

**Products and systems
for the protection and
repair of concrete
structures —
Test methods —
Determination of time
of efflux of
cementitious injection
products**

The European Standard EN 14117:2004 has the status of a
British Standard

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National foreword

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The UK participation in its preparation was entrusted by Technical Committee B/517, Concrete, to Subcommittee B/517/8, Protection and repair of concrete structures, which has the responsibility to:

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Products systems for the protection and repair of concrete structures - Test methods - Determination of time of efflux of cementitious injection products

Produits et systèmes pour la protection et la réparation des structures en béton - Méthodes d'essai - Détermination de la viscosité de produits d'injection à base de ciment

Produkte und Systeme für den Schutz und die Instandsetzung von Betontragwerken - Prüfverfahren - Bestimmung der Ausflusszeit von zementartigen Rissfüllstoffen

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Foreword

This document (EN 14117:2004) has been prepared by Technical Committee CEN/TC 104 "Concrete and related products", the secretariat of which is held by DIN.

It has been drafted by Sub-Committee 8 "Products and systems for the protection and repair of concrete structures" (Secretariat AFNOR).

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of an identical text or by endorsement, at the latest by March 2005, and conflicting national standards shall be withdrawn at the latest by March 2005.

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1 Scope

This document describes a test method for determining the time of efflux of cementitious injection products, based on the measurement of the time taken for a standard volume of the product to flow through a standardised cone (Marsh cone). This time of efflux is a measure of the viscosity of cementitious injection products.

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 1504-1:1998, *Products and systems for the protection and repair of concrete structures — Definitions, requirements, quality control and evaluation of conformity — Part 1: Definitions.*

prEN 1504-5:2001, *Products and systems for the protection and repair of concrete structures — Definitions, requirements, quality control and evaluation of conformity — Part 5: Concrete injection.*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1504-1:1998 and prEN 1504-5:2001 and the following apply.

3.1 efflux time

time taken by 1000 ml of cementitious injection product to flow through the flow cone

4 Test principle

The test measures the time for a specified volume of fluid cementitious injection product to flow through a flow cone.

5 Apparatus

5.1 Flow cone (Marsh cone) made of non corroding material, provided with a semicircular shaped sieve, with dimensions as shown in Figure 1.

The discharge tube may be detachable, with a diameter of $(4,8 \pm 0,1)$ mm, and a length of $(51,0 \pm 0,5)$ mm.

It is bolted or screwed to the lower part of the cone, in such a way that no discontinuity occurs between the cone and the discharge tube.

The sieve shall have a mesh size of 2 mm.

5.2 Ring stand, or other device, capable of supporting the flow cone in a vertical, steady position, (150 ± 10) mm above the upper face of the receiving container.

5.3 Receiving container, which allows the measurement of a volume of injection product of $(1\ 000 \pm 10)$ ml.

5.4 Level, to assure verticality of the flow cone.

- 5.5 Pouring container**, which allows the measurement of a volume of injection product of $(1\,500 \pm 15)$ ml.
- 5.6 Stop watch**, with an accuracy of 1 s.
- 5.7 Thermometer**, with an accuracy of 0,5 °C.
- 5.8 Mixer**, for cementitious injection product.

6 Sampling and preparation

The temperature of the dry materials and mixing water shall be such that the temperature of the injection product at the start of mixing is (21 ± 2) °C.

The injection product shall be mixed in accordance with the manufacturer instructions. The time t_0 is the time at the end of mixing.

If it is required to test the mixture after a longer holding period, continue the mixing of the remaining portion at slow speed for the specified time, taking care to minimize evaporation.

7 Procedure

The test shall be carried out at a temperature of (21 ± 2) °C and a relative humidity of (60 ± 10) %.

The flow cone shall be firmly mounted in such a manner that it does not vibrate. The top shall be levelled to ensure verticality. The receiving container shall be levelled.

Fill the flow cone with water and, 1 min before introducing the injection product, drain the water from the cone.

Close the outlet of the discharge tube with a stopper.

Introduce $(1\,500 \pm 15)$ ml of injection product into the cone through the sieve.

Start the stop watch and simultaneously open the outlet. Stop the watch when $(1\,000 \pm 10)$ ml of the injection product has flowed through the cone.

The measurements shall be repeated three times using a fresh mix each time. Before each measurement, the flow cone and receiving container shall be absolutely clean and free from injection product.

If the efflux time has to be determined at time t_0 , the time interval between " t_0 " and the beginning of the measurement shall not exceed 1 min.

8 Expression of results

The results are expressed as the efflux time in s.

9 Test report

The test report shall contain the following information:

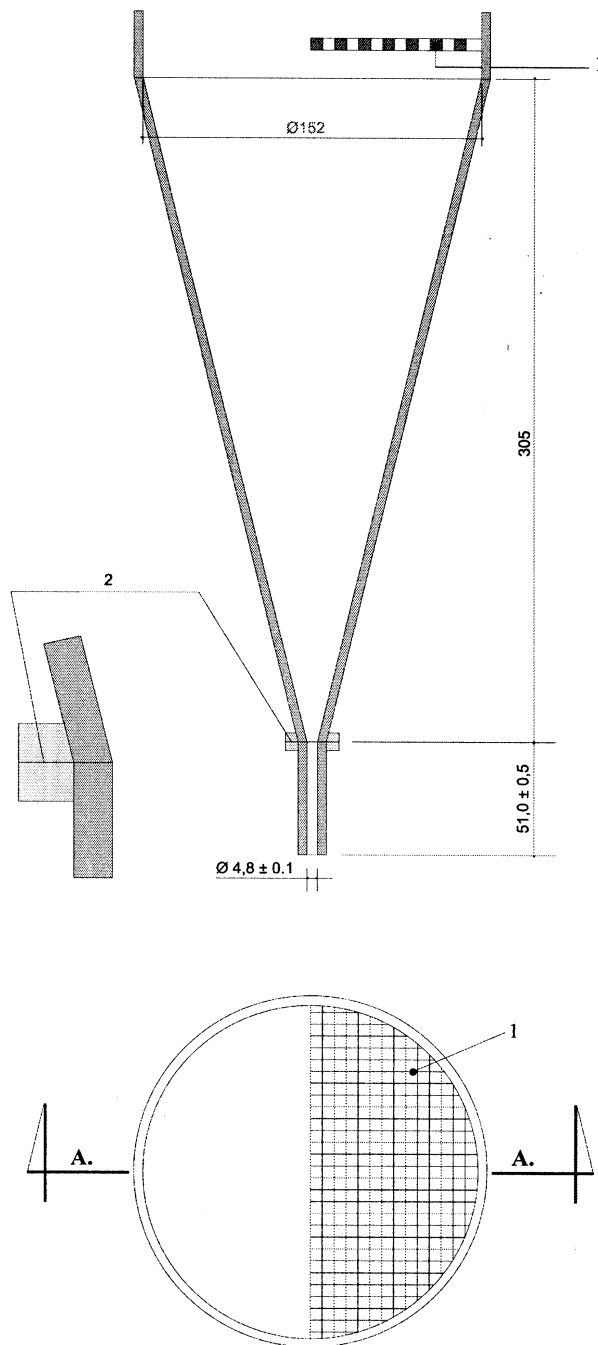
- a) reference to this document;
- b) name and address of the test laboratory;

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- c) identification number of the test report;
- d) name and address of the manufacturer or supplier of the injection product;
- e) name and identification marks or batch number of the injection product;
- f) date of supply of the injection product;
- g) procedure of mixing of the injection product (water content, description of mixing equipment, duration of mixing); time interval from completion of mixing at which the test was made;
- h) date of testing;
- i) test results : individual and average values, temperature, ambient and of the sample, at the time of test;
- j) accuracy data;
- k) date of test report and signature.

Dimensions in millimetres

Sectional elevation (section A-A)

**Key**

- 1 Semi circular shaped sieve
- 2 Bolted flange (optional)

Figure 1 — Flow cone

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