SLOVENSKI STANDARD
oSIST prEN 13863-6:2022

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Betonska vozišča - 6. del: Preskusna metoda za določanje natezne trdnosti betona na cilindričnih ploščah

Concrete pavements - Part 6: Test method for the determination of the splitting tensile strength of concrete on cylindrical discs

Fahrbahnbefestigungen aus Beton - Teil 6: Prüfverfahren zur Bestimmung der Spaltzugfestigkeit von Beton auf Zylinderscheiben

Chaussées en béton - Partie 6 : Méthodes d'essai pour la détermination de la divisant résistance à la traction de béton sur disques cylindriques

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91.100.30	Beton in betonski izdelki	Concrete and concrete products
93.080.20	Materiali za gradnjo cest	Road construction materials

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Concrete pavements - Part 6: Test method for the determination of the splitting tensile strength of concrete on cylindrical discs

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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 (prEN 13863-6:2022) has been prepared by Technical Committee CEN/TC 227 “Road materials”, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

EN 13863, *Concrete pavements,* is currently composed with the following parts:

— *Part 1: Test method for the determination of the thickness of a concrete pavement by survey method*

— *Part 2: Test method for the determination of the bond be-tween two layers*

— *Part 3: Test methods for the determination of the thickness of a concrete pavement from cores*

— *Part 4: Test methods for the determination of wear resistance of concrete pavements to studded tyres*

— *Part 5: Determination of the bond stress of dowels to be used in concrete pavements*[1)]

— *Part 6: Test method for the determination of the tensile strength of concrete on cylindrical discs*

1) Document under preparation.

1 Scope

This document specifies a method for the determination of the tensile strength on cylindrical discs of concrete using cylindrical discs as specimens, which can be

— separately manufactured or

— cut from cores of the finished concrete pavement.

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 12390-1, *Testing hardened concrete — Part 1: Shape, dimensions and other requirements for specimens and moulds*

EN 12390-2, *Testing hardened concrete — Part 2: Making and curing specimens for strength tests*

EN 12390-4, *Testing hardened concrete — Part 4: Compressive strength; Specification for testing machines*

EN 12390-7, *Testing hardened concrete — Part 7: Density of hardened concrete*

3 Terms and definitions

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

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

— IEC Electropedia: available at https://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

3.1 Terms and definitions

3.1.1
tensile strength on cylindrical discs
maximum stress determined by a controlled uniaxial, radial load on a test specimen until failure

3.1.2
test specimen
cylindrical disc prepared from a separately manufactured cylinder or core

3.2 Symbols

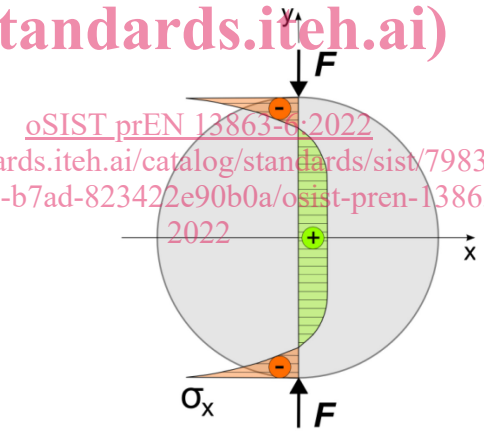
Table 1 — Symbols

Symbol	Signification	Dimension
F	Failure load	kN
d	Diameter of the specimen	mm
h	Height of the specimen	mm
α	Curvature angle of the bearing strip	[°]
b	Secant length of the bearing strip	mm
$f_{ct,cd}$	Tensile strength on cylindrical discs	MPa

4 Principle

A radial compressive force F is linearly applied to a specimen using bearing strips (see Figure 1). Thereby an almost uniform tensile stress in the transverse direction is produced at the centre of the specimen. This loading is applied until failure occurs. The maximum load sustained by the specimen is used to calculate the tensile strength on cylindrical discs.

The distribution of stress within the cylindrical disc is shown in Figure 1. Figure 2 shows a typical fracture pattern after the test.



Key

F radial compressive force

σ_X stress

Figure 1 — Distribution of stress within the cylindrical disc

Figure 2 — Fracture pattern after the test

5 Apparatus

5.1 Apparatus for production of the test specimens

5.1.1 Cylindrical mould made of steel with a minimum height of h = 200 mm according to EN 12390-1.

5.1.2 Scale with an accuracy of 0,1 g.

5.1.3 Calliper with an accuracy of 0,1 mm.

5.1.4 Straightedge and feeler gauge to check the gap width.

5.1.5 Temperature controlled water bath (20 ± 2) °C.

5.1.6 Climate chamber set to (20 ± 2) °C and (65 ± 5) % relative humidity.

5.1.7 Sawing machine to cut cylindrical discs as test specimens from separately produced cylinders or cores.

5.1.8 Grinding machine to grind the cut surface plane and parallel if necessary.

5.2 Load equipment

5.2.1 Testing machine, class 1 according to EN 12390-4 with a maximum load of at least 100 kN and force-controlled load increase of (0,4 ± 0,1) kN/s.

5.2.2 Test device with centering aid for alignment of specimen in testing machine (for example see Figure 3).

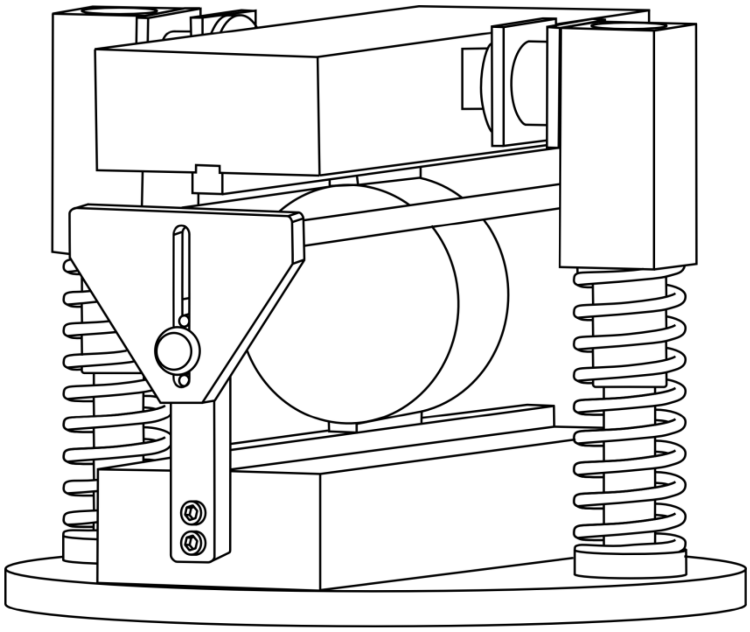


Figure 3 — Example of test device for tensile strength with centering aid for alignment

The test device shall be equipped with concave curved upper and lower load transfer bearing strips of hardened steel. The radius of curvature $d/2$ and the width of the bearing strips b have to be adapted to the radius of the test specimen according to the next formula:

$$b = d \times \sin(\alpha / 2)$$

where

α is 15°.

Tolerances on b shall be limited to a maximum of ± 0,3 mm. For specimens with d = 100 mm, the secant b of the bearing bar is corresponding to 13 mm (see Figure 4).

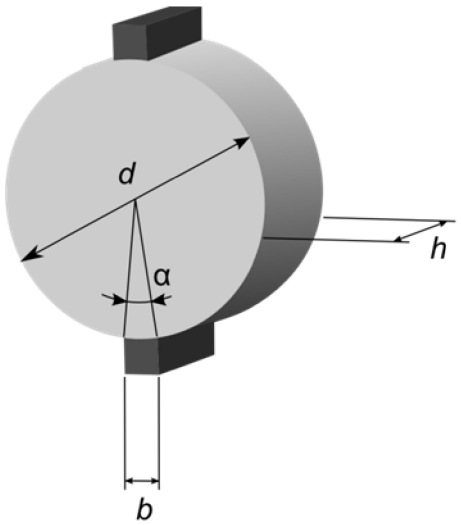


Figure 4 — Test specimen and bearing strips

5.2.3 Between the bearing strips and the specimen an **intermediate strip** made of felt with a bulk density of (520 ± 52) kg/m³ with a thickness of (4 ± 1) mm has to be inserted, the dimensions of which shall be at least the length and width of the bearing bars.

6 Test specimen

6.1 General

The specimens shall have a diameter of (100 ± 5) mm and a height of (50 ± 5) mm. In addition, the ratio h/d shall be (0,50 ± 0,05). Specimens with larger deviations shall be discarded.

The unevenness of the lateral surface along the cylinder axis of the test specimen shall not exceed a gap of 0,5 mm. Test specimens which do not meet this criterion shall be discarded.

The angle between the lateral area and the base shall be (90 ± 3)°.

All test specimens shall be visually inspected with regard to the concrete structure (voids, porosity, irregularities) and damage. Any irregularities shall be included in the test report.

Before the test, the bulk density shall be determined according to EN 12390-7.

6.2 Sampling/production, preparation and storage of test specimens

6.2.1 Separately manufactured test specimens

Separately manufactured test specimens shall be taken from cylinders with a diameter d = 100 mm and a height $h \geq 100$ mm, cast according to EN 12390-1. Manufacturing directly the test specimen disc is not permitted.

The cylinders shall be stored until preparation of the test specimens in a temperature-controlled water bath at (20 ± 2) °C.

The test specimens shall be sawn from the bottom of the cylinders. The bottom surface of the specimen shall not be processed any further.

The test specimens shall be stored until testing in a temperature controlled water bath at (20 ± 2) °C.

6.2.2 Test specimens made of cores

The concrete shall be at least 14 d old, before cores are drilled. The cores have to be stored until preparation of the test specimens in laboratory conditions at a temperature of (20 ± 5) °C.

The thickness of the individual layers of concrete, the thickness of the layer of fine mortar at the surface, the texture of the surface, the estimated maximum aggregate size, the results of the visual inspection of the concrete structure (gravel pockets, voids, porosity, irregularities), the results of the visual evaluation of the bond between the concrete layers and the position and the diameter of reinforcement bars (in mm) shall be documented.

If the test specimens are taken from the top and bottom of the core, the surface texture up to the largest texture depth and the bottom section without an enclosed concrete structure shall be removed.

The test specimens shall be stored until testing at (20 ± 2) °C and (65 ± 5) % relative humidity over at least 3 d until a constant mass is measured. The mass is considered constant, if two tests conducted at an interval of 24 h result in a mass difference of less than 0,1 %.