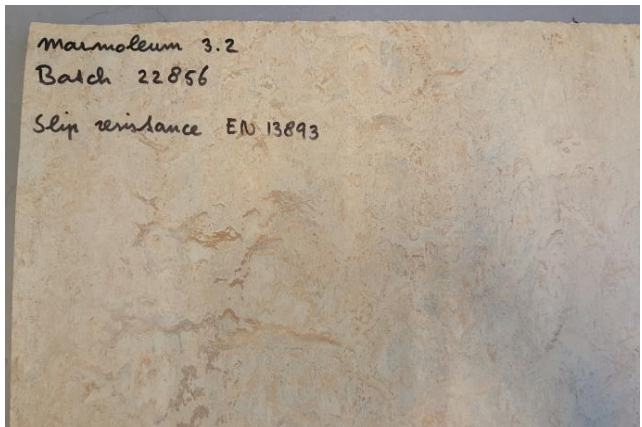
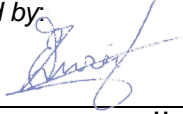


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|---|---|---|---|---|--|
| Prüfbericht-Nr.: <i>Test Report No.:</i> | 89212885.03br-3 | Auftrags-Nr.: <i>Order No.:</i> | 180993 | Seite 1 von 14 <i>Page 1 of 14</i> | |
| Kunden-Referenz-Nr.: <i>Client Reference No.:</i> | 4500958564 | Auftragsdatum: <i>Order date:</i> | 04.01.2018 | | |
| Auftraggeber: <i>Client:</i> | Forbo Flooring B.V., PO Box 13, 1560 AA Krommenie, The Netherlands | | | | |
| Prüfgegenstand: <i>Test item:</i> | Resilient floor covering | | | | |
| Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i> | Marmoleum 3.2 | | | | |
| Auftrags-Inhalt: <i>Order content:</i> | Classification of burning behaviour | | | | |
| Prüfgrundlage: <i>Test specification:</i> | EN 13501-1:2007+ A1:2009 Classification of burning behaviour <i>Test methods: Ignitability of products subjected to direct impingement of flame (EN ISO 11925-2:2010/C1:2011) and determination of the burning behaviour using a radiant heat source (EN ISO 9239-1:2010)</i> | | | | |
| Wareneingangsdatum: <i>Date of receipt:</i> | 04.01.2018 |  | | | |
| Prüfmuster-Nr.: <i>Test sample No.:</i> | MT17-180993.03 | | | | |
| Prüfzeitraum: <i>Testing period:</i> | 05.01.2018 - 18.01.2018 | | | | |
| Ort der Prüfung: <i>Place of testing:</i> | Westervoortsedijk 73, 6827 AV Arnhem, Netherlands | | | | |
| Prüflaboratorium: <i>Testing laboratory:</i> | TÜV Rheinland Nederland B.V | | | | |
| Prüfergebnis*: <i>Test result*:</i> | Siehe Sonstiges / See Other | | | | |
| geprüft von / tested by: | kontrolliert von / reviewed by: | | | | |
| 17.05.2018 | M.A. van de Vlekkert | 17.05.2018 | E. Zwier |  | |
| Datum <i>Date</i> | Name / Stellung <i>Name / Position</i> | Unterschrift <i>Signature</i> | Datum <i>Date</i> | Name / Stellung <i>Name / Position</i> | |
| | | | | Unterschrift <i>Signature</i> | |
| Sonstiges / Other: | Test result: See clause 4 on page 5. | | | | |
| Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i> | Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i> | | | | |
| * Legende: | 1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n) | 2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n) | 3 = befriedigend F(ail) = entspricht nicht o.g. Prüfgrundlage(n) | 4 = ausreichend N/A = nicht anwendbar | 5 = mangelhaft N/T = nicht getestet |
| Legend: | 1 = very good P(ass) = passed a.m. test specification(s) | 2 = good F(ail) = failed a.m. test specification(s) | 3 = satisfactory F(ail) = failed a.m. test specification(s) | 4 = sufficient N/A = not applicable | 5 = poor N/T = not tested |
| <p>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i></p> | | | | | |

v04

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Liste der verwendeten Prüfmittel
List of used test equipment

| Prüfmittel <i>Test equipment</i> | Prüfmittel-Nr. / ID-Nr. <i>Equipment No. / ID-No.</i> | Nächste Kalibrierung <i>Next calibration</i> |
|--|---|--|
| Flooring Radiant Panel | A00929 | 30.08.2018 |
| Anemometer | A01989 | 26.09.2020 |
| Scales | A00769 | 31.08.2018 |
| Thickness gauge | A00904 | 10.01.2020 |
| Metal ruler 1 | A01759 | 12.12.2019 |
| Metal ruler 2 | A01558 | 12.01.2019 |
| Metal ruler 3 | A01567 | 20.01.2019 |
| Vertical ignitability test cabinet | A01576 | N/A |
| Stopwatch | A01699 | 11.12.2020 |
| Metal reference plate | A00813 | 12.12.2019 |
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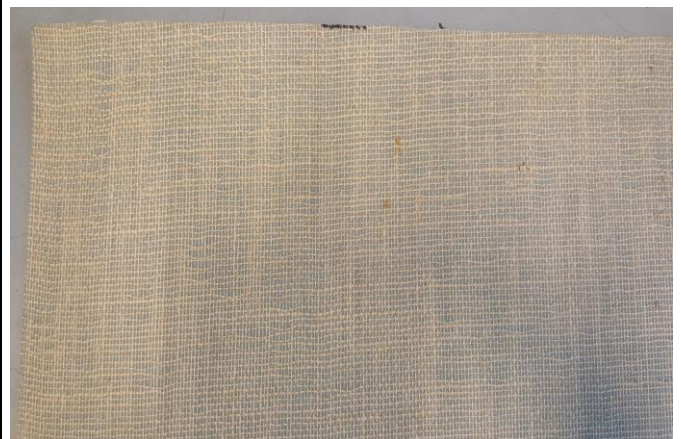
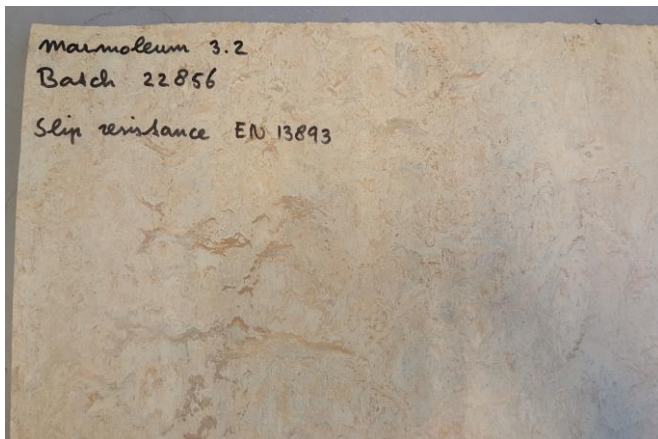
Produktbeschreibung
Product description

| | | | |
|------------------|-------------------|---|-------|
| Product identity | Marmoleum 3.2 mm* | Type of additional backings | None |
| Batch number | 22856* | Total thickness (mm) | 3.2* |
| Product type | Linoleum* | Total mass per unit area in (g/m ²) | 3900* |

* applicants declaration

Figure 1, Picture of the received sample

Figure 2, Picture of the received sample



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| | | | |
|--------|--|------------------------------|------------|
| Absatz | EN 13501-1:2007+ A1:2009 | Messergebnisse - Bemerkungen | Bewertung |
| Clause | Anforderungen - Prüfungen / Requirements - Tests | Measuring results - Remarks | Evaluation |

| | | | |
|---|--|--|--|
| 1 | Construction data (indicative) of the product obtained by the testlaboratory after pre-conditioning 01-4.3-P.02-322-WI01 | | |
| | Test condition | 23 ± 2°C and 50 ± 4% relative humidity | |
| | Pre conditioning, duration | ≥ 48 h & until constant mass is achieved | |
| | Total thickness (mm) | 3.0 | |
| | Total mass (g/m ²) | 3770 | |
| | Density (kg/m ³) | 1253 | |
| | <i>Note: the determined construction data are used for determination of constant mass, the used testmethod is not in accordance with the determination of construction data according the specification standard. Therefore the testresults should be handled as indicative.</i> | | |

| | | | | | | | |
|--|---|--|------------|------------|------------|------------|------------|
| 2 | Ignitability of products subjected to direct impingement of flame EN ISO 11925-2:2010/C1:2011 | | | | | | |
| | Date of testing | 18.01.2018 | | | | | |
| | Pre-conditioning, climate | 23 ± 2°C and 50 ± 4% relative humidity | | | | | |
| | Pre-conditioning, duration | ≥ 48 h & until constant mass is achieved | | | | | |
| | Description of substrate | Particleboard, thickness 20 ± 2 mm, density 680 ± 50 kg/m ³ conforming to EN 13238:2010 | | | | | |
| | Flame application | Surface | | | | | |
| | Flame application time (s) | 15 | | | | | |
| | Requirements according EN 13501-1:2007+A1:2009 | See clause 5 | | | | | |
| | Test result(s) | | | | | | |
| | Orientation | Length | | | Width | | |
| | Test sample | 1 | 2 | 3 | 1 | 2 | 3 |
| | Ignition of the sample | No | No | No | No | No | No |
| | Flame tip reached 150 mm above the application point | No | No | No | No | No | No |
| | Duration after application when the flame tip reached the 150 mm above the application point (s) | N/A | N/A | N/A | N/A | N/A | N/A |
| | Extent of damaged area, length (mm) | 52 | 51 | 54 | 48 | 46 | 50 |
| | Extent of damaged area, width (mm) | 13 | 12 | 12 | 11 | 11 | 11 |
| | Material melts | Yes | Yes | Yes | Yes | Yes | Yes |
| Shrinks away from flame without being ignited | No | No | No | No | No | No | |
| After glowing | No | No | No | No | No | No | |
| Flaming droplets/particles which caused ignition of filter paper | No | No | No | No | No | No | |

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| | | | |
|--------|--|------------------------------|------------|
| Absatz | EN 13501-1:2007+ A1:2009 | Messergebnisse - Bemerkungen | Bewertung |
| Clause | Anforderungen - Prüfungen / Requirements - Tests | Measuring results - Remarks | Evaluation |

| | | | | | | |
|--|--|--|------|------|------------|-------------|
| 3 | Determination of the burning behaviour using a radiant heat source <i>EN ISO 9239-1:2010</i> | | | | | |
| | Date of testing | 09.01.2018 | | | | |
| | Pre-conditioning, climate | 23 ± 2°C and 50 ± 4% relative humidity | | | | |
| | Pre-conditioning, duration | ≥ 48 h & until constant mass is achieved | | | | |
| | Description of substrate | Particleboard, thickness 20 ± 2 mm, density 680 ± 50 kg/m ³ conforming to EN 13238:2010 | | | | |
| | Fixing method | None, samples are tested loose laid on the substrate The samples are glued to the substrate with Forbo Eurocol 614 Eurostar Lino Plus on 21.12.2017 | | | | |
| | Requirements according EN 13501-1:2007+ A1:2009 | See clause 5 | | | | |
| | Test result(s) | | | | | |
| | Test sample | 1 | 2 | 3 | 4 | Mean |
| | Orientation (Length: ↑, Width: T) | ↑ | T | ↑ | ↑ | ↑ |
| | Flame spread (cm) | 42 | 37 | 39 | 38 | 40 |
| | CHF / HF-30 (kW/m ²) | 5.2 | 6.1 | 5.7 | 5.9 | 5.6 |
| | Maximum light attenuation (%) | 53.5 | 56.2 | 60.6 | 55.7 | 56.6 |
| Smoke production (%.min) | 319 | 334 | 337 | 334 | 330 | |
| Observations: Specimen 1, 2, 3 and 4: Flashing, transitory- or sustained flaming are observed. Specimen 1, 2, 3 and 4: Extinguished naturally before the end of the test duration. | | | | | | |

| | | |
|--|--|-----------------------|
| 4 | Classification of burning behaviour <i>EN 13501-1:2007+A1:2009</i> | |
| | The product, Marmoleum 3.2 mm , in relation to its reaction to fire behaviour is classified: | C_{fl} |
| | The additional classification in relation to smoke production is: | s1 |
| | Reaction to fire classification : C_{fl} – s1 | |
| | Field of application <ul style="list-style-type: none"> - As a floor covering in accordance with the nominal product parameters given on page 3. - On end use substrates of wood and of classes A1 and A2-s1,d0 according to EN 13238:2010. - Glued down with Forbo Eurocol 614 Eurostar lino plus. | |
| Statements <ul style="list-style-type: none"> - This document does not represent type approval or certification of the product. - 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 validity of this report will expire directly after alterations or modifications of the examined product (combination)(s) and/or the criteria. | | |

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| Absatz | EN 13501-1:2007+ A1:2009 | Messergebnisse - Bemerkungen | Bewertung |
| Clause | Anforderungen - Prüfungen / Requirements - Tests | Measuring results - Remarks | Evaluation |

| | | | | |
|--|---|--|--|-------------------------------|
| 5 | Potential classes of reaction to fire performance for floorings | | | |
| | EN 13501-1:2007+A1:2009 | | | |
| | Class | Test method(s) | Classification criteria | |
| | A _{1fi} | EN ISO 1182 ^a and | $\Delta T \leq 30 \text{ °C}$; and $\Delta m \leq 50 \%$; and $t_f = 0$ (i.e. no sustained flaming) | - |
| | | EN ISO 1716 | $PCS \leq 2.0 \text{ MJ/kg}^a$ and $PCS \leq 2.0 \text{ MJ/m}^2^b$ and $PCS \leq 1.4 \text{ MJ/m}^2^c$ and $PCS \leq 2.0 \text{ MJ/kg}^d$ | - |
| | A _{2fi} | EN ISO 1182 ^a or | $\Delta T \leq 50 \text{ °C}$ and $\Delta m \leq 50 \%$ and $t_f \leq 20 \text{ s}$ | - |
| | | EN ISO 1716 and | $PCS \leq 3.0 \text{ MJ/kg}^a$ and $PCS \leq 4.0 \text{ MJ/m}^2^b$ and $PCS \leq 4.0 \text{ MJ/m}^2^c$ and $PCS \leq 3.0 \text{ MJ/kg}^d$ | - |
| | | EN ISO 9239-1 ^e | $CHF \geq 8.0 \text{ kW/m}^2$ | Smoke production ^g |
| | B _{fi} | EN ISO 9239-1 ^e and | $CHF \geq 8.0 \text{ kW/m}^2$ | Smoke production ^g |
| | | EN ISO 11925-2 ^h : Exposure = 15 s | $F_s \leq 150 \text{ mm}$ within 20 s | - |
| | C _{fi} | EN ISO 9239-1 ^e and | $CHF \geq 4.5 \text{ kW/m}^2$ | Smoke production ^g |
| | | EN ISO 11925-2 ^h : Exposure = 15 s | $F_s \leq 150 \text{ mm}$ within 20 s | - |
| | D _{fi} | EN ISO 9239-1 ^e and | $CHF \geq 3.0 \text{ kW/m}^2$ | Smoke production ^g |
| EN ISO 11925-2 ^h : Exposure = 15 s | | $F_s \leq 150 \text{ mm}$ within 20 s | - | |
| E _{fi} | EN ISO 11925-2 ^h : Exposure = 15 s | $F_s \leq 150 \text{ mm}$ within 20 s | - | |
| F _{fi} | No performance determined | | | |
| ^a | For homogeneous products and substantial components of non-homogeneous products. | | | |
| ^b | For any external non-substantial component of non-homogeneous products. | | | |
| ^c | For any internal non-substantial component of non-homogeneous products. | | | |
| ^d | For the product as a whole. | | | |
| ^e | Test duration = 30 min. | | | |
| ^f | Critical flux is defined as the radiant flux at which the flame extinguishes or the radiant flux after a test period of 30 min, whichever is the lower (i.e. the flux corresponding with the furthest extent of spread of flame). | | | |
| ^g | s1 = Smoke $\leq 750 \%$ minutes; s2 = not s1. | | | |
| ^h | Under conditions of surface flame attack and, if appropriate to the end use application of the product, edge flame attack. | | | |

Prüfbericht-Nr.: 89212885.03br-3
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| | | | |
|--------|--|------------------------------|------------|
| Absatz | EN 13501-1:2007+ A1:2009 | Messergebnisse - Bemerkungen | Bewertung |
| Clause | Anforderungen - Prüfungen / Requirements - Tests | Measuring results - Remarks | Evaluation |

6 Flooring Radiant Panel Single Specimen Report

Report produced with the Fire Testing Technology FRPSoft software

page 1

Flooring Radiant Panel Single Specimen Report

Standard : EN ISO 9239-1:2010
 Laboratory : TÜV Rheinland Nederland B. V.
 Sponsor : Forbo 8921 2995
 Date of test : Jan. 09 2018

Specimen description : Marmoleum 3.2 mm batch 22856 MT17-180993.03
 Test name : # 1 Prod
 File name : D:\FRPFILES\18010023.CSV
 Test number in series : 4

Flux calibration file name : C:\FRPSOFT2.9A\CALIB\FLX18001.CSV

Thickness (mm) :
 Density (kg/m³) :

Test duration : 18 minutes 15 seconds (1095 s)
 Substrate used? : Yes
 Substrate : Particle board
 Fixing method : adhesive
 Conditioned? : Yes
 Conditioning temp. (°C) : 23
 Conditioning RH (%) : 50

Test Results

Time to ignition : 2 minutes 04 seconds (124 s)
 Time to flameout : 18 minutes 13 seconds (1093 s)
 Extent of burning (mm) : 420
 Critical flux at extinguishment (kW/m²) : 5.17
 HF-10 (kW/m²) : 6.51
 HF-20 (kW/m²) : Not calculated (test duration < 20 minutes)
 HF-30 (kW/m²) : Not calculated (test duration < 30 minutes)
 Flame spread at 10 minutes (mm) : 350
 Flame spread at 20 minutes (mm) : Not measured
 Flame spread at 30 minutes (mm) : Not measured
 Peak light attenuation (%) : 53.5
 Time to peak light attenuation : 7 minutes 19 seconds (439 s)
 Total integrated smoke (%.min) : 319.19

Potential classification : C(f)
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.

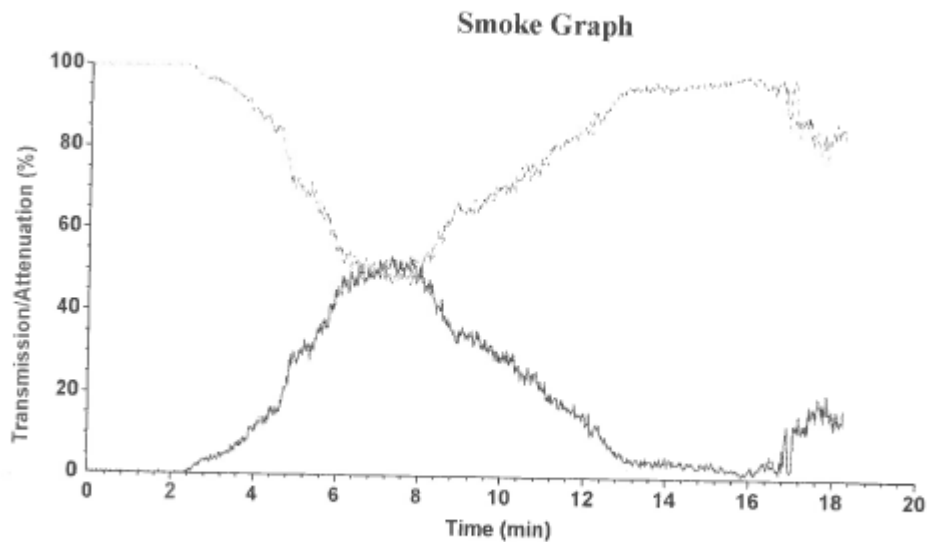
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|--------|--|------------------------------|------------|
| Absatz | EN 13501-1:2007+ A1:2009 | Messergebnisse - Bemerkungen | Bewertung |
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Report produced with the Fire Testing Technology FRPSoft software

page 2



Test name : # 1 Prod
File name : D:\FRPFILES\18010023.CSV

Rake Results

| Position (mm) | Time (s) | Flux (kW/m ²) | Qsb (MJ/m ²) | Position (mm) | Time (s) | Flux (kW/m ²) | Qsb (MJ/m ²) |
|---------------|----------|---------------------------|--------------------------|---------------|----------|---------------------------|--------------------------|
| 60 | 222 | 11.1 | 2.474 | 510 | - | 3.7 | - |
| 110 | 305 | 10.5 | 3.207 | 560 | - | 3.1 | - |
| 160 | 335 | 10.0 | 3.348 | 610 | - | 2.6 | - |
| 210 | 381 | 9.4 | 3.564 | 660 | - | 2.3 | - |
| 260 | 429 | 8.3 | 3.568 | 710 | - | 2.0 | - |
| 310 | 530 | 7.3 | 3.891 | 760 | - | 1.8 | - |
| 360 | 646 | 6.3 | 4.071 | 810 | - | 1.6 | - |
| 410 | 788 | 5.3 | 4.209 | 860 | - | 1.4 | - |
| 460 | - | 4.5 | - | 910 | - | 1.2 | - |

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.

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| | | | |
|--------|--|------------------------------|------------|
| Absatz | EN 13501-1:2007+ A1:2009 | Messergebnisse - Bemerkungen | Bewertung |
| Clause | Anforderungen - Prüfungen / Requirements - Tests | Measuring results - Remarks | Evaluation |

Report produced with the Fire Testing Technology FRPSoft software

page 1

Flooring Radiant Panel Single Specimen Report

Standard : EN ISO 9239-1:2010
 Laboratory : TÜV Rheinland Nederland B.V.
 Sponsor : Forbo 8921 2 995
 Date of test : Jan. 09 2018

Specimen description : Marmoleum 3.2 mm batch 22856 MT17-180993.03
 Test name : # 2 Cross
 File name : D:\FRPFILES\18010024.CSV
 Test number in series : 4

Flux calibration file name : C:\FRPSOFT2.9A\CALIB\FLX18001.CSV

Thickness (mm) :
 Density (kg/m³) :

Test duration : 18 minutes 33 seconds (1113 s)
 Substrate used? : Yes
 Substrate : Particle board
 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 : 18 minutes 32 seconds (1112 s)
 Extent of burning (mm) : 370
 Critical flux at extinguishment (kW/m²) : 6.11
 HF-10 (kW/m²) : 7.13
 HF-20 (kW/m²) : Not calculated (test duration < 20 minutes)
 HF-30 (kW/m²) : Not calculated (test duration < 30 minutes)
 Flame spread at 10 minutes (mm) : 320
 Flame spread at 20 minutes (mm) : Not measured
 Flame spread at 30 minutes (mm) : Not measured
 Peak light attenuation (%) : 56.23
 Time to peak light attenuation : 8 minutes 23 seconds (503 s)
 Total integrated smoke (%.min) : 333.68

Potential classification : C(fl)
Smoke production classification : s1

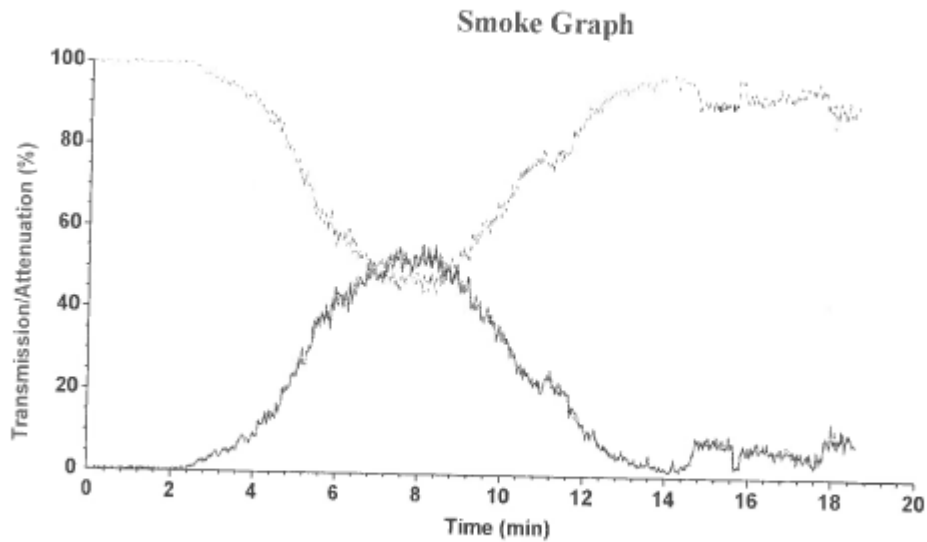
These results relate only to the behaviour of the specimens of the product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

Prüfbericht-Nr.: 89212885.03br-3
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| | | | |
|--------|--|------------------------------|------------|
| Absatz | EN 13501-1:2007+ A1:2009 | Messergebnisse - Bemerkungen | Bewertung |
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Report produced with the Fire Testing Technology FRPSoft software

page 2



Test name : # 2 Cross
File name : D:\FRPFILES\18010024.CSV

Rake Results

| Position (mm) | Time (s) | Flux (kW/m ²) | Qsb (MJ/m ²) | Position (mm) | Time (s) | Flux (kW/m ²) | Qsb (MJ/m ²) |
|---------------|----------|---------------------------|--------------------------|---------------|----------|---------------------------|--------------------------|
| 60 | 234 | 11.1 | 2.608 | 510 | - | 3.7 | - |
| 110 | 324 | 10.5 | 3.407 | 560 | - | 3.1 | - |
| 160 | 340 | 10.0 | 3.398 | 610 | - | 2.6 | - |
| 210 | 400 | 9.4 | 3.742 | 660 | - | 2.3 | - |
| 260 | 501 | 8.3 | 4.167 | 710 | - | 2.0 | - |
| 310 | 594 | 7.3 | 4.361 | 760 | - | 1.8 | - |
| 360 | 751 | 6.3 | 4.733 | 810 | - | 1.6 | - |
| 410 | - | 5.3 | - | 860 | - | 1.4 | - |
| 460 | - | 4.5 | - | 910 | - | 1.2 | - |

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.

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|--------|--|------------------------------|------------|
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Report produced with the Fire Testing Technology FRPSoft software

page 1

Flooring Radiant Panel Single Specimen Report

Standard : EN ISO 9239-1:2010
 Laboratory : TÜV Rheinland Nederland B.V.
 Sponsor : Forbo 89212885
 Date of test : Jan. 09 2018

Specimen description : Marmoleum 3.2 mm batch 22856 MT17-180993.03
 Test name : # 3 Prod
 File name : D:\FRPFILES\18010027.CSV
 Test number in series : 4

Flux calibration file name : C:\FRPSOFT2.9A\CALIB\FLX18001.CSV

Thickness (mm) :
 Density (kg/m³) :

Test duration : 16 minutes 36 seconds (996 s)
 Substrate used? : Yes
 Substrate : Particle board
 Fixing method : adhesive
 Conditioned? : Yes
 Conditioning temp. (°C) : 23
 Conditioning RH (%) : 50

Test Results

Time to ignition : 2 minutes 04 seconds (124 s)
 Time to flameout : 16 minutes 33 seconds (993 s)
 Extent of burning (mm) : 390
 Critical flux at extinguishment (kW/m²) : 5.73
 HF-10 (kW/m²) : 6.30
 HF-20 (kW/m²) : Not calculated (test duration < 20 minutes)
 HF-30 (kW/m²) : Not calculated (test duration < 30 minutes)
 Flame spread at 10 minutes (mm) : 360
 Flame spread at 20 minutes (mm) : Not measured
 Flame spread at 30 minutes (mm) : Not measured
 Peak light attenuation (%) : 60.6
 Time to peak light attenuation : 7 minutes 36 seconds (456 s)
 Total integrated smoke (%.min) : 336.54

Potential classification : C(II)
Smoke production classification : s1

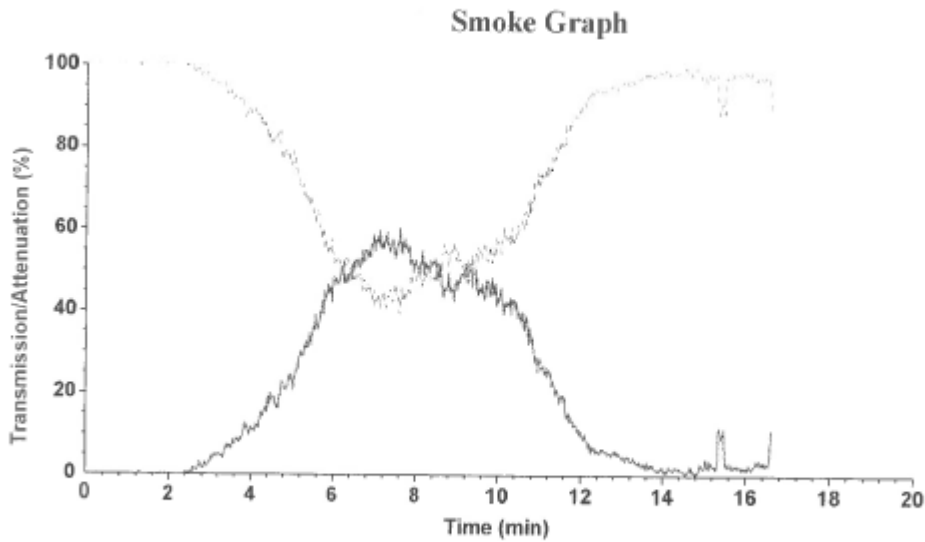
These results relate only to the behaviour of the specimens of the product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

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Test Report No.:

| | | | |
|--------|--|------------------------------|------------|
| Absatz | EN 13501-1:2007+ A1:2009 | Messergebnisse - Bemerkungen | Bewertung |
| Clause | Anforderungen - Prüfungen / Requirements - Tests | Measuring results - Remarks | Evaluation |

Report produced with the Fire Testing Technology FRPSoft software

page 2



Test name : # 3 Prod
File name : D:\FRPFILES\18010027.CSV

Rake Results

| Position (mm) | Time (s) | Flux (kW/m ²) | Qsb (MJ/m ²) | Position (mm) | Time (s) | Flux (kW/m ²) | Qsb (MJ/m ²) |
|---------------|----------|---------------------------|--------------------------|---------------|----------|---------------------------|--------------------------|
| 60 | 240 | 11.1 | 2.675 | 510 | - | 3.7 | - |
| 110 | 281 | 10.5 | 2.955 | 560 | - | 3.1 | - |
| 160 | 344 | 10.0 | 3.438 | 610 | - | 2.6 | - |
| 210 | 402 | 9.4 | 3.760 | 660 | - | 2.3 | - |
| 260 | 436 | 8.3 | 3.627 | 710 | - | 2.0 | - |
| 310 | 515 | 7.3 | 3.781 | 760 | - | 1.8 | - |
| 360 | 598 | 6.3 | 3.769 | 810 | - | 1.6 | - |
| 410 | - | 5.3 | - | 860 | - | 1.4 | - |
| 460 | - | 4.5 | - | 910 | - | 1.2 | - |

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.

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Report produced with the Fire Testing Technology FRPSoft software

page 1

Flooring Radiant Panel Single Specimen Report

Standard : EN ISO 9239-1:2010
 Laboratory : TÜV Rheinland Nederland B.V.
 Sponsor : Forbo 89212885
 Date of test : Jan. 09 2018

Specimen description : Marmoleum 3.2 mm batch 22856 MT17-180993.03
 Test name : # 4 Prod
 File name : D:\FRPFILES\18010028.CSV
 Test number in series : 4

Flux calibration file name : C:\FRPSOFT2.9A\CALIB\FLX18001.CSV

Thickness (mm) :
 Density (kg/m³) :

Test duration : 20 minutes 38 seconds (1238 s)
 Substrate used? : Yes
 Substrate : Particle board
 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 : 20 minutes 25 seconds (1225 s)
 Extent of burning (mm) : 380
 Critical flux at extinguishment (kW/m²) : 5.92
 HF-10 (kW/m²) : 6.93
 HF-20 (kW/m²) : 5.92
 HF-30 (kW/m²) : Not calculated (test duration < 30 minutes)
 Flame spread at 10 minutes (mm) : 330
 Flame spread at 20 minutes (mm) : 380
 Flame spread at 30 minutes (mm) : Not measured
 Peak light attenuation (%) : 55.7
 Time to peak light attenuation : 7 minutes 07 seconds (427 s)
 Total integrated smoke (%.min) : 333.6

Potential classification : C(II)
Smoke production classification : s1

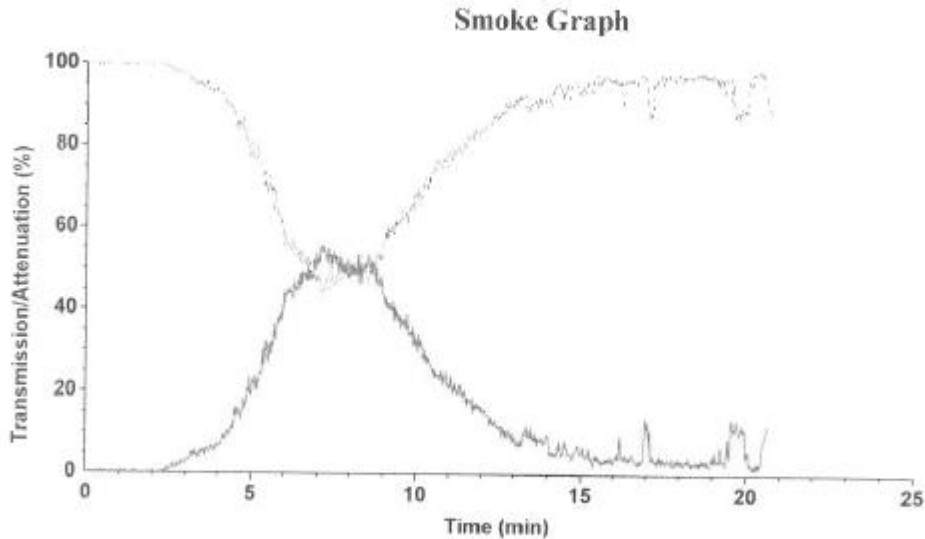
These results relate only to the behaviour of the specimens of the product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

Prüfbericht-Nr.: 89212885.03br-3
Test Report No.:

| | | | |
|--------|--|------------------------------|------------|
| Absatz | EN 13501-1:2007+ A1:2009 | Messergebnisse - Bemerkungen | Bewertung |
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Report produced with the Fire Testing Technology FRPSoft software

page 2



Test name : # 4 Prod
File name : D:\FRPFILES\18010028.CSV

Rake Results

| Position (mm) | Time (s) | Flux (kW/m ²) | Qsb (MJ/m ²) | Position (mm) | Time (s) | Flux (kW/m ²) | Qsb (MJ/m ²) |
|---------------|----------|---------------------------|--------------------------|---------------|----------|---------------------------|--------------------------|
| 60 | 252 | 11.1 | 2.809 | 510 | - | 3.7 | - |
| 110 | 296 | 10.5 | 3.113 | 560 | - | 3.1 | - |
| 160 | 349 | 10.0 | 3.488 | 610 | - | 2.6 | - |
| 210 | 427 | 9.4 | 3.994 | 660 | - | 2.3 | - |
| 260 | 479 | 8.3 | 3.984 | 710 | - | 2.0 | - |
| 310 | 553 | 7.3 | 4.060 | 760 | - | 1.8 | - |
| 360 | 732 | 6.3 | 4.613 | 810 | - | 1.6 | - |
| 410 | - | 5.3 | - | 860 | - | 1.4 | - |
| 460 | - | 4.5 | - | 910 | - | 1.2 | - |

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.