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Date  
12<sup>th</sup> of October 2012

Project number  
89202381

Report number  
89202381.03br

Phone number client  
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Fax number client  
+31 75 647 7711

Your reference  
Lab15140

Article  
Marmoleum Sport 4.0

Appendix  
I : Flooring Radiant Panel Single  
Specimen Report – 8 pages

### **Test report**

Project number : 89202381  
Report number : 89202381.03br

#### **Received:**

A sample of floor covering, linoleum, marked as: “**Marmoleum Sport 4.0**”;  
TÜV sample reference: MT12-35997.03.

Delivered already fixed on a wooden substrate, a fiberbaord, in total six pieces, three in the production direction and three in the across direction to be tested according to ISO 9239-1.

#### **Information received from applicant:**

Name : Marmoleum Sport 4.0  
Total thickness : 4.0 mm  
Total mass : 4.7 kg/m<sup>2</sup>  
Used adhesive : Eurocol 614  
Date of fixation : 10-09-2012

#### **Request:**

Classification of burning behaviour according to EN 13501-1:2007.

#### **Test method:**

Reaction to fire test, according to:

- EN ISO 11925-2 Reaction to fire tests for building products, Part 2: Ignitability when subjected to direct impingement of flame (ISO 11925-2:2002).
- EN ISO 9239-1 Reaction to fire tests for floor coverings, Part 1: Determination of the burning behaviour using a radiant heat source (ISO 9239-1:2002).

#### **Results:**

See page two up to and including three.

#### **Appendix:**

See page four up to and including eleven.

TRN applies General Terms & Conditions  
which are filed at the office of the Clerk for  
civil affairs at the Court in Zutphen (the  
Netherlands) under number 35/2010,

## TEST RESULTS

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### Ignitability EN-ISO 11925-2:2010

According EN 14041 table 3, these floor coverings are classified as E<sub>n</sub> (classified without further testing).

#### Product information:

Floor covering type : Plain & decorative Linoleum, product standard EN 548  
 Mass per unit area : 4.7 kg/m<sup>2</sup> \*  
 Thickness : 4.0 mm\*

\* information received from the applicant.

### Radiant Panel test EN ISO 9239-1:2010

Date of testing : 08-10-2012  
 Conditioning time, climate : 12 days, 23 ± 2 °C and 50 ± 5 %  
 Description of substrate : Wooden substrate, received from applicant.  
 Sampling procedure : By applicant.  
 Description of cleaning used : None.  
 Fixing method : Fixed by applicant with Eurocol 614 on 10-09-2012.

| Test specimen, orientation | Flame spread (cm) | CRF (kW/m <sup>2</sup> ) | Peak light attenuation (%) | Smoke production (%.min) |
|----------------------------|-------------------|--------------------------|----------------------------|--------------------------|
| 1, ⊥                       | 38.0              | 5.6                      | 36.3                       | 340                      |
| 2, ↑                       | 41.0              | 5.1                      | 33.4                       | 397                      |
| 3, ↑                       | 44.0              | 4.6                      | 40.8                       | 424                      |
| 4, ↑                       | 43.0              | 4.8                      | 42.1                       | 426                      |
| <b>Mean</b>                | <b>42.7</b>       | <b>4.8</b>               | <b>38.7</b>                | <b>416</b>               |

Remarks: No flashing, transitory- or sustained flaming observed.  
 None of the tested specimen extinguished naturally, all were extinguished manually after the end of the test.

## CONCLUSION

According to EN 13501-1:2007 the tested sample of the aforementioned quality **Marmoleum Sport 4.0**, glued onto wooden fiberboard substrate meets the requirements of **Class C<sub>fl</sub>-s1**.

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### Statements:

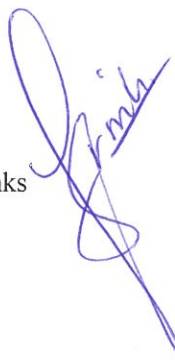
The test results only relate to the behaviour of the test specimens of the examined product under the particular conditions of the test in laboratory conditions; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use. The method might not be suitable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

The validity of this report will expire five years after its issue or directly after alterations or modifications of the examined product (combination)(s) and/or the criteria. This report shall not be reproduced, except in full, without the written approval of the testing laboratory.

**Author:**  
Mrs. I. Pierik



**Review:**  
Mr. J. Brinks



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**APPENDIX I: Flooring Radiant Panel Single Specimen Report****Date**  
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**Flooring Radiant Panel Single Specimen Report**

Standard : EN ISO 9239-1:2002  
Laboratory : TÜV Rheinland Nederland B.V.  
Sponsor : none *Falco*  
Date of test : Oct. 08 2012

Specimen description : Marmoleum Sport 4  
Test name : 0 MT12-35997.03 *cross 1*  
File name : D:\FRPFILES\12100011.CSV

Flux calibration file name : C:\FRPSOFT\CALIB\FLX12010.CSV

Thickness (mm) : 4  
Density (kg/m<sup>3</sup>) :

Test duration : 30 minutes (1800 s)  
Substrate used? : No  
Conditioned? : No  
Conditioning temp. (°C) : N/A  
Conditioning RH (%) : N/A

**Test Results**

Time to ignition : 2 minutes 01 seconds (121 s)  
Time to flameout : 30 minutes (1800 s)  
Extent of burning (mm) : 380  
Critical flux at extinguishment (kW/m<sup>2</sup>) : 5.63  
HF-10 (kW/m<sup>2</sup>) : 8.72  
HF-20 (kW/m<sup>2</sup>) : 6.76  
HF-30 (kW/m<sup>2</sup>) : 5.63  
Flame spread at 10 minutes (mm) : 220  
Flame spread at 20 minutes (mm) : 320  
Flame spread at 30 minutes (mm) : 380  
Peak light attenuation (%) : 36.34  
Time to peak light attenuation : 11 minutes 39 seconds (699 s)  
Total integrated smoke (%.min) : 339.59

**Potential classification : C(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.

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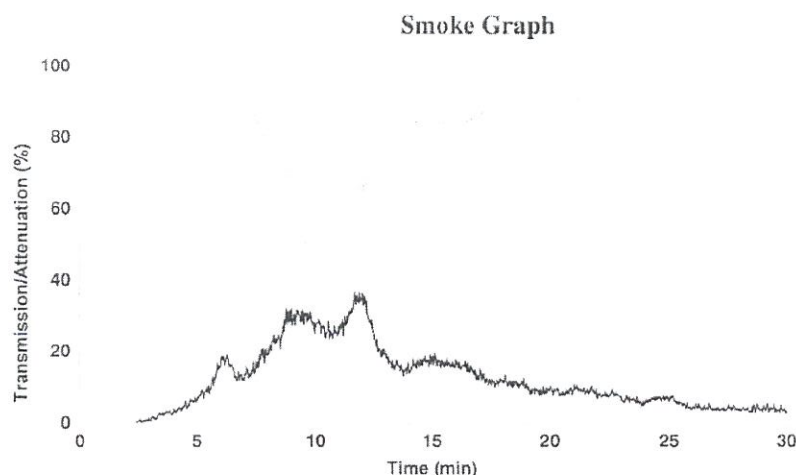
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Test name : 0 MT12-35997.03  
File name : D:\FRPFILES\12100011.CSV

### Rake Results

| Position (mm) | Time (s) | Flux (kW/m <sup>2</sup> ) | Qsb (MJ/m <sup>2</sup> ) | Position (mm) | Time (s) | Flux (kW/m <sup>2</sup> ) | Qsb (MJ/m <sup>2</sup> ) |
|---------------|----------|---------------------------|--------------------------|---------------|----------|---------------------------|--------------------------|
| 60            | 262      | 11.5                      | 2.775                    | 510           | -        | 3.5                       | -                        |
| 110           | 361      | 10.6                      | 3.544                    | 560           | -        | 2.9                       | -                        |
| 160           | 457      | 9.8                       | 4.078                    | 610           | -        | 2.4                       | -                        |
| 210           | 562      | 8.9                       | 4.445                    | 660           | -        | 2.1                       | -                        |
| 260           | 736      | 7.9                       | 5.119                    | 710           | -        | 1.8                       | -                        |
| 310           | 1111     | 7.0                       | 6.647                    | 760           | -        | 1.5                       | -                        |
| 360           | 1451     | 6.0                       | 7.388                    | 810           | -        | 1.3                       | -                        |
| 410           | -        | 5.1                       | -                        | 860           | -        | 1.2                       | -                        |
| 460           | -        | 4.2                       | -                        | 910           | -        | 1.1                       | -                        |

### Comments

Specimen was extinguished manually after end of test.

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.



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**Flooring Radiant Panel Single Specimen Report**

Standard : EN ISO 9239-1:2002  
Laboratory : TÜV Rheinland Nederland B.V.  
Sponsor : none *TCR*  
Date of test : Oct. 08 2012

Specimen description : Marmoleum Sport 4  
Test name : 0 MT12-35997.03 *Test 1*  
File name : D:\FRPFILES\12100010.CSV

Flux calibration file name : C:\FRPSOFT\CALIB\FLX12010.CSV

Thickness (mm) : 4  
Density (kg/m<sup>3</sup>) :

Test duration : 30 minutes (1800 s)  
Substrate used? : No  
Conditioned? : No  
Conditioning temp. (°C) : N/A  
Conditioning RH (%) : N/A

**Test Results**

Time to ignition : 2 minutes 02 seconds (122 s)  
Time to flameout : 30 minutes (1800 s)  
Extent of burning (mm) : 410  
Critical flux at extinguishment (kW/m<sup>2</sup>) : 5.09  
HF-10 (kW/m<sup>2</sup>) : 8.72  
HF-20 (kW/m<sup>2</sup>) : 6.18  
HF-30 (kW/m<sup>2</sup>) : 5.09  
Flame spread at 10 minutes (mm) : 220  
Flame spread at 20 minutes (mm) : 350  
Flame spread at 30 minutes (mm) : 410  
Peak light attenuation (%) : 33.36  
Time to peak light attenuation : 9 minutes 45 seconds (585 s)  
Total integrated smoke (%.min) : 396.5

**Potential classification** : C(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.

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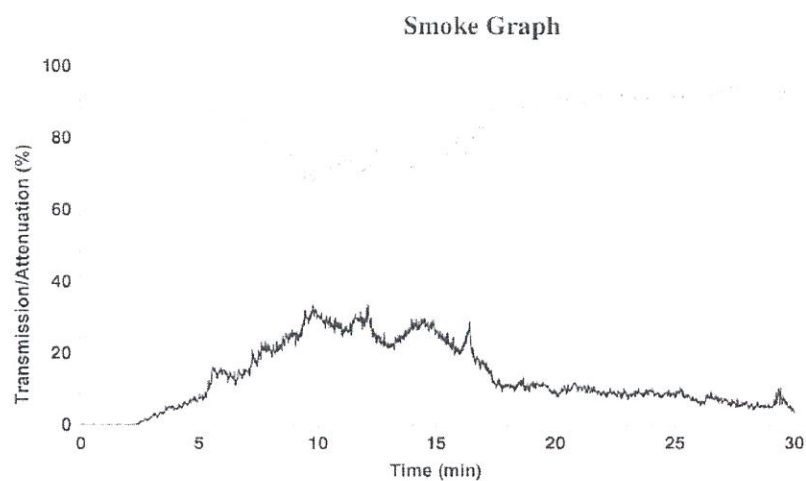
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Test name : 0 MT12-35997.03  
File name : D:\FRPFILES\12100010.CSV

### Rake Results

| Position (mm) | Time (s) | Flux (kW/m <sup>2</sup> ) | Qsb (MJ/m <sup>2</sup> ) | Position (mm) | Time (s) | Flux (kW/m <sup>2</sup> ) | Qsb (MJ/m <sup>2</sup> ) |
|---------------|----------|---------------------------|--------------------------|---------------|----------|---------------------------|--------------------------|
| 60            | 235      | 11.5                      | 2.489                    | 510           | -        | 3.5                       | -                        |
| 110           | 327      | 10.6                      | 3.210                    | 560           | -        | 2.9                       | -                        |
| 160           | 448      | 9.8                       | 3.998                    | 610           | -        | 2.4                       | -                        |
| 210           | 574      | 8.9                       | 4.540                    | 660           | -        | 2.1                       | -                        |
| 260           | 728      | 7.9                       | 5.063                    | 710           | -        | 1.8                       | -                        |
| 310           | 995      | 7.0                       | 5.953                    | 760           | -        | 1.5                       | -                        |
| 360           | 1212     | 6.0                       | 6.172                    | 810           | -        | 1.3                       | -                        |
| 410           | 1747     | 5.1                       | 7.413                    | 860           | -        | 1.2                       | -                        |
| 460           | -        | 4.2                       | -                        | 910           | -        | 1.1                       | -                        |

### Comments

Specimen was extinguished manually after end of test.

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.

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**Flooring Radiant Panel Single Specimen Report**

Standard : EN ISO 9239-1:2002  
Laboratory : TÜV Rheinland Nederland B.V.  
Sponsor : none *facbo*  
Date of test : Oct. 08 2012

Specimen description : Marmoleum Sport 4  
Test name : 0 MT12-35997.03 *Real 2*  
File name : D:\FRPFILES\12100013.CSV

Flux calibration file name : C:\FRPSOFT\CALIB\FLX12010.CSV

Thickness (mm) : 4  
Density (kg/m<sup>3</sup>) :

Test duration : 30 minutes (1800 s)  
Substrate used? : No  
Conditioned? : No  
Conditioning temp. (°C) : N/A  
Conditioning RH (%) : N/A

**Test Results**

Time to ignition : 2 minutes 02 seconds (122 s)  
Time to flameout : 30 minutes (1800 s)  
Extent of burning (mm) : 440  
Critical flux at extinguishment (kW/m<sup>2</sup>) : 4.58  
HF-10 (kW/m<sup>2</sup>) : 8.32  
HF-20 (kW/m<sup>2</sup>) : 5.8  
HF-30 (kW/m<sup>2</sup>) : 4.58  
Flame spread at 10 minutes (mm) : 240  
Flame spread at 20 minutes (mm) : 370  
Flame spread at 30 minutes (mm) : 440  
Peak light attenuation (%) : 40.79  
Time to peak light attenuation : 10 minutes 53 seconds (653 s)  
Total integrated smoke (%.min) : 423.94

**Potential classification** : C(II)  
**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.



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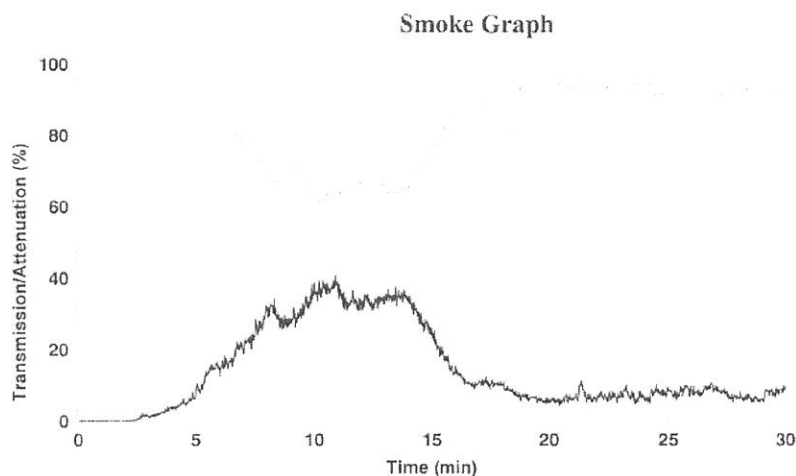
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Test name : 0 MT12-35997.03  
File name : D:\FRPFILES\12100013.CSV

### Rake Results

| Position (mm) | Time (s) | Flux (kW/m²) | Qsh (MJ/m²) | Position (mm) | Time (s) | Flux (kW/m²) | Qsh (MJ/m²) |
|---------------|----------|--------------|-------------|---------------|----------|--------------|-------------|
| 60            | 228      | 11.5         | 2.415       | 510           | -        | 3.5          | -           |
| 110           | 334      | 10.6         | 3.279       | 560           | -        | 2.9          | -           |
| 160           | 417      | 9.8          | 3.721       | 610           | -        | 2.4          | -           |
| 210           | 497      | 8.9          | 3.931       | 660           | -        | 2.1          | -           |
| 260           | 620      | 7.9          | 4.312       | 710           | -        | 1.8          | -           |
| 310           | 758      | 7.0          | 4.535       | 760           | -        | 1.5          | -           |
| 360           | 994      | 6.0          | 5.061       | 810           | -        | 1.3          | -           |
| 410           | 1524     | 5.1          | 6.466       | 860           | -        | 1.2          | -           |
| 460           | -        | 4.2          | -           | 910           | -        | 1.1          | -           |

### Comments

Specimen was extinguished manually after end of test.

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.

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**Flooring Radiant Panel Single Specimen Report**

Standard : EN ISO 9239-1:2002  
Laboratory : TÜV Rheinland Nederland B.V.  
Sponsor : none *robo*  
Date of test : Oct. 08 2012

Specimen description : Marmoleum Sport 4  
Test name : 0 MT12-35997.03 *Prod. 3*  
File name : D:\FRPFILES\12100014.CSV

Flux calibration file name : C:\FRPSOFT\CALIB\FLX12010.CSV

Thickness (mm) : 4  
Density (kg/m<sup>3</sup>) :

Test duration : 30 minutes (1800 s)  
Substrate used? : No  
Conditioned? : No  
Conditioning temp. (°C) : N/A  
Conditioning RH (%) : N/A

**Test Results**

Time to ignition : 2 minutes 01 seconds (121 s)  
Time to flameout : 30 minutes (1800 s)  
Extent of burning (mm) : 430  
Critical flux at extinguishment (kW/m<sup>2</sup>) : 4.75  
HF-10 (kW/m<sup>2</sup>) : 7.91  
HF-20 (kW/m<sup>2</sup>) : 5.8  
HF-30 (kW/m<sup>2</sup>) : 4.75  
Flame spread at 10 minutes (mm) : 260  
Flame spread at 20 minutes (mm) : 370  
Flame spread at 30 minutes (mm) : 430  
Peak light attenuation (%) : 42.07  
Time to peak light attenuation : 9 minutes 35 seconds (575 s)  
Total integrated smoke (%.min) : 426.35

**Potential classification** : C(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.

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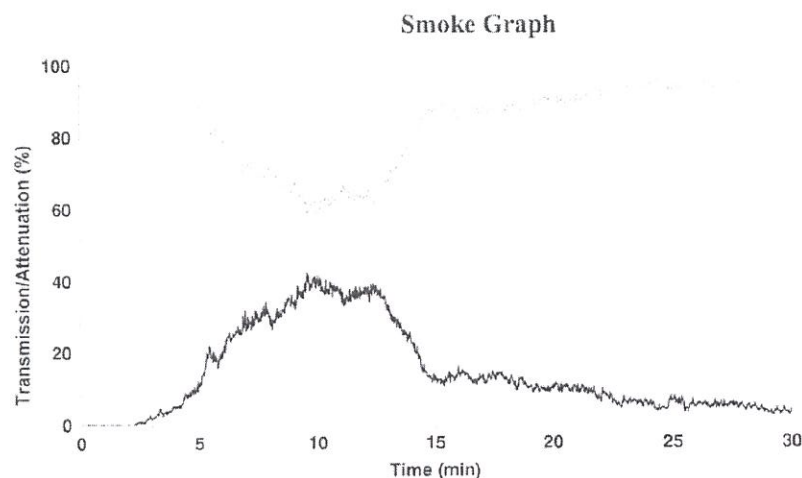
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Test name : 0 MT12-35997.03  
File name : D:\FRPFILES\12100014.CSV

### Rake Results

| Position (mm) | Time (s) | Flux (kW/m <sup>2</sup> ) | Qsb (MJ/m <sup>2</sup> ) | Position (mm) | Time (s) | Flux (kW/m <sup>2</sup> ) | Qsb (MJ/m <sup>2</sup> ) |
|---------------|----------|---------------------------|--------------------------|---------------|----------|---------------------------|--------------------------|
| 60            | 231      | 11.5                      | 2.447                    | 510           | -        | 3.5                       | -                        |
| 110           | 312      | 10.6                      | 3.063                    | 560           | -        | 2.9                       | -                        |
| 160           | 385      | 9.8                       | 3.436                    | 610           | -        | 2.4                       | -                        |
| 210           | 439      | 8.9                       | 3.472                    | 660           | -        | 2.1                       | -                        |
| 260           | 568      | 7.9                       | 3.950                    | 710           | -        | 1.8                       | -                        |
| 310           | 751      | 7.0                       | 4.493                    | 760           | -        | 1.5                       | -                        |
| 360           | 1042     | 6.0                       | 5.306                    | 810           | -        | 1.3                       | -                        |
| 410           | 1561     | 5.1                       | 6.623                    | 860           | -        | 1.2                       | -                        |
| 460           | -        | 4.2                       | -                        | 910           | -        | 1.1                       | -                        |

### Comments

Specimen was extinguished manually after end of test.

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.