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PCA Polskie Centrum Akredytacji BADANIA
AB 1501

TEST REPORT

Order no: 41291 Signature: SL/Z-091/EN45545-R21/0095a/2022 Police, 15.02.2022 r.

Tests methods:

1. EN ISO 5659-2:2017. Plastic – Smoke generation – Part 2: Determination of optical density by a single – chamber test.
2. ISO 5660-1:2015. Reaction to fire tests – Heat release, smoke production and mass loss rate – Part 1: Heat release rate (cone calorimeter method).
3. EN 17084:2018. Railway applications – Fire protection of railway vehicles – Toxicity test of materials and components.
4. EN 45545-2:2020. Railway applications – Fire protection on railway vehicles – Part 2: Requirements for fire behavior of materials and components

Content of request: Tests according to EN 45545-2:2020 - requirement R21.

Sponsor: Camira Transport Fabrics Ltd - Luke Russel

Material: Rapido faux leather on composite, batch no. 41291

Composition/specification: **Upholstery:** Generic type: Faux leather. Description: Cotton jersey, flame retardant, with flame retardant PVC coating and PU finish. Product reference: Rapido. Name of manufacturer: Not supplied. Colour reference: Beetle. Thickness 1,05 mm +/- 7,5%. Density / weight per unit area: 640 g/m^2 +/- 7,5%. **Barrier:** Generic type: Interliner. Description: Plain woven fibreglass fire barrier with a low smoke emission silicone coating. Product reference: Interliner HTSP250. Name of manufacturer: Not supplied. Colour reference: Plain. Thickness: 0,4mm +/- 5%. Density / weight per unit area: 250 g/m^2 +/- 10%. Type of weave / cell dimensions: Woven. **Foam:** Generic type: iFoam DX. Description: Graphite impregnated foam. Product reference: iFoam DX. Name of manufacturer: Not supplied. Thickness: 45mm (MARHE), 20mm (Smoke). Density: 82 kg/m^3. Colour reference: Grey.

Manufacturer/supplier: Camira Transport Fabrics Ltd
The Watermill, Wheatley Park
Mirfield, West Yorkshire WF14 8HE, United Kingdom

Assessment: The tested product fulfils the requirement of R21 according to EN 45545-2:2020 for hazard level HL1, HL2 and HL3.

The reprint and the copying: only with the agreement of Camira Transport Fabrics Ltd

Without the written consent of the Sychta Laboratory the report can be copied only in one piece.

Report applies only to the sample tested and is not necessarily indicative of the qualities of apparently identical or similar products.

Content of test report: six pages with signature and numbers.

1. Smoke generation according to EN-ISO 5659-2 + EN 45545-2

Tested side: fabric side.

Test conditions - irradiance of 25 $kW \cdot m^{-2}$ with pilot flame

Table 1.1. Final findings of smoke generation

Name of measured quantity	Unit	Specimen			Average	Standard deviation
		1	2	3		
Mass of specimen	g	14,1	13,7	14,0	13,9	0,2
Specimen thickness	mm	21,0	21,0	21,0	21,0	0,0
Ignition time - t_z	s	9	9	8	9	1
Extinction time	s	-	-	-	-	-
Duration of the test	s	600	600	600	600	0
Maximum of specific optical density - $D_s max$	-	125	130	131	128	3
Time of arrival of the maximum of $D_s max$	s	600	600	600	600	0
Specific optical density in the first 4 min of the test - Ds(4)	-	64	63	64	63	1
Cumulative specific optical densities in the first 4 min of the test - VOF_4	min	160	172	176	169	8

Remarks: none.

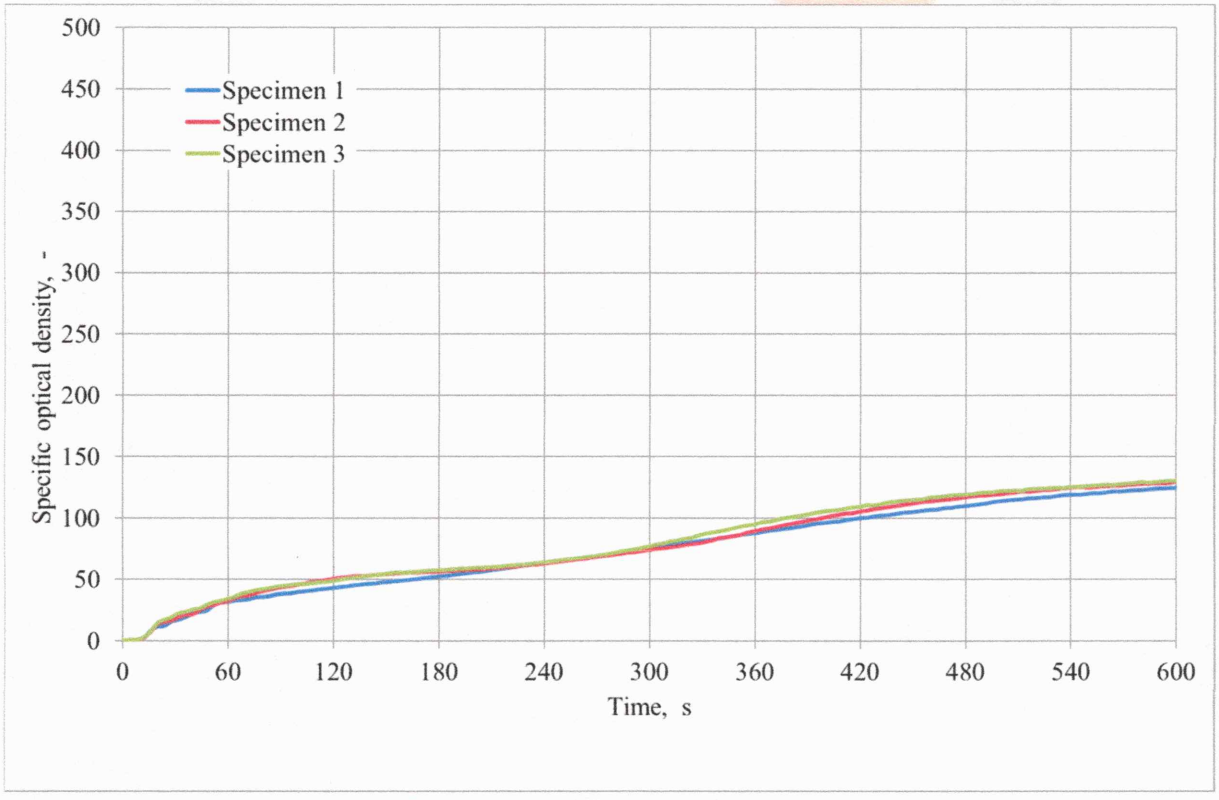


Figure 1.1. Specific optical density in the time

2. Results of toxic products emission of material decomposition and burning according to EN 17084, Method 1

Test conditions - irradiance of 25 $kW \cdot m^{-2}$ with pilot flame

Table 2.1. Concentration of toxic products of material decomposition and burning after 4 min

Toxic component of burning products	Concentration of toxic products after 4 min				
	Specimen no.			Average	Standard deviation
	1	2	3		
	$mg \cdot m^{-3}$				
CO_2	3648	4221	4215	4028	329
CO	137	154	162	151	13
HCN	0	0	0	0	0
NO_2	0	0	0	0	0
NO	0	0	0	0	0
HCL	151	117	199	156	41
SO_2	33	35	26	32	5
HF	0	0	0	0	0
HBr	0	0	0	0	0

Table 2.2. Concentration of toxic products of material decomposition and burning after 8 min

Toxic component of burning products	Concentration of toxic products after 8 min				
	Specimen no.			Average	Standard deviation
	1	2	3		
	$mg \cdot m^{-3}$				
CO_2	5596	6725	6748	6357	659
CO	200	255	253	236	31
HCN	0	0	0	0	0
NO_2	0	0	0	0	0
NO	0	0	0	0	0
HCL	116	88	120	108	17
SO_2	42	56	49	49	7
HF	0	0	0	0	0
HBr	0	0	0	0	0

Table 2.3. Conventional index of toxicity

Name of measured quantity	Unit	Specimen			Average	Standard deviation
		1	2	3		
Conventional index of toxicity CIT_G at 4 min	-	0,18	0,15	0,24	0,19	0,04
Conventional index of toxicity CIT_G at 8 min	-	0,16	0,13	0,17	0,15	0,02

Remarks: none.

3. Heat release rate of specimen according to ISO 5660-1

Test conditions - irradiance of 25 $kW \cdot m^{-2}$

Table 3.1. Heat release rate

Name of measured quantity	Unit	Specimen			Average	Standard deviation
		1	2	3		
Mass of the specimen	g	43,8	45,4	43,9	44,4	0,9
Specimen thickness	mm	46,5	46,5	46,4	46,5	0,1
Ignition time	s	-	18	-	-	-
Extinction time	s	-	22	-	-	-
Duration of the test	s	1200	1200	1200	1200	0
Maximum heat release rate	$kW \cdot m^{-2}$	10,0	59,6	10,3	26,6	28,6
Total heat release	$MJ \cdot m^{-2}$	7,4	7,5	7,0	7,3	0,3
Maximum average rate of heat emission MARHE	$kW \cdot m^{-2}$	6,1	25,2	5,8	12,4	11,1
Fire integrity acc. 5.2.2.2 EN 45545-2	YES/NO	YES	YES	YES	YES	-

Remarks: none.

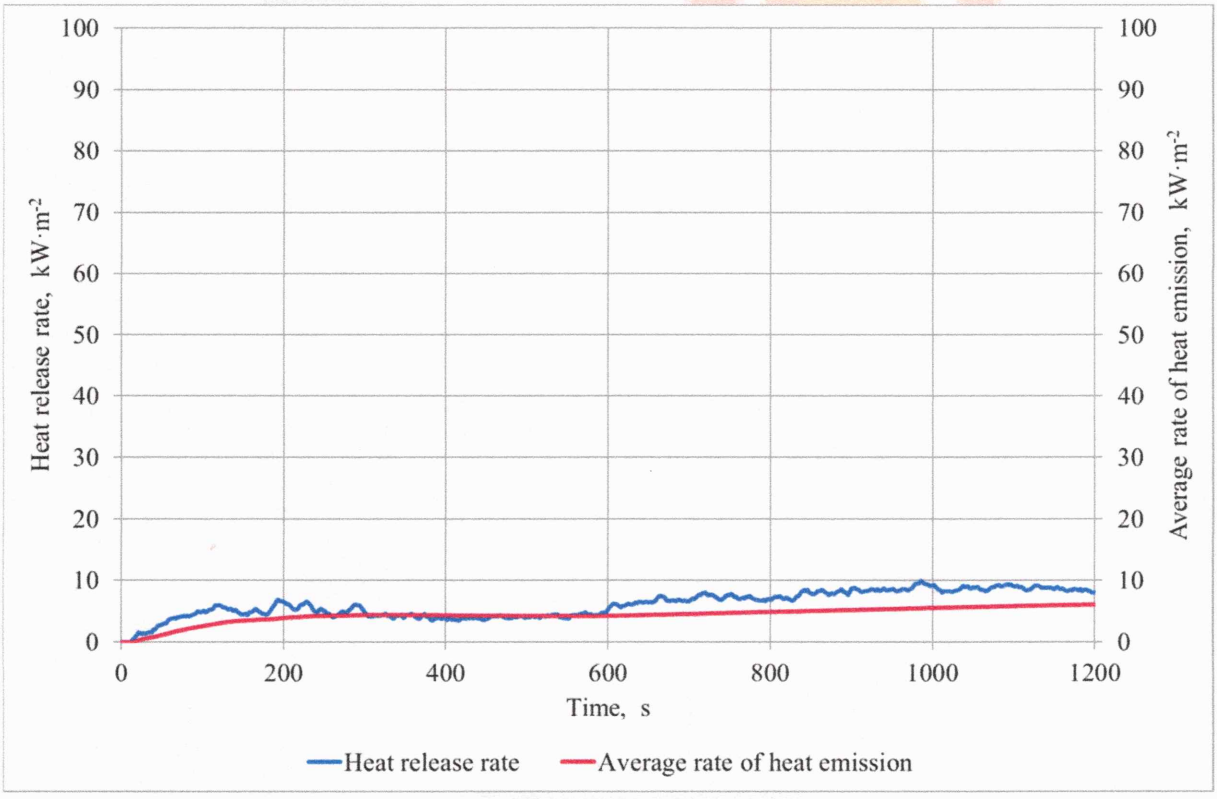


Figure 3.1. The relation of heat release rate and the time – specimen 1

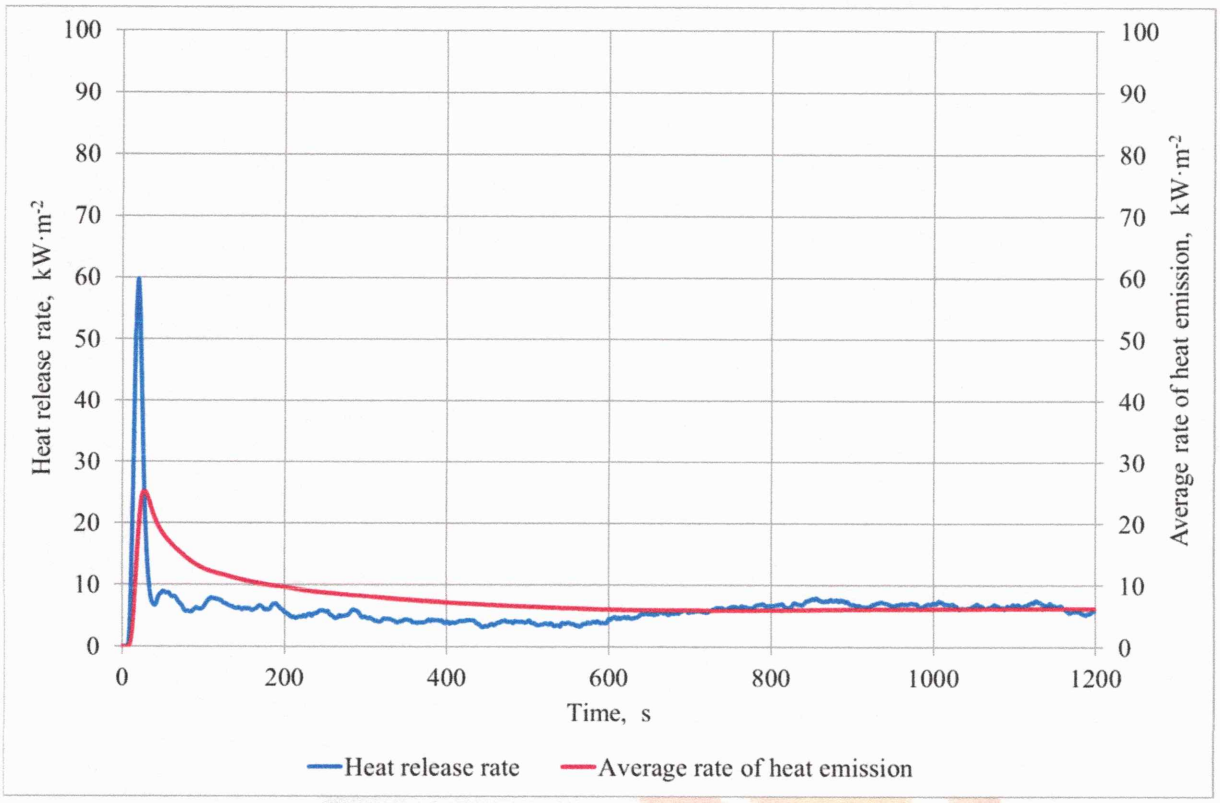


Figure 3.2. The relation of heat release rate and the time – specimen 2

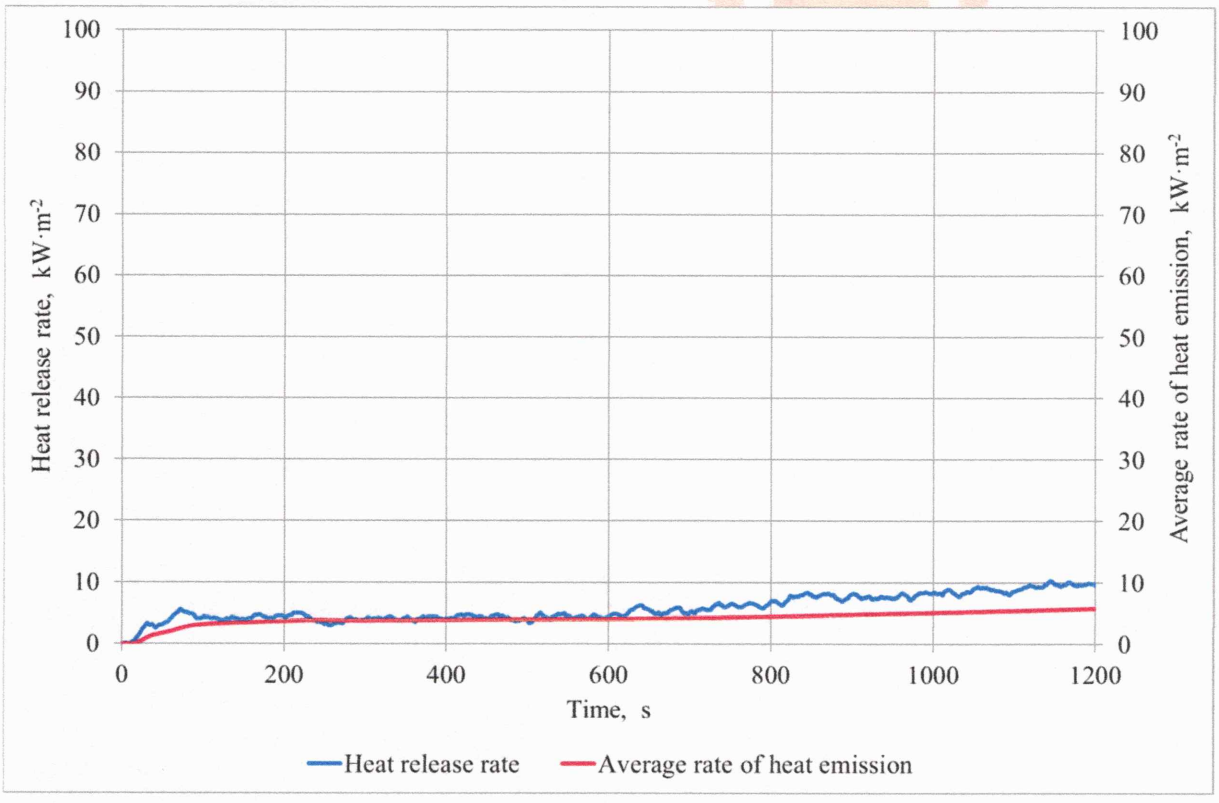
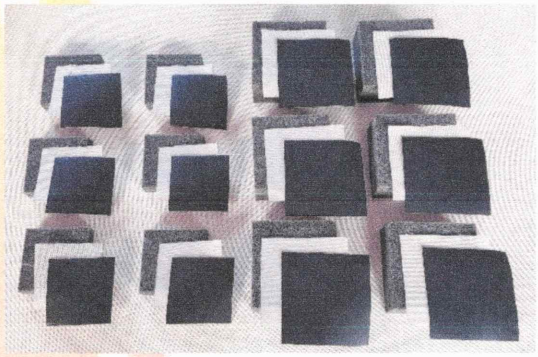


Figure 3.3. The relation of heat release rate and the time – specimen 3

4. Final findings

Requirement	Method/norm	Measured quantity	Unit	Measured value	Critical value			Crossing coefficient		
					HL1	HL2	HL3	HL1	HL2	HL3
R21	T03.02 EN ISO 5660-1: 25 kW·m^{-2}	MARHE	kW·m^{-2}	12,4	75	50	50	0,17	0,25	0,25
	T10.03 EN ISO 5659-2: 25 kW·m^{-2}	$D_s$max	-	128	300	300	200	0,43	0,43	0,64
	T11.02 EN 17084 Method 1 25 kW·m^{-2}	CIT_G (4)	-	0,19	1,2	0,9	0,75	0,16	0,21	0,25
		CIT_G (8)	-	0,15	1,2	0,9	0,75	0,13	0,17	0,20

The tested product fulfils the requirement of R21 according to EN 45545-2:2020 for hazard level HL1, HL2 and HL3.



5. Remaining required information

Date of receipt of samples: 11.02.2022

Sampling: sponsor took and delivered samples.

Description of the test material: upholstery set consisting of black faux leather, thickness of 1,0 mm and weight per unit area 650 g/m^2, white fabric interliner, thickness of 0,2 mm and weight per unit area 260 g/m^2 and gray foam, thickness of approx. 44,0 mm and 19,6 mm with density approx. 80 kg/m^3. Sponsor delivered 6 samples of faux leather with dimensions of 100x100 mm and 75x75 mm, 6 samples of interliner with dimensions of 100x100 mm and 75x755 mm, 6 samples of foam with dimensions of 100x100 mm and 75x75 mm. Laboratory prepared samples for the tests.

Conditioning of specimens: constant mass at a temperature of 23±2 °C, and relative humidity of 50±5 %.

Declarations:

1. The test results relate to the behaviour of the test specimens under the particular conditions of the test; they are not intended to be the sole criterion for assessing the potential fire hazard of the products in use.
2. The information provided on the first page of the report concerning the scope of research and identification of the tested object/objects were provided by the Sponsor.

Operators:

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mgr inż. Andrzej Sychta

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dr inż. Krzysztof Sychta

Date and place of test - 15.02.2022, Police