

## Test report no. 113750

1. edition - 04.10.2011

Sponsor: Novatio n.v.  
Industrielaan 5 C  
2250 Olen  
BELGIEN

Order from: 16.08.2011 - Vicky Engelen

Order: Reaction to fire tests according to DIN 4102-1: 1998-05,  
fire class B1, of gun-PUR-foam „B1 Foam“

Notes: In German this test report can be used only for a building  
material, not for a building product.  
For sale on the German market, other special papers according  
to the German "Landesbauordnung" are needed in addition.  
This test report can be used for these special papers.

This test report consists of 7 pages.

The test report has to be published only unabridged. Publishing in abstracts must be allowed by the testing institute. The test results refer only to the tested material.

## 1. Test material

### 1.1 Sampling and delivery

sampling: by sponsor  
delivery: on 17.08.2011 by TNT  
number of samples: 10 cans gun-PUR-foam  
dimensions: 750 ml

### 1.2 Informations about the samples

name: „B1 Foam“  
raw materials: polyurethane, flame retardent  
configuration: 1-component-gun-PUR-foam  
color: light green  
density: about 19 kg/m<sup>3</sup>

### 1.3 Mounting

For the Brandschacht-test, PUR foam was expanded between steel angles. Any protruding foam was cut away after hardening. The joint width was 40 mm and the depth 70 mm.  
4 thus prepared samples with vertical joints comprised a test specimen for the Brandschacht.

## 2. Fire tests

### 2.1 Review

All fire tests were carried out according to DIN 4102-1: 1998-05.

character and location of tests

| tests                    | amount of tests | lab              |
|--------------------------|-----------------|------------------|
| Single-flame source test | 5               | MPA BAU HANNOVER |
| Brandschacht-test        | 3               |                  |

## 2.2 Single-flame source test

The specimens for the fire tests were produced in the fire laboratory according to the ABM-Recommendation, dated 05.05.2004. The tests were carried out as edge flame attacks according to DIN 4102-1: 1998-05 clause 6.2.5.2.

flame application time: 15 s  
 observation time: 20 s  
 number of tests: 5

| position of flame application |    | edge                            |      |     |      |      |
|-------------------------------|----|---------------------------------|------|-----|------|------|
| specimen no.                  |    | 1                               | 2    | 3   | 4    | 5    |
| ignition occurs after         | s  | 0,2                             | 0,4  | 0,3 | 0,3  | 0,2  |
| duration of flames            | s  | 15,1                            | 15,0 | 9,6 | 15,0 | 12,9 |
| max. vertical flame spread    | mm | 120                             | 110  | 110 | 120  | 110  |
| smoke production              |    | high                            |      |     |      |      |
| flaming droplets/particles    |    | no ignition of the filter paper |      |     |      |      |

Requirement of class B2: max. vertical flame spread < 150 mm

### 2.3 Brandschacht-test

The Results of the Brandschacht-test are compiled in the next table. The development of smoke temperature is shown in fig. 1, the appearance of samples after burning in fig. 3 - 5. The integral value

$$I = \int_{0 \text{ min}}^{10 \text{ min}} S \cdot dt$$

was calculated from the curve in fig. 2

results of the Brandschacht-tests

| test                                  |       | A     | B     | C     |
|---------------------------------------|-------|-------|-------|-------|
| max. vertical flame spread            | cm    | 70    | 70    | 70    |
| time after beginning                  | min:s | 00:43 | 00:33 | 00:47 |
| melting and burning through           |       |       |       |       |
| time after beginning                  | min:s | —     | —     | —     |
| flames on the reverse side of samples |       |       |       |       |
| time after beginning                  | min:s | —     | —     | —     |
| flaming droplets/particles            |       | —     | —     | —     |
| residual length                       |       |       |       |       |
| single values                         | cm    | 32    | 32    | 34    |
|                                       | cm    | 37    | 38    | 37    |
|                                       | cm    | 34    | 31    | 32    |
|                                       | cm    | 32    | 33    | 33    |
| mean value                            | cm    | 34    | 34    | 34    |
| max. smoke temperature                | °C    | 117   | 114   | 116   |
| time after beginning                  | min:s | 09:59 | 09:45 | 09:51 |
| subsequent fire                       | min:s | —     | —     | —     |
| smoke intensity                       |       |       |       |       |
| max. opacity of the smoke             | %     | 50    | 51    | 41    |
| integral value I                      | min·% | 60    | 53    | 24    |

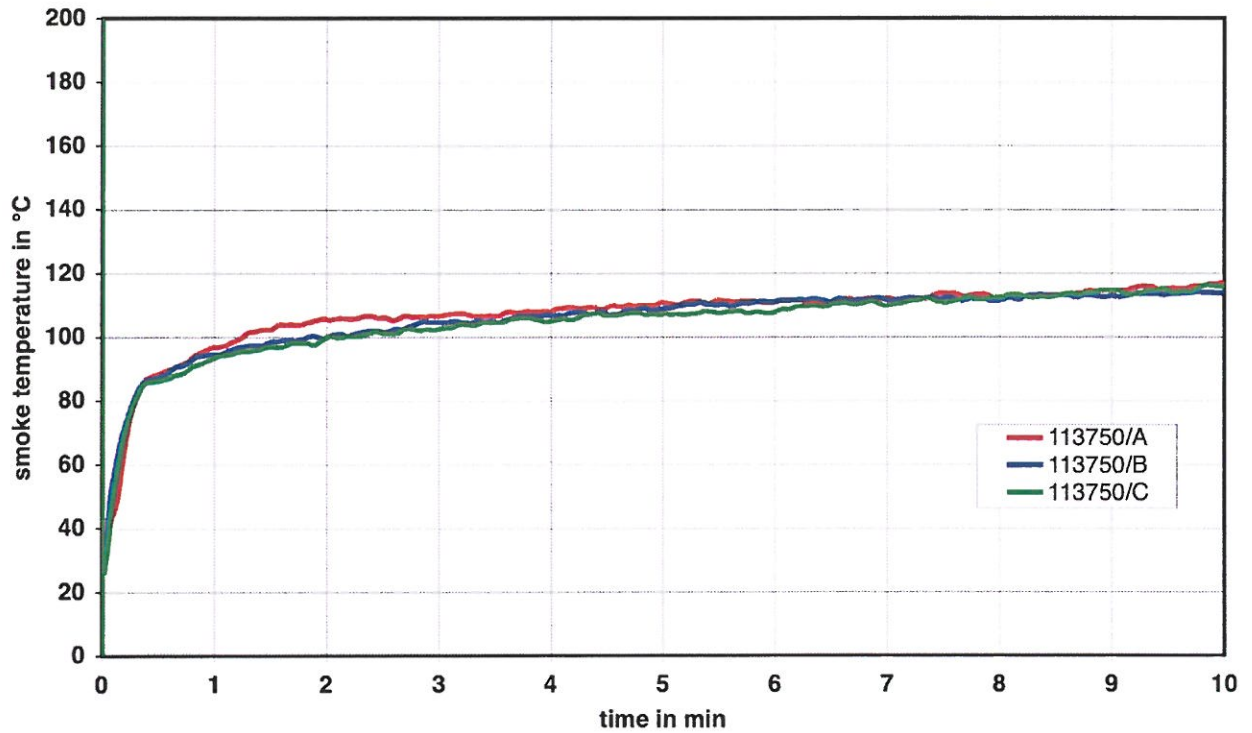


fig 1: smoke temperature

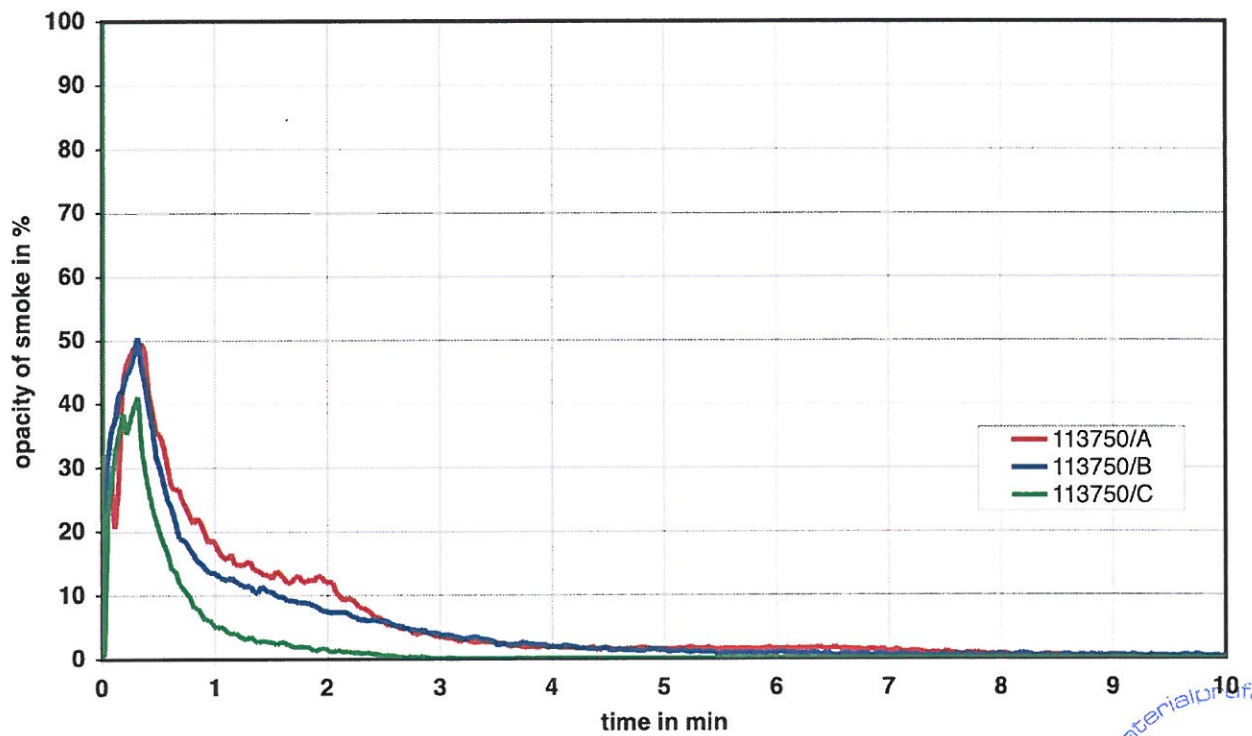


fig 2: opacity of smoke





fig. 3: Appearance of specimen A  
after 10-minutes burning



fig. 4: Appearance of specimen B  
after 10-minutes burning



fig. 5: Appearance of specimen C  
after 10-minutes burning

### 3. Summary

summary of test results

|                            |                   |                           |
|----------------------------|-------------------|---------------------------|
| name                       |                   | gun-PUR-foam<br>„B1 Foam“ |
| density                    | kg/m <sup>3</sup> | 19                        |
| Brandschacht-test          |                   |                           |
| joint width                | mm                | 40                        |
| joint depth                | mm                | 70                        |
| max. vertical flame spread | cm                | 70                        |
| residual length            | cm                | 34                        |
| max. smoke temperature     | °C                | 117                       |
| flaming droplets/particles |                   | —                         |
| max. opacity of smoke      | %                 | 51                        |
| max. integral value        | min-%             | 60                        |
| single-flame source test   |                   |                           |
| max. flame spread          | mm                | 120                       |
| flaming droplets/particles |                   | —                         |

### 4. Classification

The gun-PUR-foam „B1 Foam“ with a density of 19 kg/m<sup>3</sup>, between steel angles with a joint width of 40 mm and depth of 70 mm, fulfils the requirements of DIN 4102-1 - B1 and is thus classified in relation to its reaction to fire.

During the tests there were no flaming droplets/particles according to DIN 4102-1.

### 5. Restrictions

This test report is valid until 31.10.2016.

Hanover, 4. October 2011

Head of fire laboratory



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Technician



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