TECHNICAL REPORT

Determination of the resistance to dynamic indentation

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EUROPEAN ORGANISATION FOR TECHNICAL APPROVALS

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Foreword

EOTA Technical Reports are developed as supporting reference documents to European Technical Approval Guidelines and can also be applicable to a Common Understanding of Assessment Procedures, an EOTA Comprehension Document or an European Technical Approval, as far as reference is made therein.

EOTA Technical Reports go into detail in some aspects and express the common understanding of existing knowledge and experience of the EOTA bodies at a particular point in time.

Where knowledge and experience is developing, especially through approval work, such reports can be amended and supplemented.

When this happens, the effect of the changes upon the European Technical Approval Guidelines will be laid down in the relevant comprehension documents, unless the European Technical Approval Guideline is revised.

This EOTA Technical Report has been prepared by the EOTA Working Group 04.02/01 – "Liquid applied roof waterproofing Kits" and endorsed by EOTA.

1 Scope

This EOTA Technical Report specifies the method of the determination of the resistance to dynamic indentation installed liquid applied roof waterproofing kits.

2 Principle

The resistance to dynamic indentation of installed liquid roof waterproofing kits on a given substrate is determined by applying an impact energy of 5.9 J by means of a given steel indentor on the exposed side of the installed product.

Perforation of the installed product shall be identified, in case of doubt, by determination of the watertightness.

3 Apparatus

3.1 Hammer device

With indentor adjuster providing an impact energy of 5.9 J (± 0,1).

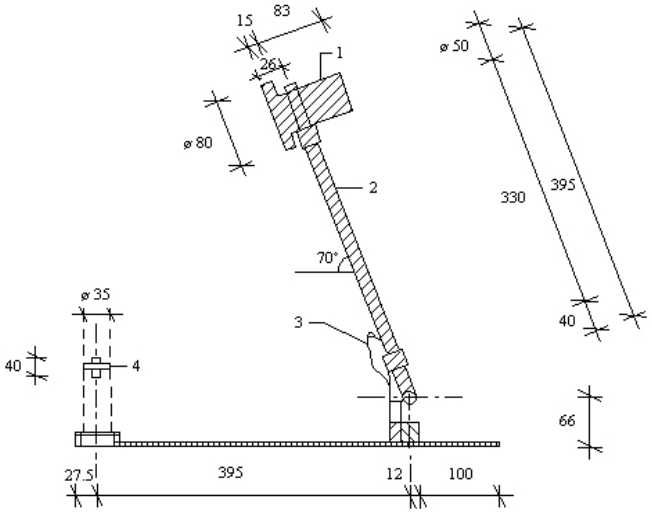

Fig. 1 – Schematic diagram of the hammer device

3.2 Steel indentors

A set of steel indentors according to Table 1 and Figure 2. The edge radius R of the cylinder shall be 0.3 mm (± 0.1).

The steel shall have a hardness of at least 58 HRC.

All surfaces polished.

	Type of indentors			
	l_4	l_3	l_2	l_1
Ø D	6 (± 0.05)	10 (± 0.05)	20 (± 0.05)	30 (± 0.05)
A	10	15	15	15
B	20	15	15	15

Table 1 – Type of indentors
dimensions in mm

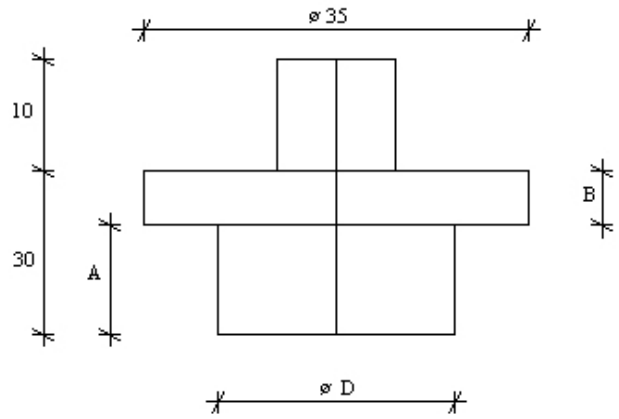

Figure 2 – Shape of the indentor

3.3 Frame

To clamp or fix the test specimen with internal dimension between 200 mm and 300 mm.

3.4 Base plate

A rigid flat base plate of sufficient size

3.5 Siliconized paper

3.6 Device for testing watertightness

In case of fully bonded installed product(s):

- suitable electrical spark tester;
- cylinder, with diameter Ø 50 mm, to apply a head of (coloured) water of at least 100 mm.

4 Test specimen

4.1 Dimensions

The test specimen is the installed product including its substrate.

The dimensions of the test specimen shall be based on the frame used but shall have a test area of 200 mm (± 1) x 200 mm (± 1)

4.2 Number of test specimen

The number of test specimen of the installed product is three.

NOTE – Depending on the type of substrate applied for and its dimensions, it is permissible to use the substrate more than once. If the substrate is damaged as a result of the test, the use of the same substrate is only allowed when the new position is not within 100 mm of any previous indentation or of the internal sides of the frame. In this case the same piece of substrate can be used for three tests.

4.3 Preparation of test specimen

In case of an installed product being defined as loose laid or partially bonded, the test specimens shall be cut from a free film sample (eg obtained by the use of siliconized paper, etc.)

In all other cases the test specimen shall be the installed product, bonded to the most and least compressible substrate specified by the applicant for that installed product; except where that substrate is concrete, a steel plate (at least 6 mm thick) shall be used as a substrate.

NOTE 1 – If the installed product incorporates a supporting layer and/or an internal layer the test specimen shall not include joints.

NOTE 2 – Only in the case of fully bonded installed product where the least compressible substrate specified is concrete, a steel plate is used as a substrate in order to allow subsequent verification of watertightness by electrical means e.g. by an electrical spark tester.

4.4 Curing time and conditioning of test specimens

The installed product shall be cured at 23°C (± 2) and at 50% (± 5) relative humidity for at least the period as prescribed by the applicant. The cured test specimen

shall be conditioned at 23°C (± 2) and at 50% (± 5) relative humidity for a period of at least 16 hours.

5 Procedure

5.1 Test conditions

The test shall be carried out at a temperature of 23°C (± 2) and a relative humidity of 50% (± 5), unless otherwise specified.

5.2 Test procedure

5.2.1 Clamp the test specimen in the frame in such a way that it is fully restrained and supported at the edges.

5.2.2 Position the apparatus in the centre of the test specimen when using dimensions of 200 mm x 200 mm, or at a distance of at least 100 mm from the internal sides of the framework, when using larger test specimen

5.2.3 Adjust the hammer device to the release position. Place the indentor in the apparatus resting on the exposed side of the test specimen: the type of indentor (see Table 1) is related to the level of resistance, corresponding with the user load category as specified by the applicant.

5.2.4 Apply an impact energy of 5.9 J (± 0.1) on the steel indentor.

NOTE – If due to the combination of impact energy and rigid substrate the hammer springs back from the indentor, the movement should be stopped manually as to prevent a second impact on the indentor.

5.2.5 Remove the test specimen; examine the specimen visually for perforation and (in case of doubt) determine the watertightness of the specimen at the place of indentation by using one of the following procedures:

a – free films: the verification method as specified in the EOTA Technical Report 003 (but with a head of water of 100 mm);

b – bonded to substrates: by the application of a 100 mm column of (coloured) water for a period of 24 hours. After this period the installed product shall be carefully removed from the substrate and the substrate shall be examined for evidence of water penetration (e.g. by use of UV lamp);

c – bonded to steel: by the application of a small amount of salt water to the indentation and theuse of an electrical method (e.g. spark tester). The steel plate is then acting as the earth. Care must be taken to ensure that the voltage applied across the test specimen is not too high to cause damage.

NOTE – When the installed product contain conductive materials the electrical spark tester cannot be used.

5.2.6 Perform the test on the remaining test specimens.

6 Expression of results

Determine whether the test specimens have been perforated by visual examination and by testing the watertightness.

The installed product is considered watertight when all three test specimens pass the test.

7 Test report

The test report shall include the following information:

a. reference to this Technical Report;

b. the name of the testing laboratory;

c. date of testing;

d. description of the installed product, including dimensions of test specimen, curing and conditioning;

e. description of the substrate (used for classification);

f. description of the indentor type used;

g. all visual examinations at the place of indentation;

h. watertightness of the three specimens at the place of the indentation and the method of determination, if relevant;

i. all operating details not specified in this Technical Report, as well as incidents likely to have influenced the results.

Annex A

Bibliography

- Directive Générale UEAtc pour l'Agrément des revêtements d'étanchéité des toitures - July 1982.