



# SLOVENSKI STANDARD

oSIST prEN 12350-9:2008

01-januar-2008

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Testing fresh concrete - Part 9: Self-compacting concrete - V-funnel test

Prüfung von Frischbeton - Teil 9: Selbstverdichtender Beton - Auslauftrichterversuch

Essai pour béton frais - Partie 9: Béton auto-plaçant - Essai d'écoulement a l'entonnoir en V

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English Version

## Testing fresh concrete - Part 9: Self-compacting concrete - V-funnel test

Essai pour béton frais - Partie 9: Béton auto-plaçant - Essai d'écoulement à l'entonnoir en V

Prüfung von Frischbeton - Teil 9: Selbstverdichtender Beton - Auslauftrichterversuch

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.

This draft European Standard was established by CEN 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 CEN Management Centre has the same status as the official versions.

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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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## Foreword

This document (prEN 12350-9:2007) 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.

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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 V-funnel flow time for self-compacting concrete. The test is not suitable when the maximum size of the aggregate exceeds 20 mm.

## 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.

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

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 V-funnel test is used to assess the viscosity and filling ability of self-compacting concrete.

A V shaped funnel is filled with fresh concrete and the time taken for the concrete to flow out of the funnel is measured and recorded as the V-funnel flow time.

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## 4 Apparatus

### 4.1 V-funnel

made to the internal dimensions and tolerances in figure 1, fitted with a quick release, watertight hinged or sliding gate at its base and supported by a frame so that the top of the funnel is horizontal with sufficient clearance beneath the gate to place the container underneath. The V-funnel shall be made from metal; the surfaces shall be smooth, and not be readily attacked by cement paste or be liable to rusting.

### 4.2 Container

to hold the test sample and having a volume not less than 12 l.

### 4.3 Stop watch

measuring to 0,1 s.

### 4.4 Straight edge

or striking off concrete level with the top of the funnel.

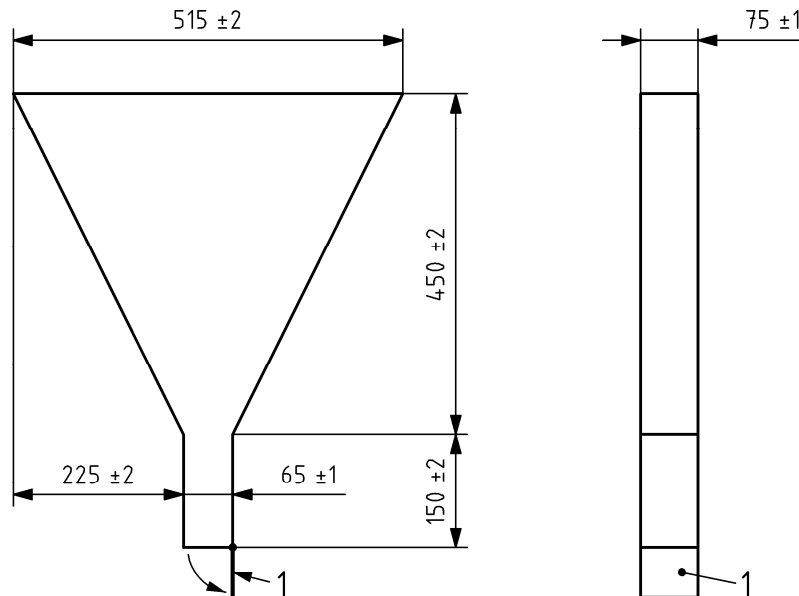


Figure 1 — V-funnel

## 5 Test sample

A sample of at least 12 l shall be obtained in accordance with EN 12350-1.

## 6 Procedure

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Clean the funnel and bottom gate, then dampen all the inside surface including the gate. Close the gate and pour the sample of concrete into the funnel, without any agitation or mechanical compaction, then strike off the top with the straight edge so that the concrete is level with the top of the funnel. Place the container under the funnel in order to collect the concrete. After a delay of  $(10 \pm 2)$  s from filling the funnel, open the gate quickly and measure the time  $t_v$ , to 0,1 s, from opening the gate to when it is possible to see vertically through the funnel into the container below for the first time.  $t_v$  is the V-funnel flow time.

## 7 Test report

The test report shall include:

- identification of the test sample;
- location where the test was performed;
- date and time of test;
- V-funnel flow time,  $t_v$ , to the nearest 0.5 s;
- age of concrete at time of test (if known);
- any deviation from the standard test method;
- 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 f).