TÜV Rheinland Nederland B.V.

TÜVRheinland®
Precisely Right.

TÜV Rheinland Nederland B.V.
The Netherlands

Postal address:
P.O. Box 337
7500 AH Enschede

Parking and delivery:
Josink Esweg 10
7545 PN Enschede

www.tuv.com/nl

T +31 88 888 7888
F +31 88 888 7859

Jan.brinks@nl.tuv.com
Ilse.pierik@nl.tuv.com

Return address: P.O. box 337, 7500 AH Enschede, The Netherlands

Forbo Flooring Coral N.V.
Att.: Mr. R. Koomen
P.O. Box 17
1560 AA
KROMMENIE
The Netherlands

Report

Project number : 89202643
Report number : 89202643.01br

Received:
A sample of floor covering, entrance mat, marked as**: "Coral Brush EV"**;
TÜV sample reference: MT12-36545.01.

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

Test method:

Identification parameters	: EN 1307.
Ignitability (direct impingement of flame)	: EN ISO 11925-2.
Reaction to fire (radiant panel)	: EN ISO 9239-1.

Results:
See page two up to and including three.

Appendix:
See page four up to and including eleven.

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.

Date
14 December, 2012

Project number
89202643

Report number
89202643.01br

Phone number client
+31 75 627 3273

Fax number client
+31 75 627 3274

Article
Coral Brush EV

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

TÜVRheinland®
Precisely Right.

TEST RESULTS

Date
14 December, 2012

Project number
89202643

Report number
89202643.01br

Article
Coral Brush EV

➢ *Identification parameters EN 1307:2008*

Type of manufacture	: Tufted
Type of pile	: Cut pile
Type of use surface	: Tonal effect
Type of secondary backing	: Vinyl backing (synthetic)*
Pile Fibre	: 100% PA*
Total mass per unit area g/m^2	: 3347
Effective pile mass, g/m^2	: 675
Total thickness, mm	: 9.2
Thickness of the pile, mm	: 6.4
Pile density, g/cm^3	: 0.105
Gauge (G), inch	: 5/32
Stitches/10 cm	: 23.0
Number of tufts/m^2	: 57,960

* = manufacturer's declaration

➢ *Ignitability EN-ISO 11925-2:2010*

Conditioning time, climate	: 6 days, 23 ± 2 °C and 50 ± 5 %
Date of testing	: 29-10-2012
Description of substrate	: 6 mm. Fibre cement board, 1800 kg/m^3.
Flame application	: Surface.
Application time	: 15 seconds.

Direction:	In production			Across production		
Total burning time[1](15 s)	15	15	15	15	15	15
Flame tip reaches 150 mm (s)	no	no	no	no	no	no
Extent of damaged area, length (mm)	91	93	90	102	90	106
Extent of damaged area, width (mm)	13	13	13	13	13	12
Material melts (yes/no)	yes	yes	yes	yes	yes	yes
Shrinks away[2] (yes/no)	no	no	no	no	no	no
Glowing[3](sec)	no	no	no	no	no	no
Flaming debris (yes/no)	no	no	no	no	no	no
Ignition of filter paper (yes/no)	no	no	no	no	no	no

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

TÜVRheinland®
Precisely Right.

Date
14 December, 2012

Project number
89202643

Report number
89202643.01br

Article
Coral Brush EV

TEST RESULTS – follow-up

➢ *Radiant Panel test ISO 9239-1:2010*

Date of testing	: 29-10-2012 (1+2) and 05-11-2012 (3+4)
Conditioning time, climate	: 4 days, 23 ± 2 °C and 50 ± 5 %
Description of substrate	: Fibre cement board, 8±2 mm ,1800±200 kg/m^3 conforming to EN 13238.
Sampling procedure	: By contractor.
Description of cleaning used	: None.
Fixing method	: Fixed, glued down with Eurocol Eurostar 540 on 23-10-2012 (1+2) and 30-10-2012 (3+4).

Test specimen, orientation	Flame spread (cm)	CRF (kW/m^2)	Peak light attenuation (%)	Smoke production (%.min)
1, ↑ *	9.0	10.4	15.6	73
2, ⊥	23.0	8.5	22.3	277
3, ⊥	26.0	7.9	27.7	228
4, ⊥ *	23.0	8.5	31.1	218
Mean	**24.0**	**8.3**	**27.0**	**241**

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

CONCLUSION

According to EN 13501-1:2007 the tested sample of the aforementioned quality **Coral Brush EV** , glued down with Eurocol Eurostar 540,
meets the requirements of **Class B_{fl} - s1**.

Author:
Mrs. I. Pierik

Review:
Mr. R. Boerboom

TÜVRheinland®
Precisely Right.

APPENDIX I: Flooring Radiant Panel Single Specimen Report

Date
14 December, 2012

Project number
89202643

Report number
89202643.01br

Article
Coral Brush EV

Page
4/11

Flooring Radiant Panel Single Specimen Report

Standard	: EN ISO 9239-1:2002
Laboratory	: TÜV Rheinland Nederland B.V.
Sponsor	: Forbo - Coral Brush EV - glued Eurocol 540
Date of test	: Oct. 29 2012
Specimen description	: MT12-36545.01
Test name	: Prod #1
File name	: D:\FRPFILES\12100040.CSV
Test number in series	: 4
Flux calibration file name	: C:\FRPSOFT\CALIB\FLX12012.CSV
Thickness (mm)	:
Density (kg/m³)	:
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

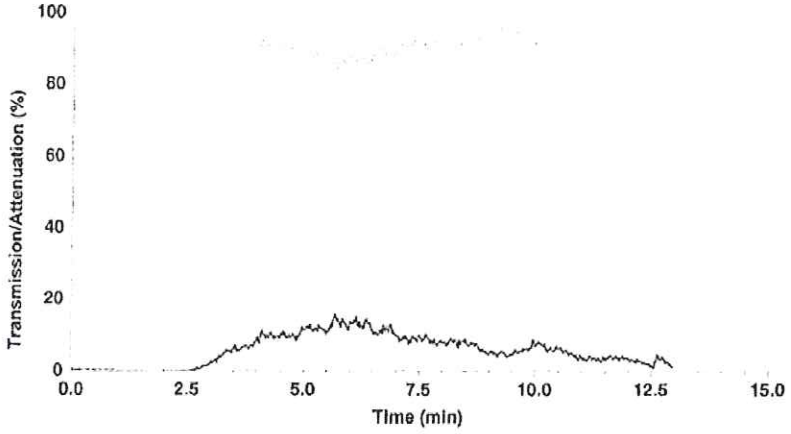
Test Results

Time to ignition	: 2 minutes 02 seconds (122 s)
Time to flameout	: 12 minutes 54 seconds (774 s)
Extent of burning (mm)	: 90
Critical flux at extinguishment (kW/m²)	: >= 10.9
HF-10 (kW/m²)	: 10.41
HF-20 (kW/m²)	: >= 10.9
HF-30 (kW/m²)	: >= 10.9
Flame spread at 10 minutes (mm)	: 80
Flame spread at 20 minutes (mm)	: -1
Flame spread at 30 minutes (mm)	: -1
Peak light attenuation (%)	: 15.6
Time to peak light attenuation	: 5 minutes 40 seconds (340 s)
Total integrated smoke (%.min)	: 73.37
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.

APPENDIX I: Flooring Radiant Panel Single Specimen Report

Smoke Graph



Test name : Prod #1
File name : D:\FRPFILES\12100040.CSV

Rake Results

Position (mm)	Time (s)	Flux (kW/m²)	Qsb (MJ/m²)	Position (mm)	Time (s)	Flux (kW/m²)	Qsb (MJ/m²)
60	456	10.7	4.577	510	-	3.6	-
110	-	10.0	-	560	-	3.0	-
160	-	9.5	-	610	-	2.5	-
210	-	8.9	-	660	-	2.1	-
260	-	7.9	-	710	-	1.8	-
310	-	6.9	-	760	-	1.6	-
360	-	6.0	-	810	-	1.4	-
410	-	5.1	-	860	-	1.3	-
460	-	4.2	-	910	-	1.2	-

Comments

Specimen extinguished naturally.

APPENDIX I: Flooring Radiant Panel Single Specimen Report

Flooring Radiant Panel Single Specimen Report

Standard	: EN ISO 9239-1:2002
Laboratory	: TÜV Rheinland Nederland B.V.
Sponsor	: Forbo - Coral Brush EV - glued Eurocol 540
Date of test	: Oct. 29 2012
Specimen description	: MT12-36545.01
Test name	: Across #1
File name	: D:\FRPFILES\12100041.CSV
Test number in series	: 4
Flux calibration file name	: C:\FRPSOFT\CALIB\FLX12012.CSV
Thickness (mm)	:
Density (kg/m³)	:
Test duration	: 30 minutes (1800 s)
Substrate used?	: Yes
Substrate	: Calcium silicate
Fixing method	: adhesive
Conditioned?	: Yes
Conditioning temp. (°C)	: 23
Conditioning RH (%)	: 50

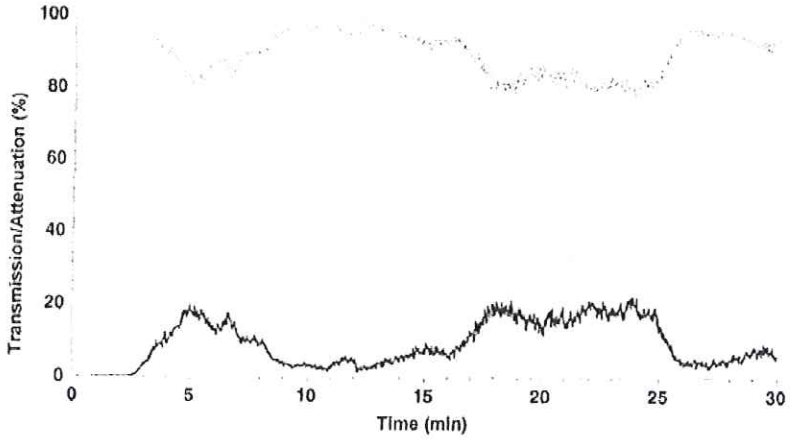
Test Results

Time to ignition	: 2 minutes 03 seconds (123 s)
Time to flameout	: Not recorded
Extent of burning (mm)	: 230
Critical flux at extinguishment (kW/m²)	: N/A (no flameout)
HF-10 (kW/m²)	: 10.29
HF-20 (kW/m²)	: 9.02
HF-30 (kW/m²)	: 8.49
Flame spread at 10 minutes (mm)	: 90
Flame spread at 20 minutes (mm)	: 200
Flame spread at 30 minutes (mm)	: 230
Peak light attenuation (%)	: 22.32
Time to peak light attenuation	: 23 minutes 52 seconds (1432 s)
Total integrated smoke (%.min)	: 276.66
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.

APPENDIX I: Flooring Radiant Panel Single Specimen Report

Smoke Graph



Test name : Across #1
File name : D:\FRPFILES\12100041.CSV

Rake Results

Position (mm)	Time (s)	Flux (kW/m²)	Qsb (MJ/m²)	Position (mm)	Time (s)	Flux (kW/m²)	Qsb (MJ/m²)
60	374	10.7	3.754	510	-	3.6	-
110	781	10.0	7.441	560	-	3.0	-
160	1016	9.5	9.037	610	-	2.5	-
210	1265	8.9	9.982	660	-	2.1	-
260	-	7.9	-	710	-	1.8	-
310	-	6.9	-	760	-	1.6	-
360	-	6.0	-	810	-	1.4	-
410	-	5.1	-	860	-	1.3	-
460	-	4.2	-	910	-	1.2	-

Comments

Specimen was extinguished manually after end of test.

TÜVRheinland®
Precisely Right.

APPENDIX I: Flooring Radiant Panel Single Specimen Report

Date
14 December, 2012

Project number
89202643

Report number
89202643.01br

Article
Coral Brush EV

Page
8/11

Flooring Radiant Panel Single Specimen Report

Standard	: EN ISO 9239-1:2002
Laboratory	: TÜV Rheinland Nederland B.V.
Sponsor	: Forbo - 89202643 - Coral Brusch EV - glued Eurcol 540 - IPK
Date of test	: Nov. 05 2012
Specimen description	: MT12-36545.01
Test name	: Across #2
File name	: D:\FRPFILES\12110001.CSV
Test number in series	: 4
Flux calibration file name	: C:\FRPSOFT\CALIB\FLX12012.CSV
Thickness (mm)	:
Density (kg/m³)	:
Test duration	: 30 minutes (1800 s)
Substrate used?	: Yes
Substrate	: Calcium silicate
Fixing method	: adhesive
Conditioned?	: Yes
Conditioning temp. (°C)	: 23
Conditioning RH (%)	: 50

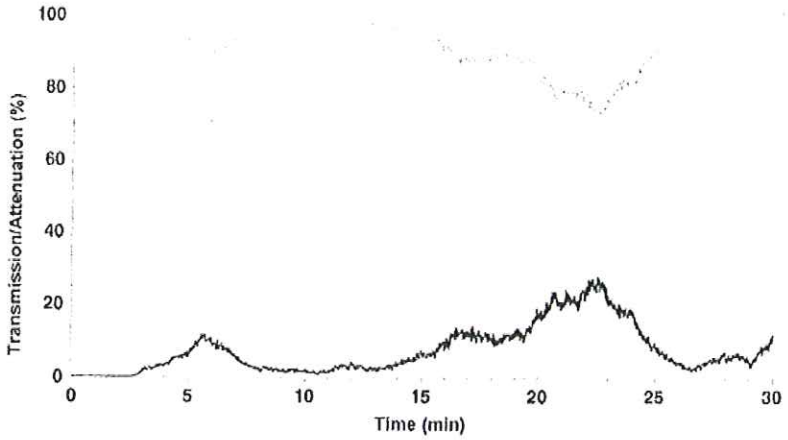
Test Results

Time to ignition	: 2 minutes 01 seconds (121 s)
Time to flameout	: Not recorded
Extent of burning (mm)	: 260
Critical flux at extinguishment (kW/m²)	: N/A (no flameout)
HF-10 (kW/m²)	: 10.41
HF-20 (kW/m²)	: 9.4
HF-30 (kW/m²)	: 7.89
Flame spread at 10 minutes (mm)	: 80
Flame spread at 20 minutes (mm)	: 170
Flame spread at 30 minutes (mm)	: 260
Peak light attenuation (%)	: 27.69
Time to peak light attenuation	: 22 minutes 32 seconds (1352 s)
Total integrated smoke (%.min)	: 227.61
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.

APPENDIX I: Flooring Radiant Panel Single Specimen Report

Smoke Graph



Test name : Across #2
File name : D:\FRPFILES\12110001.CSV

Rake Results

Position (mm)	Time (s)	Flux (kW/m²)	Qsb (MJ/m²)	Position (mm)	Time (s)	Flux (kW/m²)	Qsb (MJ/m²)
60	380	10.7	3.814	510	-	3.6	-
110	879	10.0	8.374	560	-	3.0	-
160	1073	9.5	9.544	610	-	2.5	-
210	1361	8.9	10.740	660	-	2.1	-
260	1796	7.9	12.477	710	-	1.8	-
310	-	6.9	-	760	-	1.6	-
360	-	6.0	-	810	-	1.4	-
410	-	5.1	-	860	-	1.3	-
460	-	4.2	-	910	-	1.2	-

Comments

Specimen was extinguished manually after end of test.

TÜVRheinland®
Precisely Right.

APPENDIX I: Flooring Radiant Panel Single Specimen Report

Date
14 December, 2012

Project number
89202643

Report number
89202643.01br

Article
Coral Brush EV

Page
10/11

Flooring Radiant Panel Single Specimen Report

Standard	: EN ISO 9239-1:2002
Laboratory	: TÜV Rheinland Nederland B.V.
Sponsor	: Forbo - 89202643 - Coral Brusch EV - glued Eurcol 540 -
IPK	
Date of test	: Nov. 05 2012
Specimen description	: MT12-36545.01
Test name	: Across #3
File name	: D:\FRPFILES\12110002.CSV
Test number in series	: 4
Flux calibration file name	: C:\FRPSOFT\CALIB\FLX12012.CSV
Thickness (mm)	:
Density (kg/m³)	:
Test duration	: 26 minutes 06 seconds (1566 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 04 seconds (124 s)
Time to flameout	: 26 minutes 04 seconds (1564 s)
Extent of burning (mm)	: 230
Critical flux at extinguishment (kW/m²)	: 8.49
HF-10 (kW/m²)	: 10.29
HF-20 (kW/m²)	: 9.02
HF-30 (kW/m²)	: >= 10.9
Flame spread at 10 minutes (mm)	: 90
Flame spread at 20 minutes (mm)	: 200
Flame spread at 30 minutes (mm)	: -1
Peak light attenuation (%)	: 31.11
Time to peak light attenuation	: 21 minutes 42 seconds (1302 s)
Total integrated smoke (%.min)	: 218.19
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.

TÜVRheinland®
Precisely Right.

APPENDIX I: Flooring Radiant Panel Single Specimen Report

Date
14 December, 2012

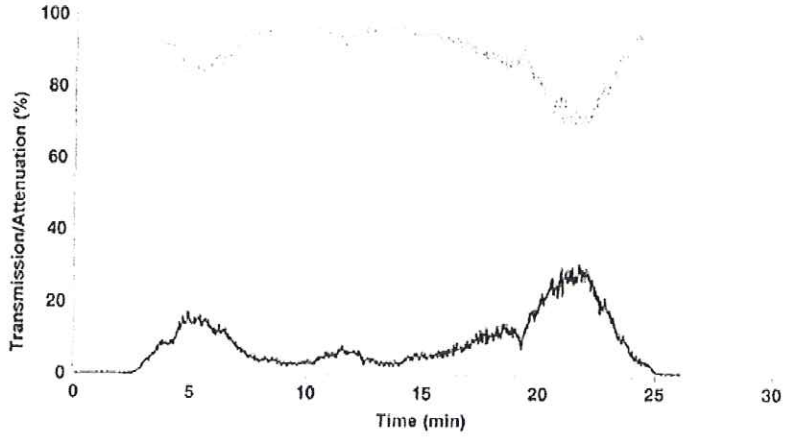
Project number
89202643

Report number
89202643.01br

Article
Coral Brush EV

Page
11/11

Smoke Graph



Test name : Across #3
File name : D:\FRPFILES\12110002.CSV

Rake Results

Position (mm)	Time (s)	Flux (kW/m²)	Qsb (MJ/m²)	Position (mm)	Time (s)	Flux (kW/m²)	Qsb (MJ/m²)
60	339	10.7	3.403	510	-	3.6	-
110	862	10.0	8.212	560	-	3.0	-
160	1098	9.5	9.767	610	-	2.5	-
210	1246	8.9	9.832	660	-	2.1	-
260	-	7.9	-	710	-	1.8	-
310	-	6.9	-	760	-	1.6	-
360	-	6.0	-	810	-	1.4	-
410	-	5.1	-	860	-	1.3	-
460	-	4.2	-	910	-	1.2	-

Comments

Specimen extinguished naturally.