Forbo-Novilon B.V.
Att.: Mr. J. Jeuring
P.O. Box 148
7740 AC Coevorden
The Netherlands

Report

Project number: T10-30350
Report number: T10.30350.01br

Received:
A PVC floor covering, marked as: Surestep/Safestep;
TÜV reference: MT10.30350.01.
Adhesive: Eurocol 540.

Request:
Classification of burning behaviour according to EN 13501:2007.

Test method:

Ignitability (direct impingement of flame) : EN ISO 11925-2:2010
Reaction to fire (radiant panel) : EN ISO 9239-1:2010

Results:
See page two up to, and including three.
Test results:

- **Sample description**
  - Type of manufacture: heterogeneous PVC floor covering*
  - Type of secondary backing: grey coloured compact layer*
  - Total mass per unit area kg/m²: 2.8
  - Total thickness, mm: 2
  - * = manufacturer's declaration

- **Ignitability EN-ISO 11925-2**
  - Conditioning time, climate: min. 3 days, 23 ± 2 °C and 50 ± 5 %
  - Description of substrate: 6 mm. Fibre cement board, 1800 kg/m³.
  - Flame application: Surface.
  - Application time: 15 seconds.

<table>
<thead>
<tr>
<th>Direction:</th>
<th>In production</th>
<th>across production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total burning time (15 s)</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Flame tip reaches 150 mm (s)</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Extent of damaged area, length (mm)</td>
<td>75</td>
<td>67</td>
</tr>
<tr>
<td>Extent of damaged area, width (mm)</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Material melts (yes/no)</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Shrinks away² (yes/no)</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Glowing (sec)</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Flaming debris (yes/no)</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Ignition of filter paper (yes/no)</td>
<td>no</td>
<td>no</td>
</tr>
</tbody>
</table>

1 Inclusive a flame application time of 15 or 30 seconds with surface or edge impingement
2 Shrinks away from flame without being ignited
3 The time at which it occurs and its duration
Radiant Panel test EN ISO 9239-1

Conditioning time, climate: min. 3 days, 23 ± 2 °C and 50 ± 5 %
Description of substrate: Fibre cement board, 6±1 mm, 1800±200 kg/m³
conforming to EN 13238
Sampling procedure: by contractor.
Description of cleaning used: none.
Fixing method: Eurocol 540

<table>
<thead>
<tr>
<th>Test specimen</th>
<th>Flame spread (cm)</th>
<th>CRF (kW/m²)</th>
<th>peak light attenuation (%)</th>
<th>Smoke production (%.min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>21,0</td>
<td>9,0</td>
<td>65,8</td>
<td>153</td>
</tr>
<tr>
<td>2</td>
<td>21,0</td>
<td>9,0</td>
<td>68,1</td>
<td>179</td>
</tr>
<tr>
<td>3</td>
<td>22,0</td>
<td>8,8</td>
<td>67,6</td>
<td>174</td>
</tr>
<tr>
<td>4</td>
<td>21,0</td>
<td>9,0</td>
<td>67,3</td>
<td>162</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td><strong>21,3</strong></td>
<td><strong>8,9</strong></td>
<td><strong>67,7</strong></td>
<td><strong>172</strong></td>
</tr>
</tbody>
</table>

Remarks: no flashing, transitory- or sustained flaming.
* specimen extinguished naturally

Conclusion:

According to EN 13501 the tested sample of the aforementioned quality Surestep/Safestep meets the requirements of Class B₁₁.₅ - s₁.

The test results only relate to the behaviour of the test specimens of the examined product under the particular conditions of the test in laboratory conditions; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use. The method might not be suitable if the product is exposed to much larger flames or heat radiant sources.

Author:
Mrs. I. Pierik

Visa:
Mr. J. Brinks

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Flooring Radiant Panel Single Specimen Report

Standard : EN ISO 9239-1:2002
Laboratory : TÜV Rheinland Nederland B.V.
Sponsor : Forbo Novilon - Surestep
Date of test : Dec. 20 2010

Specimen description : MT10-30350.01
Test name : 1 (I)
File name : D:\FRPFILES\10120022.CSV
Test number in series : 4

Flux calibration file name : C:\FRPSOFT\CALIB\FLX10004.CSV

Thickness (mm) :
Density (kg/m³) :

Test duration : 12 minutes 02 seconds (722 s)
Substrate used? : Yes
Substrate : Calcium silicate
Fixing method : adhesive
Conditioned? : Yes
Conditioning temp. (°C) : 23
Conditioning RH (%) : 50

Test Results
Time to ignition : 2 minutes 02 seconds (122 s)
Time to flameout : 12 minutes (720 s)
Extent of burning (mm) : 210
Critical flux at extinguishment (kW/m²) : 9.01
HF-10 (kW/m²) : <= 9.01
HF-20 (kW/m²) : >= 10.9
HF-30 (kW/m²) : >= 10.9
Flame spread at 10 minutes (mm) : 210
Flame spread at 20 minutes (mm) : -1
Flame spread at 30 minutes (mm) : -1
Peak light attenuation (%) : 65.79
Time to peak light attenuation : 5 minutes 01 seconds (301 s)
Total integrated smoke (%.min) : 153.24

Potential classification : A2(fl)/B(fl)
Smoke production classification : s1

These results relate only to the behaviour of the specimens of the product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.
Smoke Graph

Test name: 1 (I)
File name: D:\FRPFILES\10120022.CSV

Rake Results

<table>
<thead>
<tr>
<th>Position (mm)</th>
<th>Time (s)</th>
<th>Flux (kW/m²)</th>
<th>Qsb (MJ/m²)</th>
<th>Position (mm)</th>
<th>Time (s)</th>
<th>Flux (kW/m²)</th>
<th>Qsb (MJ/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>196</td>
<td>10.7</td>
<td>1.978</td>
<td>510</td>
<td>-</td>
<td>3.7</td>
<td>-</td>
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<tr>
<td>110</td>
<td>233</td>
<td>10.1</td>
<td>2.240</td>
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<td>-</td>
<td>3.1</td>
<td>-</td>
</tr>
<tr>
<td>160</td>
<td>280</td>
<td>9.6</td>
<td>2.524</td>
<td>610</td>
<td>-</td>
<td>2.6</td>
<td>-</td>
</tr>
<tr>
<td>210</td>
<td>366</td>
<td>9.0</td>
<td>2.953</td>
<td>660</td>
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<td>2.2</td>
<td>-</td>
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<tr>
<td>260</td>
<td>-</td>
<td>8.1</td>
<td>-</td>
<td>710</td>
<td>-</td>
<td>1.9</td>
<td>-</td>
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<tr>
<td>310</td>
<td>-</td>
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<td>360</td>
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<td>1.4</td>
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<td>410</td>
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<td>460</td>
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<td>4.4</td>
<td>-</td>
<td>910</td>
<td>-</td>
<td>1.2</td>
<td>-</td>
</tr>
</tbody>
</table>

Comments
Specimen extinguished naturally.

These results relate only to the behaviour of the specimens of the product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.
Flooring Radiant Panel Single Specimen Report

Standard : EN ISO 9239-1:2002
Laboratory : TÜV Rheinland Nederland B.V.
Sponsor : Forbo Novilon - Surestep
Date of test : Dec. 20 2010

Specimen description : MT10-30350.01
Test name : 2(I)
File name : D:\FRPFILES\10120023.CSV
Test number in series : 4

Flux calibration file name : C:\FRPSOFT\CALIB\FLX10004.CSV

Thickness (mm) :
Density (kg/m³) :
Test duration : 8 minutes 15 seconds (495 s)
Substrate used? : Yes
Substrate : Calcium silicate
Fixing method : adhesive
Conditioned? : Yes
Conditioning temp. (°C) : 23
Conditioning RH (%) : 50

Test Results
Time to ignition : 2 minutes 03 seconds (123 s)
Time to flameout : 8 minutes 13 seconds (493 s)
Extent of burning (mm) : 210
Critical flux at extinguishment (kW/m²) : 9.01
HF-10 (kW/m²) : >= 10.9
HF-20 (kW/m²) : >= 10.9
HF-30 (kW/m²) : >= 10.9
Flame spread at 10 minutes (mm) : -1
Flame spread at 20 minutes (mm) : -1
Flame spread at 30 minutes (mm) : -1
Peak light attenuation (%) : 68.13
Time to peak light attenuation : 4 minutes 58 seconds (298 s)
Total integrated smoke (%.min) : 179.03

Potential classification : A2(fI)/B(fI)
Smoke production classification : s1

These results relate only to the behaviour of the specimens of the product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.
Smoke Graph

Test name : 2(J)  
File name : D:FRPFILES\10120023.CSV

Rake Results

<table>
<thead>
<tr>
<th>Position (mm)</th>
<th>Time (s)</th>
<th>Flux (kW/m²)</th>
<th>Qsb (MJ/m²)</th>
<th>Position (mm)</th>
<th>Time (s)</th>
<th>Flux (kW/m²)</th>
<th>Qsb (MJ/m²)</th>
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</thead>
<tbody>
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<tr>
<td>260</td>
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<td>1.9</td>
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<tr>
<td>310</td>
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<td>7.2</td>
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<td>760</td>
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<td>1.6</td>
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<td>910</td>
<td>-</td>
<td>1.2</td>
<td>-</td>
</tr>
</tbody>
</table>

Comments

Specimen extinguished naturally.

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Flooring Radiant Panel Single Specimen Report

Standard : EN ISO 9239-1:2002
Laboratory : TÜV Rheinland Nederland B.V.
Sponsor : Forbo Novilon - Surestep
Date of test : Dec. 20 2010

Specimen description : MT10-30350.01
Test name : 3(I)
File name : D:\FRPFILES\10120024.CSV
Test number in series : 4

Flux calibration file name : C:\FRPSOFT\CALIB\FLX10004.CSV

Thickness (mm) :
Density (kg/m³) :

Test duration : 7 minutes 17 seconds (437 s)
Substrate used? : Yes
Substrate : Calcium silicate
Fixing method : adhesive
Conditioned? : Yes
Conditioning temp. (°C) : 23
Conditioning RH (%) : 50

Test Results
Time to ignition : 2 minutes 01 seconds (121 s)
Time to flameout : 7 minutes 16 seconds (436 s)
Extent of burning (mm) : 220
Critical flux at extinguishment (kW/m²) : 8.82
HF-10 (kW/m²) : >= 10.9
HF-20 (kW/m²) : >= 10.9
HF-30 (kW/m²) : >= 10.9
Flame spread at 10 minutes (mm) : -1
Flame spread at 20 minutes (mm) : -1
Flame spread at 30 minutes (mm) : -1
Peak light attenuation (%) : 67.61
Time to peak light attenuation : 5 minutes 11 seconds (311 s)
Total integrated smoke (%.min) : 174.29

Potential classification : A2(fl)/B(fl)
Smoke production classification : s1

These results relate only to the behaviour of the specimens of the product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.
**Smoke Graph**

![Smoke Graph](image)

**Rake Results**

<table>
<thead>
<tr>
<th>Position (mm)</th>
<th>Time (s)</th>
<th>Flux (kW/m²)</th>
<th>Qsb (MJ/m²)</th>
<th>Position (mm)</th>
<th>Time (s)</th>
<th>Flux (kW/m²)</th>
<th>Qsb (MJ/m²)</th>
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</thead>
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<td>910</td>
<td>-</td>
<td>1.2</td>
<td>-</td>
</tr>
</tbody>
</table>

**Comments**

Specimen extinguished naturally.

These results relate only to the behaviour of the specimens of the product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.
Flooring Radiant Panel Single Specimen Report

Standard : EN ISO 9239-1:2002
Laboratory : TÜV Rheinland Nederland B.V.
Sponsor : Forbo Novilon - Surestep
Date of test : Dec. 20 2010

Specimen description : MT10-30350.01
Test name : 4(J)
File name : D:\FRPFFILES\10120025.CSV
Test number in series : 4

Flux calibration file name : C:\FRPSOFT\CALIB\FLX10004.CSV

Thickness (mm) :
Density (kg/m³) :

Test duration : 9 minutes 37 seconds (577 s)
Substrate used? : Yes
Substrate : Calcium silicate
Fixing method : adhesive
Conditioned? : Yes
Conditioning temp. (°C) : 23
Conditioning RH (%) : 50

Test Results
Time to ignition : 2 minutes 03 seconds (123 s)
Time to flameout : 9 minutes 36 seconds (576 s)
Extent of burning (mm) : 210
Critical flux at extinguishment (kW/m²) : 9.01
HF-10 (kW/m²) : >= 10.9
HF-20 (kW/m²) : >= 10.9
HF-30 (kW/m²) : >= 10.9
Flame spread at 10 minutes (mm) : -1
Flame spread at 20 minutes (mm) : -1
Flame spread at 30 minutes (mm) : -1
Peak light attenuation (%) : 67.29
Time to peak light attenuation : 4 minutes 33 seconds (273 s)
Total integrated smoke (% min) : 162.3

Potential classification : A2(fl)/B(fl)
Smoke production classification : s1

These results relate only to the behaviour of the specimens of the product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.
Smoke Graph

Test name: 4(J)
File name: D:\FRPFILES\10120025.CSV

Rake Results

<table>
<thead>
<tr>
<th>Position (mm)</th>
<th>Time (s)</th>
<th>Flux (kW/m²)</th>
<th>Qsb (MJ/m²)</th>
<th>Position (mm)</th>
<th>Time (s)</th>
<th>Flux (kW/m²)</th>
<th>Qsb (MJ/m²)</th>
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<td>-</td>
<td>910</td>
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<td>1.2</td>
<td>-</td>
</tr>
</tbody>
</table>

Comments
Specimen extinguished naturally.

These results relate only to the behaviour of the specimens of the product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.