TEST REPORT

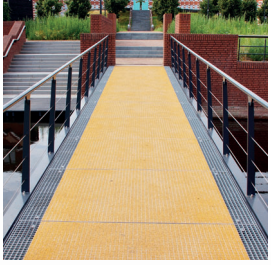
Firetest
ArtDeck ® EPDM FR

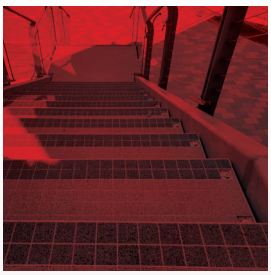
Type SPECIALS

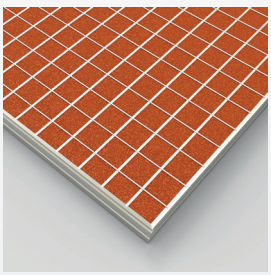
FIRE-RETARDANT EPDM FILLING

STACO

Create & Inspire







Fire test ArtDeck® FR type SPECIALS

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Fire safety is essential when developing floor and stair solutions for multi-storey residential buildings, for example. To guarantee this safety, Staco has had its Deck Series, including ArtDeck® FR, subjected to extensive fire tests by Efectis Netherlands. These tests, carried out in accordance with European standard EN 13501-1, demonstrate that ArtDeck® FR combines excellent fire resistance with an aesthetic and functional design. Thanks to the combination of galvanised steel and a fire-retardant EPDM filling, the product meets high safety requirements and is ideal for use in floors, stairs, ceilings and walls – in both new construction and renovation projects.

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REPORT

Reaction to fire testing of Deck series
Ignitability test according to EN ISO 11925-2:2020

Report no.	2023-Efectis-R001038
Sponsor	Staco Holding B.V. Molenweg 1 5953 JR REUVER THE NETHERLANDS
Prepared by	Efectis Nederland BV
Author(s)	J.L. Onderwater B.Sc. B.R. Knottnerus B.Sc. E.O. van der Laan M.Sc.
Project number	ENL-23-000705
Date of issue	September 2023
Number of pages	5

1. PRODUCT IDENTIFICATION

Deck series, further referred to as 'the product'.

2. ABSTRACT

Determination of the **ignitability** properties of the product, by **direct small flame impingement** according to EN ISO 11925-2:2020, with the objective to obtain the reaction to fire classification according to EN 13501-1:2018.

3. DETAILS OF THE PRODUCT TESTED

3.1 INTENDED APPLICATION

The product will be used as a floor covering, wallcovering and ceiling.

3.2 MANUFACTURER

Staco Holding B.V.
Molenweg 1
5953 JR REUVER
THE NETHERLANDS

3.3 PRODUCT DESCRIPTION

According to the sponsor the product is, from bottom to top / back to front composed of:

- deformed hot dip galvanized steel (S235) available in a thickness of 2 and 3 mm (tested thickness is 3 mm) (this steel sheet is composed to an open a plank-shaped panel with raised edges;
    - the steel sheet is provided with drainage holes; the mesh size of the holes varies between 6 and 8 mm (tested mesh size is 8 mm);
- an Uniprim steel primer is applied (between the steel profile and the EPDM on top of it);
- as infill Unifix-B-fl is used with a fire-retardant addition in the base product.
- the steel profile is filled with 10-15 mm EPDM grains, size 1-4 mm, in the colour black;
- the EPDM grains are bound together by a 1 component non yellowing solvent free polyurethane binder;
- the borders of each panel are finished with flat steel strips, thickness 3 mm.

The panels contain side plates with a standard height of 70 mm.

- The maximum panel width is 250 mm and are welded together at the ends.

The product has a mass per unit area range of approx. 47 to 65 kg/m^2, depending on the dimensions of the product.
The tested thickness is 40 mm. The composition of the panels was adjusted (to accommodate the total thickness in this test).

4. DETAILS OF THE EXAMINATION

4.1 SAMPLES

Sampling procedure	The specimens were prepared and submitted by the sponsor.

Age	At the time of receipt: no information received.
Date of receipt	August 04, 2023

4.2 SPECIMEN PREPARATION

Substrate used	Not applicable
Method of fixing	Not applicable

4.3 CONDITIONING

Prior to the examinations, the specimens were conditioned over a period of three weeks minimum and until constant mass at a temperature of (23 ± 2) ºC and a relative humidity of (50 ± 5) % according to § 4.1 of EN 13238.

4.4 EXAMINATION

Number of tests	A total of sixteen single ignitability tests were carried out according to EN ISO 11925-2.
Deviations from the test method	None
Harmonised Product Standard	At the time of examination of the product, the sponsor was not aware of a related existing Harmonised Product Standard.
Assessment	According to EGR 002:2016 tests that are performed with a 30 second exposure of the flame are also valid for a 15 second exposure. So, the results below can be used for floor and ceiling classification.
Date of examination	August 18, 2023
Location of examination	Efectis Nederland BV, Bleiswijk, The Netherlands
Performed by	CKB + KSB

The results are given in Table 1, Appendix: Results.

5. CONCLUSIONS

A formal classification is to be assessed in accordance with EN 13501-1, “Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests”.

Remarks:
The test results relate to the behaviour of the test specimens of a 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.

Regarding the precision of the test method, following Annex A of EN ISO 11925-2, the absolute repeatability/reproducibility for this test method is estimated to lie within 3 s to 5 s for all times measured.

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Junior Project leader Reaction to Fire

B.R. Knottnerus B.Sc.
Project leader Reaction to Fire

E.O. van der Laan M.Sc.
Project leader Reaction to Fire

APPENDIX: RESULTS

Table 1: Ignitability classification parameter results

Flame application time: 30 s					
Sample	Ignition of sample	Maximum flame Height	t_{150}	Afterburning time	Ignition of filter paper
	{Y=Yes/N=No}	[mm]	[s]	[s]	{Y=Yes/N=No}
Surface ignition steel side					
1	N	20	not reached	0	N
2	N	20		0	N
Surface ignition EPDM					
1	N	20	not reached	0	N
2	N	20		0	N
3	N	20		0	N
4	N	20		0	N
5	N	20		0	N
6	N	20		0	N
Maximum		20			
Classification parameters		**150 mm reached within 60 s**			**N**
		Ignition of filter paper			**N**
Edge ignition steel side					
1	N	5	not reached	0	N
2	N	5		0	N
Edge ignition EPDM					
1	N	5	not reached	0	N
2	N	5		0	N
3	N	5		0	N
4	N	5		0	N
5	N	5		0	N
6	N	5		0	N
Maximum		5			
Classification parameters		**150 mm reached within 60 s**			**N**
		Ignition of filter paper			**N**

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REPORT

Reaction to fire testing of Deck series
Single Burning Item test according to EN 13823:2020+A1:2022

Report no.	2023-Efectis-R001039
Sponsor	Staco Holding B.V. Molenweg 1 5953 JR REUVER THE NETHERLANDS
Prepared by	Efectis Nederland BV
Author(s)	J.L. Onderwater B.Sc. B.R. Knottnerus B.Sc. E.O. van der Laan M.Sc.
Project number	ENL-23-000705
Date of issue	September 2023
Number of pages	11

1. PRODUCT IDENTIFICATION

Deck series, further referred to as 'the product'.

2. ABSTRACT

Determination of the reaction to fire properties of the product, when exposed to the thermal attack by a **Single Burning Item** according to EN 13823:2020+A1:2022, with the objective to obtain the reaction to fire classification according to EN 13501-1:2018.

3. DETAILS OF THE PRODUCT TESTED

3.1 INTENDED APPLICATION

The product will be used as a ceiling.

3.2 MANUFACTURER

Staco Holding B.V.
Molenweg 1
5953 JR REUVER
THE NETHERLANDS

3.3 PRODUCT DESCRIPTION

According to the sponsor the product is, from bottom to top / back to front composed of:

- deformed hot dip galvanized steel (S235) available in a thickness of 2 and 3 mm (tested thickness is 3 mm) (this steel sheet is composed to an open a plank-shaped panel with raised edges;
    - the steel sheet is provided with drainage holes; the mesh size of the holes varies between 6 and 8 mm (tested mesh size is 8 mm);
- an Uniprim steel primer is applied (between the steel profile and the EPDM on top of it);
- as infill Unifix-B-fl is used with a fire-retardant addition in the base product.
- the steel profile is filled with 10-15 mm EPDM grains, size 1-4 mm, in the colour black;
- the EPDM grains are bound together by a 1 component non yellowing solvent free polyurethane binder;
- the borders of each panel are finished with flat steel strips, thickness 3 mm.

The panels contain side plates with a standard height of 70 mm.

- The maximum panel width is 250 mm and are welded together at the ends.

The product has a mass per unit area range of approx. 47 to 65 kg/m^2, depending on the dimensions of the product.
The product has a total thickness of 70 mm.

4. DETAILS OF THE EXAMINATION

4.1 SAMPLES

Sampling procedure	The specimens were prepared and submitted by the sponsor.
Age	At the time of receipt: no information received.

Date of receipt	August 04, 2023

4.2 SPECIMENS

Substrate used	Not applicable
Specimen preparation	The long specimen wing was not provided with a vertical joint at a distance of 200 mm from the inner corner. The long wing is provided with horizontal joints at a distance of the working width from the bottom.

4.3 CONDITIONING

Prior to the examinations, the specimens were conditioned over a period of three weeks minimum and until constant mass at a temperature of (23 ± 2) ºC and a relative humidity of (50 ± 5) % according to § 4.1 of EN 13238.

4.4 EXAMINATION

Method of mounting and fixing	The panels were positioned with a ventilated air gap of 80 mm to the backing board. (Free standing)
Exposed surface	The steel side of the product was exposed by flames during testing. This resembles the product applied as a ceiling with the EPDM side up.
Deviations from the test method	None
Harmonised Product Standard	At the time of examination of the product, the sponsor was not aware of a related existing Harmonised Product Standard.
Assessment	Due to the results of the test in horizontal orientation on the steel side it is decided not to check the direction sensitivity of the product. According to Efectis the fire behaviour of the vertical orientation will be similar to the fire behaviour of the horizontal orientation.
Number of tests	A total of three Single Burning Item tests, were carried out, all in accordance with EN 13823.
Date of examination:	August 21, 2023
Location of examination	Efectis Nederland BV, Bleiswijk, The Netherlands

The results are given in Table 1.

Table 1: Single Burning Item classification parameter results

Test parameter / Test number		1	2	3	**Classification parameter**
Sample variant		Metal side			
$FIGRA_{0.2\ MJ}$	[W/s]	3	0	4	**2**
$FIGRA_{0.4\ MJ}$	[W/s]	3	0	4	**2**
THR_{600s}	[MJ]	0.4	0.6	0.4	**0.5**
LFS	{Yes, No}	No	No	No	**No**
SMOGRA	[m^2/s^2]	0.0	0.0	0.0	**0.0**
TSP_{600s}	[m^2]	1	1	1	**1**
Flaming droplets/particles					
Flaming ≤ 10 s	{Yes, No}	No	No	No	**No**
Flaming > 10 s	{Yes, No}	No	No	No	**No**

FIGRA Fire growth rate: The maximum of the quotient of heat release rate from the burning specimen and the time of its occurrence, determined during the full test period, using a THR-threshold of 0.2 MJ or 0.4 MJ and a HRR_{av}-threshold of 3 kW.

THR_{600s} Total heat release from the burning specimen during the first 600s of exposure to the main burner flames.

LFS Lateral flame spread over the long specimen wing.

SMOGRA Smoke growth rate: The maximum of the quotient of smoke production rate from the burning specimen and the time of its occurrence (multiplied by 10.000), determined during the full test period, using the TSP-threshold of 6 m^2 and the SPR_{av}-threshold of 0.1 m^2/s.

TSP_{600s} Total smoke production from the burning specimen during the first 600s of exposure to the main burner flames.

Observations of physical behaviour of the test specimen: None

5. CONCLUSIONS

A formal classification is to be assessed in accordance with EN 13501-1, “Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests”.

Graphs of Rate of Heat Release ($HRR_{av}(t)$), Rate of Smoke Production ($SPR_{av}(t)$), Total Heat release (THR(t)), Total Smoke Production (TSP(t)), $FIGRA_{0.2\ MJ}$, $FIGRA_{0.4\ MJ}$ and SMOGRA, are presented hereafter followed by some photographs of the test setup and test results.

Remarks:
The test results relate to the behaviour of the test specimens of a 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.

Regarding the estimated precision of the test method, the following information is given in Annex B of EN 13823.

Table B.2 — Average relative standard deviations

	$FIGRA_{0.2\ MJ}$	$FIGRA_{0.4\ MJ}$	$THR_{600\ s}$	SMOGRA	$TSP_{600\ s}$
Average (s_r /m)	14 %	15 %	11 %	15 %	18 %
Average (s_R /m)	23 %	25 %	21 %	40 %	44 %

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APPENDIX: CHARTS

Chart 1 Rate of Heat Release ($HRR_{av}(t)$) [kW]

Chart 2 Rate of Smoke Production ($SPR_{av}(t)$) [m^2/s]

Chart 3 Total Heat release (THR(t)) [MJ]

Chart 4 Total Smoke Production (TSP(t)) [m^2]

Chart 5 $FIGRA_{0.2\ MJ}$ [W/s]

Chart 6 $FIGRA_{0.4\ MJ}$ [W/s]

Chart 7 SMOGRA [m^2/s^2]

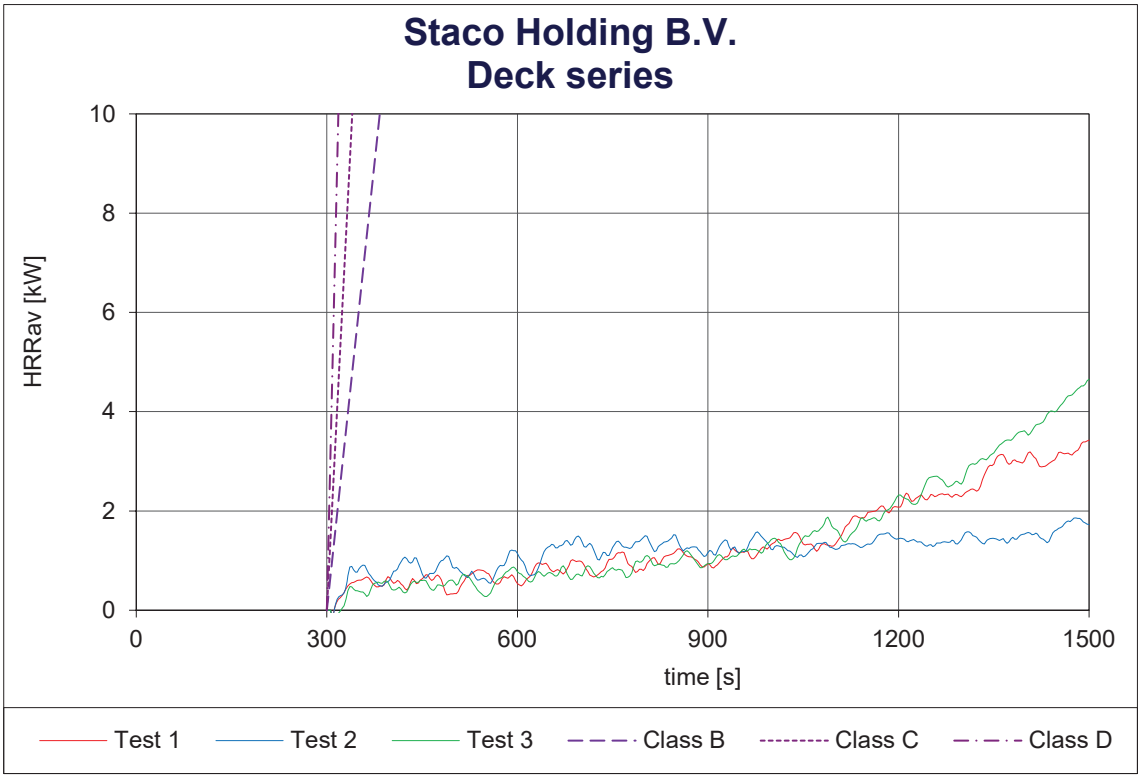

Chart 1: Rate of Heat Release ($HRR_{av}(t)$) [kW]

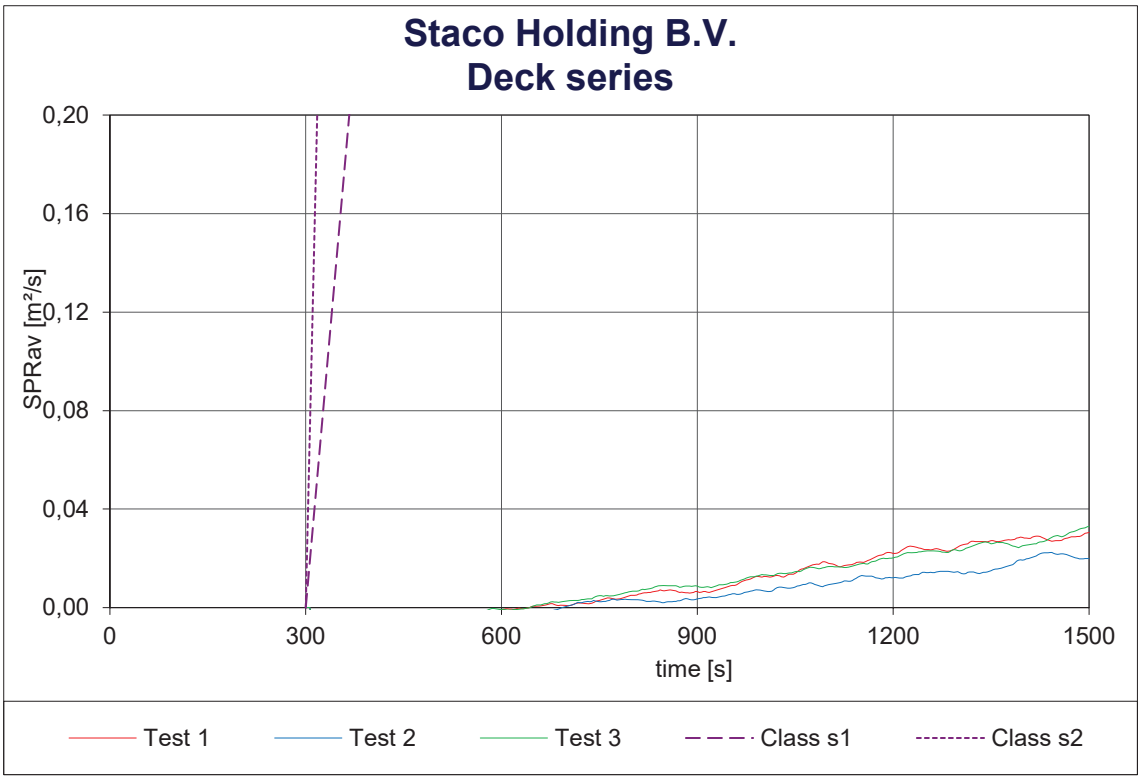

Chart 2: Rate of Smoke Production ($SPR_{av}(t)$) [m^2/s]

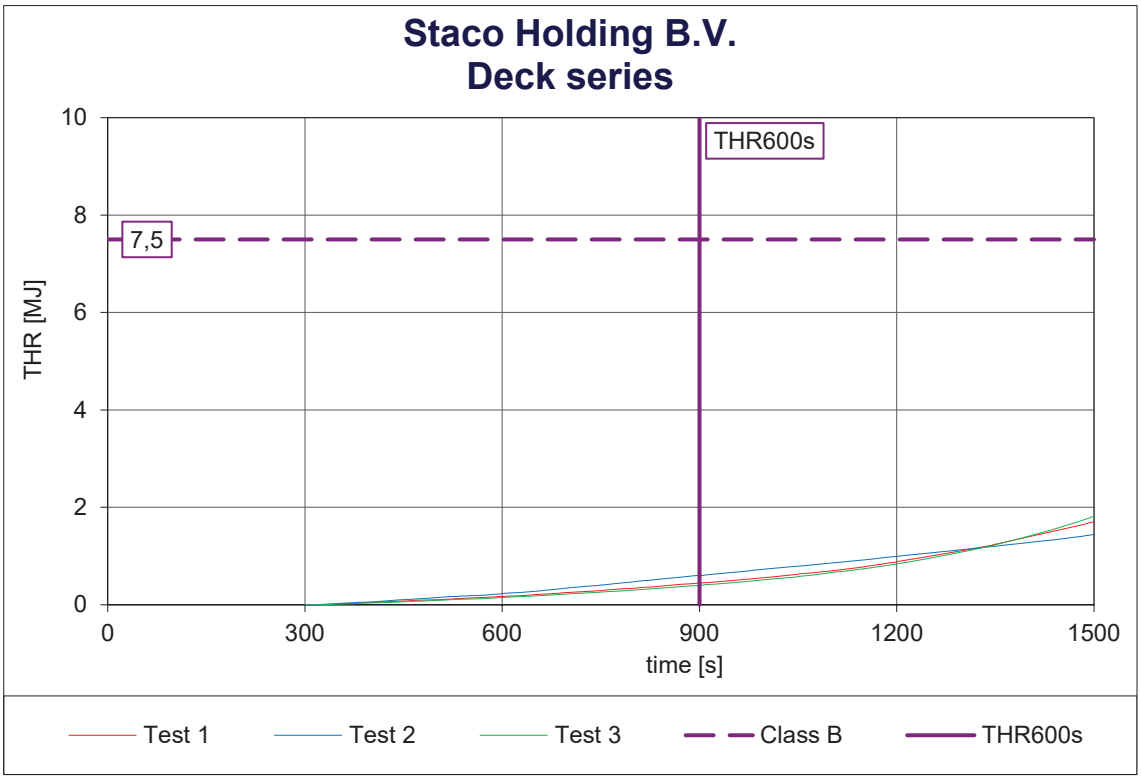

Chart 3: Total Heat release (THR(t)) [MJ]

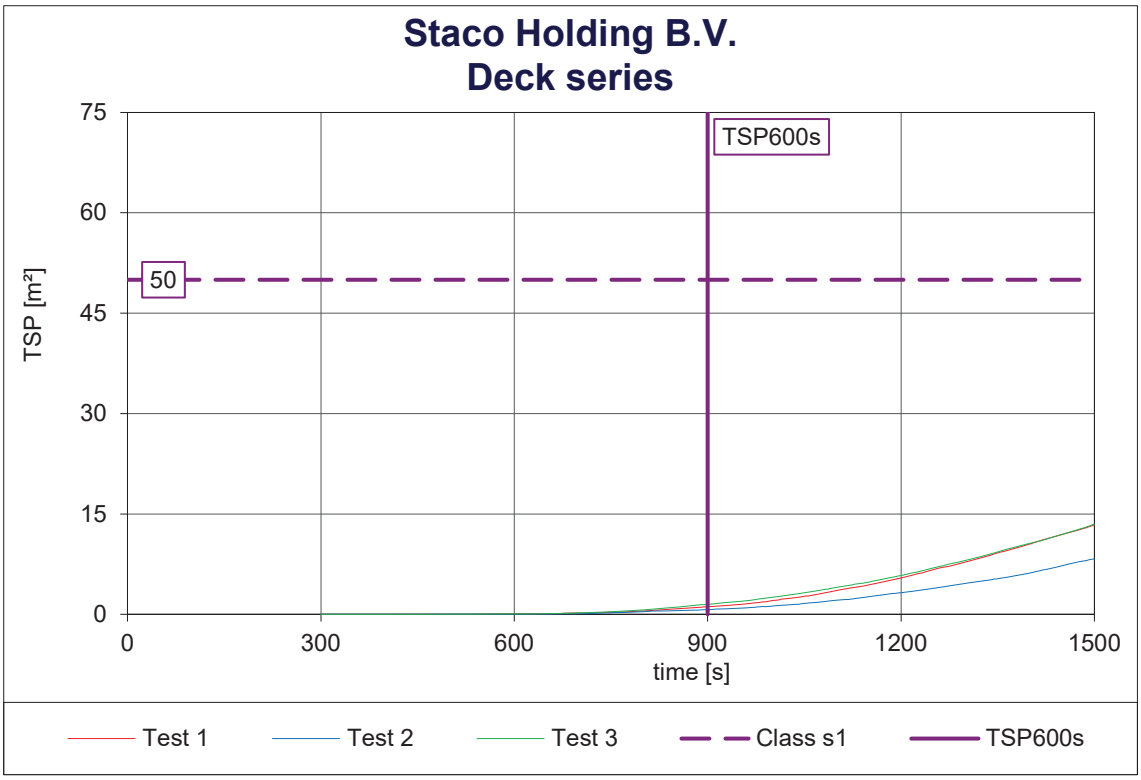

Chart 4: Total Smoke Production (TSP(t)) [m²]

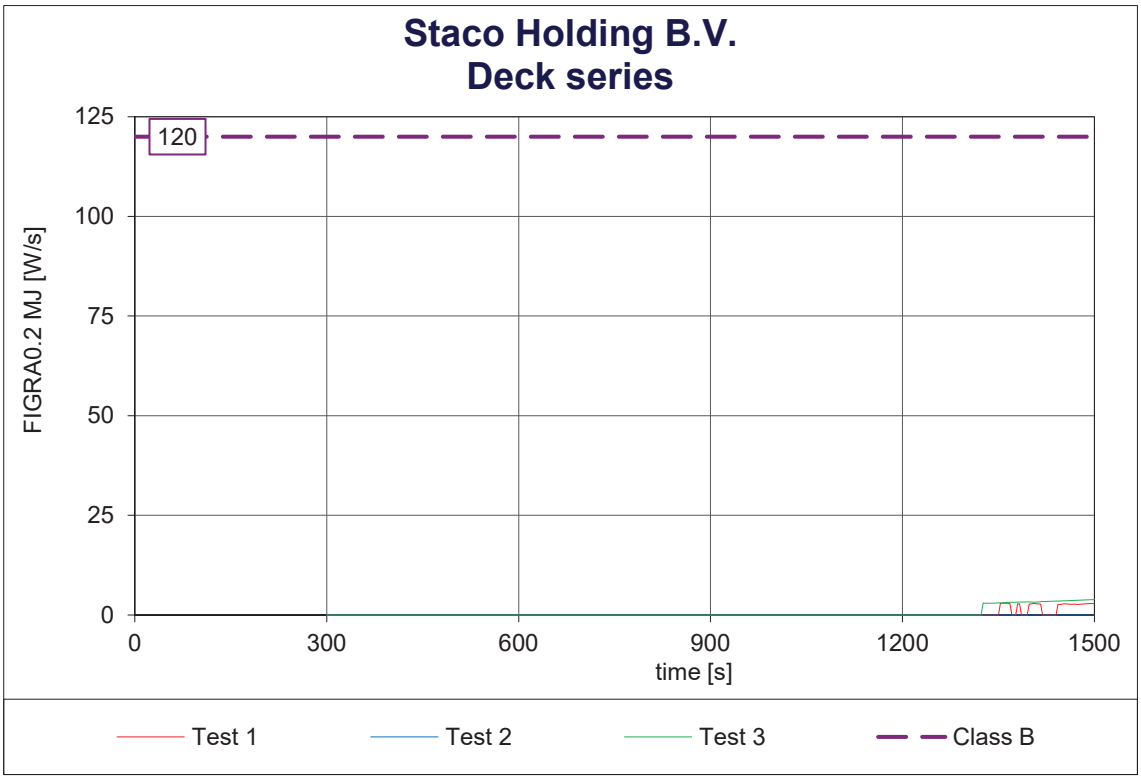

Chart 5: $FIGRA_{0.2\ MJ}$ [W/s]

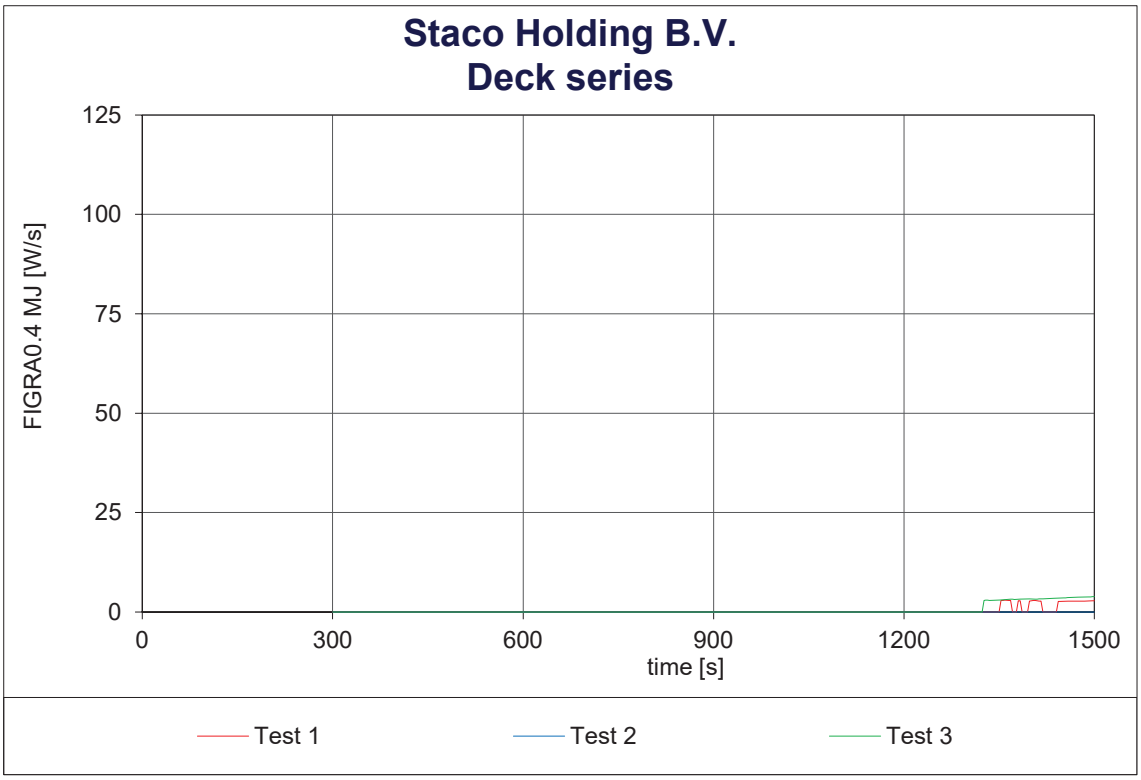

Chart 6: $FIGRA_{0.4\ MJ}$ [W/s]

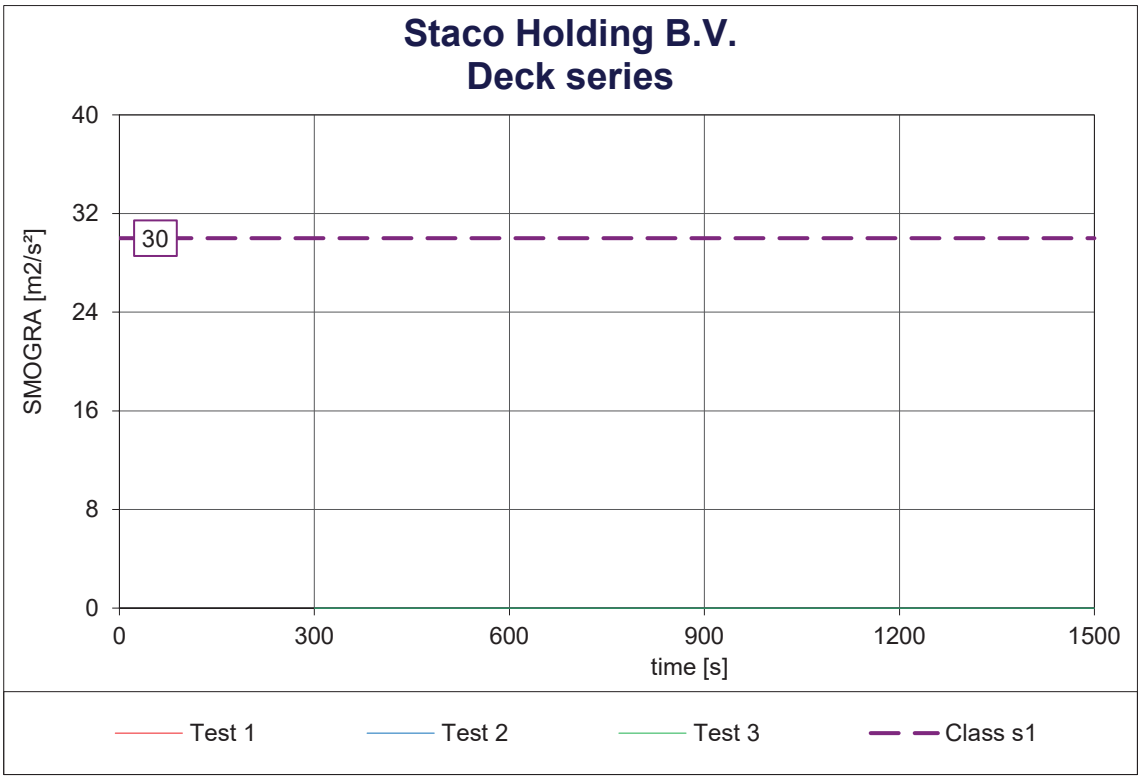

Chart 7: SMOGRA [m^2/s^2]

APPENDIX: PHOTOGRAPHS

Photographs 1 and 2: Specimen Deck series test 1 prior to testing

Photographs 3 and 4: Specimen Deck series test 1 after testing

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CLASSIFICATION OF REACTION TO FIRE PERFORMANCE IN ACCORDANCE WITH EN 13501-1:2018

Classification no.	2023-Efectis-R001040
Sponsor	Staco Holding B.V. Molenweg 1 5953 JR REUVER THE NETHERLANDS
Product name	**Deck series**
Prepared by	Efectis Nederland BV
Author(s)	J.L. Onderwater B.Sc. B.R. Knottnerus B.Sc. E.O. van der Laan M.Sc.
Project number	ENL-23-000705
Date of issue	September 2023
Number of pages	5

1. INTRODUCTION

This classification report defines the classification assigned to **Deck series** in accordance with the procedures given in EN 13501-1:2018.

2. DETAILS OF CLASSIFIED PRODUCT

2.1 GENERAL

The product, **Deck series**, is defined as a floor covering.

2.2 MANUFACTURER

Staco Holding B.V.
Molenweg 1
5953 JR REUVER
THE NETHERLANDS

2.3 PRODUCT DESCRIPTION

According to the sponsor the product is, from bottom to top / back to front composed of:

- deformed hot dip galvanized steel (S235) available in a thickness of 2 and 3 mm (tested thickness is 3 mm) (this steel sheet is composed to an open a plank-shaped panel with raised edges;
    - the steel sheet is provided with drainage holes; the mesh size of the holes varies between 6 and 8 mm (tested mesh size is 8 mm);
- an Uniprim steel primer is applied (between the steel profile and the EPDM on top of it);
- as infill Unifix-B-fl is used with a fire-retardant addition in the base product.
- the steel profile is filled with 10-15 mm EPDM grains, size 1-4 mm, in the colour black;
- the EPDM grains are bound together by a 1 component non yellowing solvent free polyurethane binder;
- the borders of each panel are finished with flat steel strips, thickness 3 mm.

The panels contain side plates with a standard height of 70 mm.

- The maximum panel width is 250 mm and are welded together at the ends.

The product has a mass per unit area range of approx. 47 to 65 kg/m^2, depending on the dimensions of the product.

3. STANDARDS, TEST REPORTS & TEST RESULTS IN SUPPORT OF CLASSIFICATION

3.1 APPLICABLE (PRODUCT) STANDARDS

EN ISO 11925-2:2020	Reaction to fire tests - Ignitability of products subjected to direct impingement of flame - Part 2: Single-flame source test
EN ISO 9239-1:2010	Reaction to fire tests for floorings - Part 1: Determination of the burning behaviour using a radiant heat source
EN 13238:2010	Reaction to fire tests for building products - Conditioning procedures and general rules for selection of substrates
EN 13501-1:2018	Fire classification of construction products and building elements

3.2 TEST REPORTS

Name of Laboratories	Name of sponsor	Test reports	Test method
Efectis Nederland BV THE NETHERLANDS	Staco Holding B.V. THE NETHERLANDS	2023-Efectis-R001038 2023-Efectis-R001041	EN ISO 11925-2:2020 EN ISO 9239-1:2010

3.3 TEST RESULTS

Test method & test number	Parameter	No. tests	Results	
			Continuous parameter – maximum	Compliance Parameters
EN ISO 11925-2				
surface flame impingement steel side	Fs ≤150 mm	2	20	-
	Ignition of filter paper		-	Compliant
Surface flame impingement EPDM side	Fs ≤150 mm	6	20	-
	Ignition of filter paper		-	Compliant

Test method & test number	Parameter	No. tests	Results	
			Continuous parameter – mean (m)	Compliance Parameters
EN ISO 9239-1				
Length variant	Critical Heat Flux [kW/m2]	3	≥ 11	-
	Smoke density [%.min]		6	-
Cross variant	Critical Heat Flux [kW/m2]	1	≥ 11	-
	Smoke density [%.min]		11	-

3.4 CLASSIFICATION CRITERIA

Classification criteria of the Flooring Radiant Panel (FRP) test			
Classification criteria			
Class Test method(s)	**B_{fl}**	**C_{fl}**	**D_{fl}**
EN ISO 11925-2 Exposure = 15 s	F_s ≤ 150 mm within 20 s		

EN ISO 9239-1 Critical flux [kW/m²]	≥ 8.0	≥ 4.5	≥ 3.0
Additional classification			
Smoke production	**s1** = ≤ 750% min **s2** = > 750% min		

4. CLASSIFICATION AND FIELD OF APPLICATION

4.1 REFERENCE OF CLASSIFICATION

This classification has been carried out in accordance with clause 12 of EN 13501-1:2018.

4.2 CLASSIFICATION

The product, **Deck series**, in relation to its reaction to fire behaviour is classified:

B_{fl}

The additional classification in relation to smoke production is:

s1

Reaction to fire classification: B_{fl} - s1

4.3 FIELD OF APPLICATION

This classification is valid for the following product parameters:

Thickness	≥ 40 mm (tested thickness is 40 mm)
Surface density	47 – 65 mm kg/m² depending on the dimensions
Colour	Black (EPDM)
Other properties	The grains are bound together by a polyurethane binder. A steel primer is applied between the EPDM and steel profile. The panels contain side plates with a standard height of 70 mm on every side.

This classification is valid for the following end use applications:

Substrate	Not applicable
Air gap	Yes
Methods and means of fixing	Loosely laid
Joints	Horizontally and vertically
Other aspects of end use conditions	Mesh size in the perforated steel was 8 mm

4.4 DURATION OF THE VALIDITY OF THIS CLASSIFICATION REPORT

Consult classification standard and national laws and regulations for limitations on the period of validity of the classification.

5. LIMITATIONS

This classification document does not represent type approval or certification of the product.

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REPORT

Reaction to fire testing of Deck series
Floor Radiant Panel test according to EN ISO 9239-1:2010

Report no.	2023-Efectis-R001041
Sponsor	Staco Holding B.V. Molenweg 1 5953 JR REUVER THE NETHERLANDS
Prepared by	Efectis Nederland BV
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Project number	ENL-23-000705
Date of issue	September 2023
Number of pages	9

1. PRODUCT IDENTIFICATION

Deck series, further referred to as 'the product'.

2. ABSTRACT

Determination of the reaction to fire properties of the product, when exposed to the thermal attack by a **Radiant Panel** according to EN ISO 9239-1:2010, with the objective to obtain the reaction to fire classification according to EN 13501-1:2018.

3. DETAILS OF THE PRODUCT TESTED

3.1 INTENDED APPLICATION

The product will be used as a floor covering.

3.2 MANUFACTURER

Staco Holding B.V.
Molenweg 1
5953 JR REUVER
THE NETHERLANDS

3.3 PRODUCT DESCRIPTION

According to the sponsor the product is, from bottom to top / back to front composed of:

- deformed hot dip galvanized steel (S235) available in a thickness of 2 and 3 mm (tested thickness is 3 mm) (this steel sheet is composed to an open a plank-shaped panel with raised edges;
    - the steel sheet is provided with drainage holes; the mesh size of the holes varies between 6 and 8 mm (tested mesh size is 8 mm);
- an Uniprim steel primer is applied (between the steel profile and the EPDM on top of it);
- as infill Unifix-B-fl is used with a fire-retardant addition in the base product.
- the steel profile is filled with 10-15 mm EPDM grains, size 1-4 mm, in the colour black;
- the EPDM grains are bound together by a 1 component non yellowing solvent free polyurethane binder;
- the borders of each panel are finished with flat steel strips, thickness 3 mm.

The panels contain side plates with a standard height of 70 mm.

- The maximum panel width is 250 mm and are welded together at the ends.

The product has a mass per unit area range of approx. 47 to 65 kg/m^2, depending on the dimensions of the product.
The tested thickness was 40 mm. The composition of the panels was adjusted (to accommodate the total thickness in this test).

4. DETAILS OF THE EXAMINATION

4.1 SAMPLE

Sampling procedure	The specimens were prepared and submitted by the sponsor.

Age	At the time of receipt: no information received.
Date of receipt	August 04, 2023

4.2 SPECIMEN PREPARATION

Preparation	The specimens were prepared by Efectis Nederland
Substrate used	Not applicable
Method of fixing	Mechanically with clamps

4.3 CONDITIONING

Prior to the examinations, the specimens were conditioned over a period of three weeks at a temperature of (23 ± 2) ºC and a relative humidity of (50 ± 5) % according to § 4.1 of EN 13238.

4.4 METHOD OF EXAMINATION

Number of tests	A total of 4 Radiant Panel Flooring tests were carried out, all in accordance with EN ISO 9239-1.
Deviations from the test method	None
Harmonised Product Standard	At the time of examination of the product, the sponsor was not aware of a related existing Harmonised Product Standard.
Assessment	One FRP test was performed with a ‘parallel’ and ‘cross’ oriented specimen, before it was decided to perform the full examination with the ’parallel’ oriented specimens.

4.5 EXAMINATION

Date of examination	August 21, 2023
Location of examination	Efectis Nederland BV, Bleiswijk, The Netherlands
Performed by	KSB + ZSA

The results are given in Table 1 of the Appendix: Results.

5. CONCLUSIONS

A formal classification is to be assessed in accordance with EN 13501-1, “Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests”.

Graphs of (Critical) Heat Flux, Attenuation (smoke), Smoke density (smoke) are presented hereafter followed by a photograph of the samples tested.

Remarks:
The test results relate to the behaviour of the test specimens of a 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.

J.L. Onderwater B.Sc.
Junior Project leader Reaction to Fire

B.R. Knottnerus B.Sc.
Project leader Reaction to Fire

E.O. van der Laan M.Sc.
Project leader Reaction to Fire

APPENDIX: RESULTS

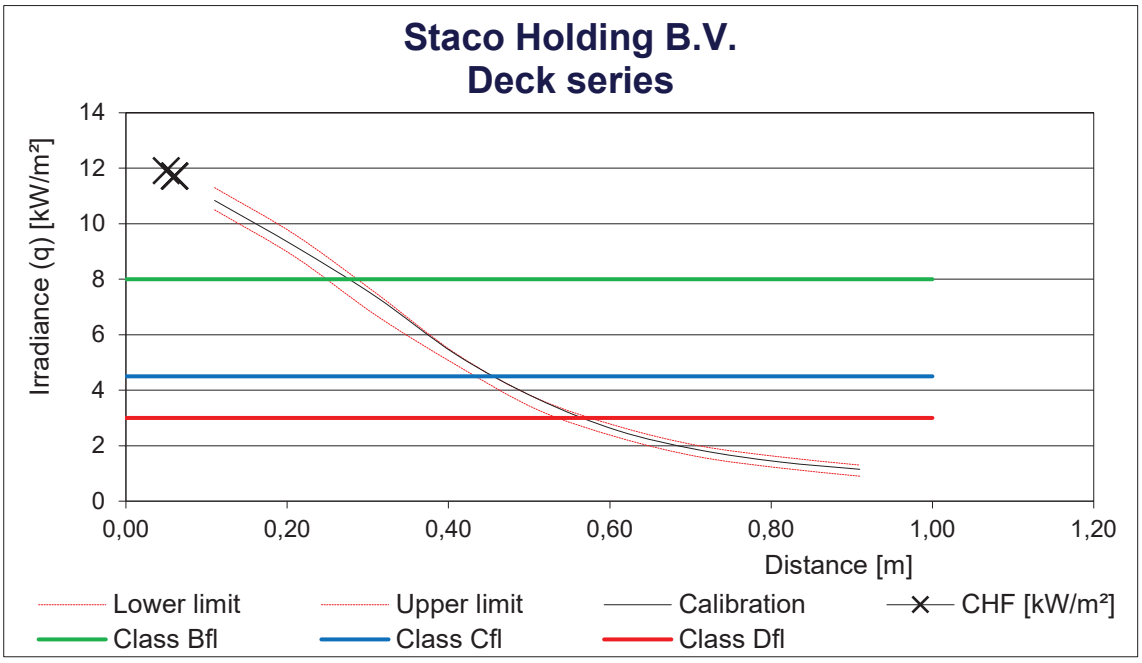
Table 1: Horizontal surface spread of flame, heat flux and light attenuation

Sample number		1	2	3	**Classification parameter**	4
Orientation/Description		Vertical oriented				Horizonal oriented
Spread of flame						
Distance	[mm]	Time [s]				
	60	452	511	0		697
	110	0	0	0		0
	160	0	0	0		0
	210	0	0	0		0
	260	0	0	0		0
	310	0	0	0		0
	360	0	0	0		0
	410	0	0	0		0
	460	0	0	0		0
	510	0	0	0		0
	560	0	0	0		0
	610	0	0	0		0
	660	0	0	0		0
	710	0	0	0		0
	760	0	0	0		0
	810	0	0	0		0
	860	0	0	0		0
	910	0	0	0		0
Maximum spread of flame						
Distance	[mm]	60	60	50		60
Flameout	[s]	754	749	769		845
(Critical) Heat Flux(CHF)						
CHF	[kW/m²]	>=11	>=11	>=11	**>=11**	>=11
Heat flux (HF) after 10, 20, 30 minutes						
Time	[min]	HF [kW/m²]				
	10	>=11	>=11	>=11	**>=11**	>=11
	20	>=11	>=11	>=11	**>=11**	>=11
	30	>=11	>=11	>=11	**>=11**	>=11
Light attenuation (LA)						
Smoke density	[%.min]	10	7	1	**6**	11
Test end	[s]	1800	1800	1800		1800

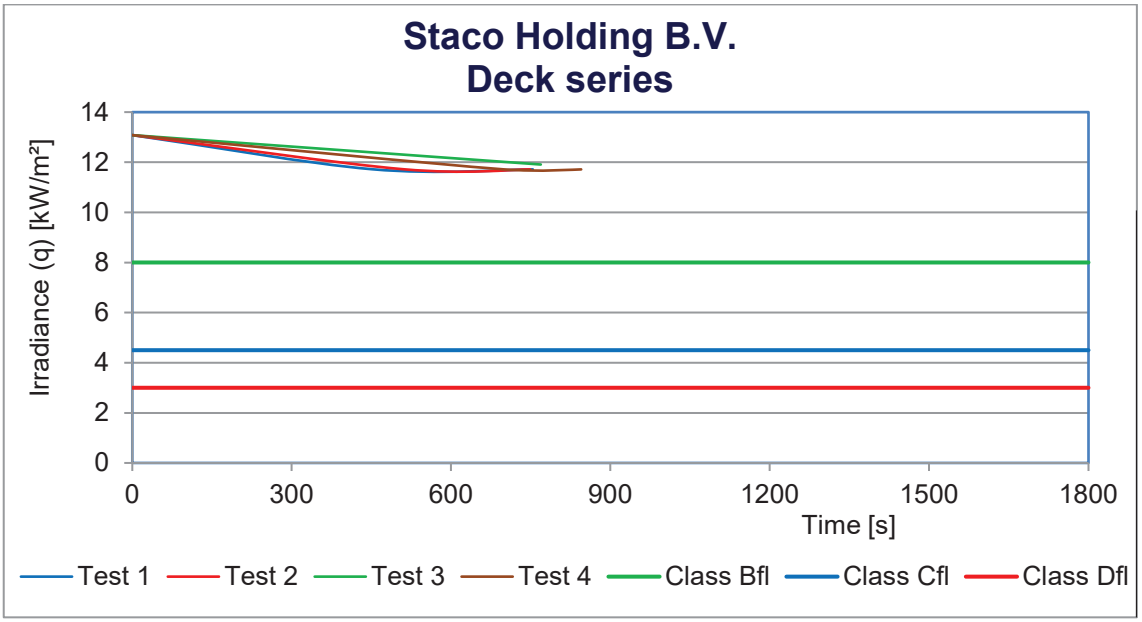
Observations of physical behaviour of the test specimen: None

APPENDIX: GRAPHS

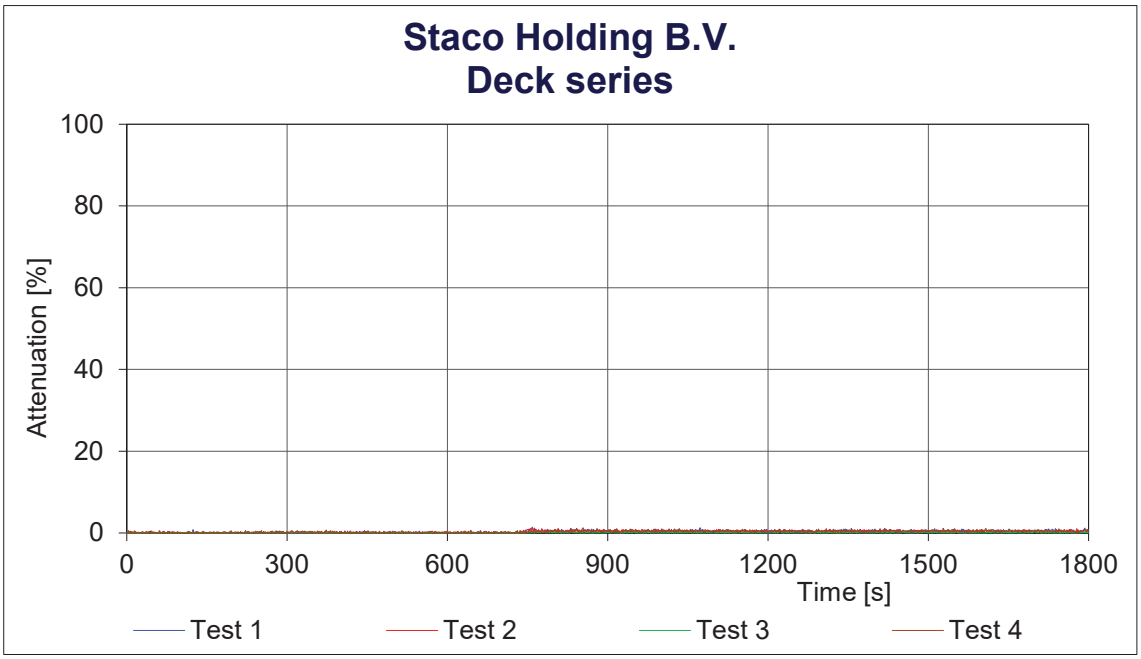
Graph 1: (Critical) Heat Flux, Radiant Panel Flooring Test
Graph 2: Flame spread vs time
Graph 3: Attenuation [%]
Graph 4: Smoke density [%.min]



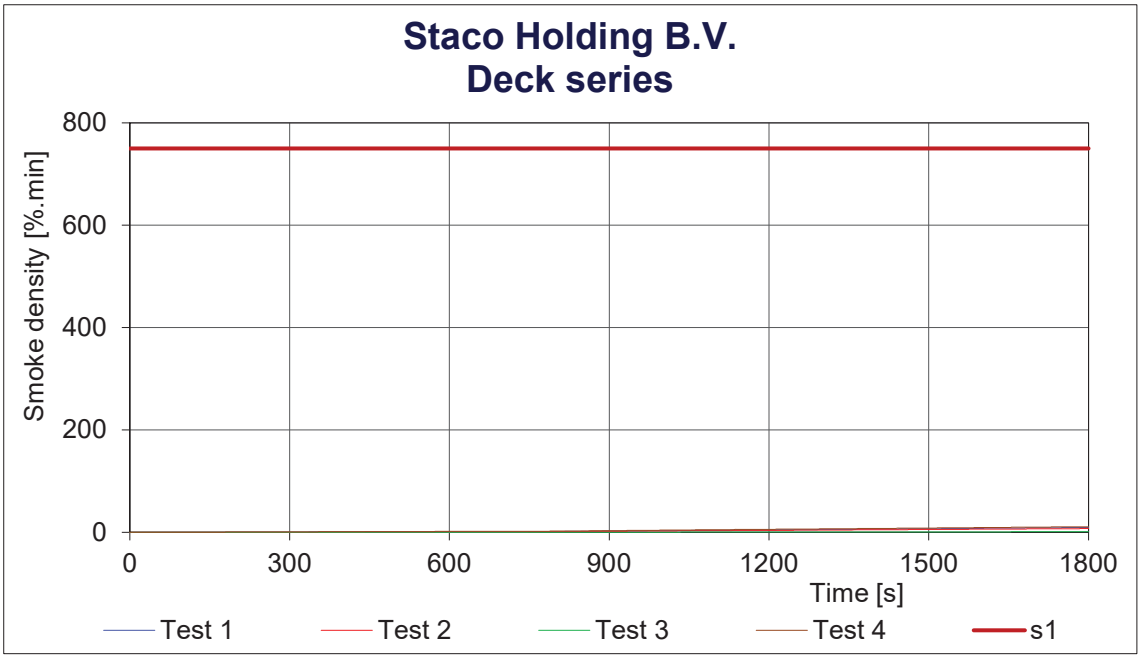
Graph 1: (Critical) Heat Flux, Radiant Panel Flooring Test



Graph 2: Flame spread vs time

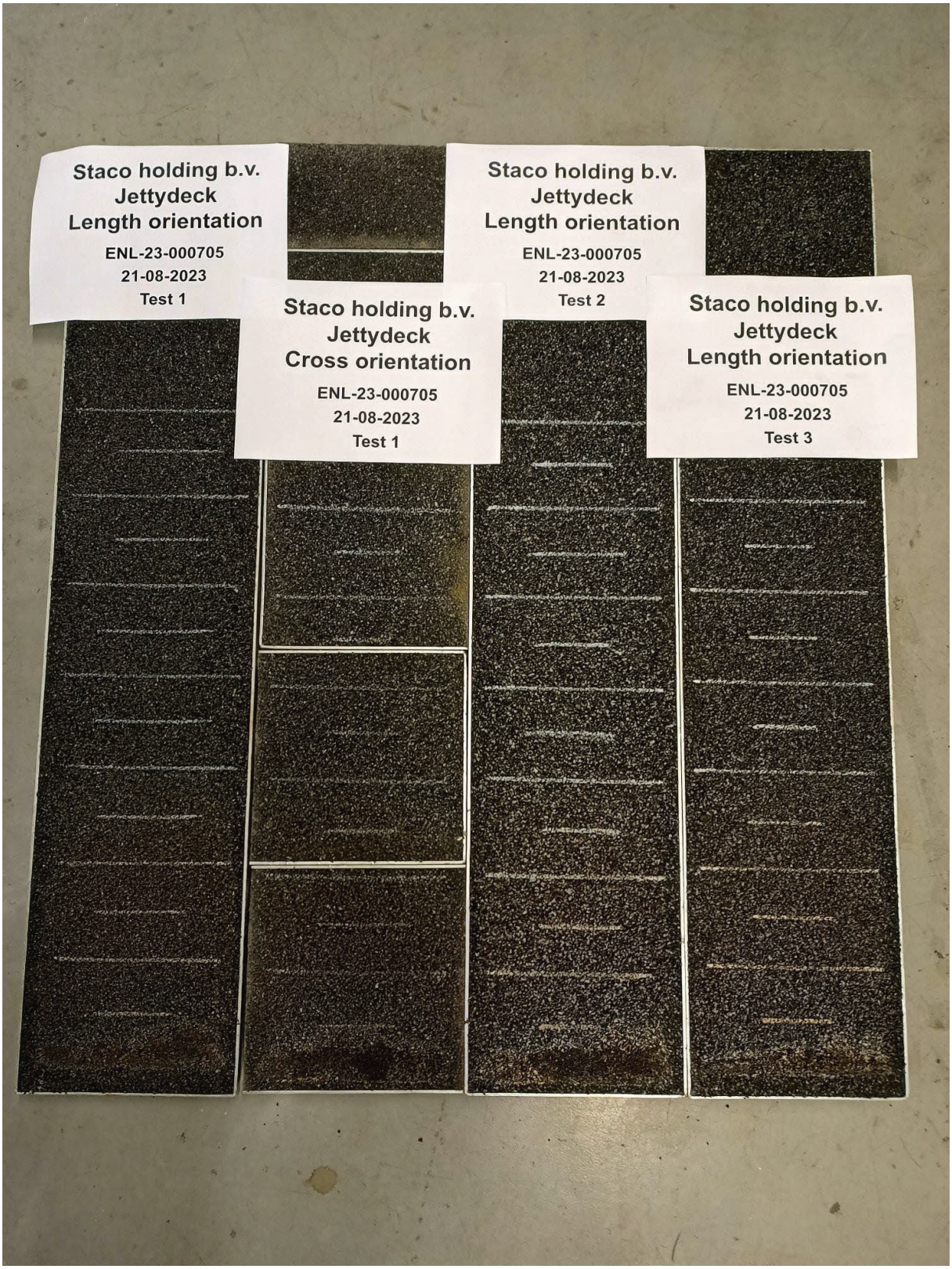


Graph 3: Attenuation [%]



Graph 4: Smoke density [%.min]

APPENDIX: PHOTOGRAPH



Photograph 1: Specimens after testing

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CLASSIFICATION

CLASSIFICATION OF REACTION TO FIRE PERFORMANCE IN ACCORDANCE WITH EN 13501-1:2018

Classification no.	2023-Efectis-R001043
Sponsor	Staco Holding B.V. Molenweg 1 5953 JR REUVER THE NETHERLANDS
Product name	**Deck series**
Prepared by	Efectis Nederland BV
Author(s)	J.L. Onderwater B.Sc. B.R. Knottnerus B.Sc. E.O. van der Laan M.Sc.
Project number	ENL-23-000705
Date of issue	September 2023
Number of pages	5

1. INTRODUCTION

This classification report defines the classification assigned to **Deck series**, in accordance with the procedures given in EN 13501-1:2018.

2. DETAILS OF CLASSIFIED PRODUCT

2.1 GENERAL

The product, **Deck series**, is defined as a ceiling.

2.2 MANUFACTURER

Staco Holding B.V.
Molenweg 1
5953 JR REUVER
THE NETHERLANDS

2.3 PRODUCT DESCRIPTION

According to the sponsor the product is, from bottom to top / back to front composed of:

- deformed hot dip galvanized steel (S235) available in a thickness of 2 and 3 mm (tested thickness is 3 mm) (this steel sheet is composed to an open a plank-shaped panel with raised edges;
    - the steel sheet is provided with drainage holes; the mesh size of the holes varies between 6 and 8 mm (tested mesh size is 8 mm);
- an Uniprim steel primer is applied (between the steel profile and the EPDM on top of it);
- as infill Unifix-B-fl is used with a fire-retardant addition in the base product.
- the steel profile is filled with 10-15 mm EPDM grains, size 1-4 mm, in the colour black;
- the EPDM grains are bound together by a 1 component non yellowing solvent free polyurethane binder;
- the borders of each panel are finished with flat steel strips, thickness 3 mm.

The panels contain side plates with a standard height of 70 mm.

- The maximum panel width is 250 mm and are welded together at the ends.

3. STANDARDS, REPORTS, RESULTS AND CRITERIA IN SUPPORT OF THIS CLASSIFICATION

3.1 APPLICABLE (PRODUCT) STANDARDS

EN ISO 11925-2:2020	Reaction to fire tests - Ignitability of products subjected to direct impingement of flame - Part 2: Single-flame source test
EN 13823:2020+A1:2022	Reaction to fire tests for building products - Building products, excluding floorings exposed to the thermal attack by a single burning item
EN 13238:2010	Reaction to fire tests for building products - Conditioning procedures and general rules for selection of substrates
EN 13501-1:2018	Fire classification of construction products and building elements Part 1: Classification using data from reaction to fire tests

3.2 REPORTS

Name of Laboratories	Name of sponsor	Report ref. no.	Test method
Efectis Nederland BV THE NETHERLANDS	Staco Holding B.V. THE NETHERLANDS	2023-Efectis-R001038 2023-Efectis-R001039	EN ISO 11925-2:2020 EN 13823:2020+A1:2022

3.3 TEST RESULTS

Test method and test number	Parameter	No. tests	Results	
			Continuous parameter – maximum	Compliance with parameters
EN ISO 11925-2				
Surface flame Impingement steel side	Fs ≤150 mm	2	20	-
	Ignition of filter paper		-	Compliant
Surface flame Impingement EPDM	Fs ≤150 mm	6	20	-
	Ignition of filter paper		-	Compliant
Edge flame Impingement steel side	Fs ≤150 mm	2	5	-
	Ignition of filter paper		-	Compliant
Edge flame Impingement EPDM	Fs ≤150 mm	6	5	-
	Ignition of filter paper		-	Compliant

Test method and test number	Parameter	No. tests	Results	
			Continuous parameter – mean (m)	Compliance with parameters
EN 13823				
Steel side	$FIGRA_{0.2MJ}$ [W/s]	3	2	-
	$FIGRA_{0.4MJ}$ [W/s]		2	-
	THR_{600s} [MJ]		0.5	-
	LFS < edge		-	Compliant
	SMOGRA [m^2/s^2]		0	-
	TSP_{600s} [m^2]		1	-
	Flaming debris - flaming ≤ 10 s - flaming > 10 s		 - -	 Compliant Compliant

3.4 CLASSIFICATION CRITERIA

Fire classification of construction products and building elements Excluding floorings and linear pipe thermal insulation products			
Classification criteria			
Class Test method(s)	**B**	**C**	**D**
EN ISO 11925-2 Exposure = 30 s	$F_s \leq 150$ mm within 60 s Ignition of the paper in EN ISO 11925-2 results in a d2 classification.		
EN 13823	$FIGRA_{0.2\ MJ} \leq 120$ W/s LFS < edge of specimen $THR_{600s} \leq 7.5$ MJ	$FIGRA_{0.4\ MJ} \leq 250$ W/s LFS < edge of specimen $THR_{600s} \leq 15$ MJ	$FIGRA_{0.4\ MJ} \leq 750$ W/s
Additional classification			
Smoke production	**s1** = SMOGRA ≤ 30 m^2/s^2 and $TSP_{600s} \leq 50$ m^2 ; **s2** = SMOGRA ≤ 180 m^2/s^2 and $TSP_{600s} \leq 200$ m^2; **s3** = not s1 or s2		
Flaming Droplets/particles	**d0** = no flaming droplets/ particles in EN 13823 within 600 s; **d1** = no flaming droplets/ particles persisting longer than 10 s in EN 13823 within 600 s; **d2** = not d0 or d1.		

4. CLASSIFICATION AND FIELD OF APPLICATION

4.1 REFERENCE OF CLASSIFICATION

This classification has been carried out in accordance with clause 11 of EN 13501-1:2018.

4.2 CLASSIFICATION

The product, **Deck series**, in relation to its reaction to fire behaviour is classified:

B

The additional classification in relation to smoke production is:

s1

The additional classification in relation to flaming droplets / particles is:

d0

Reaction to fire classification: B – s1, d0

4.3 FIELD OF APPLICATION

This classification is valid for the following product parameters:

Thickness	Steel plates 3 mm. Total panel thickness 65mm
Surface density	47 to 65 kg/m^2 depending on the dimensions of the panels
Colour	Black (EPDM)
Other properties	The EPDM grains are bound together by a polyurethane binder. A steel primer is applied between the EPDM and steel profile. The panels contain side plates with a standard height of 70 mm on every side.

This classification is valid for the following end use applications:

Substrate	Not applicable
Application	Free hanging
Air gap	Yes
Methods and means of fixing	The steel upright side plates are welded onto each other.
Joints	No (No other than between adjacent panels.)
Other aspects of end use conditions	Mesh size in the perforated steel 8 mm

4.4 DURATION OF THE VALIDITY OF THIS CLASSIFICATION REPORT

Consult classification standard and national laws and regulations for limitations on the period of validity of the classification.

5. LIMITATIONS

This classification document does not represent type approval or certification of the product.

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Junior Project leader Reaction to Fire

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Project leader Reaction to Fire

E.O. van der Laan M.Sc.
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Report

Staco Holding B.V.
Attn. Mr. L. Habets
Molenweg 1
5953 JR REUVER
THE NETHERLANDS

Our reference	2023-Efectis-R001050/ORJ/TNL	Bleiswijk (NL), September 18, 2023
Your reference	Contact July 4, 2023	
Project number	ENL-23-000705	

Reaction to fire testing of deck series EPDM side

Dear Mr. Habets,

On August 21, 2023, we have performed, on behalf of your firm, an indicative Single Burning Item (SBI) test according to EN 13823:2020+A1:2022 to determine the reaction to fire behaviour of **deck series EPDM side**.

1. PURPOSE OF TESTING

The purpose of the tests was to find out whether the product could achieve the desired classification B according to the European classification standard EN 13501-1:2018.

Immediately after testing you were informed about the test results.
This letter is meant as a final reporting of this part of the examination program on the products described.

2. SAMPLES

On August 04, 2023, a representative sample of the product type was submitted by your firm. According to the sponsor the product is, from bottom to top / back to front composed of:

- deformed hot dip galvanized steel (S235) available in a thickness of 2 and 3 mm (tested thickness is 3 mm) (this steel sheet is composed to an open a plank-shaped panel with raised edges;
    - the steel sheet is provided with drainage holes; the mesh size of the holes varies between 6 and 8 mm (tested mesh size is 8 mm);
- an Uniprim steel primer is applied (between the steel profile and the EPDM on top of it);
- as infill Unifix-B-fl is used with a fire-retardant addition in the base product.
- the steel profile is filled with 10-15 mm EPDM grains, size 1-4 mm, in the colour black;
- the EPDM grains are bound together by a 1 component non yellowing solvent free polyurethane binder;
- the borders of each panel are finished with flat steel strips, thickness 3 mm.

The panels contain side plates with a standard height of 70 mm.

- The maximum panel width is 250 mm and are welded together at the ends.

2.1 SPECIMEN PREPARATION

The long wing of the specimen was provided with horizontal joints at a distance of the working width from the bottom. The long wing was not provided with vertical joints. Both short and long wings were positioned with a ventilated air gap of 80 mm to a backing board.

3. EXAMINATION

Prior to testing the specimens were conditioned according to EN 13238:2010.
In total one Single Burning Item (SBI) test according to EN 13823 was carried out.

3.1 TEST RESULT SBI-TESTS

Table 1: Results Single Burning Item test

Test parameter	Test number	1
FIGRA Threshold: 0.2 MJ	[W/s]	128
FIGRA Threshold: 0.4 MJ	[W/s]	128
THR_{600s}	[MJ]	12.7
Lateral flame spread to the edge of the long wing specimen (LFS)	{Y=Yes/N=No}	N
SMOGRA	[m^2/s^2]	6.2
TSP_{600s}	[m^2]	59
Flaming droplets/particles ≤ 10 s, within 600 sec	{Y=Yes/N=No}	N
Flaming droplets/particles > 10 s, within 600 sec	{Y=Yes/N=No}	N

Classification criteria of the Single Burning Item (SBI) test only to be used after a full examination

Class	Classification criteria	Class	Classification criteria
A2	$FIGRA_{0.2\ MJ}$ ≤ 120 W/s LFS < edge of the long wing specimen THR_{600s} ≤ 7,5 MJ	s1	SMOGRA ≤ 30 m^2/s^2 TSP_{600s} ≤ 50 m^2
		s2	SMOGRA ≤ 180 m^2/s^2 TSP_{600s} ≤ 200 m^2
B	$FIGRA_{0.2\ MJ}$ ≤ 120 W/s LFS < edge of the long wing specimen THR_{600s} ≤ 7,5 MJ	s3	Not s1 or s2
C	$FIGRA_{0.4\ MJ}$ ≤ 250 W/s LFS < edge of the long wing specimen THR_{600s} ≤ 15 MJ	d0	No flaming droplets/particles
		d1	No flaming droplets/particles longer than 10 s
D	FIGRA ≤ 750 W/s	d2	Not d0 or d1

FIGRA	FIre Growth RAte. The maximum quotient of the heat release of the test specimen and the moment of occurrence, using a THR-threshold 0,2 MJ or 0,4 MJ
THR	Total Heat Release Total heat release of the test specimen during the first 600s exposure to the flames of the main burner.
LFS	Lateral Flame Spread. Horizontal flame spread across the long wing of the test specimen.
SMOGRA	SMOke Growth RAte. The maximum quotient of the smoke production of the test specimen and the moment of occurrence.
TSP	Total Smoke Production. Total smoke production of the test specimen during the first 600s of exposure to the flames of the main burner.

4. ASSESSMENT

Based on the table with classification criteria the possible classification of the product can be determined, when a complete test series according EN 13823 would be performed.

Only based on the classification parameters results of a complete test series a formal classification can be determined. As with an indicative examination this requirement is not fulfilled, no classification can be given.

4.1 REMARK

Indicative examination is carried out by Efectis Nederland to give the contractor insight in the reaction to fire behaviour properties of the product(s).

The test results relate to the behaviour of the test specimens of a 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.

This report covers a test which was conducted to a procedure which is not the subject of a standard test, but utilised the principles of standard EN 13823. The presentation of the results in this short form may not satisfy the requirements of that standard. Since fire tests are the subject of a continuing standardisation process and because existing tests are the subject of review and possible amendment and new interpretations, it is recommended that the report be referred back to Efectis after a period of 3-5 years to ensure that the methodology adopted remains valid at that time. Note: National procedures and requirements with respect to test reports may be different to those presented herein. In that case national requirements should be paramount.

Best regards,

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Project leader Reaction to Fire

E.O. van der Laan M.Sc.
Project leader Reaction to Fire

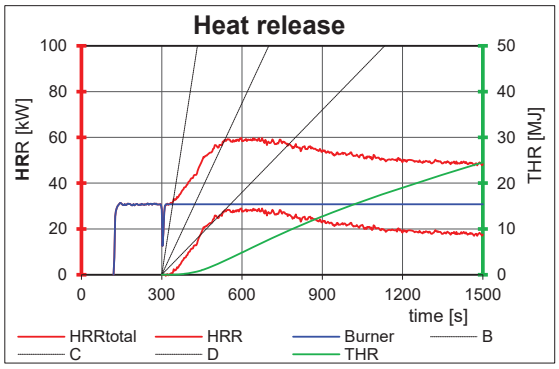
Efectis Nederland

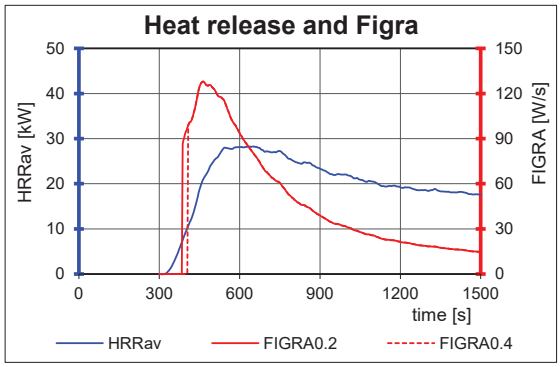
Data processing

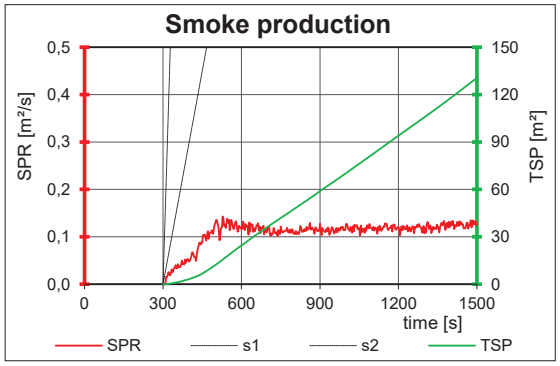
SBI-Test

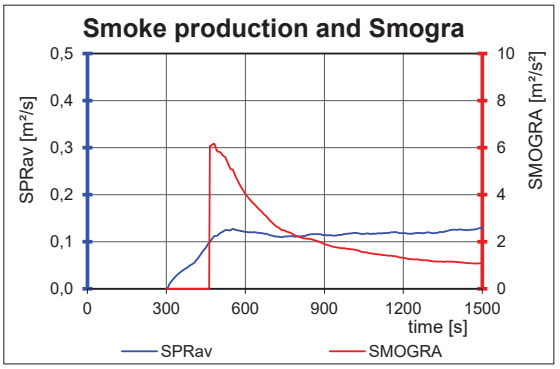
Preliminary SBI classification

Construction products









Classification criteria		A1*	A2-B	C	D
$FIGRA_{0.2MJ}$	[W/s] <=	20	120		
$FIGRA_{0.4MJ}$	[W/s] <=			250	750
THR_{600s}	[kW] <=	4	7,5	15	
		s1, d0	**s1**	**s2**	**s3**
SMOGRA	[m^2/s^2] <=		30	180	not s1/s2
TSP_{600s}	[m^2] <=		50	200	not s1/s2

* External non-substantial component having PCS > 2,0 MJ/kg and a PCS ≤ 2,0 MJ/m²

Final classification assessment is based on 3 repetative SBI tests and other tests:
- **A1: EN ISO 1182 or EN ISO 1716**
- **A2: EN ISO 1182 or EN ISO 1716**
- **B, C, D: EN ISO 11925-2**

General information

Date of test	21/08/2023
Report identification number/file	ENL-23-000705_1.xls
Operator	BKS

Specimen

Sponsor	staco holding
Description	jetty deck voorkant zwart test 1
Standard used	EN 13823:2020

Fire attack

Start of test	[s]	300
Burner exposure time	[s]	1200
Burner exposure level	[kW]	30,8

Std 0,19

Results

Heat release related

			t-t0 [s]	t [s]
Peak HRR_{av} (t<t0+600s)	[kW]	28,3	351	651
Peak HRR_{av} (t<t0+900s)	[kW]	28,3	351	651
Peak HRR_{av} (t<t0+1200s)	[kW]	28,3	351	651
(t0 = 300s)				
$Figra_{0.2\ MJ}$	[W/s]	128		
$Figra_{0.4\ MJ}$	[W/s]	128		C
Figra	**[W/s]**	**128**		**C**
$Figra_{0.2\ MJ}$: Corresponding HRRav	[kW]	21,1	165	465
$Figra_{0.4\ MJ}$: Corresponding HRRav	[kW]	21,1	165	465
t(HRR_{av} >= 3 kW)			60	360
(HRR_{av} + t(THR_{ta})) >= 0.2 MJ	[kW]	7,51	87	387
(HRR_{av} + t(THR_{ta})) >= 0.4 MJ	[kW]	10,7	108	408
THR_{ta} (t0+600s)	**[MJ]**	**12,74**		**C**
THR_{ta} (t0+900s)	[MJ]	19,0		
THR_{ta} (t0+1200s)	[MJ]	24,5		
(t0 = 300s)			**Estimated class:**	**C**

Lateral flame spread

Till long wing end of specimen	No	No = not to long wing end of specimen
		Estimated class: C

Smoke production related

			t-t0 (s)	t(s)
Peak SPR_{av} (t<t0+600s)	[m^2/s]	0,13	252	552
Peak SPR_{av} (t<t0+900s)	[m^2/s]	0,13	252	552
Peak SPR_{av} (t<t0+1200s)	[m^2/s]	0,13	1200	1500
(t0 = 300s)				
Smogra max	**[m^2/s^2]**	**6,2**		**s1**
at SPR_{av}	[m^2/s]	0,11	180	480
t(SPR_{av} >= 0.1 m^2/s)			165	465
t(TSP_{ta} >= 6 m^2)			144	444
TSP_{ta} (t0_t0+600s)	**[m^2]**	**59**		**s2**
TSP_{ta} (t0_t0+900s)	[m^2]	94		
TSP_{ta} (t0_t0+1200s)	[m^2]	131		
(t0 = 300s)			**Estimated class:**	**s2**

Flaming droplets/particles related

Flaming droplets/particles

FDP (t0_t0+600s)	No	No = no flaming droplets/particles
FDP (t0_t0+600s) F>10s	No	No = no flaming droplets/particles F>10s
(not d0 or d1)		
		Estimated class: d0

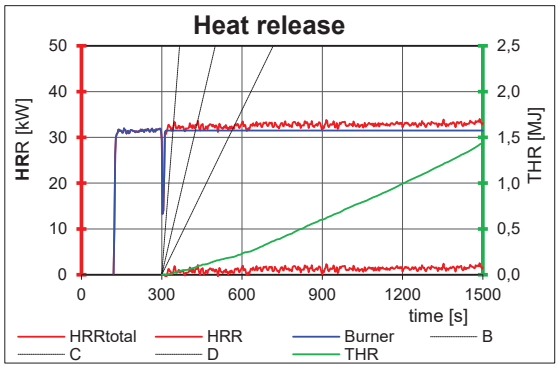
Efectis Nederland

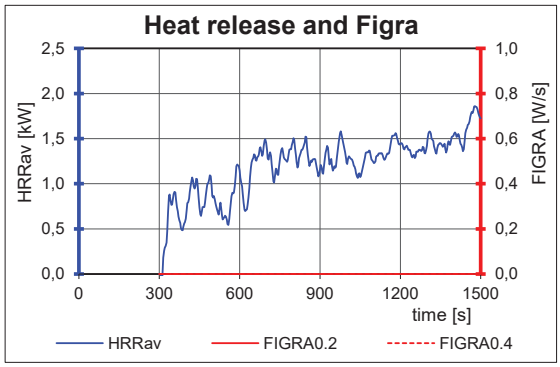
Data processing

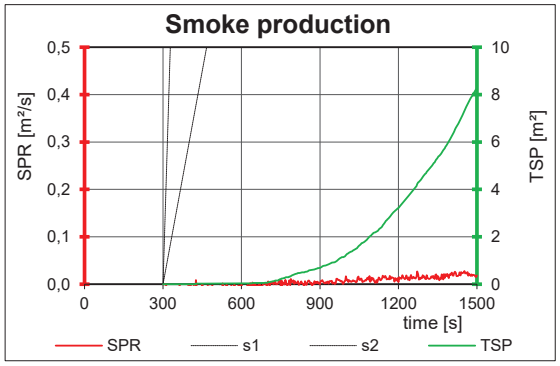
SBI-Test

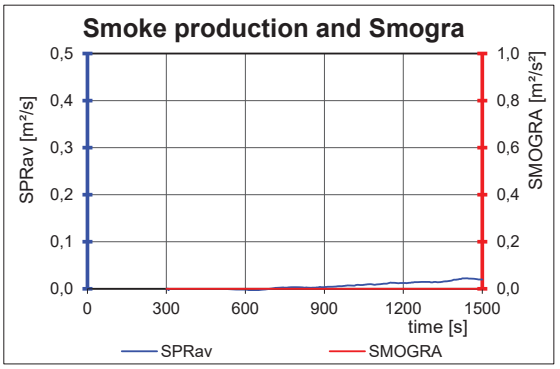
Preliminary SBI classification

Construction products









Classification criteria		A1*	A2-B	C	D
$FIGRA_{0.2MJ}$	[W/s] <=	20	120		
$FIGRA_{0.4MJ}$	[W/s] <=			250	750
THR_{600s}	[kW] <=	4	7,5	15	
		s1, d0	**s1**	**s2**	**s3**
SMOGRA	[m^2/s^2] <=		30	180	not s1/s2
TSP_{600s}	[m^2] <=		50	200	not s1/s2

* External non-substantial component having PCS > 2,0 MJ/kg and a PCS ≤ 2,0 MJ/m²

Final classification assessment is based on 3 repetative SBI tests and other tests:
- **A1: EN ISO 1182 or EN ISO 1716**
- **A2: EN ISO 1182 or EN ISO 1716**
- **B, C, D: EN ISO 11925-2**

General information

Date of test	21/08/2023
Report identification number/file	ENL-23-000705_3.xls
Operator	BKS

Specimen

Sponsor	staco holding b.v.
Description	jetty deck achterkant test 2
Standard used	EN 13823:2020

Fire attack

Start of test	[s]	300
Burner exposure time	[s]	1200
Burner exposure level	[kW]	31,5

Std 0,23

Results

Heat release related

			t-t0 [s]	t [s]	
Peak HRR_{av} (t<t0+600s)	[kW]	1,5	546	846	
Peak HRR_{av} (t<t0+900s)	[kW]	1,6	678	978	
Peak HRR_{av} (t<t0+1200s)	[kW]	1,9	1179	1479	
(t0 = 300s)					
$Figra_{0.2\ MJ}$	[W/s]	0			B or better
$Figra_{0.4\ MJ}$	[W/s]	0			
Figra	**[W/s]**	**0**			**B or better**
$Figra_{0.2\ MJ}$: Corresponding HRRav	[kW]	n/a	n/a	n/a	
$Figra_{0.4\ MJ}$: Corresponding HRRav	[kW]	n/a	n/a	n/a	
t(HRRav >= 3 kW)			n/a	n/a	
(HRRav + t(THR_{ta})) >= 0.2 MJ	[kW]	n/a	n/a	n/a	
(HRRav + t(THR_{ta})) >= 0.4 MJ	[kW]	n/a	n/a	n/a	
THR_{ta} (t0+600s)	**[MJ]**	**0,60**			**B or better**
THR_{ta} (t0+900s)	[MJ]	1,0			
THR_{ta} (t0+1200s)	[MJ]	1,4			
(t0 = 300s)			**Estimated class:**		**B or better**

Lateral flame spread

Till long wing end of specimen	No	No = not to long wing end of specimen
		Estimated class: B or better

Smoke production related

			t-t0 (s)	t(s)	
Peak SPR_{av} (t<t0+600s)	[m²/s]	0,00	582	882	
Peak SPR_{av} (t<t0+900s)	[m²/s]	0,01	852	1152	
Peak SPR_{av} (t<t0+1200s)	[m²/s]	0,02	1140	1440	
(t0 = 300s)					
Smogra max	**[m^2/s^2]**	**0,0**			**s1**
at SPR_{av}	[m²/s]	n/a	n/a	n/a	
t(SPR_{av} >= 0.1 m²/s)			n/a	n/a	
t(TSP_{ta} >= 6 m²)			1092	1392	
TSP_{ta} (t0_t0+600s)	**[m²]**	**1**			**s1**
TSP_{ta} (t0_t0+900s)	[m²]	3			
TSP_{ta} (t0_t0+1200s)	[m²]	8			
(t0 = 300s)			**Estimated class:**		**s1**

Flaming droplets/particles related

Flaming droplets/particles

FDP (t0_t0+600s)	No	No = no flaming droplets/particles
FDP (t0_t0+600s) F>10s	No	No = no flaming droplets/particles F>10s
(not d0 or d1)		
		Estimated class: d0

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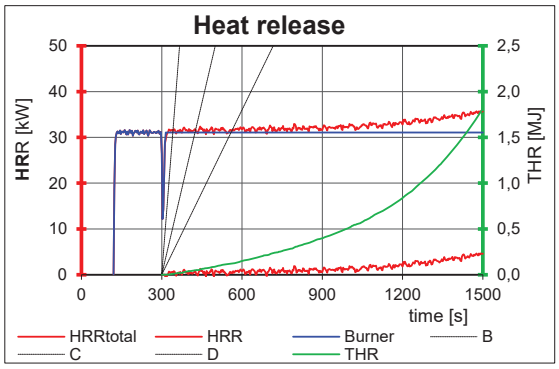
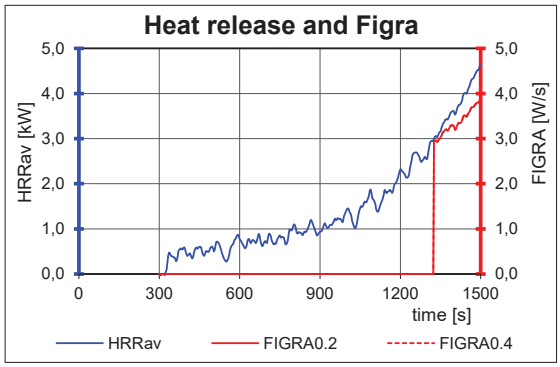
Data processing

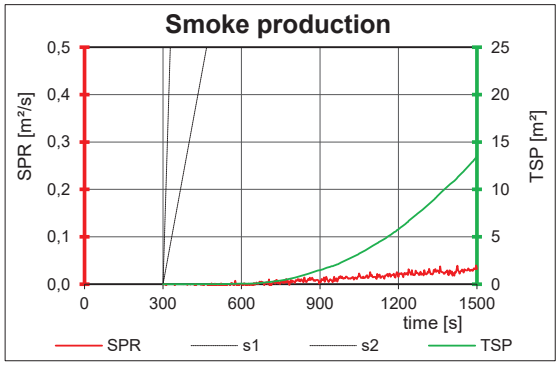
SBI-Test

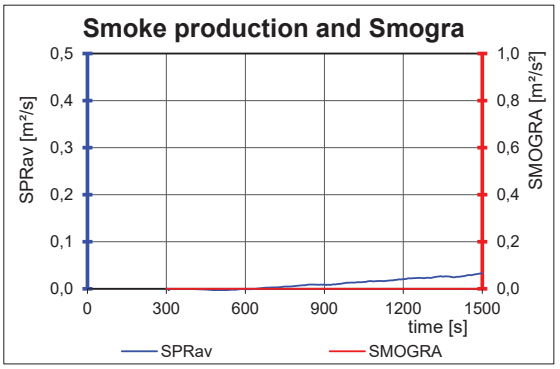
Preliminary SBI classification

Construction products









Classification criteria		A1*	A2-B	C	D
$FIGRA_{0.2MJ}$	[W/s] <=	20	120		
$FIGRA_{0.4MJ}$	[W/s] <=			250	750
THR_{600s}	[kW] <=	4	7,5	15	
		s1, d0	s1	s2	s3
SMOGRA	[m^2/s^2] <=		30	180	not s1/s2
TSP_{600s}	[m^2] <=		50	200	not s1/s2

* External non-substantial component having PCS > 2,0 MJ/kg and a PCS ≤ 2,0 MJ/m²

Final classification assessment is based on 3 repetative SBI tests and other tests:
- **A1: EN ISO 1182 or EN ISO 1716**
- **A2: EN ISO 1182 or EN ISO 1716**
- **B, C, D: EN ISO 11925-2**

General information

Date of test		21/08/2023
Report identification number/file		ENL-23-000705_4.xls
Operator		BKS

Specimen

Sponsor		staco holding b.v.
Description		jetty deck achterkant test 3
Standard used		EN 13823:2020

Fire attack

Start of test	[s]	300
Burner exposure time	[s]	1200
Burner exposure level	[kW]	31,0

Std 0,30

Results

Heat release related

			t-t0 [s]	t [s]	
Peak HRR_{av} (t<t0+600s)	[kW]	1,2	567	867	
Peak HRR_{av} (t<t0+900s)	[kW]	2,3	900	1200	
Peak HRR_{av} (t<t0+1200s)	[kW]	4,7	1200	1500	
(t0 = 300s)					
$Figra_{0.2\ MJ}$	[W/s]	4			B or better
$Figra_{0.4\ MJ}$	[W/s]	4			
Figra	**[W/s]**	**4**			**B or better**
$Figra_{0.2\ MJ}$: Corresponding HRR_{av}	[kW]	4,7	1200	1500	
$Figra_{0.4\ MJ}$: Corresponding HRR_{av}	[kW]	4,7	1200	1500	
t(HRR_{av} >= 3 kW)			1026	1326	
(HRR_{av} + t(THR_{ta})) >= 0.2 MJ	[kW]	3,01	1026	1326	
(HRR_{av} + t(THR_{ta})) >= 0.4 MJ	[kW]	3,0	1026	1326	
THR_{ta} (t0+600s)	**[MJ]**	**0,40**			**B or better**
THR_{ta} (t0+900s)	[MJ]	0,8			
THR_{ta} (t0+1200s)	[MJ]	1,8			
(t0 = 300s)				**Estimated class:**	**B or better**

Lateral flame spread

Till long wing end of specimen		No	No = not to long wing end of specimen
			Estimated class: **B or better**

Smoke production related

			t-t0 (s)	t(s)	
Peak SPR_{av} (t<t0+600s)	[m^2/s]	0,01	543	843	
Peak SPR_{av} (t<t0+900s)	[m^2/s]	0,02	900	1200	
Peak SPR_{av} (t<t0+1200s)	[m^2/s]	0,03	1200	1500	
(t0 = 300s)					
Smogra max	**[m^2/s^2]**	**0,0**			**s1**
at SPR_{av}	[m^2/s]	n/a	n/a	n/a	
t(SPR_{av} >= 0.1 m^2/s)			n/a	n/a	
t(TSP_{ta} >= 6 m^2)			912	1212	
TSP_{ta} (t0_t0+600s)	**[m^2]**	**1**			**s1**
TSP_{ta} (t0_t0+900s)	[m^2]	6			
TSP_{ta} (t0_t0+1200s)	[m^2]	13			
(t0 = 300s)				**Estimated class:**	**s1**

Flaming droplets/particles related

Flaming droplets/particles

FDP (t0_t0+600s)	No	No = no flaming droplets/particles
FDP (t0_t0+600s) F>10s	No	No = no flaming droplets/particles F>10s
(not d0 or d1)		
		Estimated class: **d0**

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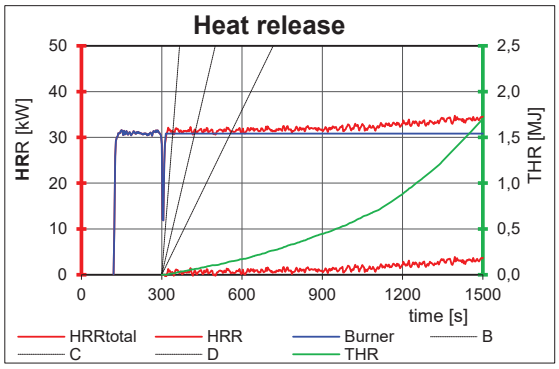
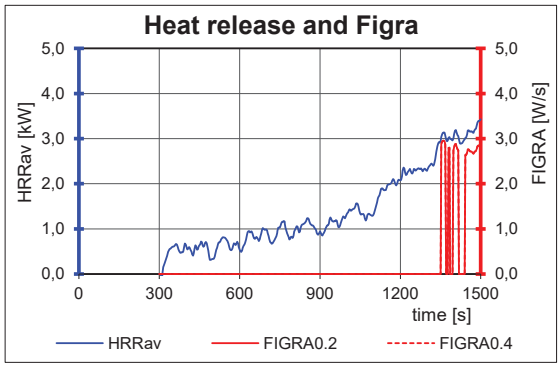
Data processing

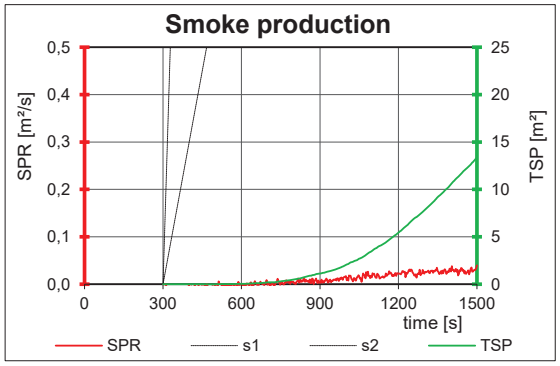
SBI-Test

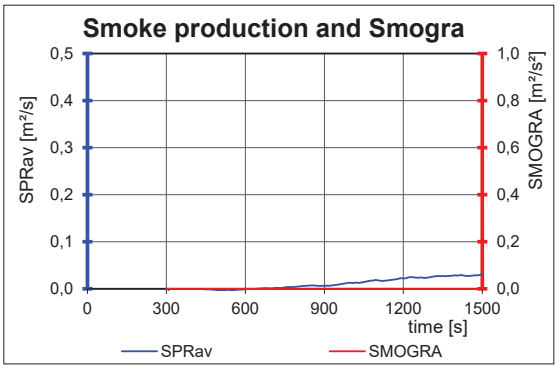
Preliminary SBI classification

Construction products









Classification criteria		A1*	A2-B	C	D
$FIGRA_{0.2MJ}$	[W/s] <=	20	120		
$FIGRA_{0.4MJ}$	[W/s] <=			250	750
THR_{600s}	[kW] <=	4	7,5	15	
		s1, d0	s1	s2	s3
SMOGRA	[m^2/s^2] <=		30	180	not s1/s2
TSP_{600s}	[m^2] <=		50	200	not s1/s2

* External non-substantial component having PCS > 2,0 MJ/kg and a PCS ≤ 2,0 MJ/m²

Final classification assessment is based on 3 repetative SBI tests and other tests:
- **A1: EN ISO 1182 or EN ISO 1716**
- **A2: EN ISO 1182 or EN ISO 1716**
- **B, C, D: EN ISO 11925-2**

General information

Date of test	21/08/2023
Report identification number/file	ENL-23-000705_2.xls
Operator	BKS

Specimen

Sponsor	staco holding b.v.
Description	jetty deck achterkant test 1
Standard used	EN 13823:2020

Fire attack

Start of test	[s]	300
Burner exposure time	[s]	1200
Burner exposure level	[kW]	30,8

Std 0,24

Results

Heat release related

			t-t0 [s]	t [s]	
Peak HRR_{av} (t<t0+600s)	[kW]	1,2	555	855	
Peak HRR_{av} (t<t0+900s)	[kW]	2,1	873	1173	
Peak HRR_{av} (t<t0+1200s)	[kW]	3,4	1200	1500	
(t0 = 300s)					
$Figra_{0.2\ MJ}$	[W/s]	3			B or better
$Figra_{0.4\ MJ}$	[W/s]	3			
Figra	**[W/s]**	**3**			**B or better**
$Figra_{0.2\ MJ}$: Corresponding HRR_{av}	[kW]	3,1	1062	1362	
$Figra_{0.4\ MJ}$: Corresponding HRR_{av}	[kW]	3,1	1062	1362	
t(HRR_{av} >= 3 kW)			1053	1353	
(HRR_{av} + t(THR_{ta})) >= 0.2 MJ	[kW]	3,04	1053	1353	
(HRR_{av} + t(THR_{ta})) >= 0.4 MJ	[kW]	3,0	1053	1353	
THR_{ta} (t0+600s)	**[MJ]**	**0,45**			**B or better**
THR_{ta} (t0+900s)	[MJ]	0,9			
THR_{ta} (t0+1200s)	[MJ]	1,7			
(t0 = 300s)					**Estimated class: B or better**

Lateral flame spread

Till long wing end of specimen	No	No = not to long wing end of specimen
		Estimated class: B or better

Smoke production related

			t-t0 (s)	t(s)	
Peak SPR_{av} (t<t0+600s)	[m^2/s]	0,01	558	858	
Peak SPR_{av} (t<t0+900s)	[m^2/s]	0,02	894	1194	
Peak SPR_{av} (t<t0+1200s)	[m^2/s]	0,03	1200	1500	
(t0 = 300s)					
Smogra max	**[m^2/s^2]**	**0,0**			**s1**
at SPR_{av}	[m^2/s]	n/a	n/a	n/a	
t(SPR_{av} >= 0.1 m^2/s)			n/a	n/a	
t(TSP_{ta} >= 6 m^2)			924	1224	
TSP_{ta} (t0_t0+600s)	**[m^2]**	**1**			**s1**
TSP_{ta} (t0_t0+900s)	[m^2]	5			
TSP_{ta} (t0_t0+1200s)	[m^2]	13			
(t0 = 300s)					**Estimated class: s1**

Flaming droplets/particles related

Flaming droplets/particles

FDP (t0_t0+600s)	No	No = no flaming droplets/particles
FDP (t0_t0+600s) F>10s	No	No = no flaming droplets/particles F>10s
(not d0 or d1)		
		Estimated class: d0

Table 1: Horizontal surface spread of flame, heat flux and light attenuation

Sample number		1	2	3	**Classification parameter**	4
Orientation/Description		Vertical oriented				Horizonal oriented
Spread of flame						
Distance	[mm]	Time [s]				
	60	452	511	0		697
	110	0	0	0		0
	160	0	0	0		0
	210	0	0	0		0
	260	0	0	0		0
	310	0	0	0		0
	360	0	0	0		0
	410	0	0	0		0
	460	0	0	0		0
	510	0	0	0		0
	560	0	0	0		0
	610	0	0	0		0
	660	0	0	0		0
	710	0	0	0		0
	760	0	0	0		0
	810	0	0	0		0
	860	0	0	0		0
	910	0	0	0		0
Maximum spread of flame						
Distance	[mm]	60	60	50		60
Flameout	[s]	754	749	769		845
(Critical) Heat Flux(CHF)						
CHF	[kW/m²]	>=11	>=11	>=11	**>=11**	>=11
Heat flux (HF) after 10, 20, 30 minutes						
Time	[min]	HF [kW/m^2]				
	10	>=11	>=11	>=11	**>=11**	>=11
	20	>=11	>=11	>=11	**>=11**	>=11
	30	>=11	>=11	>=11	**>=11**	>=11
Light attenuation (LA)						
Smoke density	[%.min]	10	7	1	**6**	11
Test end	[s]	1800	1800	1800		1800

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