SLOVENSKI STANDARD
SIST EN 1097-8:2020

01-julij-2020

Nadomešča:
SIST EN 1097-8:2009

Preskusi mehanskih in fizikalnih lastnosti agregatov - 8. del: Določevanje vrednosti količnika zaglajevanja kamenih zrn

Tests for mechanical and physical properties of aggregates - Part 8: Determination of the polished stone value

Prüfverfahren für mechanische und physikalische Eigenschaften von Gesteinskörnungen - Teil 8: Bestimmung des Polierwertes

Essais pour déterminer les caractéristiques mécaniques et physiques des granulats - Partie 8: Détermination du coefficient de polissage accéléré

Ta slovenski standard je istoveten z: **EN 1097-8:2020**

ICS:

91.100.15	Mineralni materiali in izdelki	Mineral materials and products

SIST EN 1097-8:2020	**en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1097-8

April 2020

ICS 91.100.15

Supersedes EN 1097-8:2009

English Version

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This European Standard was approved by CEN on 24 February 2020.

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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 (EN 1097-8:2020) 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of an identical text or by endorsement, at the latest by October 2020, and conflicting national standards shall be withdrawn at the latest by October 2020.

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 supersedes EN 1097-8:2009.

The main technical changes compared to the previous version are the following:

— Clauses 5 and A.3 about sampling have been deleted as sufficient information is given in the Scope and in 8.1. Consequently, all clauses have been renumbered.

— New Clause 5 Materials has been restructured.

— Grading requirements for corn emery have been completed (Table 1).

— Requirements for emery flour have been added (5.2.2).

— The sources of PSV control stone and friction tester reference stone have been changed (5.2.3 and 5.2.4).

— The feed mechanisms for corn emery and emery flour have been clarified (6.2.5 and 6.2.6).

— The friction tester design has been clarified (6.3).

— The range of test sieves has been extended (6.4).

— The precision of grid sieve bar spacing has been changed (6.5).

— Notes with normative text have been transformed into main text or deleted (6.2.7, 7.4 and A.5.2).

— An illustration of correct and incorrect prepared test specimens has been added (7.5).

— Instructions for clamping specimens around the road wheel have been given (9.3).

— The precision of corn emery feed rate has been changed (9.4).

— The time between water storage and accelerated polishing of specimens has been limited (9.8).

— The friction test procedure has been rewritten and supplemented with illustrations showing the positioning of test specimens (Clause 10).

— The PSV control stone has been changed and the specified range adapted (11.2).

— Formula (1) has been adapted to the new control stone (11.3.3).

— The test report content has been adapted to the current rules (Clause 12).

— The temperature for conditioning rubber-tyred wheels has been changed (C.1.3).

— The verification of the alignment of the road wheel relative to each rubber-tyred wheel has been extensively revised (Annex C).

— The control of sliders and slider rubber in D.2 has been specified.

— Annex E about precision has been removed as the test method has been changed and the former precision results were not acceptable any more.

— A new normative Annex E has been added: “Friction tester reference stone specimen preparation and friction slider conditioning”.

— Precision for the aggregate abrasion value has been moved to a new Annex F.

— The Bibliography has been supplemented.

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

EN 932, *Tests for general properties of aggregates*

EN 933, *Tests for geometrical properties of aggregates*

EN 1367, *Tests for thermal and weathering properties of aggregates*

EN 1744, *Tests for chemical properties of aggregates*

EN 13179, *Tests for filler aggregate used in bituminous mixtures*

The other parts of EN 1097 are:

— *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 water content by drying in a ventilated oven*

— *Part 6: Determination of particle density and water absorption*

— *Part 7: Determination of the particle density of filler – Pyknometer method*

— *Part 9: Determination of the resistance to wear by abrasion from studded tyres: Nordic test*

— *Part 10: Water suction height*

In this document, the Annexes A, B, C, D and E are normative and the Annex F is informative.

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, 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.

1 Scope

This document describes the reference method used for type testing and in case of dispute for determining the polished stone value (PSV) of a coarse aggregate used in road surfacings. For other purposes, in particular factory production control, other methods are possible provided that an appropriate working relationship with the reference method has been established. Examples of advanced test methods can be found in the Bibliography.

Annex A describes an optional method for the determination of the aggregate abrasion value (AAV).

NOTE 1 The AAV method is suitable to use when particular types of skid resistant aggregates, (typically those with a PSV of 60 or greater) which can be susceptible to abrasion under traffic, are required.

The sample is taken from normal run of production from the plant.

NOTE 2 Chippings that have been freshly crushed in the laboratory or recovered from bituminous materials may give misleading results.

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 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 933-3, *Tests for geometrical properties of aggregates — Part 3: Determination of particle shape – Flakiness index*

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

ISO 48, *Rubber, vulcanized or thermoplastic — Determination of hardness*

ISO 4662, *Rubber, vulcanized or thermoplastic — Determination of rebound resilience*

3 Terms and definitions

For the purposes of this document, the following definitions 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/ui

3.1
batch
production quantity, a delivery quantity, a partial delivery quantity (railway wagon-load, lorry-load, ship's cargo) or a stockpile produced at one time under conditions that are presumed uniform

Note 1 to entry: With a continuous process, the quantity produced during an agreed period is treated as a batch.

3.2
laboratory sample
reduced sample derived from a bulk sample for laboratory testing

3.3
subsample
sample obtained by means of a sample reduction procedure

3.4
test portion
sample used as a whole in a single test

3.5
test specimen
sample used in a single determination when a test method requires more than one determination of a property

4 Principle

PSV is a measure of the resistance of coarse aggregate to the polishing action of vehicle tyres under conditions which simulate those occurring on the surface of a road.

The test is carried out on aggregate passing a 10 mm sieve and retained on a 7,2 mm grid sieve, and is in two parts:

a) test specimens are subjected to a polishing action in an accelerated polishing machine;

b) the state of polish reached by each specimen is measured by means of a friction test. The PSV is then calculated from the friction determinations.

5 Materials

5.1 General

Detailed requirements for the control of materials are specified in Annex B.

5.2 Materials

5.2.1 Natural corn emery, complying with the grading specified in Table 1. This shall be used only once.

Table 1 — Grading requirements for corn emery

Nominal width of sieve aperture mm	**Total passing** %
1,0	100
0,600	98 to 100
0,500	70 to 100
0,425	30 to 90
0,355	0 to 30
0,300	0 to 5

5.2.2 Air-floated or water-washed natural emery flour, complying with the characteristics specified below. This shall be used only once.

a) at least 50 % Al_2O_3 content;

b) particle density of at least 3,5 Mg/m^3;

c) particle size distribution (by air jet sieving) as given in Table 2.

Table 2 — Grading requirements for emery flour

Sieve size mm	**Passing** %
0,063	100
0,050	99 to 100
0,032	75 to 98
0,020	60 to 80

5.2.3 PSV control stone, from a recognized source, with a mean PSV in the range 50 to 60.

NOTE 1 At present the only recognized source of PSV control stone is a stock of granite aggregate controlled by Technische Universität München (TUM), MPA Bau – Abteilung Baustoffe, Baumbachstrasse 7, 81245 München, Germany.

NOTE 2 An alternative source of PSV control stone with a mean PSV in the range 50 to 60 can be used provided the PSV has been established in a controlled experiment carried out in at least ten laboratories, by cross testing against the Herrnholzer control stone.

In case of dispute, the Herrnholzer control stone should be used.

5.2.4 Friction tester reference stone, from a recognized source, for conditioning new sliders (Annex E) and checking the friction tester (10.3), with a mean PSV in the range 60 to 65.

NOTE 1 At present the only recognized source of friction tester reference stone is a stock of olivine basalt aggregate controlled by Wessex Precision Instruments, info@wessextestequipment.co.uk.

NOTE 2 An alternative source of friction tester reference stone with a mean PSV in the range 60 to 65 can be used provided the PSV has been established in a controlled experiment carried out in at least ten laboratories, by cross testing against the WESSEX type friction tester reference stone.

In case of dispute, the WESSEX type friction tester reference stone should be used.

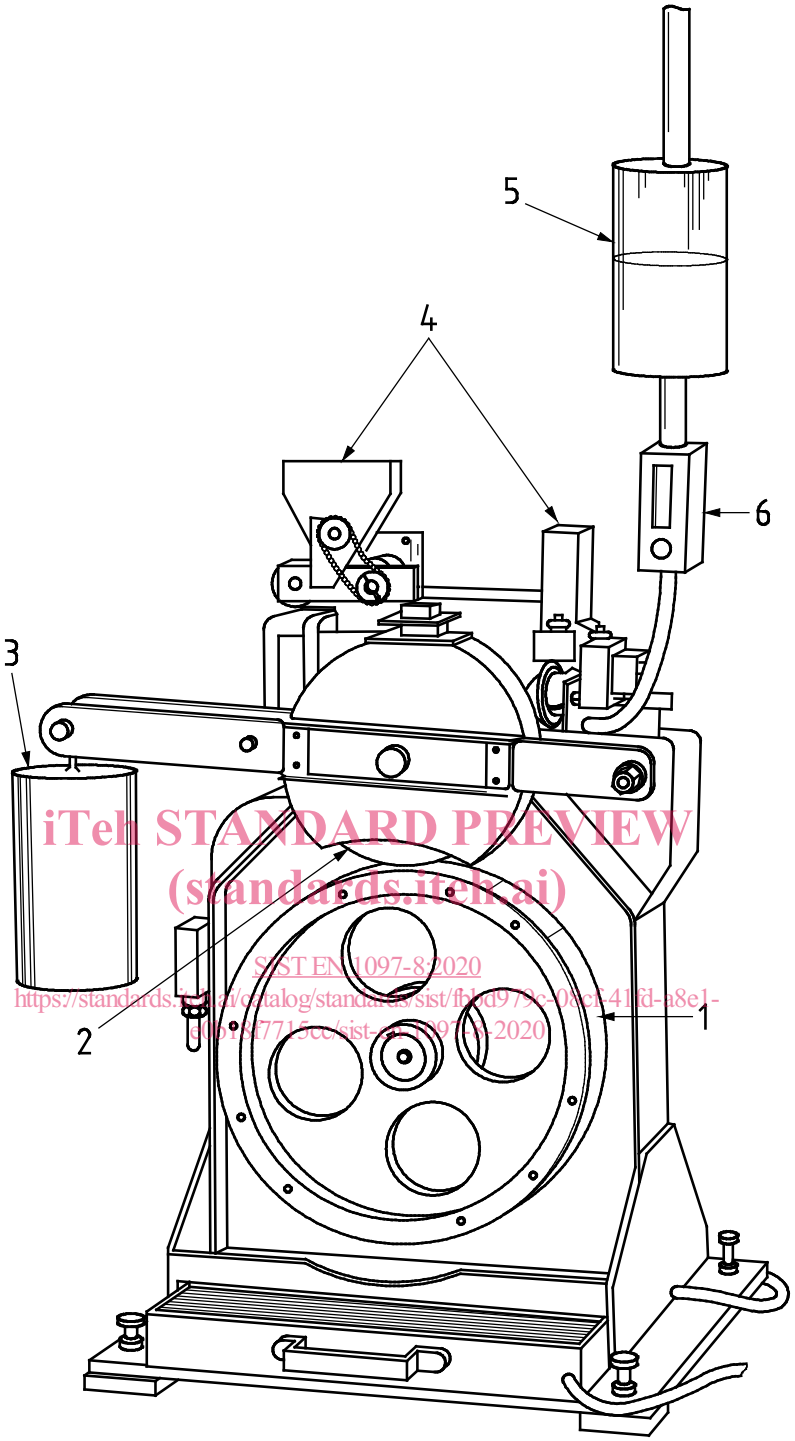
6 Apparatus

6.1 General

All apparatus, unless otherwise stated, shall conform to the general requirements of EN 932-5. Additional requirements for calibration and control of the accelerated polishing machine and the rubber-tyred wheels are given in Annex C.

6.2 Accelerated polishing machine

The polishing machine (Figure 1) shall be mounted on four adjustable levelling feet, placed at the corners and secured on a firm, level base of stone or concrete. It shall include the parts specified in 6.2.1 to 6.2.7.



Key

1 road wheel	4 feed mechanisms
2 solid rubber-tyred wheel	5 water feed
3 weight	6 flow gauge

Figure 1 — Typical accelerated polishing machine

6.2.1 A wheel, referred to as the "road wheel", having a flat periphery and clamping arrangements to hold the aggregate specimens shown in Figure 2. It shall be of such a size and shape as to permit 14 of the specimens described in Clause 7 to be clamped onto the periphery so as to form a surface of aggregate particles (406 ± 3) mm in diameter and bounded by clamping rings (44,5 ± 0,5) mm apart.

Dimensions in millimetres

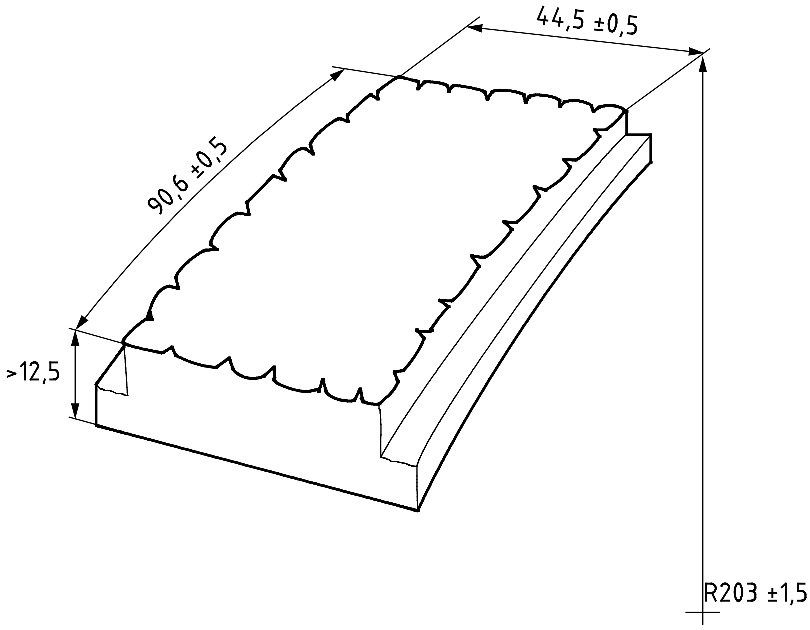


Figure 2 — Test specimen dimensions

6.2.2 A means of rotating the road wheel about its own axis at a speed of (320 ± 5) min^{-1} under test conditions.

6.2.3 Two solid rubber-tyred wheels of (200 ± 3) mm diameter and with a width of (38 ± 2) mm. One of these wheels shall be used exclusively with the corn emery and clearly marked as such, whereas the other wheel shall be used exclusively with the emery flour and clearly marked as such. The surface of the rubber tyres shall initially have a hardness of (69 ± 3) IRHD as specified in ISO 48.

6.2.4 A lever arm and weight to bring the surface of the appropriate solid rubber-tyred wheel to bear on the road wheel with a total free force of (725 ± 10) N. The solid rubber-tyred wheel shall be free to rotate about its own axis, which shall be parallel with the axis of the road wheel, and the plane of rotation of the tyre shall be in line with that of the road wheel.

The machine shall be accurately aligned so that the road wheel and either of the rubber-tyred wheels shall be free to rotate without play in the bearings (C.2.4):

a) the planes of rotation of the two wheels in use shall be not more than 0,33° of arc out of parallel (1 mm in 200 mm);

b) the planes of rotation through the centres of the two wheels in use shall be not more than 0,8 mm apart.

6.2.5 Feed mechanism for the corn emery, identified as being for use with the rubber-tyred wheel marked for use with the corn emery (6.2.3), to feed the corn emery (5.2.1) and water at the specified rates. The emery and water shall be fed directly onto the road wheel near the point of contact with the rubber-tyred wheel.

NOTE Feeding the corn emery and water near the point of contact with the rubber-tyred wheel is usually achieved using a nozzle into which water and emery mix. In such a case, instead of having a continuous emery flow, emery clusters may form under capillary forces and discharge discontinuously near the point of contact with the rubber-tyred wheel. To avoid this phenomenon, a possible solution would be to connect the water supply to the lowest point of the nozzle (close to the road wheel).