

# **Products and systems for the protection and repair of concrete structures — Test methods — Tests to measure the suitability of structural bonding agents for application to concrete surface**

The European Standard EN 1799:1998 has the status of a  
British Standard

ICS 83.180; 91.080.40

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### Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 6, an inside back cover and a back cover.

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EUROPEAN STANDARD  
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Descriptors: concrete structures, repairs, protection, areas, glue, tests, laboratory tests, determination, operating requirements

English version

## Products and systems for the protection and repair of concrete structures — Test methods — Tests to measure the suitability of structural bonding agents for application to concrete surface

Produits et systèmes pour la protection et la réparation des structures en béton — Méthodes d'essais — Essais de détermination de l'aptitude à l'emploi des colles structurales à appliquer sur les surfaces en béton

Produkte und Systeme für den Schutz und die Instandsetzung von Betontragwerken — Prüfverfahren — Prüfungen der Eignung von Klebern für die Anwendung auf Betonoberflächen

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 Europäisches Komitee für Normung

**Central Secretariat: rue de Stassart 36, B-1050 Brussels**

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## Foreword

This European Standard has been prepared by Technical Committee CEN/TC 104, Concrete (performance, production, placing and compliance criteria), 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of an identical text or by endorsement, at the latest by June 1999, and conflicting national standards shall be withdrawn at the latest by June 1999.

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NOTE This European Standard should be read together with EN 1504-1.

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## 1 Scope

This standard specifies methods of testing to measure the suitability of structural bonding agents for application to vertical and horizontal surfaces.

## 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.

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

prEN 12189, *Products and systems for the protection and repair of concrete structures — Test methods — Determination of open time.*

## 3 Test methods

This standard describes a method for the determination of the suitability of structural bonding agents applied using a spreader to a vertical or horizontal surface, referred to as the “sag flow test”.

This standard also describes a method for the determination of the suitability of injectable structural bonding agents for application between two surfaces, referred to as the “squeezeability test”.

## 4 Equipment

### 4.1 Sag flow test

4.1.1 *Sag flow board*, in steel as depicted in Figure 1.

4.1.2 *Temperature-controlled conditioning cabinet*, adjustable to within 1 °C.

4.1.3 *Thermometer* measuring in degrees Celsius with 0,1 °C divisions.

4.1.4 *Straightedge*.

4.1.5 *Timer*.

4.1.6 *Mould release agent*.

### 4.2 Squeezeability test

4.2.1 *Wax papers*, at least 400 mm square.

4.2.2 *Flat steel plate*, 6 mm thick and at least 400 mm square.

4.2.3 *Means of applying load of 150 N*.

4.2.4 *Timer*.

4.2.5 *Rule*, graduated in mm.

## 5 Test procedure

### 5.1 Sag flow test

#### 5.1.1 Conditioning

Condition the resin and hardener components of the bonding agent and the sag flow board for at least 4 h at the test temperature of  $(21 \pm 2)$  °C or an alternative test temperature as required.

#### 5.1.2 Procedure

Clean the surface of the sag flow board.

Mix the components of the sample in accordance with the manufacturer's instructions.

With the sag flow board in the horizontal position, spread the sample into each of the required channels, beginning with the shallowest channel. Round the material slightly above the top of the guides for each channel. With a straightedge, strike off the excess flush with the top surface of the guides for each channel, and flush with the lower end of the guides (see Figure 2).

After all the required channels have been filled, allow the sag board to remain in a horizontal position for a further 30 s. Then, place the board gently into the vertical position, so that the board rests on the edge marked bottom (see Figure 1). Start the timer. The board shall remain in position throughout the test.

All the required channels should be filled within 10 min after the end of mixing. If the open time of the mixture, as measured by prEN 12189 is less than 15 min, the material should be tested in channels one at a time.

At the end of the test (30 min unless otherwise reported), measure in millimetres the distance from the lower end of the guides to the point of maximum flow for each thickness of interest. If the adhesive reaches the base of the sag flow board, the report should state that the sag was greater than 50 mm.

### 5.2 Squeezeability test

#### 5.2.1 Conditioning

Condition the resin and hardener components of the bonding agent as well as the plates for at least 4 h at the test temperature of  $(21 \pm 2)$  °C or an alternative temperature as required.

#### 5.2.2 Procedure

Mix the components of the sample in accordance with the manufacturer's instructions.

10 min after the completion of mixing, pour 300 cm<sup>3</sup> of bonding agent onto a sheet of wax paper, placed on a hard level surface. The area occupied by the bonding agent should be as small as possible.

Place a second piece of wax paper over the poured out bonding agent. A flat plate is placed on top of this second wax paper and a load of 150 N is applied centrally and vertically. The flat plate should be maintained parallel with the level surface.

Maintain this load for 3 min, then remove the load and steel plate and measure the squeezed out diameter of the bonding agent. If the material squeezes out beyond the test area, the quantity of material should be reduced as appropriate.

## 6 Test report

### 6.1 Sag flow test

The report shall include the following information for each determination.

- 6.1.1 Type and identification of the product to be tested.
- 6.1.2 Temperature of the test environment.
- 6.1.3 Temperature of the components before mixing.
- 6.1.4 Volume of the sample mixed at one time.
- 6.1.5 Method of mixing.
- 6.1.6 Length of time of the test.
- 6.1.7 Mode of application.
- 6.1.8 Length of sag flow for each thickness at the end of the test.
- 6.1.9 Thickest section of bonding agent which develops zero sag flow within the time of the test.
- 6.1.10 Any deviation from this European Standard.

### 6.2 Squeezability test

The report shall include the following information for each determination.

- 6.2.1 Type and identification of the product to be tested.
- 6.2.2 Temperature of the test environment.
- 6.2.3 Temperature of the components before mixing.
- 6.2.4 Volume of the sample mixed at one time.
- 6.2.5 Method of mixing.
- 6.2.6 Length of time of the test.
- 6.2.7 Quantity of material poured for the test.
- 6.2.8 Diameter of the squeezed out bonding agent, in millimetres, at the end of the test.
- 6.2.9 Any deviation from this European Standard.

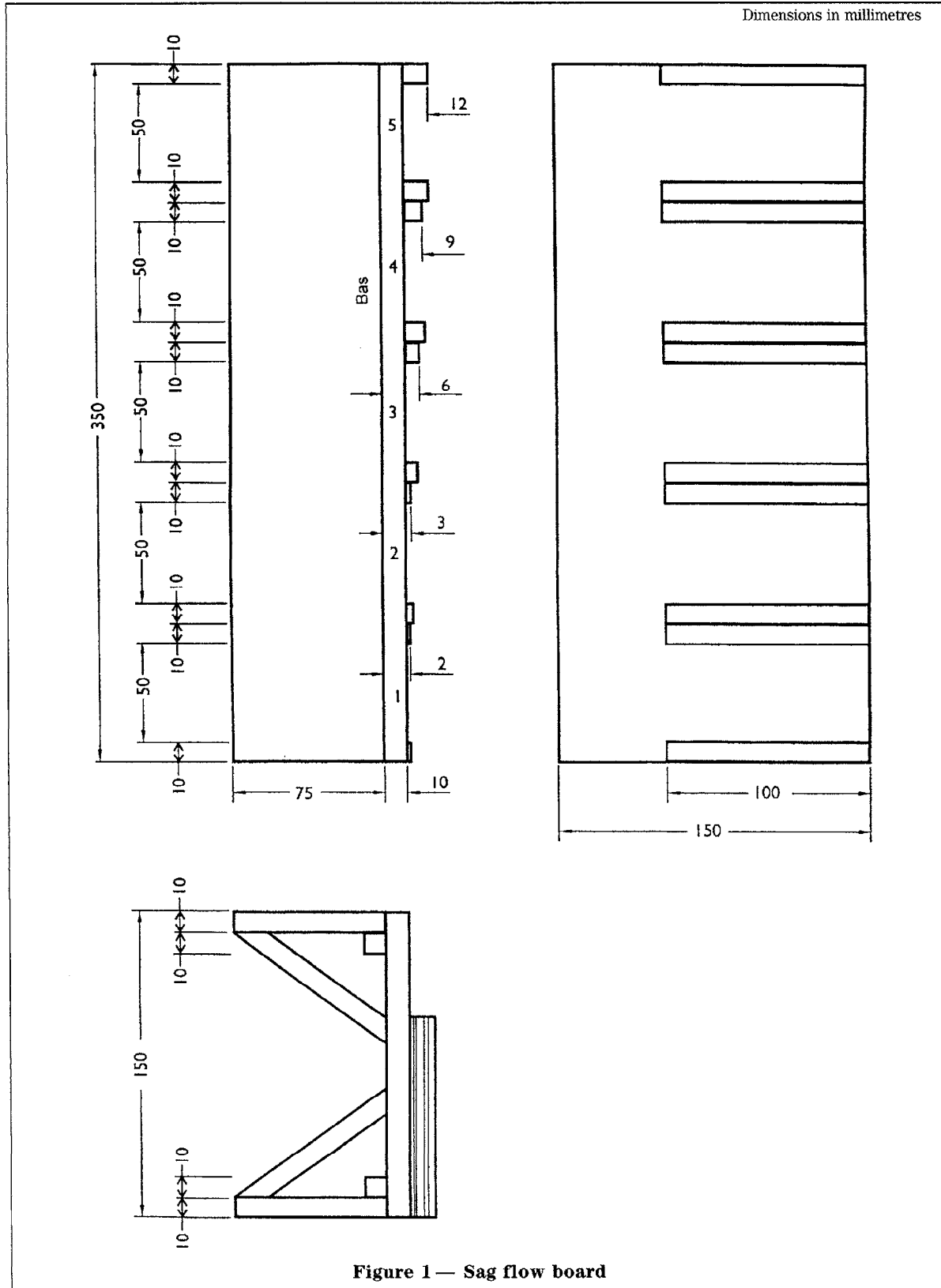
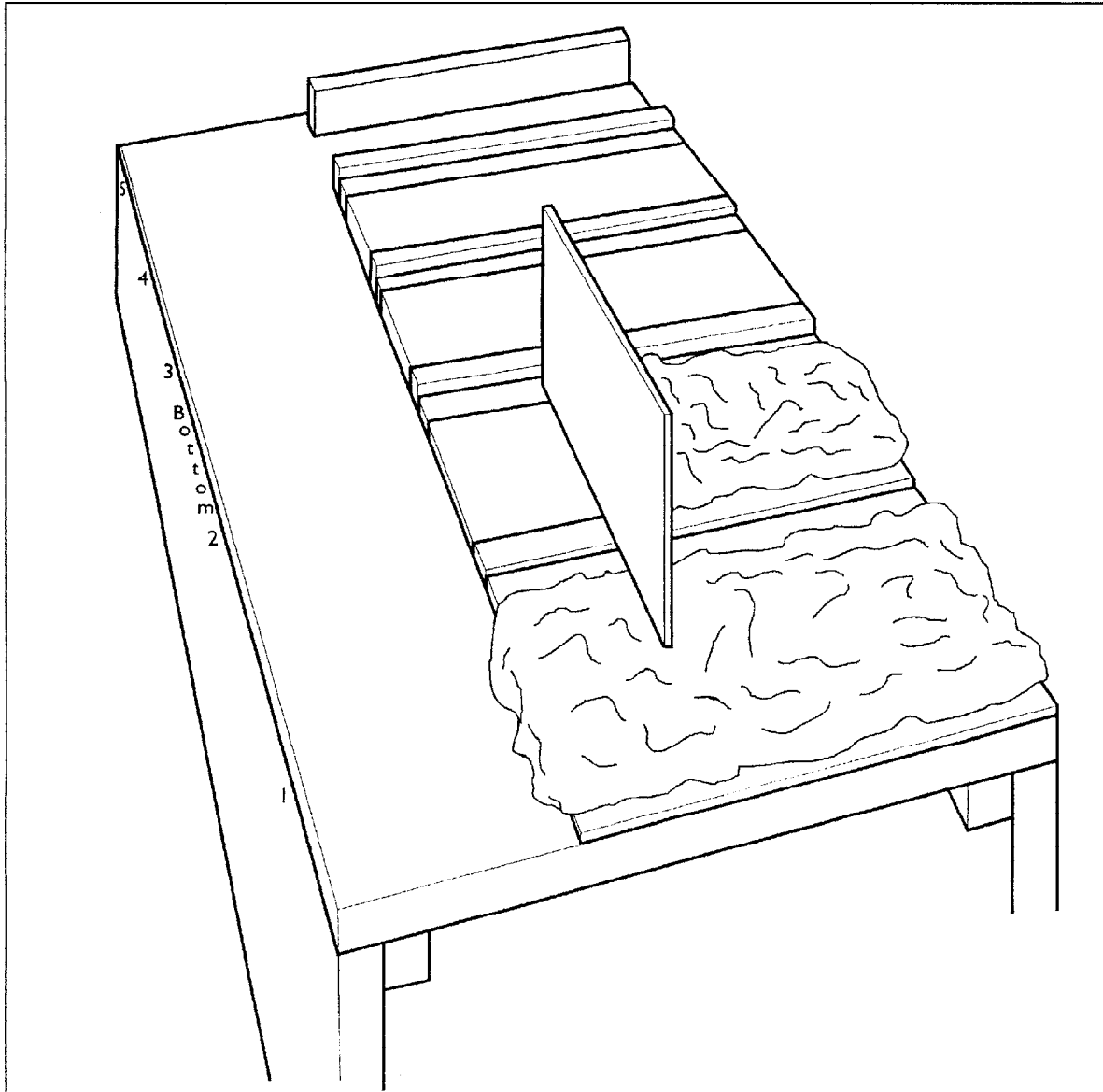


Figure 1 — Sag flow board



- Channel 5 remains empty
- Channels 3 and 4 have been completed
- Channel 2 Straight edge is being used to strike off excess paste in Channel 2 (towards top of board)
- Channel 1 is ready to be struck off

**Figure 2 — Sag flow board in use**



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