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European Organisation for Technical Approvals  
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## ETAG 022

GUIDELINE FOR  
EUROPEAN TECHNICAL APPROVAL  
Of

Watertight covering kits for wet room floors and or walls

**- ANNEX C TEST FOR SCRATCHING RESISTANCE**

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## **1. Scope**

The purpose of the test is to assess the resistance of building surfaces to scratching. For testing purposes such scratchings are simulated by means of an impact body having a hard and rough surface.

## **2. Field of application**

The method is used for wetroom coverings without wearing surface, such as paints and thin resilient coverings. The coverings can be tested only when applied to a base, e.g. a board. The test is for use in a laboratory using small test specimens. The method is used to assess whether a watertight covering will be perforated when exposed to mechanical loads.

## **3. References**

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## **4. Definitions**

The resistance of a surface to scratching is given as the depth of the mark produced by a blow from an impact body having a hard and rough surface.

For a waterproof covering the resistance is supplementary given as its ability to resist perforation due to a blow from the impact body.

## **5. Sampling**

The waterproofing covering shall be applied on a board material commonly used for walls in wet-rooms, e.g. gypsum boards, in accordance with the manufacturers instructions. The components used shall be stated.

## **6. Method of test**

### **6.1 Principle**

The test specimen is fixed to a steel frame and supported in a well-defined manner by a suspended concrete slab, the mass of which is large compared to that of the test specimen. An impact body at the end of a pendulum is caused to strike against the test specimen at an angle of 20° relative to the surface.

## 6.2 Apparatus

The impact body used is a steel disc, 20 mm thick and with a diameter of 94 mm. The edge of the disc is of a roughness, defined as a thread with the designation  $M6 \times 0,5$ . It is made of UHB Arne Steel, diameter 6 mm. When the thread has been cut and the steel bent to fit the shape of the disc, it is hardened and tempered according to specifications.

The final diameter of the disc, measured to the edge of the round steel, should be  $100 \pm 1$  mm. The total weight of the disc and round steel should be  $10 \text{ N} \pm 0,1 \text{ N}$ .

The steel disc is suspended from a 12 mm steel rod fastened to the centre of the disc and at right angles to its surface. The length of the rod being  $600 \text{ mm} \pm 5 \text{ mm}$  measured from the point of suspension to the centre of gravity of the disc, see figure 1.

At the top the pendulum is attached to a universal joint allowing the bob to swing freely in two planes, but not to revolve around the axis of the rod. This means that the bob after having touched the surface of the test specimen will continue its movement until it is intercepted, either by the operator, or by a mechanical device. The total energy released by bob and pendulum is approx. 7,5 Nm.

The pendulum is suspended in a frame in which the test specimen is also fixed. The arrangement of the frame should be such that the same test specimen may be subjected to several blows.

To establish a well-defined rigidity during the test, the specimen is supported by a concrete slab, which weighs  $300 \text{ N} \pm 50 \text{ N}$ . The concrete slab is suspended by means of two steel wires, 3 mm in diameter. To ensure that the test specimen is well supported, a steel plate of the dimensions  $80 \times 150 \times 20$  mm is secured by an adhesive to the concrete slab.

Before the test is carried out, the pendulum is raised to a horizontal position, which results in a drop of 600 mm. In this position the pendulum is held by a release mechanism, which ensures that the impact against the test specimen is guided accurately and the angle of  $20^\circ$  relative to the surface is maintained.

The reference surface used is a steel plate not less than 5 mm thick ( $d = 100$  mm) with a hole ( $d = 25$  mm) at the centre through which the contact point of the watch dial may pass. The contact point is a ball with a diameter of 3 mm.

## 6.3 Preparation of test samples

Minimum dimensions of a test specimen is  $100 \text{ mm} \times 150 \text{ mm}$ . Ten tests should be carried out on each test specimen, and  $300 \text{ mm} \times 600 \text{ mm}$  is consequently a suitable size. The apparatus should be flexible enough to allow test specimens up to 100 mm in thickness to be tested. Test specimens should be conditioned in air at a temperature of  $23 \pm 2^\circ\text{C}$  and a relative humidity of  $50 \pm 5 \%$ . The coverings should be applied to a substrate specified by the manufacturer.

## 6.4 Procedure

Secure the test specimen in the frame so that the concrete slab with the steel plate rests lightly on the back of the test specimen. Next ensure that the bob, when at rest in a vertical position, just

touches the point, which is intended to be the point of impact. Raise the pendulum to its horizontal position and activate the release mechanism. When the pendulum swings it impinges on the test specimen with an energy of approximately 7,5 Nm. Afterwards change the position of the test specimen on the frame and repeat the impact on other points of the test specimen and, if required, on other specimens, until altogether ten individual tests have been carried out.

A visual inspection is made to ascertain whether the surface covering is perforated. If no visible perforation is observed a supplementary test using the method described in Annex F is performed to assess the watertightness of the wall covering.

Before each test any residues of material left in the rough edge of the impact body shall be removed. On each test specimen the distance between points of impact should be not less than 50 mm and between the point of application and the edge not less than 50 mm.

### 6.5 Expression of results

A visual inspection is made to determine if the covering has been penetrated.

### 6.6 Accuracy

The method provides reproducible results within a wide field ranging from soft to hard coverings.

## 7 Test report

The test report should give the following information:

- a) Name and address of the testing laboratory
- b) Identification number of the test report
- c) Name and address of the organisation or the person who ordered the test
- d) Purpose of the test
- e) Method of sampling and other circumstances (date and person responsible for sampling)
- f) Name and address of manufacturer or supplier of the tested material or system.
- g) Name or identification marks of the tested product or products
- h) Description of the tested object
- i) Date of supply of the tested object
- j) Date of test
- k) Test method
- l) Conditioning of the test specimens, environmental data during the test (temperature, relative humidity etc.)
- m) Identification of the test equipment and instruments used
- n) Any deviations from the test method
- o) Test results
- p) Inaccuracy or uncertainty of the test results
- q) Date and signature

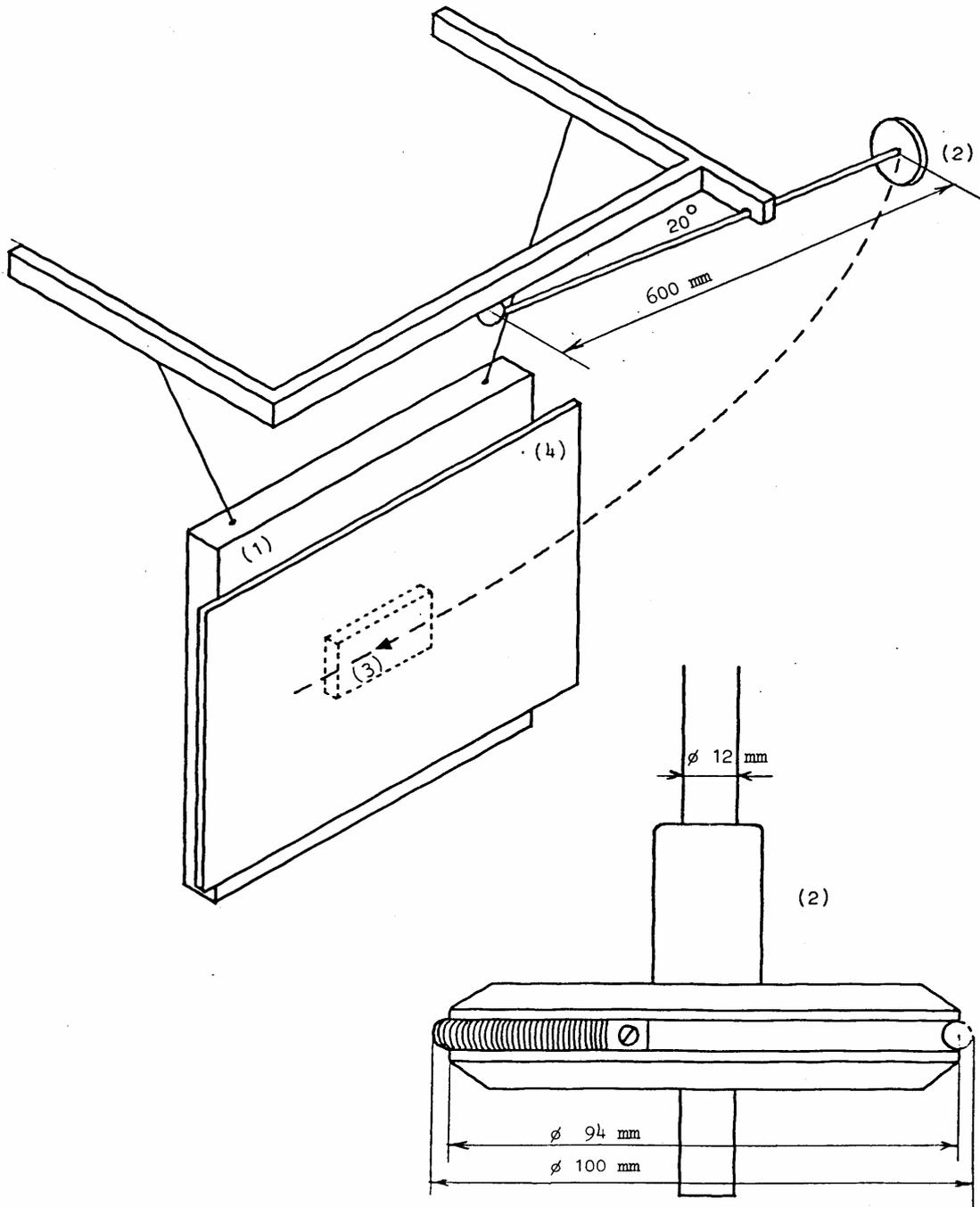


Fig. 1: Principle of test arrangement

- 1) Concrete slab
- 2) Impact body
- 3) Steel plate
- 4) Test specimen