



SLOVENSKI STANDARD SIST EN 13894-2:2003

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Dfc]nj cX]]b`g]ghYa]`nUnUy]lc`]b`dcdfUj]c`VYfcbg_]` _cbglfi _VY^!`DfYg_i gbY
a YlcXY!`8 c`c Yj Ub^Y`i ffi ^Ub^Udf]X]bUa] b]cVhryV]!`&^rXY. Dc`glf^Yj Ub^f

Products and systems for the protection and repair of concrete structures - Test methods
- Determination of fatigue under dynamic loading - Part 2: After hardening

Produkte und Systeme für den Schutz und die Instandsetzung von Betontragwerken -
Prüfverfahren - Bestimmung des Ermüdungsverhaltens bei dynamischer Belastung - Teil
2: Nach dem Erhärten

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Produits et systemes pour la protection et la réparation des structures en béton -
Méthodes d'essai - Détermination de la fatigue sous charge dynamique - Partie 2: Apres
durcissement

Ta slovenski standard je istoveten z: EN 13894-2:2002

ICS:

91.080.40 Betonske konstrukcije Concrete structures

SIST EN 13894-2:2003 en

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 13894-2

October 2002

ICS 91.080.40

English version

Products and systems for the protection and repair of concrete structures - Test methods - Determination of fatigue under dynamic loading - Part 2: After hardening

Produits et systèmes pour la protection et la réparation des structures en béton - Méthodes d'essais - Détermination de la fatigue sous charge dynamique - Partie 2: Après durcissement

Produkte und Systeme für den Schutz und die Instandsetzung von Betontragwerken - Prüfverfahren - Bestimmung des Ermüdungsverhaltens bei dynamischer Belastung - Teil 2: Nach dem Erhärten

This European Standard was approved by CEN on 11 July 2002.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (EN 13894-2:2002) has been prepared by Technical Committee CEN/TC 104 "Concrete and related products", the secretariat of which is held by DIN.

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 April 2003, and conflicting national standards shall be withdrawn at the latest by April 2003.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard : Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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EN 13894-2:2002 (E)

1 Scope

This part of this European Standard describes a method for determining the response to fatigue under dynamic loading of structural bonding agents after hardening.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN ISO 8501-1, *Preparation of steel substrates before application of paints and related products - Visual assessment of surface cleanliness - Part 1: Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings (ISO 8501-1:1988).*

ISO 3800, *Threaded fasteners - Axial load fatigue testing - Test methods and evaluation of results.*

3 Principle

A slant shear test is conducted using steel prisms of size 40 mm × 40 mm × 160 mm with a bond line inclined at an angle of 45 ° (Figure 1). The test is performed by applying a dynamic tension force along the longitudinal axis of the bonded prism. The number of load cycles is progressively raised until failure occurs.

4 Equipment

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4.1 Steel prisms, 40 mm × 40 mm × 160 mm cut at an angle of 45 °, as shown in Figure 1 with threaded holes at the two extremities for connection to steel bars as described in 5.3.

4.2 Grit blasting equipment with oil separator.

4.3 A tension testing machine capable of applying load cycles with a frequency of 2 Hz to 5 Hz with loads between 5 kN and 20 kN and a device for counting the load cycles.

5 Test procedure

5.1 Preparation of test pieces

The test specimens shall be prepared at 21 °C ± 2 °C and a RH of 60 % ± 10 %. The bonding surfaces of the steel prisms shall be degreased using a suitable degreasing agent and then grit blasted to grade SA 2.5 of EN ISO 8501-1. The steel surfaces shall then be vacuumed to remove any dust. Mix the adhesive in accordance with the manufacturer's instructions and apply it to each of the prepared bonding surfaces such that when they are brought together using the 4 screws shown in Figure 1 a bond line thickness of 1,0 mm ± 0,1 mm is achieved or such other bond-line thickness as shall be specified in accordance with the use of the product. The assembled test specimens shall be stored at 21 °C ± 2 °C and a RH 60 % ± 10 % for at least 7 days.

5.2 Number of test specimens

Three prisms shall be tested to find the mean short term failure load, F_{um} . Five prisms shall be subjected to dynamic loading test at each of three load ranges.

5.3 Testing

The short term failure load for each prism, F_u , is determined by applying a constant rate of loading of 1 kN/s until failure. The mean value, F_{um} , is then calculated.

The fatigue test shall be performed at three load ranges. In each case the lowest load shall be 5 % of F_{um} . The three upper loads shall be 80 %, 70 % and 60 % of F_{um} , respectively. If more than three prisms do not fail before 10^7 load cycles at the lowest load range, the test shall be repeated at the next highest load range.

Connect the ends of the prisms by screwing in steel bars of 10 mm diameter. The length of these bars shall be at least 200 mm. Remove or loosen the bond line adjustment screws. Carry out the dynamic tension test in accordance with ISO 3800 at a cycle frequency between 2 Hz and 5 Hz. Record the number of load cycles and the failure mode (see 5.4).

5.4 Failure mode

Record the failure mode as one of the following two types:

Type A: cohesion failure within the adhesive;

Type B: adhesion failure at one of the interfaces.

If a mixture of failure modes is recorded, visually determine the surface area percentage for each type of failure and express this as a ratio, for example:

A:B = 70:30

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6 Test report

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The test report shall include the following information:

- a) a reference to this test method standard;
- b) name and address of the test laboratory;
- c) identification number and date of the test report;
- d) name and address of the manufacturer or supplier of the product;
- e) name and identification marks or batch number of the product;
- f) date of supply of the product;
- g) date of preparation of the test specimens and any deviation from the prescribed method of preparation;
- h) conditions of storage of prepared specimens prior to test;
- i) date of test and details of the test equipment used, including the make, type and capacity and the calibration details or the identification number of the apparatus;
- j) the short term failure load of each prism, F_u , and the mean value, F_{um} ;
- k) the bottom load and the upper load of each test in percentages of F_{um} ;
- l) the frequency of the load cycles;
- m) the number of load cycles of each test;

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- n) the failure mode of each test specimen;
- o) precision data;
- p) any deviation from this standard;
- q) date of test report and signature.

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