



# SLOVENSKI STANDARD

oSIST prEN 12350-8:2008

01-januar-2008

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Testing fresh concrete - Part 8: Self-compacting concrete - Slump-flow test

Prüfung von Frischbeton - Teil 8: Selbstverdichtender Beton - Setzfließversuch

Essai pour béton frais - Partie 8: Béton auto-plaçant - Essai d'étalement au cône  
d'Abrams

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**Ta slovenski standard je istoveten z: prEN 12350-8**

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**ICS:**

91.100.30

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November 2007

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English Version

## Testing fresh concrete - Part 8: Self-compacting concrete - Slump-flow test

Essai pour béton frais - Partie 8: Béton auto-plaçant - Essai  
d'étalement au cône d'Abrams

Prüfung von Frischbeton - Teil 8: Selbstverdichtender  
Beton - Setzfließversuch

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 104.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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## Foreword

This document (prEN 12350-8:2007) has been prepared by Technical Committee CEN/TC 104 “Concrete and related products”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This standard is based on the results from the EU-project “Testing-SCC” under the 5th Frame Programme (GRD2-2000-30024/G6RD-CT-2001-00580).

Owing to its significant advantages in the improvement of construction quality and working environment, self-compacting concrete (SCC) has been more widely accepted by the construction owners. The use of SCC in practical concrete construction is stably increasing. Since SCC has to give satisfactory in-situ properties (perfect filling of the mould and embedment of the reinforcement, homogeneity and full compaction) without vibration, the proper methods for testing the workability of fresh SCC are very important. The workability of fresh SCC should basically include three key properties: filling ability, passing ability and resistance to segregation. It is desirable, especially in the case of new constituents or new concrete compositions, to test the workability of fresh SCC before casting in place.

A number of test methods are available for testing fresh SCC. Most of the commonly used test methods were evaluated in the recently closed EU-project “Testing-SCC” under the 5th Frame Programme (GRD2-2000-30024/G6RD-CT-2001-00580). According to the results from this EU project, it seems no single test method can completely cover all the three key properties. Nevertheless any test method should at least be correlated to the practical situation and give consistent results in order to provide reliable data for judgment of concrete workability.

[oSIST prEN 12350-8:2008](http://ceniordc.industrydocuments.ucsf.edu/docs/45b0-b6b1-6462a47f1ea6/osist-pren-12350-8-2008)

This standard is one of a series concerned with testing fresh concrete.

This series EN 12350 includes the following parts:

EN 12350 Testing fresh concrete

Part 1: Sampling;

Part 2: Slump test;

Part 3: Vebe test;

Part 4: Degree of compactability;

Part 5: Flow table test;

Part 6: Density;

Part 7: Air content — Pressure methods;

Part 8: Self compacting concrete - Slump-flow test;

Part 9: Self compacting concrete - V-funnel test;

Part 10: Self compacting concrete - L-box test;

Part 11: Self compacting concrete - Sieve segregation test;

Part 12: Self compacting concrete - J-ring test.

Caution When cement is mixed with water, alkali is released. Take precautions to avoid dry cement entering the eyes, mouth and nose whilst mixing concrete. Prevent skin contact with wet cement or concrete by wearing suitable protective clothing. If cement or concrete enters the eye, immediately wash it out thoroughly with clean water and seek medical treatment without delay. Wash wet concrete off the skin immediately.

## 1 Scope

This document specifies the procedure for determining the slump-flow and t500 time for self-compacting concrete. The test is not suitable when the maximum size of the aggregate exceeds 40 mm.

## 2 Normative references

This document 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 document only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to (including any amendments) applies.

EN 12350-1, *Testing fresh concrete — Part 1: Sampling*

EN 12350-2, *Testing fresh concrete — Part 2: Slump test*

ISO 5725, *Precision of test methods — Determination of repeatability and reproducibility for a standard test method by inter-laboratory tests*

## 3 Principle

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The slump-flow and t500 time is a test to assess the flowability and the flow rate of self-compacting concrete in the absence of obstructions. It is based on the slump test described in EN 12350-2. The result is an indication of the filling ability of self-compacting concrete. The t500 time is a measure of the speed of flow and an indication of the relative viscosity of the self-compacting concrete.

The fresh concrete is poured into a cone as used for the EN 12350-2 slump test. When the cone is withdrawn upwards the time from commencing upward movement of the cone to when the concrete has flowed to a diameter of 500 mm is measured; this is the t500 time. The largest diameter of the flow spread of the concrete and the diameter of the spread at right angles to it are then measured and the mean is the slump-flow.

NOTE Measurement of the t500 time may be omitted if not requested.

## 4 Apparatus

The apparatus shall be in accordance with EN 12350-2 except as detailed below:

### 4.1 Baseplate

made from a flat metal plate with a plane area of at least 900 mm x 900 mm on which concrete can be placed. The plate shall have a flat, smooth surface.

The surface shall not be readily attacked by cement paste or be liable to rusting. The construction of the plate shall be such as to prevent distortion. The deviation from flatness shall not exceed 3mm at any point when a straight edge is placed between the centres of opposing sides.

The centre of the plate shall be scribed with a cross, the lines of which run parallel to the edges of the plate and with circles of  $(210 \pm 1)$  mm diameter and  $(500 \pm 1)$  mm diameter having their centres coincident with the centre point of the plate. See figure 1. All lines shall be a maximum of 1,0 mm wide.

#### 4.2 Rule or measuring tape

of minimum length 1000 mm and having sub-divisions not greater than 5mm along its entire length.

#### 4.3 Stop watch

capable of measuring to 0,1 s.

#### 4.4 Spirit level

for checking horizontality of base plate prior to commencing the test.

#### 4.5 Container

to hold the test sample and having a volume of at least 10 l.

#### 4.6 Collar (optional)

having a mass of at least 9 kg.

NOTE: The collar allows the test to be carried out by one person.

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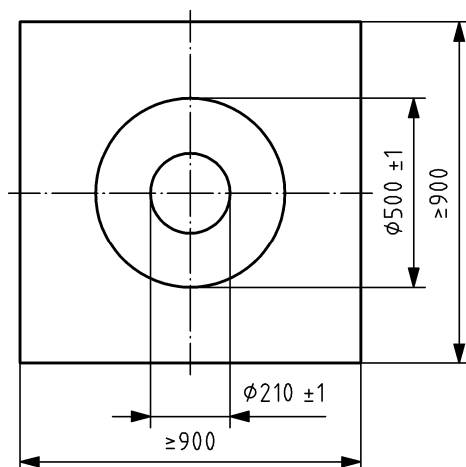


Figure 1 — Baseplate

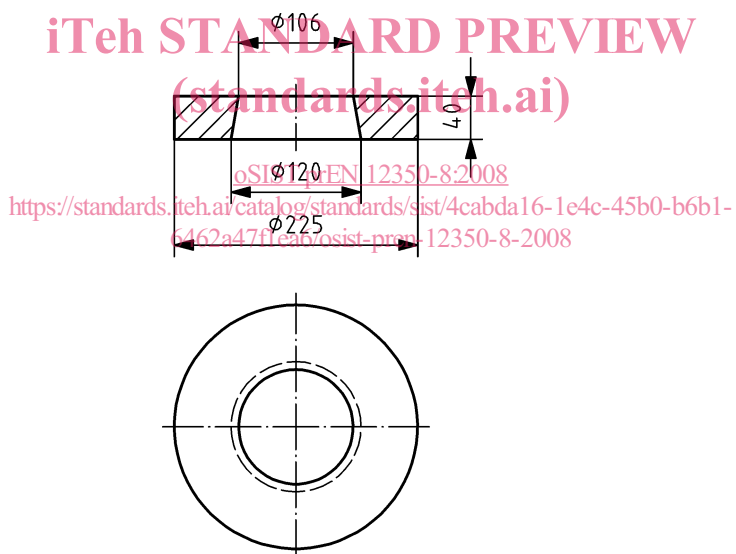


Figure 2 — Example of dimensions of a steelweighted collar



## 5 Test sample

The sample shall be obtained in accordance with EN 12350-1.

## 6 Procedure

Place the baseplate on a flat and horizontal surface free from external vibration or shock. Check the top surface for horizontality using the spirit level. Clean the table and the mould and dampen immediately prior to testing, but keep free from excess moisture.

Fit the collar to the cone if being used.

Place the cone centrally within the 210 mm circle on the baseplate and hold in position by standing on the foot pieces (or use the collar), ensuring that no concrete can leak from under the cone.

Fill the cone in one operation without any agitation or mechanical compaction, and strike off surplus from the top of the cone. Allow the filled cone to stand for not more than 30 s; during this time remove any spilled concrete from the baseplate.

Lift the cone vertically in one movement without interfering with the flow of concrete. If the t500 time has been requested, start the stop watch immediately the cone ceases to be in contact with the baseplate and record the time taken to the nearest 0,1 s for the concrete to first touch the 500mm circle

Without disturbing the baseplate or concrete, measure the largest diameter of the flow spread and record as  $d_m$  to the nearest 10 mm. Then measure the diameter of the flow spread at right angles to  $d_m$  to the nearest 10 mm and record as  $d_r$  to the nearest 10 mm. If the difference between  $d_m$  and  $d_r$  is greater than 50 mm another sample shall be taken and the procedure repeated.

If two consecutive tests show the difference between  $d_m$  and  $d_r$  to be greater than 50 mm, the concrete lacks the necessary flowability for the slump-flow test to be suitable.

Check the concrete spread for segregation. The cement paste/mortar may segregate from the coarse aggregate to give a ring of paste/mortar. Segregated coarse aggregate may also be observed in the central area. Report that segregation has occurred and that the test was therefore unsatisfactory.

## 7 Test result

The slump-flow SF is the mean of  $d_m$  and  $d_r$ , expressed to the nearest 10 mm, given by the following equation.

$$SF = \frac{(d_m + d_r)}{2}$$

where:

SF slump-flow, in mm

$d_m$  largest diameter of flow spread, in mm

$d_r$  flow spread at 90° to  $d_m$ , in mm

The t500 time is reported to the nearest 0,5 s.

## 8 Test report

The test report shall include:

- a) identification of the test sample;
- b) location where the test was performed;
- c) date and time of test;
- d) slump-flow, SF, to the nearest 10 mm;
- e) any indication of segregation of the concrete;
- f) age of concrete at time of test (if known);
- g) any deviation from the standard test method;
- h) a declaration by the person technically responsible for the test that it was carried out in accordance with this document, except as noted in item h).

The report may include:

- i) temperature of the concrete at the time of test;
- j) t500 time, to the nearest 0,5 s;

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## 9 Precision

prEN 12350-8:2008

The repeatability r and reproducibility R have been determined by a programme including 8 laboratories, 16 operators and 2 replicates, and interpreted in accordance with ISO 5725:1994.

The resulting values for r and R are given in table 1.

**Table 1 — Repeatability and reproducibility for typical values of Slump-flow and t500 times**

Slump-flow SF mm	< 600	600 - 750	> 750
Repeatability r mm	n/a	42	22
Reproducibility R mm	n/a	43	28
t500 time s	< 3,5	3,5 – 6,0	> 6,0
Repeatability r s	0,66	1,18	n/a
Reproducibility R s	0,88	1,18	n/a