EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 14694

June 2005

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English version

Flexible sheets for waterproofing

Waterproofing of concrete bridge decks and other concrete surfaces trafficable by vehicles

Determination of resistance to dynamic water pressure after damage by pre-treatment

Feuilles souples d'étanchéité – Étanchéité de ponts et autres surfaces en béton circulables par les véhicules – Détermination de la résistance à la pression dynamique de l'eau après dégradation par prétraitement

Abdichtungsbahnen – Abdichtungen für Betonbrücken und andere Verkehrsflächen auf Beton – Bestimmung des Widerstandes gegenüber dynamischem Wasserdruck nach Schadenvorbeanspruchung

This European Standard was approved by CEN on 2005-04-14.

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.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

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CEN

European Committee for Standardization
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Europäisches Komitee für Normung

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (EN 14694:2005) has been prepared by Technical Committee CEN/TC 254, "Flexible sheets for waterproofing", the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by December 2005, and conflicting national standards shall be withdrawn at the latest by December 2005.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

The purpose of this test is to determine the resistance to pre-treatment by impact puncturing followed by dynamic water pressure testing for sheets in the waterproofing system.

The test is normally performed for single sheets but may also be performed for double sheet systems.

1 Scope

This European Standard specifies a test method for the evaluation of the resistance to impact puncturing of a sheet or sheet system.

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 13375, *Flexible sheets for waterproofing — Waterproofing of concrete bridge decks and other concrete surfaces trafficable by vehicles —Specimen preparation*

EN 13416:2001, *Flexible sheets for waterproofing — Bitumen, plastic and rubber sheets for roof waterproofing — Rules for sampling*

prEN 14695:2003, *Flexible sheets for waterproofing — Reinforced bitumen sheets for waterproofing of concrete bridge decks and other concrete surfaces trafficable by vehicles — Definitions and characteristics*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13416:2001 and prEN 14695:2003 apply.

4 Test methods

4.1 Principle

Pre-treatment impact puncturing is carried out at room temperature, where a conical weight is allowed to fall freely on to the waterproofing sheet. The degree of penetration is then assessed with the aid of dynamic water pressure testing.

4.2 Apparatus and materials

Equipment for impact puncturing, with a puncturing tool consisting of (1,0 ± 0,01) kg of steel with a 90° conical point (see Figures 2 and 3).

Concrete slab, according to EN 13375 for supporting the test specimen during impact puncturing.

Suitable frame, for holding the test specimen firmly to the concrete slab.

Equipment for the water pressure test, with a dynamic water pressure applied (see Figures 4 and 5)

4.3 Preparation of test specimens

Take test samples and test pieces in accordance with EN 13416.

Select one test specimen of 400 mm × 200 mm for testing.

In the case of a double sheet system, weld or glue the two sheets together according to manufacturer instructions. Ensure that the sheet or sheet system thickness is within the limits of the equipment used

Condition the test specimen for at least 24 h at a temperature of (23 ± 2) °C.

4.4 Procedure

4.4.1 Carry out the testing at a temperature of (23 ± 2) °C.

4.4.2 Select on the test specimen of 400 mm × 200 mm two circular sections of diameter 135 mm approximately.

4.4.3 Lay the test specimen on the horizontal concrete slab, with the upper side of the sheet facing upwards. Hold the test specimen down and in place with a suitable frame. The sheet shall not be bonded to the concrete.

4.4.4 Impact the test specimen at 4 points in each circular section, ensuring that the 4 points are diametrically positioned within each circular section so that each point will fit into a disc slot according to Figure 5. Allow the puncturing tool to fall freely and vertically from a specified height of (200 ± 2) mm onto the surface of the test specimen.

4.4.5 Cut the two circular test specimens (diameter 135 mm approximately) from the pre-treated test specimen for water pressure testing.

4.4.6 Fill the apparatus for the water pressure test with water till overflowing. In testing, mount the circular test specimen firmly with the upper side of the sheet facing upwards in the equipment (see Figure 4). Place the slotted disc (see Figure 5), on top of the test specimen so that a punctured point appears in the middle of each slot, with one of the slots being parallel to the longitudinal direction of the sheet. Progressively tighten until the test specimen is firmly in place, and dry where necessary with a cloth or with compressed air.

4.4.7 Under the influence of a specified dynamic water pressure, examine the circular test specimen to determine whether it remains impervious for a specified number of pulses. The dynamic pressure is defined in Figure 1. The water pressure is increased from 0 kPa to (500 ± 5) kPa within 0,5 s, kept at that pressure for 2,5 s, decreased again within 0,5 s to 0 kPa and kept there for another 2,5 s. The total time of a pulse is 5 s to 6 s. Perform 1 000 pulses of the dynamic water pressure test on both circular test specimens. If a visual inspection identifies a leakage in the test specimen, terminate the test and record the number of pulses.

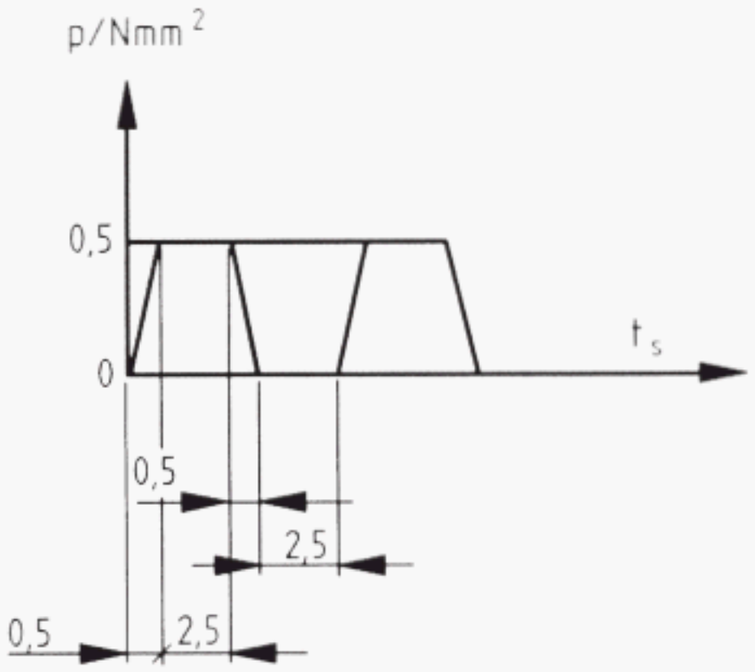


Figure 1 — Dynamic pressure load function

4.5 Expression of results

If both circular test specimens are watertight, the result is "pass". Repeat the test once if one of the two circular test specimens has leaked, and report the test results. If both circular test specimens of this repeated test are watertight, the result is "pass", if not "not pass".

NOTE There is no precision data currently available.

4.6 Test report

The test report shall include at least the following information:

a) all details necessary to identify the product tested;

b) a reference to this document and any deviation from it;

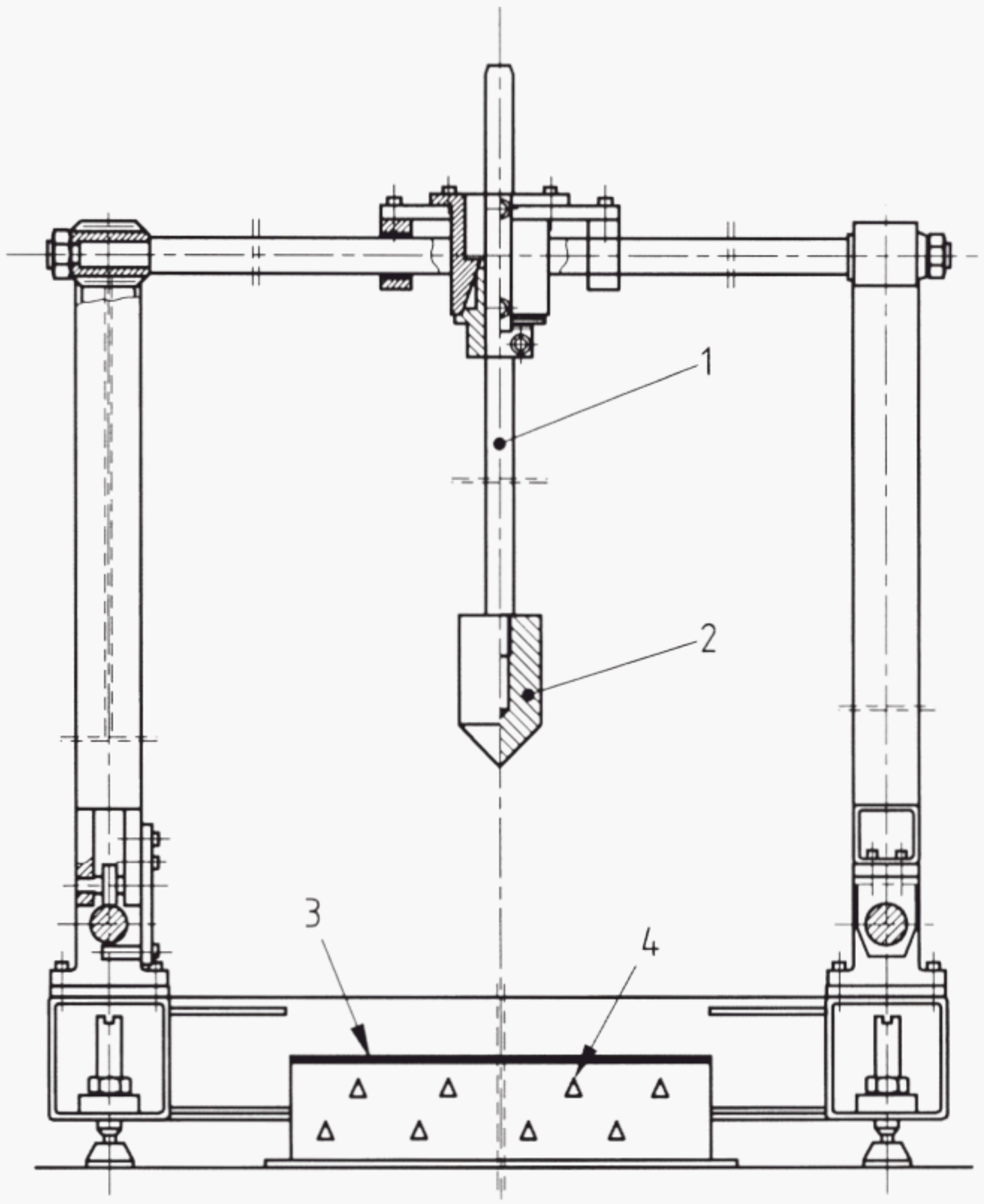
c) the dates of delivery of sample and preparation of test specimens;

d) information about preparation of test specimens in accordance with 4.3;

e) information about the procedure in accordance with 4.4;

f) the test results in accordance with 4.5 and, in case of leakage, the number of pulses before leakage;

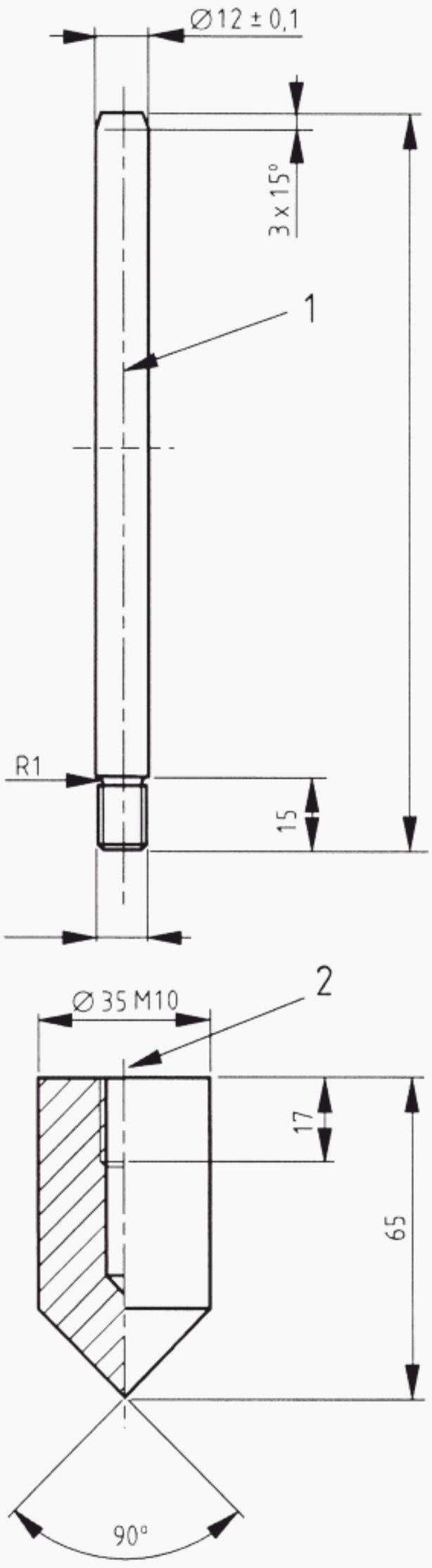
g) the date of tests.



Key

1 Shaft
2 Puncturing tool
3 Test specimen
4 Concrete slab

Figure 2 — Example of equipment for impact puncturing



Key

1 Shaft with diameter (12 ± 0,1) mm

2 Puncturing tool

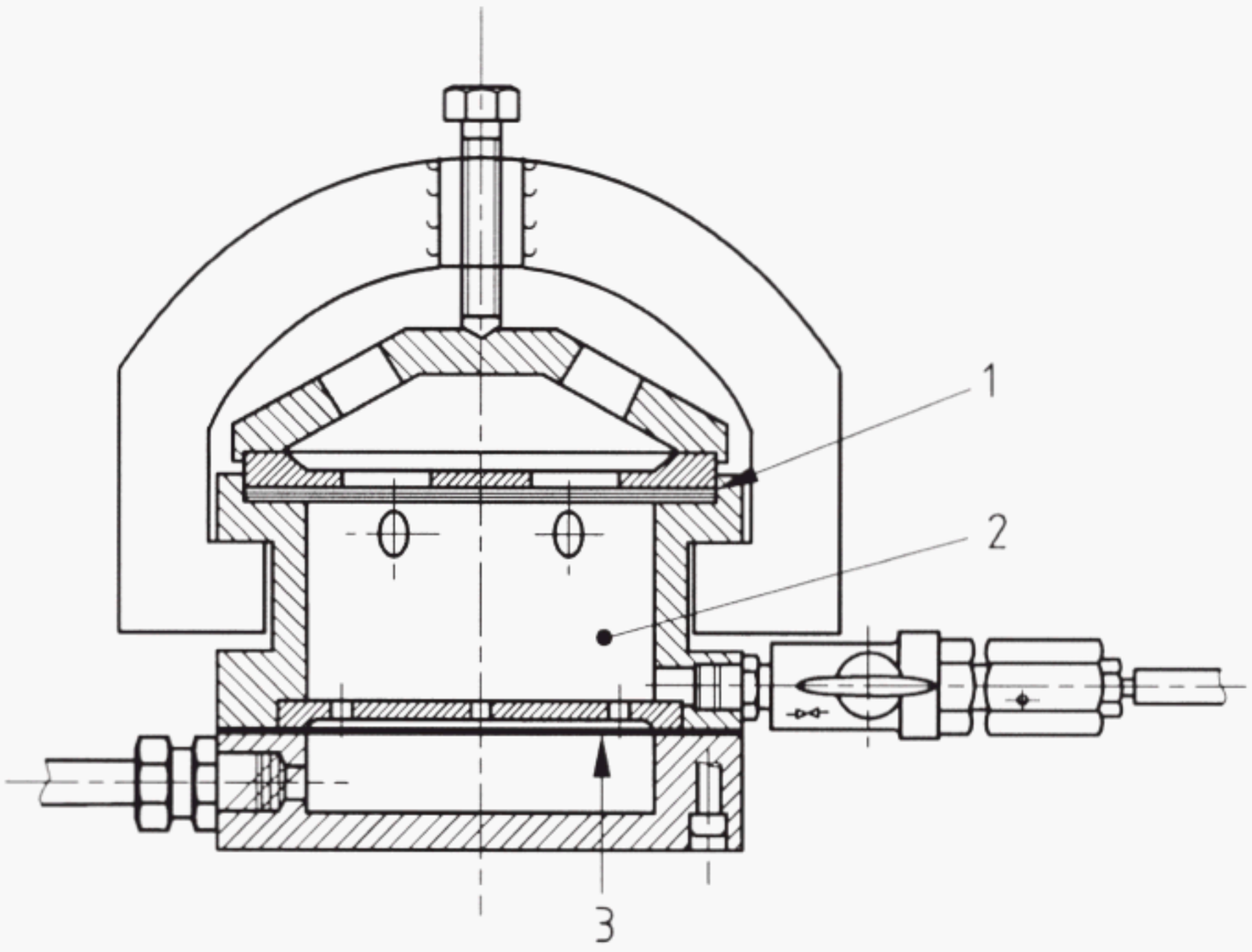
Cone hardened to 26 HRC to 31 HRC, surface even and unmarked

Cone diameter (35 ± 0,1) mm

Cone height (65 ± 0,1) mm

Cone end point diameter (0,5 ± 0,05) mm

Figure 3 — Puncturing tool



Key

1 Test specimen
2 Water
3 Membrane

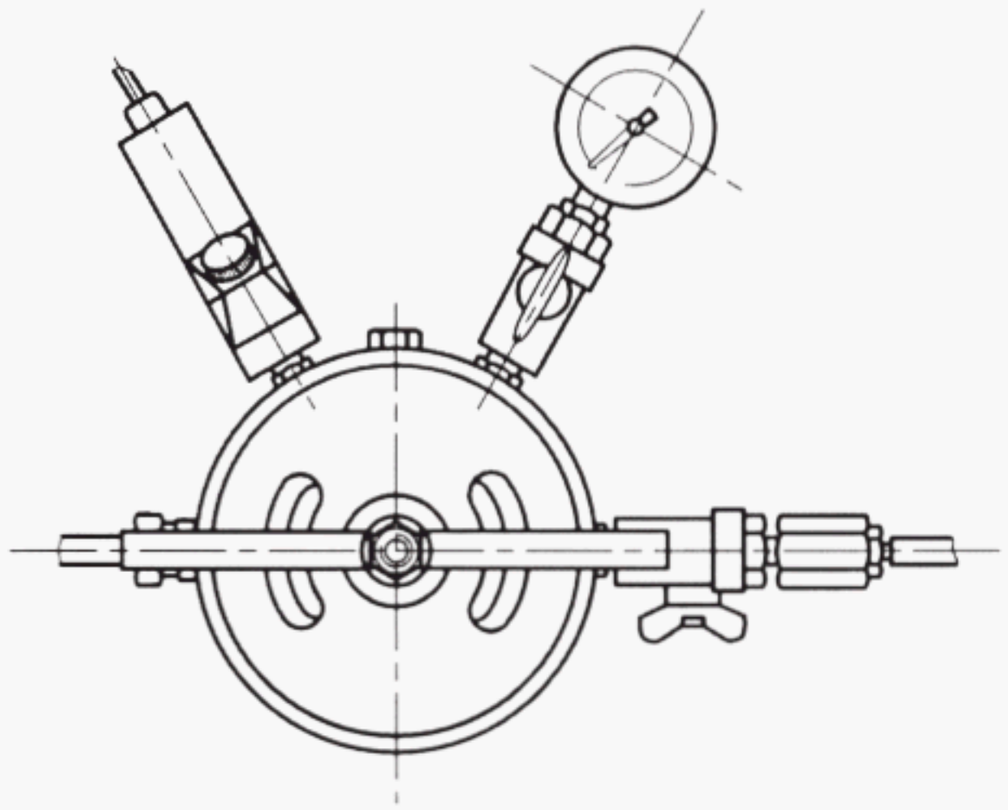
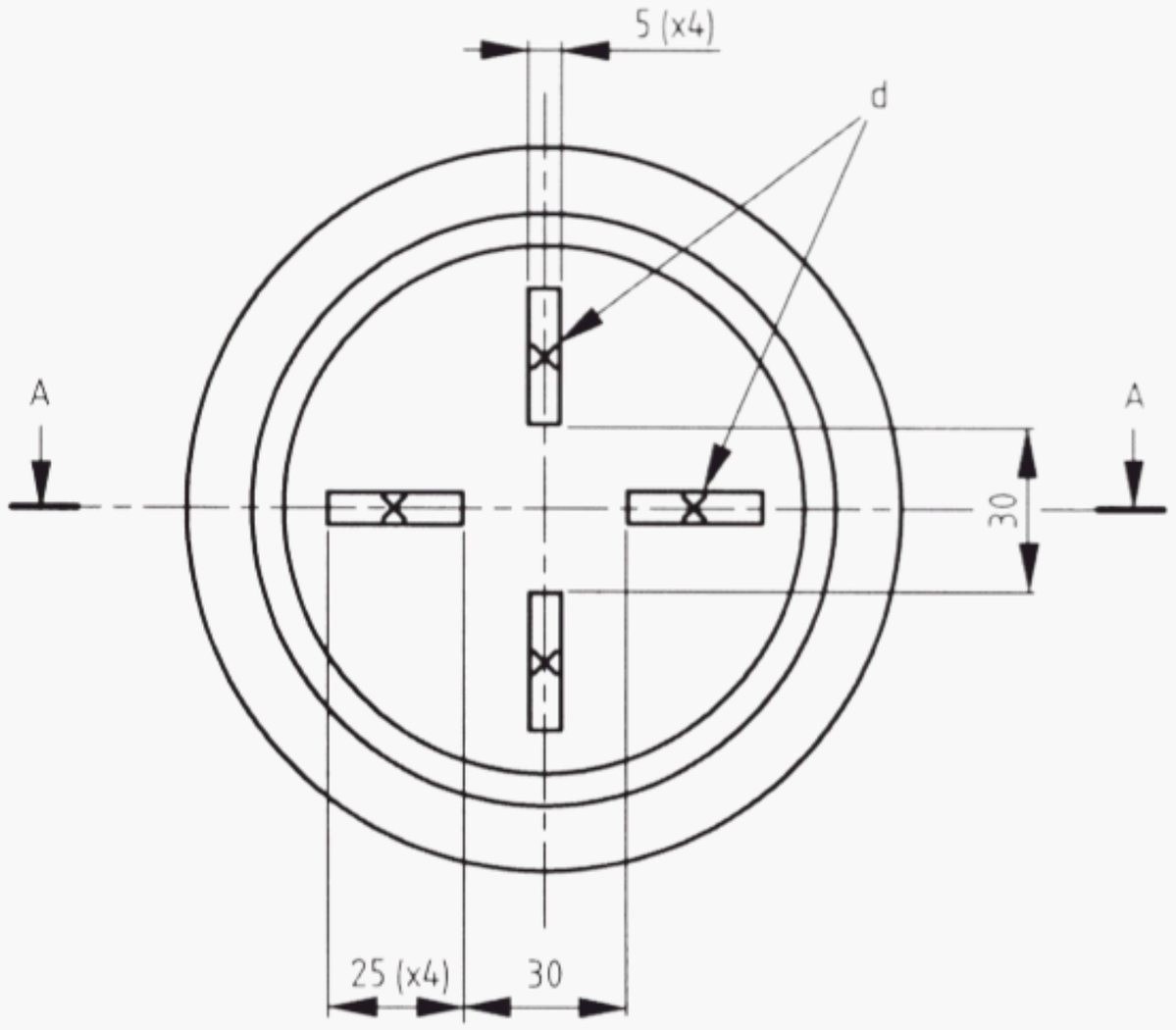
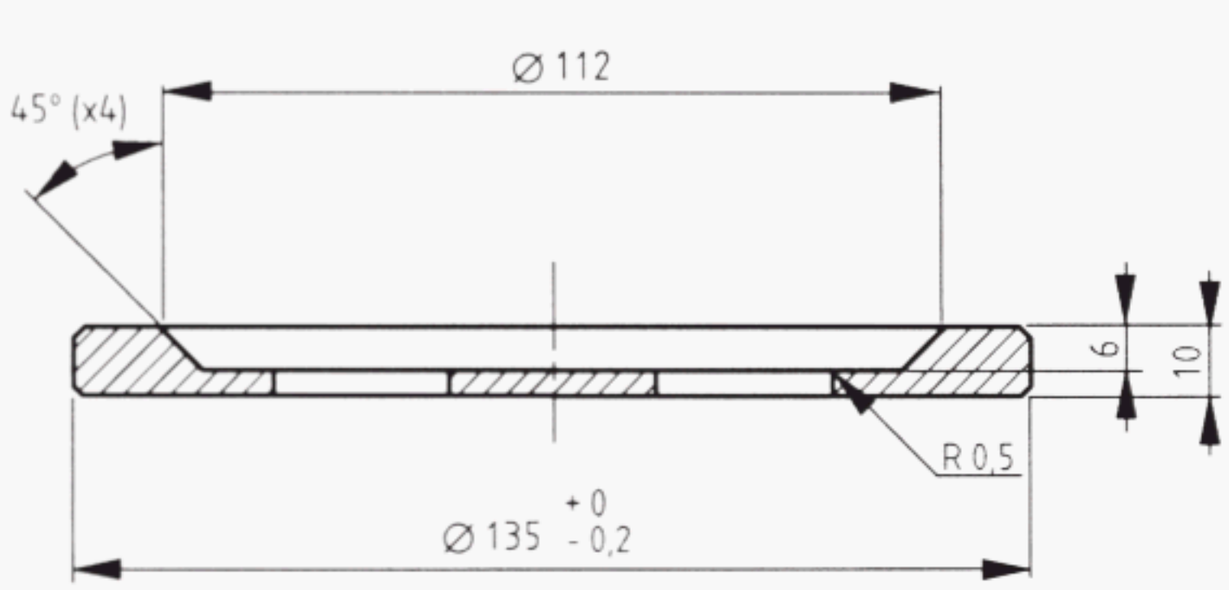


Figure 4 — Example of equipment for determination of the resistance to dynamic water pressure

Dimensions in millimetres

Top view:





A - A

Key

d position of perforation

Section A — A

Figure 5 — Slotted disc of the slit pressure-testing device