



TECHNICAL REPORT

**Determination  
of the resistance to wind  
loads of partially bonded  
roof waterproofing  
membranes**

TR 005  
Edition June 2003

# Determination of the resistance to wind loads of partially bonded roof waterproofing membranes

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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 wind loads of installed kits of liquid roof waterproofing partially bonded to a substrate.

## 2 Principle of the method

The resistance to wind load of a partially bonded installed product is determined by the application of cycles of suction pressures to a test specimen of given dimensions, according to a given proportional array of suction pressures and determining the peak pressure of the cycle, preceding that during which the test specimen fails.

## 3 Apparatus

### 3.1 Pressure chamber

With sufficient length and width to accommodate the dimensions of the test specimen (see 4.1) and with such height, unaffected by deformations, if any, of the test specimen and the applied pressure is evenly distributed.

The pressure chamber shall be provided with one or more windows (or other means) that the test specimen can be observed during the testing.

The pressure chamber shall be capable of resisting a suction pressure of 4 kPa and shall have the possibility to create an airtight seal between the test specimen and the pressure chamber during the suction pressure phase.

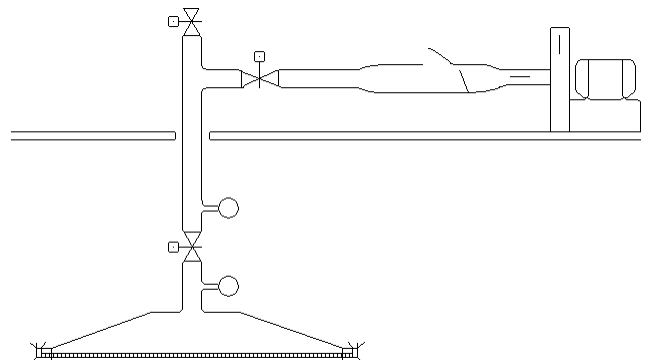


Figure 1 – Schematic diagram of a dynamic wind tester

### 3.2 Fan, controlling and recording equipment

They have to be connected to the pressure chamber, to achieve dynamic suction pressure cycles with the proportional array of suction pressures (see Figure 2) with an accuracy on the suction pressures of  $\pm 10\%$ .

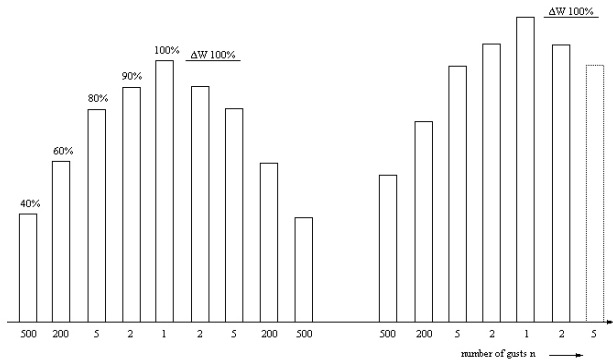


Figure 2 – Proportional array of suction pressures

## 4 Test specimen

### 4.1 Dimensions

The test specimen is a model of a roof construction, incorporating the installed product partially bonded.

The dimensions of the test specimen will depend on the dimensions of the pressure chamber chosen but shall have a minimum testing area of  $4 \text{ m}^2$  and a shortest dimension of at least 1,5 m.

### 4.2 Number

The number of test specimens is one.

### 4.3 Preparation

The installation of the product partially bonded shall be executed in accordance with the manufacturers instruction to the least compressible of the substrates specified by the applicant (see also the Note on Clause 5).

Lap joints, if any, in the support layer shall be symmetrically positioned in accordance with Figure 3.

Where the substrate consists of board materials (thermal insulation), the boards shall be positioned in accordance with Figure 4a and 4b.

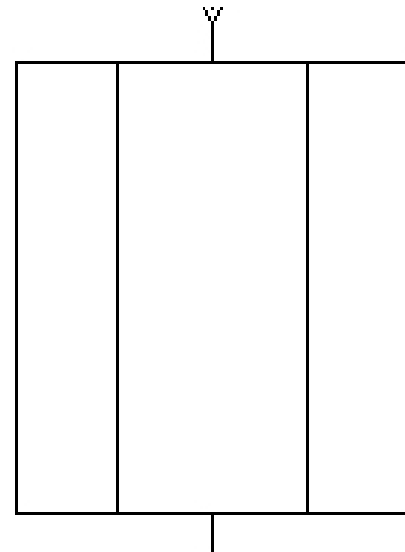


Figure 3 – Positioning of lap joints of a partially bonded assembled "system" incorporating a supporting layer

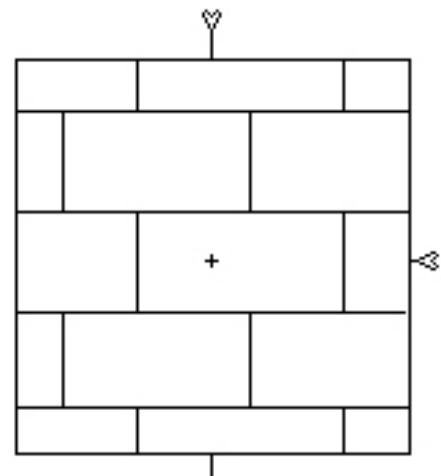
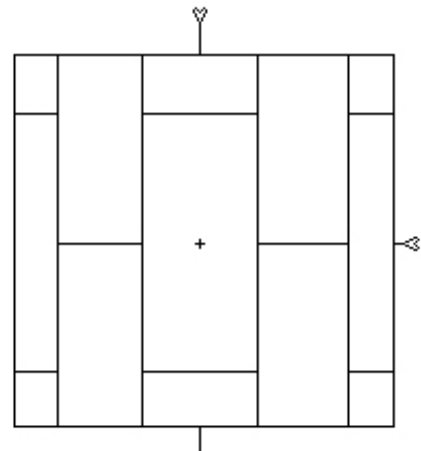


Figure 4 – Positioning of boards as a substrate  
4a – double symmetrical positioning with staggered butt joint  
4b – positioning at will with staggered butt joints.

#### 4.4 Curing and conditioning

The test specimen shall be cured at 23°C (± 5) for at least the period of time as prescribed by the manufacturer of the product.

The cured test specimen shall be conditioned at 23°C (± 5) for at least 16 hours.

### 5 Procedure

The test shall be carried out at 23°C (± 5) and the test specimen shall be fixed symmetrically in the pressure chamber.

Provision shall be made at the edge zones so that these areas do not influence the mode of failure (e.g. movements must remain possible) and to ensure an airtight seal during the application of the suction pressures.

The fan and the controlling equipment shall be used to apply to the test specimen the proportional suction pressures in accordance with Figure 2.

The time/suction pressure diagram shall comply with that given in Figure 5.

The tolerance on the time is ± 0,1 s and 90% of the peak pressure shall be reached in between 0,7 and 1,0 s after the loading has started.

The lapse time for one suction pressure shall be ≤ 8 s.

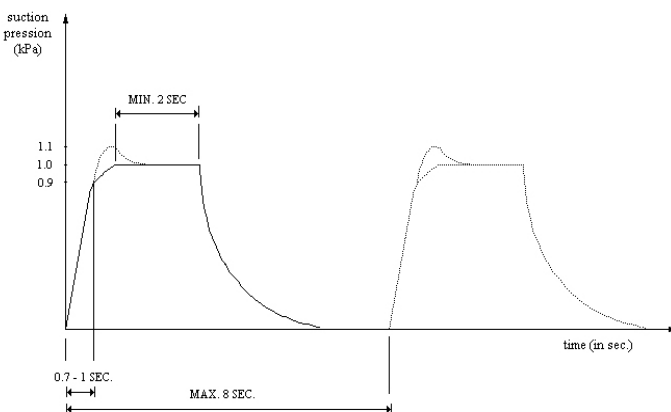


Figure 5 – Time/suction pressure diagram (trapezium)

The applied suction pressure of each array of cycles shall be in accordance with Table 1.

The behaviour of the test specimen shall be observed during each cycle: the stage, the number of suction

cycles at which the roof waterproofing kit fails and the mode of any such failure, shall be recorded.

Number of cycles	Applied suction pressure in kPA
4	1,0
1	1,5
1	2,0
1	2,5
1	3,0
1	3,5
1	4,0

Table 1 – Peak suction pressure at each cycle ( $\Delta W_{100\%}$ )

*NOTE – In the test specimen provisions shall be made that the peak suction pressure with an accuracy of ± 10 % directly affect the installed product. Where the peak suction pressure does not act directly on the installed product, the test specimen shall be adjusted accordingly for example by means of openings between boards and/or in the supporting structure.*

### 6 Expression of results

Record of the load at which the roof collapses and the peak load ( $\Delta W_{100\%}$ ) of the preceding cycle, expressed in kPa for the partially bonded product.

### 7 Test report

The test report shall include the following information:

- reference to this Technical Report;
- the name of the testing laboratory;
- the date of testing;
- a description of the installed product including dimensions and conditioning;
- a description of the substrate (used for classification);
- all observations made during the testing including the description of the failure mode of the test specimen;
- the test conditions;
- test results;
- all operating details not specified in this Technical Report, as well as incidents likely to have influenced the results.