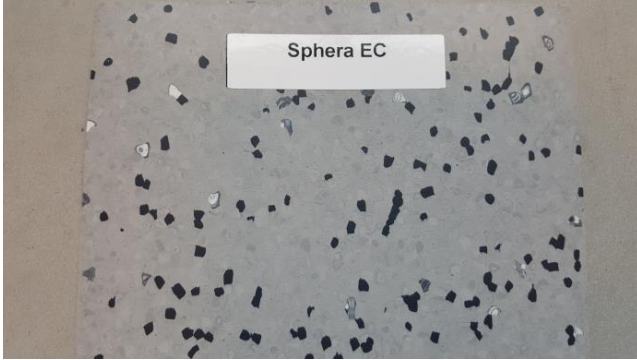
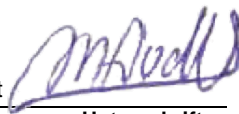



<b>Prüfbericht-Nr.:</b> <i>Test Report No.:</i>	<b>89216445.01br</b>	<b>Auftrags-Nr.:</b> <i>Order No.:</i>	106016	Seite 1 von 14 <i>Page 1 of 14</i>	
<b>Kunden-Referenz-Nr.:</b> <i>Client Reference No.:</i>	4501089719	<b>Auftragsdatum:</b> <i>Order date:</i>	22.01.2020		
<b>Auftraggeber:</b> <i>Client:</i>	Forbo-Novilon B.V., De Holwert 12, 7741 KC COEVORDEN, The Netherlands				
<b>Prüfgegenstand:</b> <i>Test item:</i>	Resilient floor covering				
<b>Bezeichnung / Typ-Nr.:</b> <i>Identification / Type No.:</i>	Sphera EC				
<b>Auftrags-Inhalt:</b> <i>Order content:</i>	Classification of burning behaviour				
<b>Prüfgrundlage:</b> <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>				
<b>Wareneingangsdatum:</b> <i>Date of receipt:</i>	22.01.2020				
<b>Prüfmuster-Nr.:</b> <i>Test sample No.:</i>	MT20-106016.01				
<b>Prüfzeitraum:</b> <i>Testing period:</i>	22.01.2020 – 11.02.2020				
<b>Ort der Prüfung:</b> <i>Place of testing:</i>	Westervoortsedijk 73, 6827 AV Arnhem, Netherlands				
<b>Prüflaboratorium:</b> <i>Testing laboratory:</i>	TÜV Rheinland Nederland B.V				
<b>Prüfergebnis*:</b> <i>Test result*:</i>	Siehe Sonstiges / See Other				
<b>geprüft von / tested by:</b>	<b>kontrolliert von / reviewed by:</b>				
12.02.2020 M.A. van de Vlekkert 	12.02.2020 R. Boerboom 				
<b>Datum</b> <i>Date</i>	<b>Name / Stellung</b> <i>Name / Position</i>	<b>Unterschrift</b> <i>Signature</i>	<b>Datum</b> <i>Date</i>	<b>Name / Stellung</b> <i>Name / Position</i>	<b>Unterschrift</b> <i>Signature</i>
<b>Sonstiges / Other:</b>		Test result: See clause 4 on page 5.			
<b>Zustand des Prüfgegenstandes bei Anlieferung:</b> <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>			
<p>* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft  P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet  Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor  P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested</p>					
<p><b>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.</b>  <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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**Produktbeschreibung**  
**Product description**

Product identity	Sphera EC*	Weight (g/m <sup>2</sup> )	2900*
Product type	Homogeneous PVC floor covering*	Total thickness (mm)	2.00*

\* applicants declaration

Figure 1, Picture of the received sample (surface)

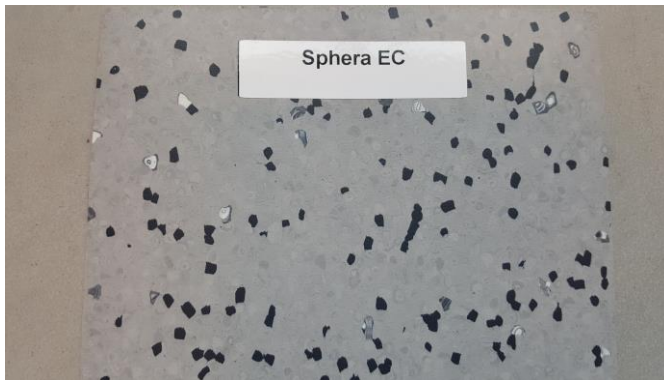


Figure 2, Picture of the received sample (back)



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1	<b>Construction data (indicative) of the product obtained by the testlaboratory after pre-conditioning</b> 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)	2.1	
	Total mass (g/m <sup>2</sup> )	3014	
	Density (kg/m <sup>3</sup> )	1415	
	<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	<b>Ignitability of products subjected to direct impingement of flame</b> EN ISO 11925-2:2010/C1:2011						
	Date of testing	11.02.2020					
	Pre-conditioning, climate	23 ± 2°C and 50 ± 4% relative humidity					
	Pre-conditioning, duration	≥ 48 h & until constant mass is achieved					
	Description of substrate	Fibre cement board, thickness 8 ± 2 mm, density 1800 ± 200 kg/m <sup>3</sup> conforming to EN 13238:2010					
	Flame application	Surface					
	Flame application time (s)	15					
	Requirements according EN 13501-1:2007+A1:2009	See clause 5					
	<b>Test result(s)</b>						
	Orientation	Length			Width		
	Test sample	1	2	3	1	2	3
	Ignition of the sample	Yes	Yes	Yes	Yes	Yes	Yes
	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)	20	18	18	16	15	16
	Extent of damaged area, width (mm)	10	10	9	10	10	10
	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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<b>3</b>	<b>Determination of the burning behaviour using a radiant heat source</b> EN ISO 9239-1:2010					
	Date of testing	11.02.2020				
	Pre-conditioning, climate	23 ± 2°C and 50 ± 4% relative humidity				
	Pre-conditioning, duration	≥ 48 h & until constant mass is achieved				
	Description of substrate	Fibre cement board, thickness 8 ± 2 mm, density 1800 ± 200 kg/m <sup>3</sup> conforming to EN 13238:2010				
	Fixing method	The samples are glued to the substrate with Eurocol 540.				
	Requirements according EN 13501-1:2007+ A1:2009	See clause 5				
	<b>Test result(s)</b>					
	Test sample	1	2	3	4	Mean
	Orientation (Length: ↑, Width: T)	↑	T	↑	↑	↑
	Flame spread (cm)	12	8	12	11	<b>12</b>
	CHF / HF-30 (kW/m <sup>2</sup> )	10.4	≥ 10.9	10.4	10.5	<b>10.4</b>
	Maximum light attenuation (%)	30.9	28.3	41.2	31.2	<b>34.4</b>
	Smoke production (%.min)	97	76	99	102	<b>99</b>
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.						

<b>4</b>	<b>Classification of burning behaviour</b> EN 13501-1:2007+A1:2009	
	The product, <b>Sphera EC</b> , in relation to its reaction to fire behaviour is classified:	<b>B<sub>fl</sub></b>
	The additional classification in relation to smoke production is:	<b>s1</b>
	<b>Reaction to fire classification : B<sub>fl</sub> – s1</b>	
	Field of application	
	<ul style="list-style-type: none"> <li>- As a floor covering in accordance with the nominal product parameters given on page 3.</li> <li>- On end use substrates of classes A1 and A2-s1,d0 according to EN 13238:2010.</li> <li>- Glued down with Eurocol 540.</li> </ul>	
Statements		
<ul style="list-style-type: none"> <li>- This document does not represent type approval or certification of the product.</li> <li>- 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.</li> <li>- The validity of this report will expire directly after alterations or modifications of the examined product (combination)(s) and/or the criteria.</li> </ul>		

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5	<b>Potential classes of reaction to fire performance for floorings</b>			
	EN 13501-1:2007+A1:2009			
	Class	Test method(s)	Classification criteria	
	A1 <sub>fi</sub>	EN ISO 1182 <sup>a</sup> 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 $PCS \leq 2.0 \text{ MJ/kg}^d$	-
	A2 <sub>fi</sub>	EN ISO 1182 <sup>a</sup> 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 <sup>e</sup>	$CHF \geq 8.0 \text{ kW/m}^2$	Smoke production <sup>g</sup>
	B <sub>fi</sub>	EN ISO 9239-1 <sup>e</sup> and	$CHF \geq 8.0 \text{ kW/m}^2$	Smoke production <sup>g</sup>
		EN ISO 11925-2 <sup>h</sup> : Exposure = 15 s	$F_s \leq 150 \text{ mm}$ within 20 s	-
	C <sub>fi</sub>	EN ISO 9239-1 <sup>e</sup> and	$CHF \geq 4.5 \text{ kW/m}^2$	Smoke production <sup>g</sup>
		EN ISO 11925-2 <sup>h</sup> : Exposure = 15 s	$F_s \leq 150 \text{ mm}$ within 20 s	-
	D <sub>fi</sub>	EN ISO 9239-1 <sup>e</sup> and	$CHF \geq 3.0 \text{ kW/m}^2$	Smoke production <sup>g</sup>
EN ISO 11925-2 <sup>h</sup> : Exposure = 15 s		$F_s \leq 150 \text{ mm}$ within 20 s	-	
E <sub>fi</sub>	EN ISO 11925-2 <sup>h</sup> : Exposure = 15 s	$F_s \leq 150 \text{ mm}$ within 20 s	-	
F <sub>fi</sub>	No performance determined			
<sup>a</sup>	For homogeneous products and substantial components of non-homogeneous products.			
<sup>b</sup>	For any external non-substantial component of non-homogeneous products.			
<sup>c</sup>	For any internal non-substantial component of non-homogeneous products.			
<sup>d</sup>	For the product as a whole.			
<sup>e</sup>	Test duration = 30 min.			
<sup>f</sup>	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).			
<sup>g</sup>	s1 = Smoke $\leq 750 \%$ minutes; s2 = not s1.			
<sup>h</sup>	Under conditions of surface flame attack and, if appropriate to the end use application of the product, edge flame attack.			

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page 1

## Flooring Radiant Panel Single Specimen Report

Standard : EN ISO 9239-1:2010  
 Laboratory : TÜV Rheinland Nederland B.V.  
 Sponsor : Forbo 89216445  
 Date of test : Feb. 11 2020

Specimen description : Sphera EC MT20-106016.01  
 Test name : # prod 1  
 File name : D:\FRPFILES\20020017.CSV  
 Test number in series : 4

Flux calibration file name : C:\FRPSOFT2.9A\CALIB\FLX19003.CSV

Thickness (mm) : 2.1  
 Density (kg/m<sup>3</sup>) : 1415

Test duration : 12 minutes 56 seconds (776 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 05 seconds (125 s)  
 Time to flameout : 12 minutes 54 seconds (774 s)  
 Extent of burning (mm) : 120  
 Critical flux at extinguishment (kW/m<sup>2</sup>) : 10.36  
 HF-10 (kW/m<sup>2</sup>) : 10.36  
 HF-20 (kW/m<sup>2</sup>) : Not calculated (test duration < 20 minutes)  
 HF-30 (kW/m<sup>2</sup>) : Not calculated (test duration < 30 minutes)  
 Flame spread at 10 minutes (mm) : 120  
 Flame spread at 20 minutes (mm) : Not measured  
 Flame spread at 30 minutes (mm) : Not measured  
 Peak light attenuation (%) : 30.9  
 Time to peak light attenuation : 3 minutes 28 seconds (208 s)  
 Total integrated smoke (%.min) : 96.81

Potential classification : A2(II)/B(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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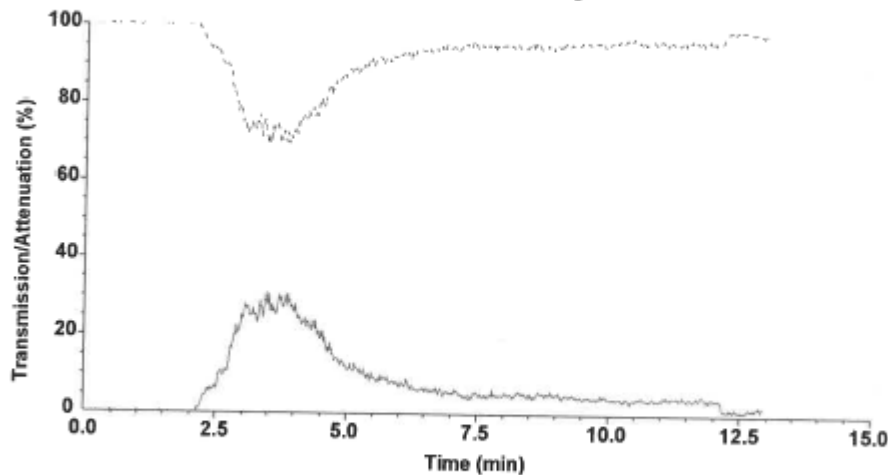
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page 2

### Smoke Graph



Test name : # prod 1

File name : D:\FRPFILES\20020017.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	214	11.1	2.372	510	-	3.7	-
110	289	10.5	3.023	560	-	3.1	-
160	-	9.9	-	610	-	2.7	-
210	-	9.3	-	660	-	2.3	-
260	-	8.3	-	710	-	2.0	-
310	-	7.3	-	760	-	1.7	-
360	-	6.2	-	810	-	1.5	-
410	-	5.2	-	860	-	1.3	-
460	-	4.4	-	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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## Flooring Radiant Panel Single Specimen Report

Standard : EN ISO 9239-1:2010  
 Laboratory : TÜV Rheinland Nederland B.V.  
 Sponsor : Forbo 89216445  
 Date of test : Feb. 11 2020

Specimen description : Sphera EC MT20-106016.01  
 Test name : # cross 2  
 File name : D:\FRPFILES\20020018.CSV  
 Test number in series : 4

Flux calibration file name : C:\FRPSOFT2.9A\CALIB\FLX19003.CSV

Thickness (mm) : 2.1  
 Density (kg/m³) : 1415

Test duration : 12 minutes 58 seconds (778 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 05 seconds (125 s)  
 Time to flameout : 12 minutes 57 seconds (777 s)  
 Extent of burning (mm) : 80  
 Critical flux at extinguishment (kW/m²) :  $\geq 10.9$   
 HF-10 (kW/m²) : 10.83  
 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) : 80  
 Flame spread at 20 minutes (mm) : Not measured  
 Flame spread at 30 minutes (mm) : Not measured  
 Peak light attenuation (%) : 28.32  
 Time to peak light attenuation : 3 minutes 07 seconds (187 s)  
 Total integrated smoke (%.min) : 76.42

**Potential classification** : A2(1)/B(1)  
**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.

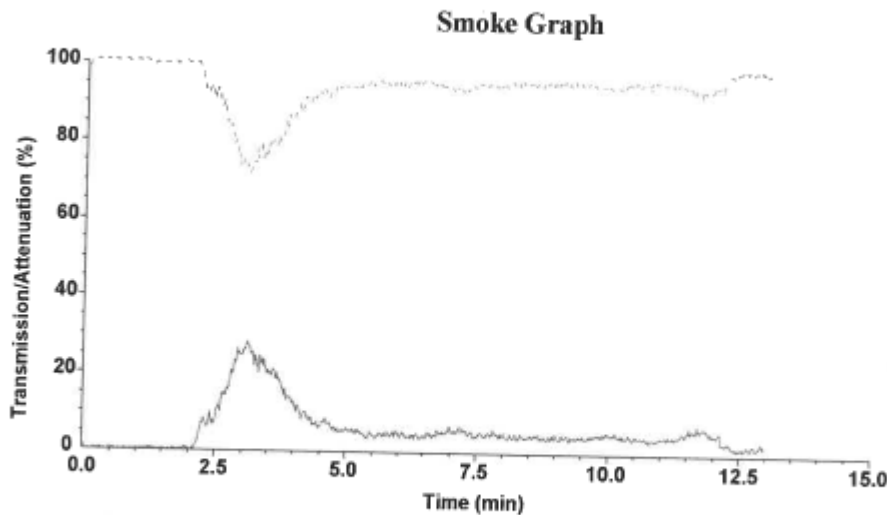
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Test name : # cross 2  
File name : D:\FRPFILES\20020018.CSV

### 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	208	11.1	2.306	510	-	3.7	-
110	-	10.5	-	560	-	3.1	-
160	-	9.9	-	610	-	2.7	-
210	-	9.3	-	660	-	2.3	-
260	-	8.3	-	710	-	2.0	-
310	-	7.3	-	760	-	1.7	-
360	-	6.2	-	810	-	1.5	-
410	-	5.2	-	860	-	1.3	-
460	-	4.4	-	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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## Flooring Radiant Panel Single Specimen Report

Standard : EN ISO 9239-1:2010  
 Laboratory : TÜV Rheinland Nederland B.V.  
 Sponsor : Forbo 89216445  
 Date of test : Feb. 11 2020

Specimen description : Sphera EC MT20-106016.01  
 Test name : # prod 3  
 File name : D:\FRPFILES\20020019.CSV  
 Test number in series : 4

Flux calibration file name : C:\FRPSOFT2.9A\CALIB\FLX19003.CSV

Thickness (mm) : 2.1  
 Density (kg/m<sup>3</sup>) : 1415

Test duration : 12 minutes 19 seconds (739 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 06 seconds (126 s)  
 Time to flameout : 12 minutes 17 seconds (737 s)  
 Extent of burning (mm) : 120  
 Critical flux at extinguishment (kW/m<sup>2</sup>) : 10.36  
 HF-10 (kW/m<sup>2</sup>) : 10.36  
 HF-20 (kW/m<sup>2</sup>) : Not calculated (test duration < 20 minutes)  
 HF-30 (kW/m<sup>2</sup>) : Not calculated (test duration < 30 minutes)  
 Flame spread at 10 minutes (mm) : 120  
 Flame spread at 20 minutes (mm) : Not measured  
 Flame spread at 30 minutes (mm) : Not measured  
 Peak light attenuation (%) : 41.21  
 Time to peak light attenuation : 3 minutes 10 seconds (190 s)  
 Total integrated smoke (%.min) : 99.12

**Potential classification** : A2(II)/B(II)  
**Smoke production classification** : s1

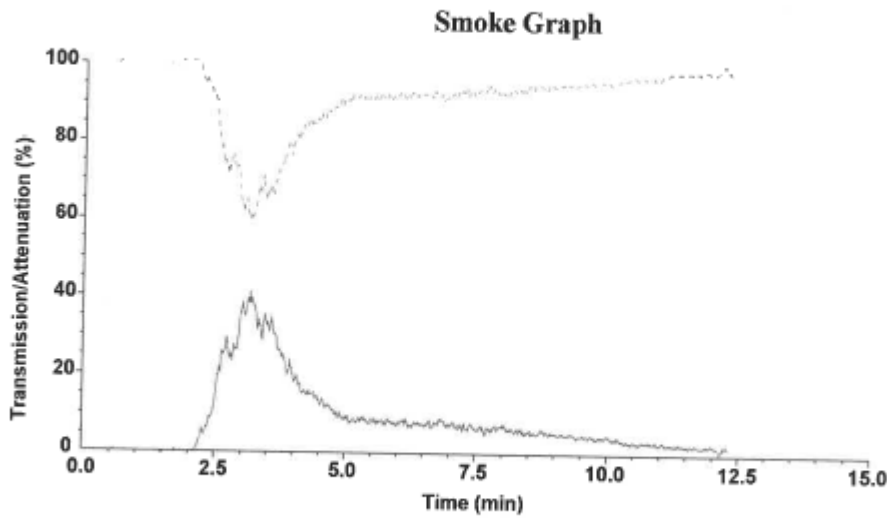
These results relate only to the behaviour of the specimens of the product under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

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Test name : # prod 3  
File name : D:\FRPFILES\20020019.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	182	11.1	2.017	510	-	3.7	-
110	222	10.5	2.322	560	-	3.1	-
160	-	9.9	-	610	-	2.7	-
210	-	9.3	-	660	-	2.3	-
260	-	8.3	-	710	-	2.0	-
310	-	7.3	-	760	-	1.7	-
360	-	6.2	-	810	-	1.5	-
410	-	5.2	-	860	-	1.3	-
460	-	4.4	-	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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## Flooring Radiant Panel Single Specimen Report

Standard : EN ISO 9239-1:2010  
 Laboratory : TÜV Rheinland Nederland B.V.  
 Sponsor : Forbo 89216445  
 Date of test : Feb. 11 2020

Specimen description : Sphera EC MT20-106016.01  
 Test name : # prod 4  
 File name : D:\FRPFILES\20020020.CSV  
 Test number in series : 4

Flux calibration file name : C:\FRPSOFT2.9A\CALIB\FLX19003.CSV

Thickness (mm) : 2.1  
 Density (kg/m<sup>3</sup>) : 1415

Test duration : 13 minutes 49 seconds (829 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 05 seconds (125 s)  
 Time to flameout : 13 minutes 47 seconds (827 s)  
 Extent of burning (mm) : 110  
 Critical flux at extinguishment (kW/m<sup>2</sup>) : 10.46  
 HF-10 (kW/m<sup>2</sup>) : 10.58  
 HF-20 (kW/m<sup>2</sup>) : Not calculated (test duration < 20 minutes)  
 HF-30 (kW/m<sup>2</sup>) : Not calculated (test duration < 30 minutes)  
 Flame spread at 10 minutes (mm) : 100  
 Flame spread at 20 minutes (mm) : Not measured  
 Flame spread at 30 minutes (mm) : Not measured  
 Peak light attenuation (%) : 31.23  
 Time to peak light attenuation : 3 minutes 16 seconds (196 s)  
 Total integrated smoke (%.min) : 102.12

**Potential classification** : A2(f)/B(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.

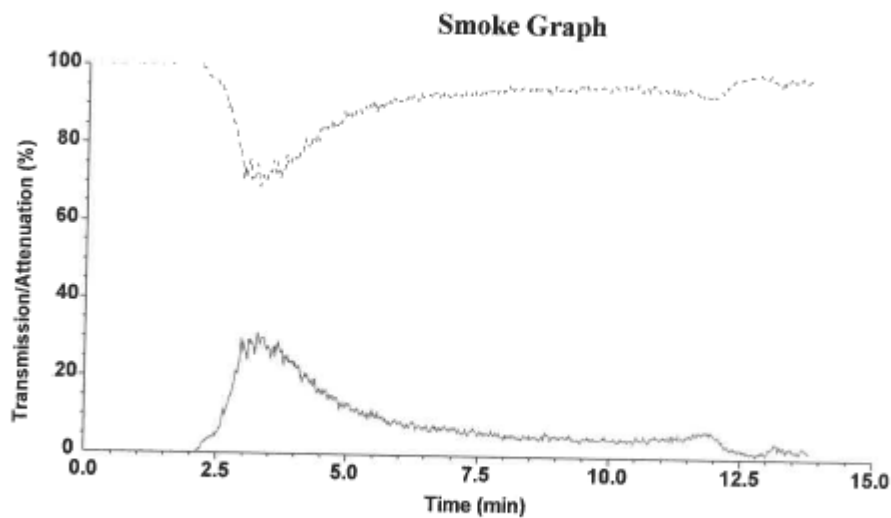
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Absatz	EN 13501-1:2007+ A1:2009	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / Requirements - Tests	Measuring results - Remarks	Evaluation

Report produced with the Fire Testing Technology FRPSoft software

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Test name : # prod 4  
File name : D:\FRPFILES\20020020.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	186	11.1	2.062	510	-	3.7	-
110	734	10.5	7.677	560	-	3.1	-
160	-	9.9	-	610	-	2.7	-
210	-	9.3	-	660	-	2.3	-
260	-	8.3	-	710	-	2.0	-
310	-	7.3	-	760	-	1.7	-
360	-	6.2	-	810	-	1.5	-
410	-	5.2	-	860	-	1.3	-
460	-	4.4	-	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.