

**ADHESIVES, MASTICS, COATINGS
WATERTIGHTNESS OF JOINTS AND
SEALED ORIFICES**

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NO USE RESTRICTION*This is a translation, the French original shall be used in all cases of litigation**Date of translation : 21/10/2003***FOREWORD**

*This document is in technical conformity with the RNUR test method No. 1112.
It must not be modified without prior consultation with RNUR.*

1. OBJECT AND FIELD OF APPLICATION

The object of this method is to check the ability of adhesives, mastics or various devices to seal an assembly or an orifice. It may apply to homogeneous assemblies (steel sheet-steel sheet for example) or heterogeneous assemblies (steel sheet-glass, steel sheet-plastic material, etc.).

Note : *For steel sheet-glass bonding, the test method D55 1383 should be used in preference.*

2. PRINCIPLE

To subject to a given hydrostatic pressure, for a certain time, either joints of steel sheets or of any other material or orifices of a given diameter, previously sealed using the product or device under examination. Observe any possible leakage.

3. EQUIPMENT**3.1. A BRUSH**

(1 cm wide).

3.2. A MASTIC KNIFE**3.3. SPRAYING EQUIPMENT**

suited to the condition of application.

3.4. EXTRUSION EQUIPMENT

fitted with a gun with a 3 mm diameter nozzle.

3.5. INSERTION EQUIPMENT

conforming to the device in test method D55 1107 (paste products) or a hollow punch (formed products).

3.6. PERMEABILITY METER

(see figures 1 and 2).

It consists of a flat tank connected to a rigid vertical 90 cm tube, at the top of which is a glass tube at least 30 cm long. The tank must be able to rock around a horizontal axis to be placed in any position between the horizontal and the vertical.

In vertical position, the side of the tank facing upwards is fitted with a bleed screw allowing the vat to be completely filled with water.

The upper part of this tank consists of a test plate which is fixed so as to be sealed around the whole circumference.

4. PREPARATION OF TEST SPECIMENS

4.1. COMPOSITION OF THE TEST SPECIMEN

4.1.1. BONDED OR WELDED JOINTS

The test specimen consists of two parts (figure 3) :

4.1.1.1 A 9/10 mm steel plate or other material with the outside edge adapted to the opening of the tank in which an opening of 100 x 100 mm is bored.

4.1.1.2 A 9/10 mm steel plate 120 x 120 mm square. This plate is designed to cover the 100 x 100 mm opening made in the first plate with an excess of 10 mm round the whole circumference. It is permanently fixed by spot welds, with one spot every 50 mm approximately.

If this plate is of glass or plastic or other non-weldable material, it is fixed solely by the product, which in this case provides the bonding and the sealing of the assembly.

4.1.2. SEALED ORIFICES

The test specimen consists of a 9/10 mm steel plate or other material, with the outside edge adapted to the opening of the tank. The tank is bored with holes of equal diameter, the dimensions of which correspond to the relevant application (figure 3a).

4.2. TYPE AND SURFACE PREPARATION OF SUPPORTS

The documents shall specify as to whether the products are to be applied to oiled, phosphated, coated with primer, painted sheet metal or on glass, plastic, etc.

4.3. PREPARATION OF TEST SPECIMENS

4.3.1. JOINTS

The preparation is carried out according to the product to be examined.

4.3.1.1 Sealants in pre-formed beads

In the case of a pre-formed mastic, a beading 10 mm in diameter is applied to cover the joint, either by compressing it with the thumb, if the consistency allows it or with a mastic knife if the product is viscous. In both cases, it is a question of obtaining a seal as regular as possible approximately 2 mm thick and 2,5 cm wide carefully arranged either side of the joint to be sealed.

4.3.1.2 Extrudable or sprayable sealants

In the case of a curable sealant, either extrudable or sprayable, the extruded or sprayed bead is deposited exactly on the joint using the equipment (3.3.) or (3.4.).

The smoothing operation is only carried out on the extruded bead as the sprayed product is self-smoothing. The geometry of the joint to be obtained is identical to that described in paragraph 4.3.1.1.

4.3.1.3 Adhesive strips

The adhesive strip 12 mm wide is placed by hand exactly on the joint. The operation may be carried out in two different ways :

- 4 pre-cut pieces of length equal to one side of the test specimen are applied in a straight line so as to place the connections in the corners (the connections are produced by overlapping).
- one single length of adhesive strip is used to seal the whole of the test specimen perimeter. The corners are covered by turning the adhesive strip. The connection is located in the middle of one side with the two ends of the strip overlapping. The method of preparation of the test specimen must be shown in the test report.

4.3.1.4 Weldable sealants

(mastics in pre-formed beads or in bulk for application by extrusion or by spraying).

The central plate B is not fixed to plate A (see figure 3). The weldable sealant is applied so as to obtain a layer 1 mm thick and 10 mm wide around the circumference of the square opening of plate A.

Plate B is applied so that it projects 10 mm on each side and it is fixed by spot welds.

This process is equally applicable to test specimens in non-weldable material, the bonding is then made in conditions specific to each product used.

The temperatures and baking times that the product may be subjected to before the sealing test shall be stated in the documents.

4.3.2. ORIFICES

The preparation is carried out according to the product or device under examination.

4.3.2.1 Paste products

Deposit blocks of 22 mm diameter and 4 mm high over the different orifices of the test plate complying with the instructions given in test method D55 1107.

4.3.2.2 Products in slabs

Deposit product samples cut out by means of the selected hollow punch over the different orifices of the test plate. The diameter of the cutting tool shall be 10 mm greater than that of the orifice to be sealed.

4.3.2.3 Devices which may be used such as covers, plugs, etc.

Deposit these on the test plate according to the vehicle assembly instructions. The possible temperatures and baking times to which the product may be subjected before the sealing test shall be indicated in the documents together with the diameter of the holes to be sealed in relation to the relevant application.

5. METHOD OF OPERATION

- The test specimen is fixed so that it is sealed to the water tank, the product being on the outside.
- The tank test specimen assembly is tipped up vertically to eliminate the air retained in the tank by actuating the bleed screw which is at the highest point on the side of the tank (see fig. 1).
- The column of water is adjusted to 100 cm taking as the base the lower seal (see fig. 1) or to any other height specified in the documents.
- The test specimen remains in the horizontal plane used as a base for the water column also 100 cm high (see figure 2) or any other height specified in the documents.
- The hydrostatic pressure is left to actuate for one hour and a record is made as to whether or not there is a water leak.

6. EXPRESSION OF RESULTS

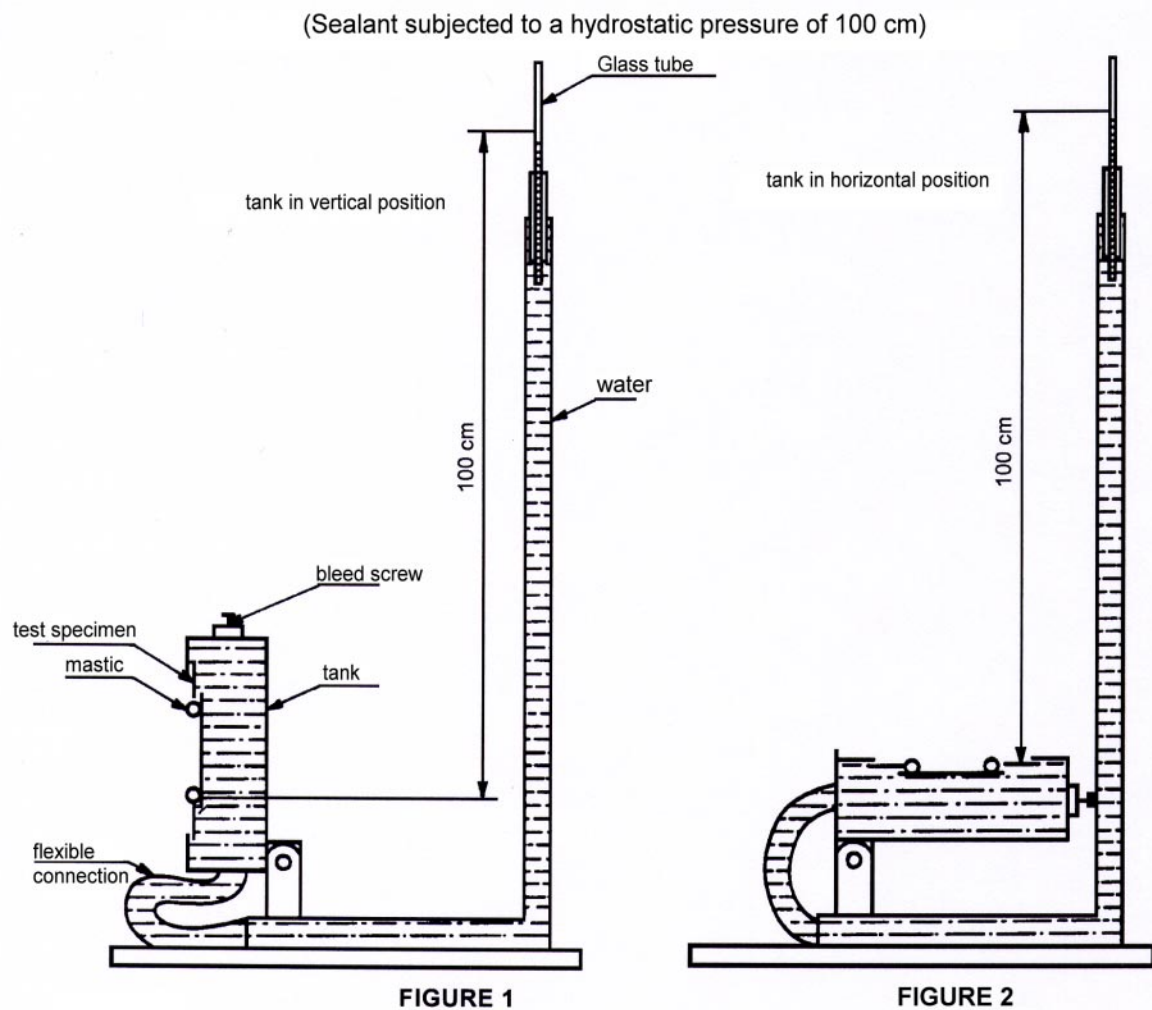
A record is made as to whether or not there has been a leak during the test.

7. TEST REPORT

On the test report, the following shall be recorded :

- the type of test specimen (bonded or welded joints or holes specifying their diameter), the type of constituent materials and their surface preparation,
- the condition of the product tested (new, aged according to test method D47 1165 or subjected to other treatments),
- the hydrostatic pressure in height of water in centimetres,
- the test duration (pressure holding time) if it is different to 1 hour.

EXAMPLE OF APPLICATION OF THE PERMEABILITY METER



TEST SPECIMEN - JOINTS

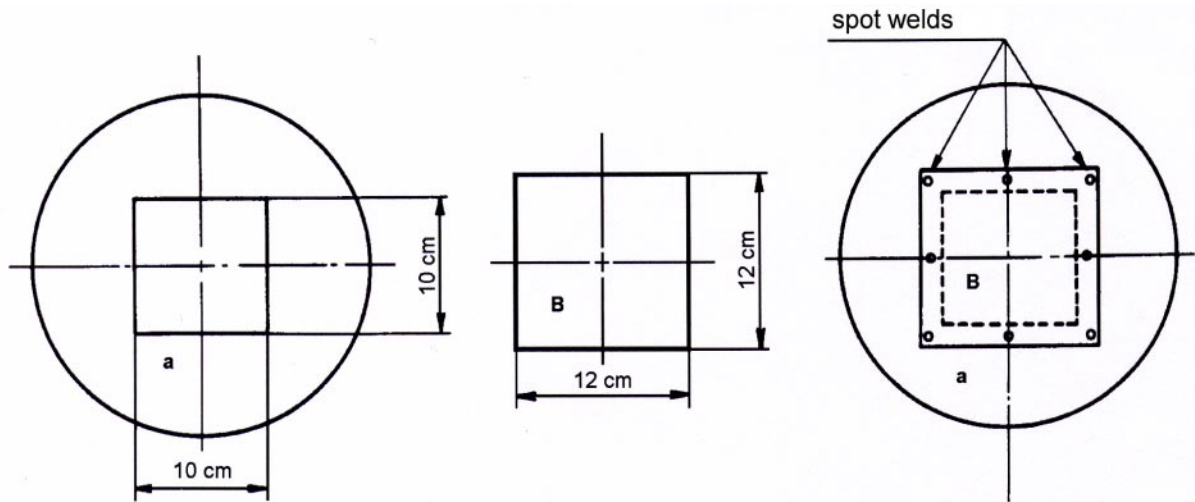


FIGURE 3

TEST SPECIMEN - HOLES

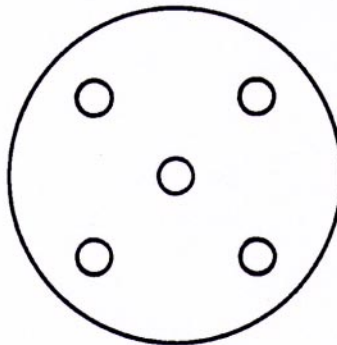


FIGURE 3 a

8. RECORDS AND REFERENCE DOCUMENTS

8.1. RECORDS

8.1.1. CREATION

OR : 01/01/1982 – CREATION OF THE NORME

8.1.2. SUBJECT OF THE MODIFICATION

- A : 28/11/1996 – INTRODUCED INTO IDEM (*French only*).
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8.2. REFERENCE DOCUMENTS

8.2.1. PSA DOCUMENTS

D47 1165, D55 1107, D55 1383.

8.2.1.1 Normes

8.2.1.2. Others

8.2.2. EXTERNAL DOCUMENTS

8.3. EQUIVALENT TO :

REN1112

8.4. CONFORMS TO :

8.5. KEY-WORDS