



TECHNICAL REPORT

**Determination
of the resistance
to delamination**

TR 004
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Technical Report 004 revised

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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 for determining the resistance to delamination of an installed liquid applied roof waterproofing kit, partially or fully bonded to a substrate.

2 Principle of the method

The resistance to delamination of the installed product fully bonded to a substrate, is determined by placing the test specimen, attached between a stiff plate and a fixed rigid substrate, in a tensile testing machine and pulling it apart at a given speed.

The recorded maximum force, corresponding to the cohesion of the test specimen divided by the cross sectional area of the test specimen gives the delamination strength.

3 Apparatus

3.1 Tensile testing machine

With suitable capacity and shall comply with EN ISO 527-1 and to a constant testing speed of (10 ± 1) mm/min. The tensile testing machine shall allow measurement of force with an accuracy of $\pm 1\%$.

3.2 Recording equipment

For measuring forces during the tensile operation.

3.3 Steel plate

with a thickness ≥ 10 mm (to resist deformation during the test).

3.4 Accessories

Which permit self alignment of the test specimen and allow an equally distributed tensile stress.

3.5 Adhesive

Which is compatible with the roof waterproofing product and the substrate.

3.6 Cutter

A suitable cutting device is used to cut a test specimen from the installed product, with a diameter of (100 ± 1) mm.

4 Test specimen

4.1 Dimensions

The test specimen is the installed product including its rigid substrate and shall have a diameter of (100 ± 1) mm.

4.2 Number

The number of test specimens is five.

4.3 Preparation of test specimens

The waterproofing product shall be applied to the substrate as specified by the applicant.

The test specimen shall either have a diameter of (100 ± 1) mm, or the sample of the installed product shall be cut to the substrate to provide a circular testing area with a diameter of (100 ± 1) mm.

The steel plate shall be attached on top of the test specimen after curing of the product.

In particular it is important that:

- the used hot or cold adhesives shall not reinforce or in any other way affect the characteristics of the test specimen;
- the used solvent shall be compatible with the test specimen;
- the used adhesive shall not be the weakest part of the test specimen.

NOTE – In the relevant product specification advice may be available concerning the type of adhesive to be used and its possible effect on the assembled product may be obtained from the manufacturer.

4.4 Curing and conditioning of test specimens

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

After attaching the stiff plate to the test specimen the whole shall be conditioned at (23 ± 2) °C and a relative

humidity of (50 ± 5) % for a period of at least 16 hours, to allow sufficient strength of the adhesive used.

5 Procedure

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

5.2 Clamp the test specimen including the attached stiff plate in the tensile testing machine by means of the accessories.

5.3 Adjust the speed of the testing machine to 10 mm/min and start the testing.

5.4 The maximum force of the roof waterproofing kit is recorded in Newton.

5.5 Note and record the failing way of the product or of the substrate failed.

5.6 Discard and replace any test specimen, where the test specimen failed totally or partially in the adhesive layer between the specimen and the plate, or where failure occurred at the bond of the substrate to the tensile testing machine.

Note 1: When the calculated resistance to delamination is substantial higher than 50 kPa, then the test shall not be repeated.

Note 2: The value of 50kPa has derived from the maximum load by the wind. In practice the delamination strength will be significantly in excess of this load.

5.7 Perform the test on the remaining test specimens.

6 Expression of results

For each test specimen calculate the resistance to delamination using the following equation:

$$R = \frac{F}{A} \cdot 10^3$$

where:

R = resistance to delamination expressed in kPa;

F = force at delamination expressed in N;

A = cross sectional area of the test specimen expressed in mm².

In order to determine the resistance to delamination of partially bonded product the mean calculated value from the test results shall be expressed in relation to the percentage of bonding of the partially bonded product to the substrate, following the design rules of the manufacturer.

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. a description of the installed product including dimensions, curing and conditioning;
- e. a description of the substrate (used for classification);
- f. the test conditions;
- g. all individual tensile strengths and an arithmetical mean value, rounded to the nearest 1 kPa;
- h. a description of the failure modes in the test specimen/substrate combination;
- i. all operating details not specified in this Technical Report, as well as incidents likely to have influenced the results.

Annex A Bibliography

- EN 1607 (+ /C1): 1997 Thermal insulating products for building applications – Determination of tensile strength perpendicular to faces.
- EN ISO 527-1 (+ C1): 1993 Plastics – Determination of tensile properties – Part 1: General principles.
- EN ISO 4624: 2003 Paints and varnishes – Pull-off test for adhesion.