

TEST REPORT

Order no: 4.12.2018

Signature: SL/Z-312/EN45545-R21/629a/2018

Police, 11.12.2018

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 45545-2:2013+A1:2015.: Railway applications - Fire protection of railway vehicles - Part 2: Requirements for fire behaviour of materials and components.

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

Sponsor: Chieftain Fabrics
Wellington Place
Trim
Ireland

Material: Just Colour

Composition/specification: Phthalate free PVC based on organic cotton/rPES

Manufacturer/supplier: Chieftain Fabrics
Wellington Place
Trim
Ireland

Assessment: The tested product fulfils the requirement R21 according to EN 45545-2:2013+A1:2015 for hazard level HL1, HL2 and HL3.

The reprint and the copying: only with the agreement of Chieftain Fabrics

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.

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

1. Smoke generation according to EN ISO 5659-2

Test conditions - irradiance of $25 \text{ kW} \cdot \text{m}^{-2}$ with pilot flame + EN 45545-2:2013+A1:2015

Table 1.1. Final findings of smoke generation

Name of measured quantity	Unit	Specimen			Average	Standard deviation
		1	2	3		
Mass of specimen	g	4,2	4,2	4,1	4,2	0,1
Specimen thickness	mm	1,1	1,1	1,1	1,1	0,0
Ignition time - t_z	s	7	8	9	8,0	1,0
Extinction time	s	373	-	-	-	-
Duration of the test	s	600	600	600	600	0
Maximum of specific optical density - $D_{s,max}$	-	165	122	129	139	23
Time of arrival of the maximum of $D_{s,max}$	s	180	485	380	348	155
Specific optical density in the first 4 min of the test - $D_s(4)$	-	165	112	123	133	28
Cumulative specific optical densities in the first 4 min of the test - VOF_4	min	546	363	391	433	99

Remarks: none.

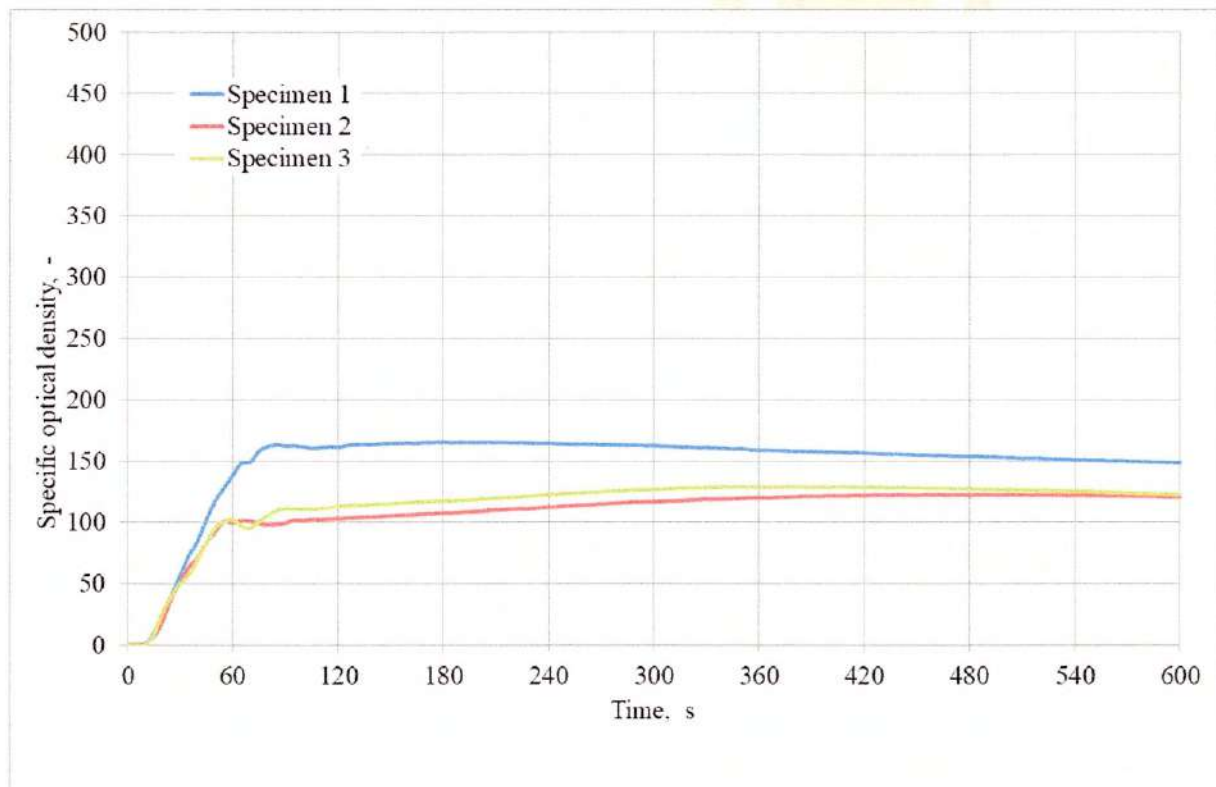


Figure 1.1. Specific optical density in the time

2. Results of toxic products emission of material decomposition and burning according to EN ISO 5659-2

Test conditions - irradiance of $25 \text{ kW} \cdot \text{m}^{-2}$ with pilot flame + EN 45545-2:2013+A1:2015

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·m ⁻³				
CO ₂	7786	6875	6624	7095	611
CO	603	475	477	518	73
HCN	0	0	0	0	0
NO ₂	0	0	0	0	0
NO	0	0	0	0	0
HCL	598	343	402	448	134
SO ₂	0	0	0	0	0
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·m ⁻³				
CO ₂	10010	9405	9368	9595	360
CO	641	537	544	574	58
HCN	0	0	0	0	0
NO ₂	0	0	0	0	0
NO	0	0	0	0	0
HCL	527	254	388	390	137
SO ₂	0	0	0	0	0
HF	0	0	0	0	0
HBr	0	0	0	0	0

Table 2.3. Conventional index of toxicity according EN 45545-2

Name of measured quantity	Unit	Specimen			Average	Standard deviation
		1	2	3		
Conventional index of toxicity CIT _G at 4 min	-	0,69	0,40	0,47	0,52	0,15
Conventional index of toxicity CIT _G at 8 min	-	0,61	0,31	0,46	0,46	0,15

Remarks: none.

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

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

Table 3.1. Heat release rate

Name of measured quantity	Unit	Specimen			Average	Standard deviation
		1	2	3		
Mass of the specimen	g	7,5	7,5	7,4	7,5	0,0
Specimen thickness	mm	1,1	1,1	1,1	1,1	0,0
Ignition time	s	58	66	84	69	13
Extinction time	s	104	110	134	116	16
Duration of the test	s	700	622	614	645	48
Maximum heat release rate	$\text{kW}\cdot\text{m}^{-2}$	133,5	129,4	111,4	124,8	11,8
Total heat release	MJ	5,5	4,6	4,9	5,0	0,5
Maximum average rate of heat emission MARHE	$\text{kW}\cdot\text{m}^{-2}$	40,0	32,8	25,8	32,8	7,1
Fire integrity acc. 5.2.2.2 EN 45545-2	YES/NO	NO	NO	NO	NO	-

Remarks: none.

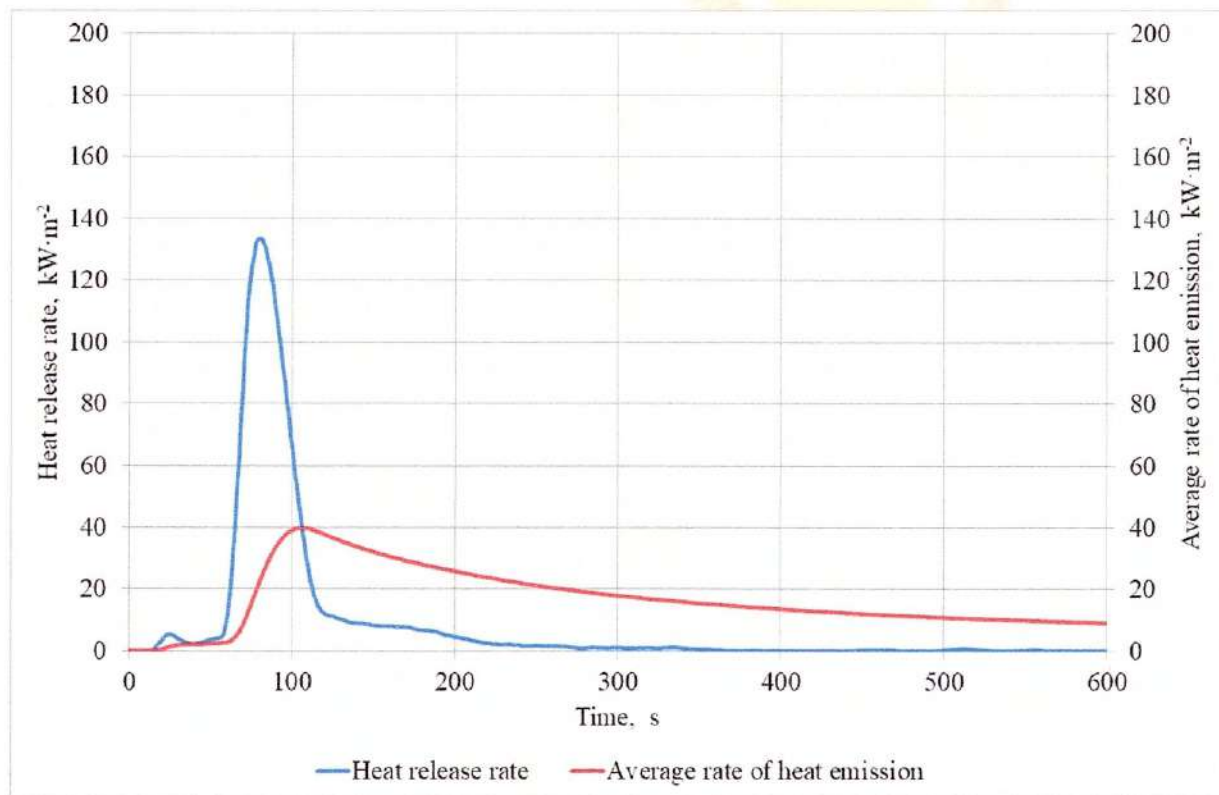


Figure 3.1. The relation of heat release rate and the time – specimen 1

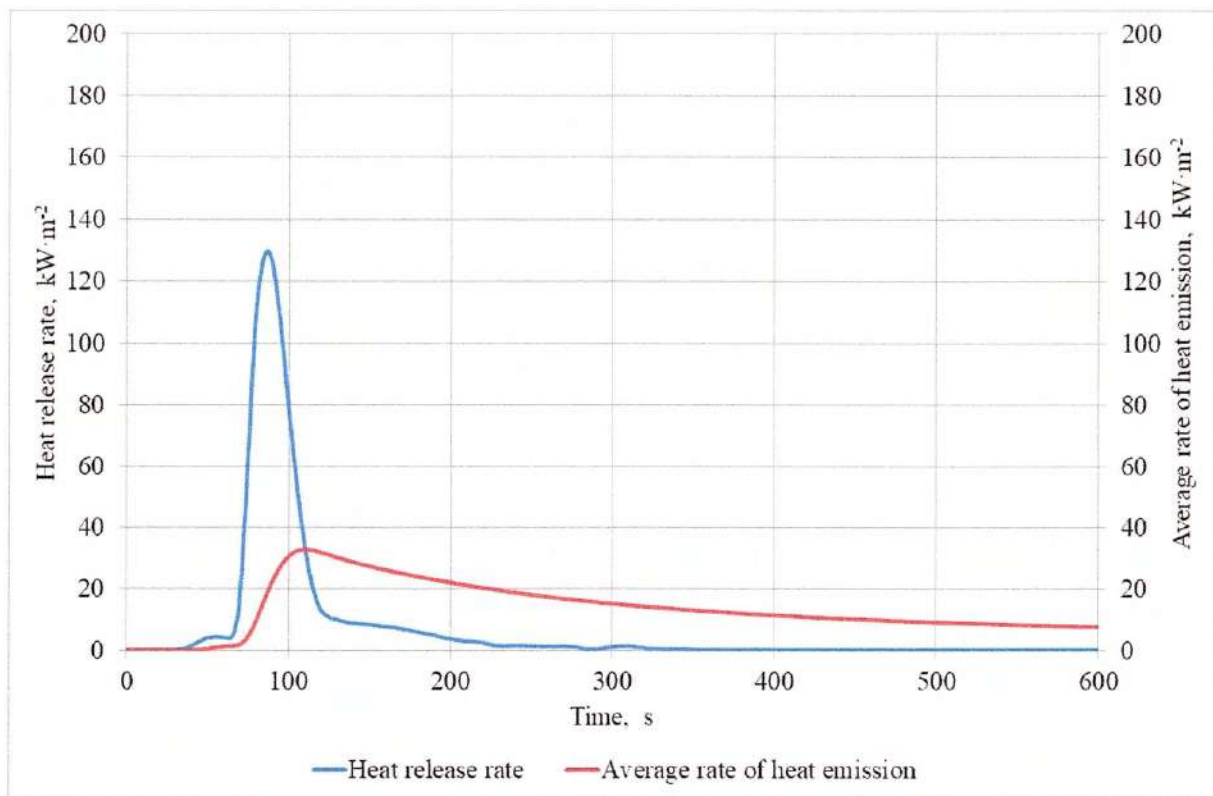


Figure 3.2. The relation of heat release rate and the time – specimen 2

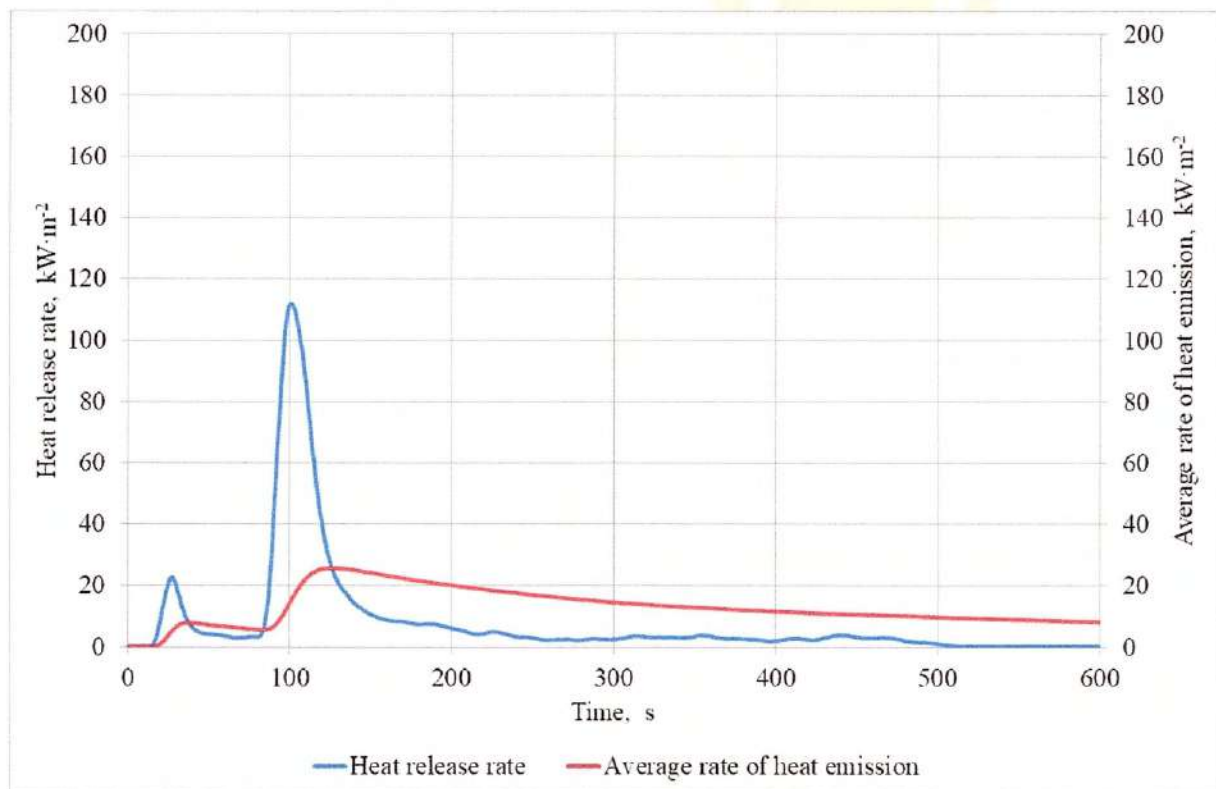


Figure 3.3. The relation of heat release rate and the time – specimen 3

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	32,8	75	50	50	0,44	0,66	0,66
	T10.03 EN ISO 5659-2: 25 kW·m ²	D _s max	-	139	300	300	200	0,46	0,46	0,69
	T11.02 EN ISO 5659-2: 25 kW·m ²	CIT _G (4)	-	0,52	1,2	0,9	0,75	0,43	0,58	0,69
		CIT _G (8)	-	0,46	1,2	0,9	0,75	0,39	0,51	0,62

The tested product fulfils the requirement R21 according to EN 45545-2:2013+A1:2015 for hazard level HL1, HL2 and HL3.

5. Remaining required information

Date of receipt of samples: 06.12.2018

System of the sampling: sponsor took and delivered samples.

Description of the test material: Sponsor delivered one piece of fabric, red color, dimensions of 1,72x1,39 m, thickness of 1,1 mm and weight per unit area 710-750 g/m². Laboratory prepared samples for tests.

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

Declaring: The test results rate 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.

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Date and place of test - 10-11.12.2018, Police