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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 A WATER TIGHTNESS AROUND PENETRATIONS AND OTHER DETAILS IN  
WET ROOM FLOORS WITH FLEXIBLE SUBSTRATE**

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## **1 Scope**

The aim of this method is to evaluate the ability of normally used details - such as floor gully, pipe penetrations and in- and outgoing corners – of watertight floors or floor coverings when exposed to water and mechanical stresses.

The test procedure is intended to simulate the mechanical loads and exposure to hot and cold water that can be expected during long-term use in order to verify satisfactory performance.

## **2 Field of application**

The method is applicable to all floors intended for use as watertight floors in wet rooms. The method is intended for floors with a flexible substrate, i.e. plywood, chipboard, gypsum, anhydrite and similar material vulnerable to water, but is not restricted to those.

## **3 References**

ASTM E-72: Strength Test of Panels for Building Construction.

## **4. Definitions**

Water tightness in this test refers to penetration of water acting on the surface of the floor and adjoining walls according to the test conditions.

## **5. Sampling**

One sample is used for the test. The sample is made as a floor with adjoining walls. It shall measure approximately 1200 mm x 1500 mm x 500 mm.

The test specimen shall be made on and fastened to a rack which supports the floor and which creates a space of approximately 0.5 m in height beneath the floor. The supporting rack might for instance be made from timber simulating a wooden subfloor.

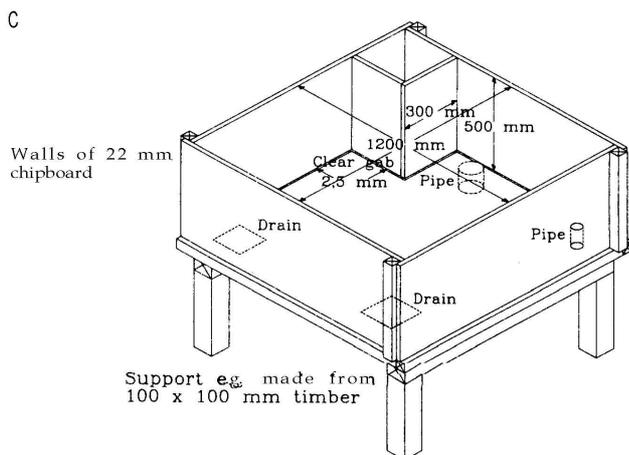


Fig. 1. Dimensions of the test floor.

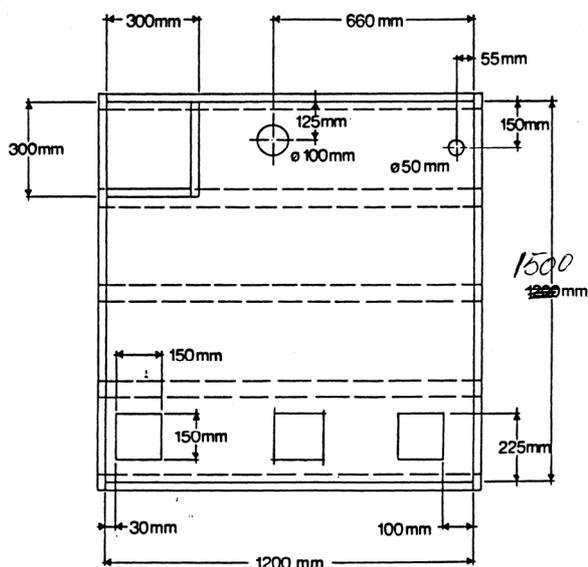


Figure 2. Plane view of test box

The floor and walls of the specimen shall be made from 22 mm chipboard or 19 mm plywood fastened to wooden joists per 300 mm. The joist shall be with dimensions 38 mm x 57 mm. The floor shall form a rectangle approximately 1200 mm x 1500 mm with a cut of ca. 300 mm x 300 mm in one corner and a joint in the middle. Walls are simulated with 500 mm high pieces of chipboard with an additionally outgoing corner 300 mm x 300 mm as shown in figure 1. The walls are screwed together by means of joists in the corners. The walls are placed on the rack so the outgoing corner fits in the cut in the floor. The walls are supported along the perimeter of the floor and are fastened to the floor with screws.

The floor shall be supplied with gullies suitable for use with the floor in question. At least one representative sample of each type of gully intended to be used with the floor i.e. gullies:

- of stainless steel with flange for attaching of collar/membrane figure (typical example shown in figure 3A)

- of plastics – type PE or PP – for attaching of collar/membrane (typical example shown in figure 3B)
- with clamping ring (and collar) (typical examples shown in figure 4 A and B)

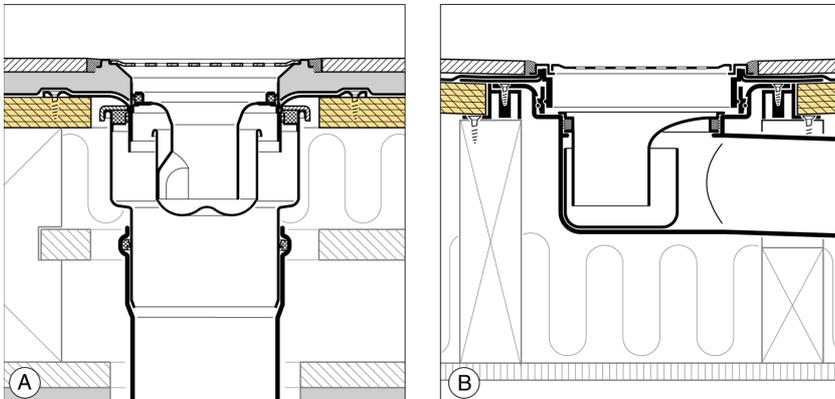


Figure 3

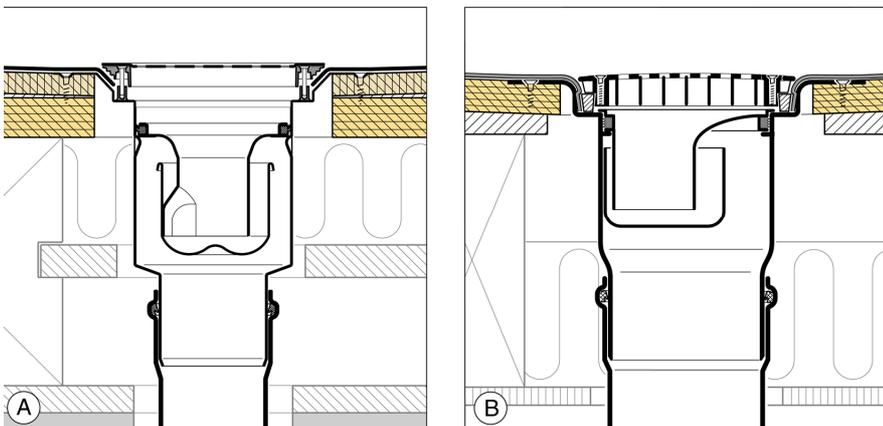


Figure 4

Further the floor is supplied with at least two PP plastic pipes with different diameter - e.g. 50 and 110 mm - penetrating the floor. The watertight floor covering shall protect subfloor as well as walls. The watertight layer shall be carefully applied including all details – e.g. joints around gullies and between floor and walls (including in- and outgoing corners) and skirtings to pipe penetrations - as recommended by the supplier. The waterproof layer on the floor shall for testing purposes continue at least 200 mm up the wall - to form a basin - and be connected to the watertight layer of the wall if this is a different system. If the same system is used for floor and wall the watertight covering is continued so the entire floor and wall surfaces are covered.

Waterproofing membranes that are normally used with protective layers, e.g. tiles, are tested without this protection unless something different has been agreed with the approval body, for example due to the protective layer being an integrated part of the watertight system.

## 6 Method of test

### 6.1 Principle

The water tightness of all details, e.g. penetrations in the floor and in- and outgoing corners, is tested by exposing the floor to a head of water. Afterwards the surface is exposed to a series of dynamic loads and alternating influences from hot and cold water. Finally the floor is again tested with a head of water.

### 6.2 Apparatus

A sand bag made of leather (according to ASTM E-72). The sand bag shall have a diameter of 250 mm and a mass of 30 kg. The sand shall be placed in a cloth bag, which shall be securely tied and placed inside the leather bag. The sand used shall be dry beach sand with a maximum grain size of 4 mm, 30-60 % able to pass through a sieve of mesh size 0.125 mm.

9 nozzles mounted on water pipes at a distance of about 300 mm from the surface of the floor. The spray of water from the nozzles shall form a cone of about 60°, and shall be evenly distributed. Nozzles shall each give approximately 0.05 l/sec..

*Note: A suitable nozzle is for example produced by Spraying Systems Inc., USA. It is marked ¼ G 10 (female) or ¼ GG 10 (male).*

### 6.3 Procedure

6.3.1 The floor gullies are blocked in the trap (at the outlet) and the basin formed by the floor is filled with (tap) water to a height of 100 mm above the gullies. After 24 hours it is controlled visually and/or with a moisture meter if water has penetrated.

*Note: When assessing the results of the test, measurements of the humidity level in the board materials used for the test specimen may be used. The humidity level in the board materials shall roughly correspond to the humidity level in boards at conditions similar to those in the test laboratory. Only minor differences in the humidity content of the boards shall occur.*

The test specimen is left to dry for at least 24 hours.

6.3.2 The floor is - in 5 different places - exposed to a dynamic load by the bag falling 3 times from 0.45 m. A protection of e.g. 18 mm plywood 200 x 200 mm with rounded edges is placed on points where the dynamic loads are applied.

At least 1 of the impacts shall be so close to the edge of a gully that the edge of the bag just touches the gully.

6.3.3 After the mechanical exposure the test sample is again filled with water to create a head of water of 100 mm above the gullies. After 24 hours the floor is again controlled from beneath for any signs of water penetration.

6.3.4 If the floor still proves to be watertight, the following exposure to hot and cold water is carried out.

1) Hot and cold water is alternately led into the floor gullies in such a way that the water is applied on the edge/flange of the gullies (at the joint between the gully and the floor). The water can be

applied successively to one gully at a time or to all three gullies at the same time depending on the test equipment. The water supply shall be in accordance with the following cycle:

Hot water ( $90 \pm 3$  °C) 0.3 litre/sec for 60 sec,  
Pause for 60 sec,  
Cold water ( $10 \pm 3$  °C) 0.3 litre/sec for 60 sec,  
Pause for 60 sec.

The temperature is measured at the nozzle.

The cycle is repeated 100 times.

### 6.3.5

2) From the nozzles, hot and cold water is alternately sprayed over the details, see figure 3 of the floor construction, e.g. gullies, pipes and corners. The nozzles are mounted at least 300 mm from the floor and/or wall surfaces. The water is applied with the following cycle:

Hot water ( $60 \pm 3$  °C) for 60 sec,  
Pause for 60 sec.  
Cold water ( $10 \pm 3$  °C) for 60 sec,  
Pause for 60 sec.

The temperature is measured at the nozzle.

In the gullies an arrangement for simulating blocked floor drains shall be mounted, so that the water level rises 20 mm above the gully during each spraying period.

The cycle is repeated 1500 times.

After the exposure the specimen is controlled for any signs of damage or leakage.

After the hot and cold water exposure the test sample is again filled with water to create a head of water of 100 mm above the gullies. After 7 days the test is terminated and the details are controlled for any signs of water penetration from beneath.

Supplementary humidification of material/substrate around details considered vulnerable may be recorded with a moisture meter preferably after opening the construction.

## 6.4 Expression of results

As result of the test is stated whether the product is assessed to be watertight. There shall be no signs of water penetration after the test e.g. after visual inspection and possible measurement of humidity level around sensitive details.

## 7. Test report

The test report should include the following information:

- a) Name and address of the testing laboratory
- b) Identification number of the test report

- c) Name and address of the organization 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