BRITISH STANDARD

BS EN
14488-5:2006

Testing sprayed concrete —

Part 5: Determination of energy absorption capacity of fibre reinforced slab specimens

The European Standard EN 14488-5:2006 has the status of a British Standard

ICS 91.100.30

BSI
British Standards

National foreword

This British Standard is the official English language version of EN 14488-5:2006.

The UK participation in its preparation was entrusted by Technical Committee B/517, Concrete, to Subcommittee B/517/10, Sprayed concrete, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

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Summary of pages

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English Version

Testing sprayed concrete - Part 5: Determination of energy absorption capacity of fibre reinforced slab specimens

Essais pour béton projeté - Partie 5: Détermination de la capacité d'absorption de l'énergie d'une dalle-éprouvette renforcée par des fibres

Prüfung von Spritzbeton - Teil 5: Bestimmung der Energieabsorption bei faserverstärkten plattenförmigen Prüfkörpern

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

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Foreword

This European Standard (EN 14488-5:2006) 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of an identical text or by endorsement, at the latest by October 2006, and conflicting national standards shall be withdrawn at the latest by December 2007.

This European Standard is part of a series of standards concerning testing sprayed concrete.

This series EN 14488 ‘Testing sprayed concrete’ includes the following parts:

— Part 1: Sampling fresh and hardened concrete

— Part 2: Compressive strength of young sprayed concrete

— Part 3: Flexural strengths (first peak, ultimate and residual) of fibre reinforced beam specimens

— Part 4: Bond strength of cores by direct tension

— Part 5: Determination of energy absorption capacity of fibre reinforced slab specimens

— Part 6: Thickness of concrete on a substrate

— Part 7: Fibre content of fibre reinforced concrete

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

1 Scope

This part of European Standard specifies a method for the determination of the load/deflection response of a slab specimen in order to calculate the energy absorption capacity up to a specified deflection.

2 Normative references

The following referenced documents are indispensable for the application 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 12390-2, *Testing hardened concrete - Part 2: Making and curing specimens for strength tests*

EN 12390-4:2000, *Testing hardened concrete — Part 4: Compressive strength — Specification for testing machines*

EN 14488-1, *Testing sprayed concrete - Part 1: Sampling fresh and hardened concrete*

3 Principle

A fibre reinforced slab specimen, sprayed in accordance with EN 14488-1 is subject to a load, under deflection control, through a rigid steel block positioned at the centre of the slab.

The load-deflection curve is recorded and the test is continued until a deflection of at least 30 mm is achieved at the centre point of the slab.

From the load-deflection curve a second curve is calculated giving the absorbed energy as a function of the slab deflection.

4 Apparatus

4.1 Testing machine

4.1.1 The test shall be carried out using a testing machine conforming to 4.2 and 4.3 of EN 12390-4:2000.

4.1.2 The stiffness and control system of the testing machine shall be such that the test can be displacement controlled. The stiffness of the load system (including frame, load cell, loading block and support frame) shall be at least 200 kN/mm.

4.1.3 A calibrated electronic transducer with a resolution of at least 0,02 mm.

4.1.4 An electronic data logger or XY plotter.

4.2 Load application

The device for applying the load shall consist of:

- A frame with a rigid square support (20 ± 1) mm thick and (500 ± 2) mm x (500 ± 2) mm internal dimension supporting the slab.
- A rigid steel square loading block having a contact surface of (100 ± 1) mm x (100 ± 1) mm and thickness of (20 ± 1) mm, positioned at the centre of the upper face of the slab (see Figure 1).

- A suitably stiff bedding material to be applied between the sample and both the loading block and the square support.

NOTE Suitable materials are mortar and plaster.

4.3 Deflection measurement and control

4.3.1 Bending deflection at the centre of the slab, relative to the frame support shall be measured by means of an electronic transducer.

4.3.2 The testing machine shall be displacement controlled at a constant rate.

5 Test specimen

5.1 A square specimen shall be produced from a panel, sprayed and cured in a mould, in accordance with EN 14488-1, with dimensions of 600 mm x 600 mm and trimmed to a thickness of 100^{+5}_{0} mm immediately after spraying.

5.2 The prepared slab shall be cured under conditions according to EN 12390-2, for a minimum of 3 d immediately before testing and kept moist until testing.

5.3 Testing shall normally be performed at 28 d.

5.4 The specimens shall be examined and any abnormality observed shall be reported.

6 Procedure

6.1 Preparation and positioning of specimens

6.1.1 The load shall be applied to the sprayed face, the smooth moulded side of the test slab being on the bottom during the test.

6.1.2 The moulded face shall be bedded with the bedding material at the location of contact with the supporting frame. Also the loading block shall be bedded onto the slab so that it is perpendicular to the applied load.

6.2 Loading

6.2.1 The testing machine shall be displacement controlled at a constant rate of (1 ± 0,1) mm/min at the centre of the slab.

6.2.2 The test shall be finished when the central deflection exceeds 30 mm.

6.2.3 The load and deflection shall be continuously recorded with the data logger or XY plotter until a deflection of at least 30 mm is obtained (see Figure 2).

7 Expression of results

From the load-deflection curve the energy diagram giving the work performed as a function of displacement shall be calculated (see Figure 3).

The energy absorption capacity in joules is reported as the area under the load-deflection curve between 0 and 25 mm deflection.

8 Test report

The report shall include:

a) identification of the test specimen;

b) shape and dimensions of slab (diameter or width) to the nearest millimetre;

c) average thickness of the slab, evaluated to within 1 mm, at the location of the loading block;

d) sketch or photograph showing number and location of the cracks;

e) type and stiffness of the testing machine;

f) load-deflection curve;

g) maximum load in kN;

h) calculated energy-deflection diagram;

i) energy absorption capacity to nearest 10 J;

j) any deviation from this standard;

k) a declaration from the person technically responsible for the test that the testing was carried out in accordance with this standard, except as detailed in item j).

NOTE The report may also include, if known:

- conditions of specimen at receipt;

- curing conditions;

- age of specimen at test.

9 Accuracy

Currently no accuracy data are available for this test

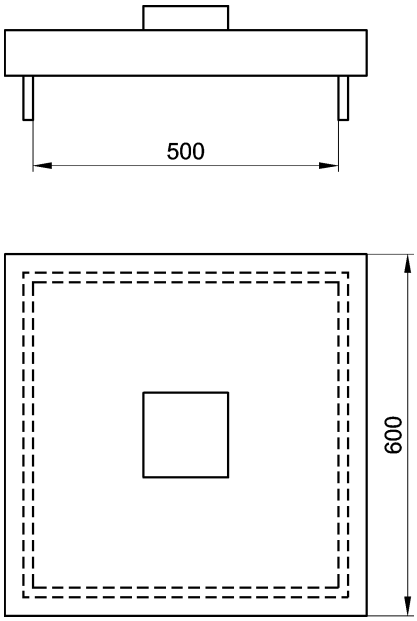
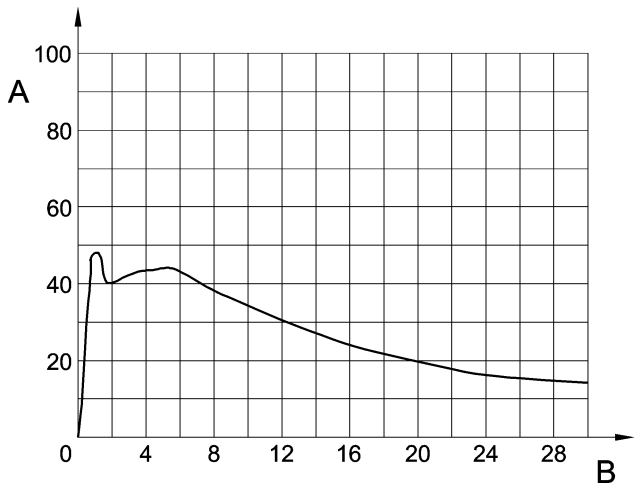


Figure 1 — Arrangement of loading of test specimen

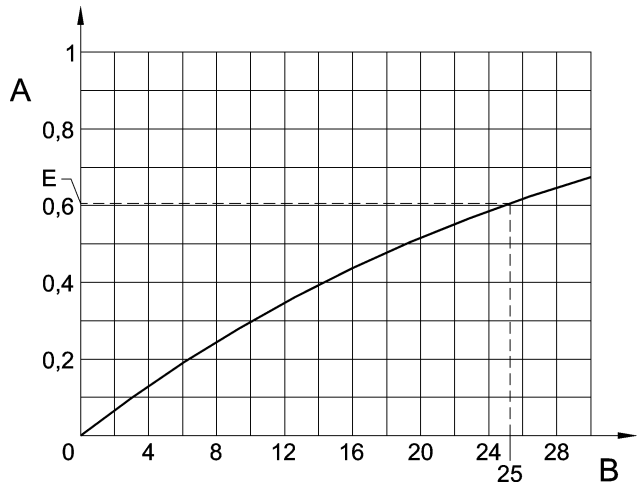


Key

A Load in KN

B Deflection at centre in mm

Figure 2 — Example of load/deflection curve



Key

A Energy in joules (10’)

B Deflection at centre in mm

E Energy absorption capacity

Figure 3 — Example of energy/deflection curve

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