



TECHNICAL REPORT

**Factory made boards and  
products formed  
by moulding of a silicate  
polystyrene composite  
for thermal and or  
acoustical insulation**

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# **EOTA**

## **TECHNICAL REPORT**

### **TR 030**

**Factory-made boards and products formed by moulding  
of a silicate polystyrene composite  
for thermal and/or acoustical insulation**

**Testing procedures for:**

- A. Determination of the density of the silicate polystyrene composite beads and the ratio silicate/polystyrene in the silicate polystyrene composite beads**
- B. Reaction to fire test – Mounting and fixing according EN 13823**

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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 approval body Kiwa to define testing procedures in support of the CUAP 12.01/24: “Factory-made boards and products formed by moulding of a silicate polystyrene composite for thermal and/or acoustical insulation”.*

## A. Determination of the density of the silicate polystyrene composite beads and the ratio silicate/polystyrene in the silicate polystyrene composite beads

### A.1 Principle

- A well known volume of silicate polystyrene composite beads is weighed after conditioning. From the mass and volume the density of the silicate polystyrene composite beads is determined.
- A well known quantity of silicate polystyrene composite beads is treated in a screen machine. When a significant amount of silicate has come loose from the beads, the silicate is weighed and put in an oven at a defined temperature for a defined period of time. After cooling down the mass of the remains – being the dry silicate – is weighed. From the two measured weights the ratio in mass percentage of the silicate to the bonded water can be calculated.
- A well known quantity of silicate polystyrene composite beads is put in an oven at a defined temperature for a defined period of time. After cooling down the mass of the remains – being the dry silicate – is weighed. From the two measured weights the ratio in mass percentage of the silicate to the bonded water and the polystyrene can be calculated.

### A.2 Apparatus

A.2.1 **Jug,  $V$** , with a volume of  $(2 \pm 0,01)$  litres.

A.2.2 **Balance**, with a scale from 0 to 100 g and an accuracy of 0,01 g.

A.2.3 **Oven**, for conditioning the material at a temperature of  $(23 \pm 5)$  °C and a relative humidity of  $(50 \pm 5)$  % R.H.

A.2.4 **Oven**, for treating the material at a temperature of  $(800 \pm 10)$  °C.

A.2.5 **Screen machine**, sieve with a width of 1,25 mm.

A.2.6 **Porcelain bowl**.

### A.3 Procedure

#### A.3.1 Determination of the density of the silicate polystyrene composite beads

- Condition an amount of silicate polystyrene composite beads at a temperature of  $(23 \pm 5)$  °C and  $(50 \pm 5)$  % R.H. for 6 hours Weigh the empty jug, in grams with an accuracy of 0,01 g ( $m_0$ ).
- Fill the empty jug with the conditioned beads and level the top of the jug with a straight metal ruler.
- Determine the weight of the filled jug in grams with an accuracy of 0,01 g ( $m_1$ ).
- Calculate the mass of the content of the jug,  $m_2$  in grams by using the following formula :  
$$m_2 = (m_1 - m_0)$$
- Calculate the density,  $\rho_1$  in g/l, of the moulded silicate polystyrene composite beads by using the following formula:  
$$\rho_1 = (m_2 / V)$$
, whereby  $V = 2$  litres

### A.3.2 Determination of the ratio silicate to bonded water

- Put approximately 5 grams of silicate polystyrene composite beads in a screen machine. Shake until a significant (ca. 3 gr) amount of the coating is shaken off.
- Weigh the empty porcelain bowl,  $m_3$ , in grams with an accuracy of 0,01 g.
- Put the coating that has been shaken off in the porcelain bowl.
- Weigh the filled bowl,  $m_4$ , in grams with an accuracy of 0,01 g.
- Put the filled bowl in the oven at 800 °C for 1 hour.
- After 1 hour take the bowl out of the oven and cool it till room temperature.
- Weigh the bowl,  $m_5$ , in grams with an accuracy of 0,01 g.
- Calculate the silicate/bonded water ratio,  $R_1$ , in mass percentage by using the following formula :

$$R_1 = (m_5 - m_3) / (m_4 - m_3) \times 100$$

### A.3.3 Determination of the ratio silicate to bonded water and polystyrene

- Weigh the empty porcelain bowl,  $m_6$ , in grams with an accuracy of 0,01 g.
- Fill the bowl with silicate polystyrene composite beads
- Weigh the filled bowl,  $m_7$ , in grams with an accuracy of 0,01 g.
- Put the filled bowl in the oven at 800 °C for 1 hour.
- After 1 hour take the bowl out of the oven and cool it till room temperature.
- Weigh the bowl,  $m_8$ , in grams with an accuracy of 0,01 g.
- Calculate the silicate/bonded water and polystyrene ratio,  $R_2$ , in mass percentage by using the following formula:

$$R_2 = (m_8 - m_6) / (m_7 - m_6) \times 100$$

## **B. Reaction to fire test – Mounting and fixing according EN 13823**

### **B.1 General**

This procedure is used only applicable for boards which are directly glued or mechanically fixed to the substrate (e.g. wall).

NOTE: Kits/systems which are assembled elements using framework etc. are not covered by this procedure.

### **B.2 Test specimen**

- The board with the highest thickness and the highest density and the highest organic content (related to the mass in dried condition) has to be used for the preparation of the test specimen.  
The test result covers arrangements with boards of the same type, with thicknesses and densities between those evaluated in the tests and with equal or lower organic content.
- The board used in the test assembly shall always include facings and/or coatings that are applied to the product in its end use condition. Each type of facing and/or coating requires new tests.  
Test results from boards with maximum facing or coating thickness are also valid for thinner coatings.
- Influences of different colours of facings or coatings can be determined by performing indicative SBI tests on a light and on a dark colour. If there is no difference in the test result, then the full scale SBI test is only conducted on one colour.
- The type and dimensions of materials and products used, the dimensions and the location of the fixing, etc shall be recorded in the test report.

### **B.3 Mounting and fixing of the boards**

#### **B.3.1 Substrates**

Standard substrates in accordance with EN 13238 may be used.

#### **B.3.2 Mounting by using an adhesive**

The board shall be glued with the adhesive in accordance with the specifications of the ETA applicant.

The influence of the type of adhesive is assumed to be negligible. Only the amount of organic content is considered to be important. Therefore, an adhesive with the highest amount of organic content should be used for preparing the test specimens applied at the maximum thickness. The test result is valid for adhesives with a thickness and organic content lower than used in the test.

#### **B.3.3 Mounting by using a mechanical fixing**

If the ETA applicant does not normally use a particular mechanical fixing, rivets, dips or screw fixings, the minimum performance criteria of the ETA-applicant should be used. In that case, the type of fixing used during the tests should be agreed between ETA applicant and approval body.

In any other case, the fixings of the ETA applicant shall be used.

If the board is fixed by mechanical fixings to the substrate, the minimum number of fixings are 7 for the large wing and 6 for the small wing. These fixings shall be evenly distributed as shown in figure B.1.

The minimum fixing distance from any edge is 25 mm. No fixings are to be placed below the U profile of the EN 13823 test.

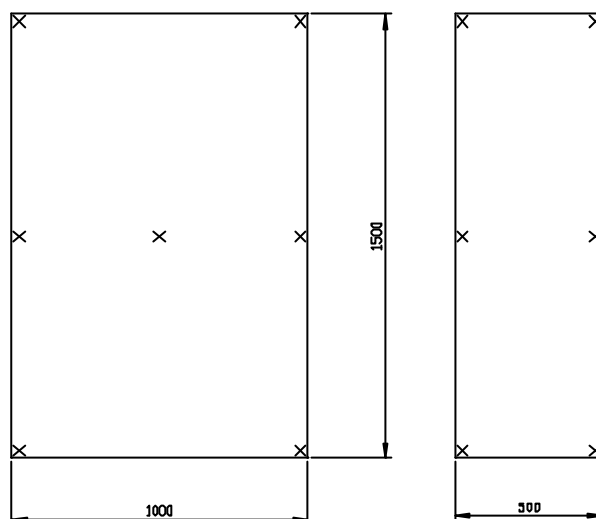


Figure B.1 : Mechanical fixed boards in the SBI testing

#### B.4 Normative references

- EN 13823: 2003** Reaction to fire tests for building products – Building products excluding floorings exposed to the thermal attack by a single burning item