constancy of Performance (AVCP)	47
ZA.3	Assignment of AVCP tasks	48
	Bibliography	50

European foreword

This document (EN 13055:2016) 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 November 2016, and conflicting national standards shall be withdrawn at the latest by February 2018.

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 13055-1:2002 and EN 13055-2:2004.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports basic work requirements of EU Regulation.

For relationship with EU Regulation see informative Annex ZA, which is an integral part of this document.

The most significant changes compared to the previous editions include:

- a) Merging of the former 2 parts and simplifying the title of the standard;
- b) Amending terminology and Annex ZA to be consistent with the Construction Products Regulation;
- c) Clarifying the scope of the standard to cover construction products only;
- d) Adding a new normative Annex A dealing with all source materials considered to be within the scope;
- e) Referring certain recycled aggregates and MIBA to other aggregate standards (same product family);
- f) Referring certain LWA for specific applications to other aggregate standards in a new normative Annex B;
- g) Replacement of 3 former test method annexes with normative references to new, separate EN test method standards;
- h) Reorganisation and alignment of text in subclauses under Clause 5 Product characteristics;
- i) Adding a new general clause on dangerous substances;
- j) Replacement of former clause on Evaluation of Conformity, and the normative text from the former annex on Factory Production Control, with new normative clauses on Assessment and Verification of Constancy of Performance;
- k) Adding a new informative Annex D describing a test method for determination of water absorption for fine LWA.

No changes to existing technical classes and/or threshold levels have been made.

Characteristics for other aggregates are specified in the following European Standards:

- EN 12620, *Aggregates for concrete*,
- EN 13043, *Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas*,
- EN 13139, *Aggregates for mortar*,
- EN 13242, *Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction*,
- EN 13383-1, *Armourstone - Part 1: Specification*,
- EN 13450, *Aggregates for railway ballast*.

According to the CEN/CENELEC Internal Regulations, the national standards organizations 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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard specifies the properties of Lightweight Aggregates (LWA) and fillers derived thereof obtained by processing natural or manufactured materials and mixtures of these aggregates for concrete, mortar and grout, bituminous mixtures and surface treatments and for unbound and hydraulically bound applications in construction works.

This European Standard covers LWA of mineral origin having particle densities not exceeding 2000 kg/m³ (2,000 Mg/m³) or loose bulk densities not exceeding 1200 kg/m³ (1,200 Mg/m³) including:

- a) natural LWA;
- b) LWA manufactured from natural materials;
- c) LWA manufactured from by-products of industrial processes or from recycled source materials;
- d) LWA as by-products of industrial processes.

A list of source materials and specific materials, which are within the scope of this standard, is given in Annex A (normative).

NOTE Recycled aggregates from construction and demolition waste and Municipal Solid Waste Incinerator Bottom Ash (MIBA) are covered by EN 12620, EN 13043, EN 13139 and EN 13242.

Some LWA for specific applications are covered in separate European product Standards (Annex B, normative).

The requirements specified in this European Standard may not be equally relevant to all types of LWA. For particular applications, the requirements and tolerances can be adapted for the end use.

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

EN 933-10, *Tests for geometrical properties of aggregates — Part 10: Assessment of fines — Grading of filler aggregates (air jet sieving)*

EN 1097-1, *Tests for mechanical and physical properties of aggregates — Part 1: Determination of the resistance to wear (micro-Deval)*

EN 1097-2, *Tests for mechanical and physical properties of aggregates — Part 2: Methods for the determination of resistance to fragmentation*

EN 1097-3, *Tests for mechanical and physical properties of aggregates — Part 3: Determination of loose bulk density and voids*

EN 1097-4, *Tests for mechanical and physical properties of aggregates — Part 4: Determination of the voids of dry compacted filler*

EN 1097-5, *Tests for mechanical and physical properties of aggregates — Part 5: Determination of the water content by drying in a ventilated oven*

EN 1097-6, *Tests for mechanical and physical properties of aggregates — Part 6: Determination of particle density and water absorption*

EN 1097-8, *Tests for mechanical and physical properties of aggregates — Part 8: Determination of the polished stone value*

EN 1097-9, *Tests for mechanical and physical properties of aggregates — Part 9: Determination of the resistance to wear by abrasion from studded tyres - Nordic test*

EN 1097-10, *Tests for mechanical and physical properties of aggregates — Part 10: Determination of water suction height*

EN 1097-11, *Tests for mechanical and physical properties of aggregates — Part 11: Determination of compressibility and confined compressive strength of lightweight aggregates*

EN 1367-5, *Tests for thermal and weathering properties of aggregates — Part 5: Determination of resistance to thermal shock*

EN 1367-7, *Tests for thermal and weathering properties of aggregates — Part 7: Determination of resistance to freezing and thawing of Lightweight aggregates*

EN 1367-8, *Tests for thermal and weathering properties of aggregates — Part 8: Determination of resistance to disintegration of Lightweight Aggregates*

EN 1744-1 *Tests for chemical properties of aggregates — Part 1: Chemical analysis*

EN 1744-3, *Tests for chemical properties of aggregates — Part 3: Preparation of eluates by leaching of aggregates*

EN 12664, *Thermal performance of building materials and products — Determination of thermal resistance by means of guarded hot plate and heat flow meter methods — Dry and moist products of medium and low thermal resistance*

EN 12667, *Thermal performance of building materials and products — Determination of thermal resistance by means of guarded hot plate and heat flow meter methods — Products of high and medium thermal resistance*

EN 12697-11, *Bituminous mixtures — Test methods for hot mix asphalt — Part 11: Determination of the affinity between aggregate and bitumen*

EN 13179-1, *Tests for filler aggregate used in bituminous mixtures — Part 1: Delta ring and ball test*

EN 13286-7, *Unbound and hydraulically bound mixtures — Part 7: Cyclic load triaxial test for unbound mixtures*

EN ISO 10456, *Building materials and products — Hygrothermal properties — Tabulated design values and procedures for determining declared and design thermal values (ISO 10456)*