

## TEST REPORT

Order no: IMP 5/520000/ RDLAB-11      Signature: SL/Z-649/EN45545-R21/831a/2020      Police, 10.11.2020

### 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:** Tests according to EN 45545-2 - requirement R21/ HL3.

**Sponsor:** Mayur Uniquoters Ltd.  
Village-Dhodsar, Khajiroli Link Road  
Jaipur-Sikar Highway  
Jaipur, Rajasthan, India

**Material:** 12601, 100% Polyurethane Coated Cotton fabric without natural leather and without PVC content

**Composition/specification:** PUR coated fabric 660-680 g/m<sup>2</sup>, 1,2 mm Cotton fabric  
Batch number TD/Z 1765A  
100% PU, free from Lead, Cadmium or other toxic substance, having no PVC content and without halogenated flame retardants

**Manufacturer/supplier:** Mayur Uniquoters Ltd.  
Village-Dhodsar, Khajiroli Link Road  
Jaipur-Sikar Highway  
Jaipur, Rajasthan, India

**Assessment:** The tested product fulfils the requirement of 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 Mayur Uniquoters 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

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	4,0	4,0	3,9	4,0	0,0
Specimen thickness	mm	1,2	1,2	1,2	1,2	0,0
Ignition time - $t_z$	s	19	16	20	18	2
Extinction time	s	134	-	363	-	-
Duration of the test	s	600	600	600	600	0
Maximum of specific optical density - $D_{s,max}$	-	118	121	122	120	2
Time of arrival of the maximum of $D_{s,max}$	s	440	492	484	472	28
Specific optical density in the first 4 min of the test - $D_s(4)$	-	97	94	91	94	3
Cumulative specific optical densities in the first 4 min of the test - $VOF_4$	min	200	200	191	197	5

**Remarks:** none.

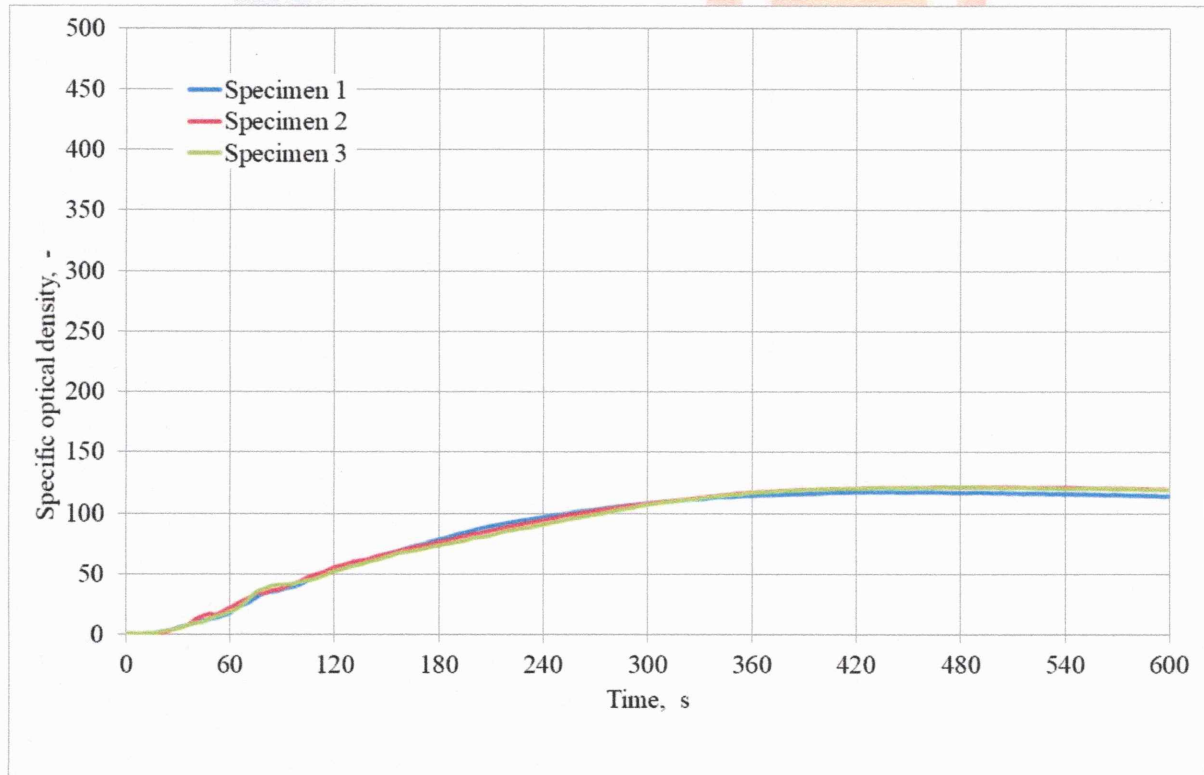


Figure 1.1. Specific optical density in the time



**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		
	$\text{mg} \cdot \text{m}^{-3}$				
CO <sub>2</sub>	4993	4410	3934	4446	530
CO	274	282	222	259	32
HCN	0	0	0	0	0
NO <sub>2</sub>	0	0	0	0	0
NO	12	2	0	5	6
HCL	0	0	0	0	0
SO <sub>2</sub>	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		
	$\text{mg} \cdot \text{m}^{-3}$				
CO <sub>2</sub>	7483	6538	5737	6586	874
CO	640	677	577	631	51
HCN	2	1	4	2	2
NO <sub>2</sub>	0	0	0	0	0
NO	6	6	4	5	1
HCL	0	0	0	0	0
SO <sub>2</sub>	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 <sub>G</sub> at 4 min	-	0,05	0,03	0,02	0,03	0,02
Conventional index of toxicity CIT <sub>G</sub> at 8 min	-	0,06	0,06	0,05	0,06	0,00

**Remarks:** material HCL free.

**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	6,9	6,8	6,8	6,8	0,1
Specimen thickness	mm	1,2	1,2	1,2	1,2	0,0
Ignition time	s	48	46	47	47	1
Extinction time	s	94	104	104	101	6
Duration of the test	s	618	928	710	752	159
Maximum heat release rate	$\text{kW}\cdot\text{m}^{-2}$	134,8	136,8	140,7	137,4	3,0
Total heat release	$\text{MJ}\cdot\text{m}^{-2}$	6,3	6,0	6,4	6,2	0,2
Maximum average rate of heat emission MARHE	$\text{kW}\cdot\text{m}^{-2}$	40,4	38,5	41,8	40,2	1,6
Fire integrity acc. 5.2.2.2 EN 45545-2	YES/NO	NO	NO	NO	NO	-

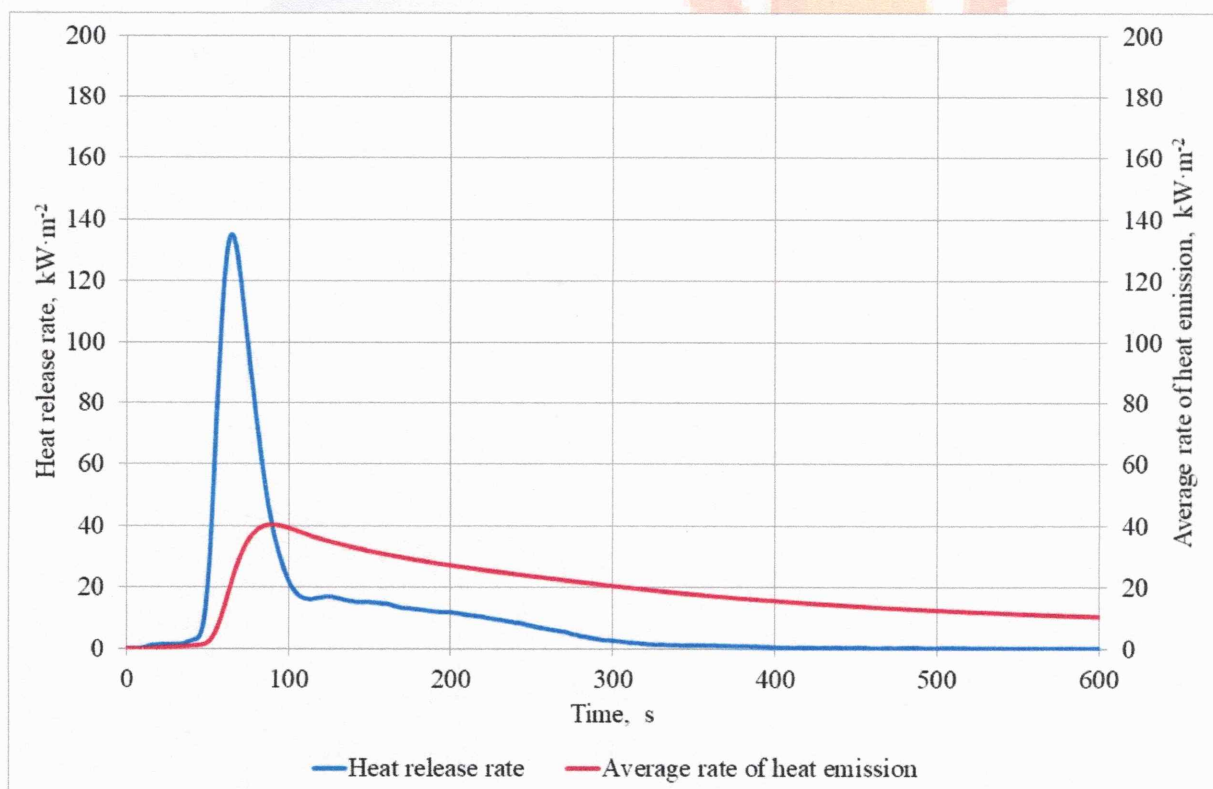
**Remarks:** none.


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



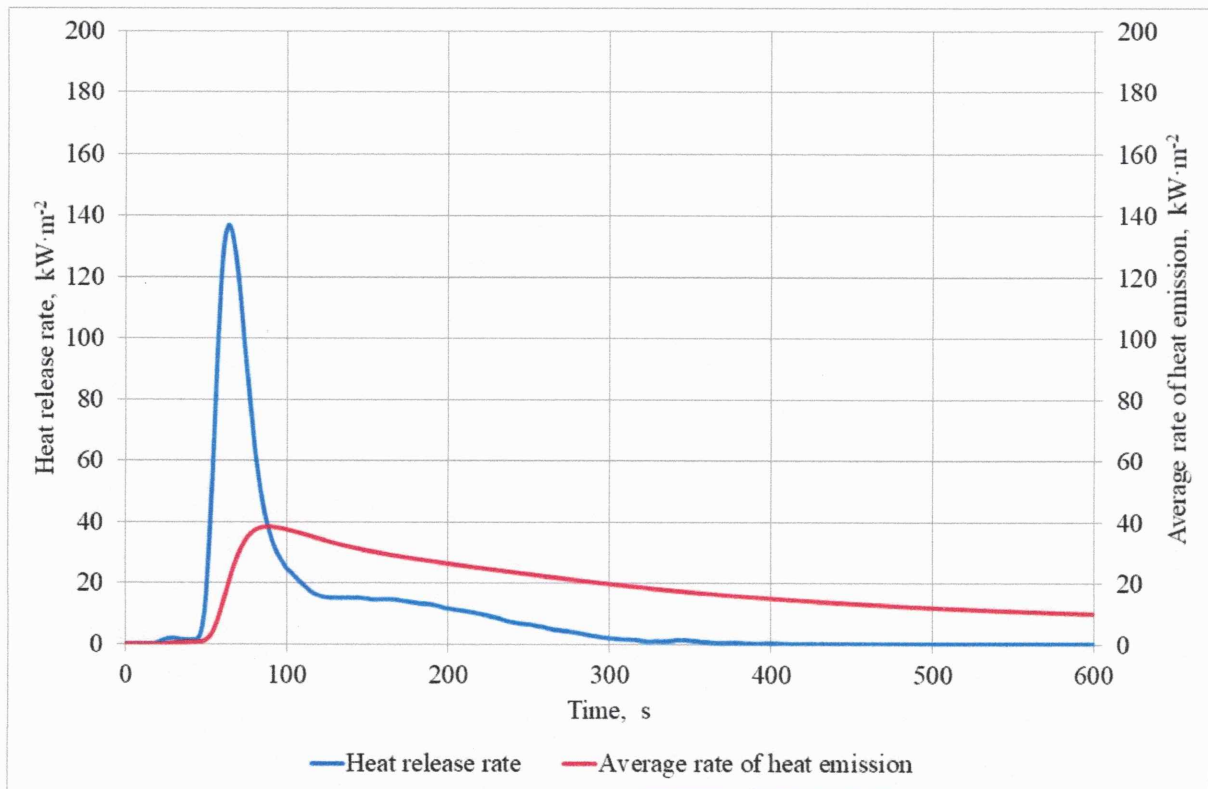


Figure 3.2. The relation of heat release rate and the time – specimen 2

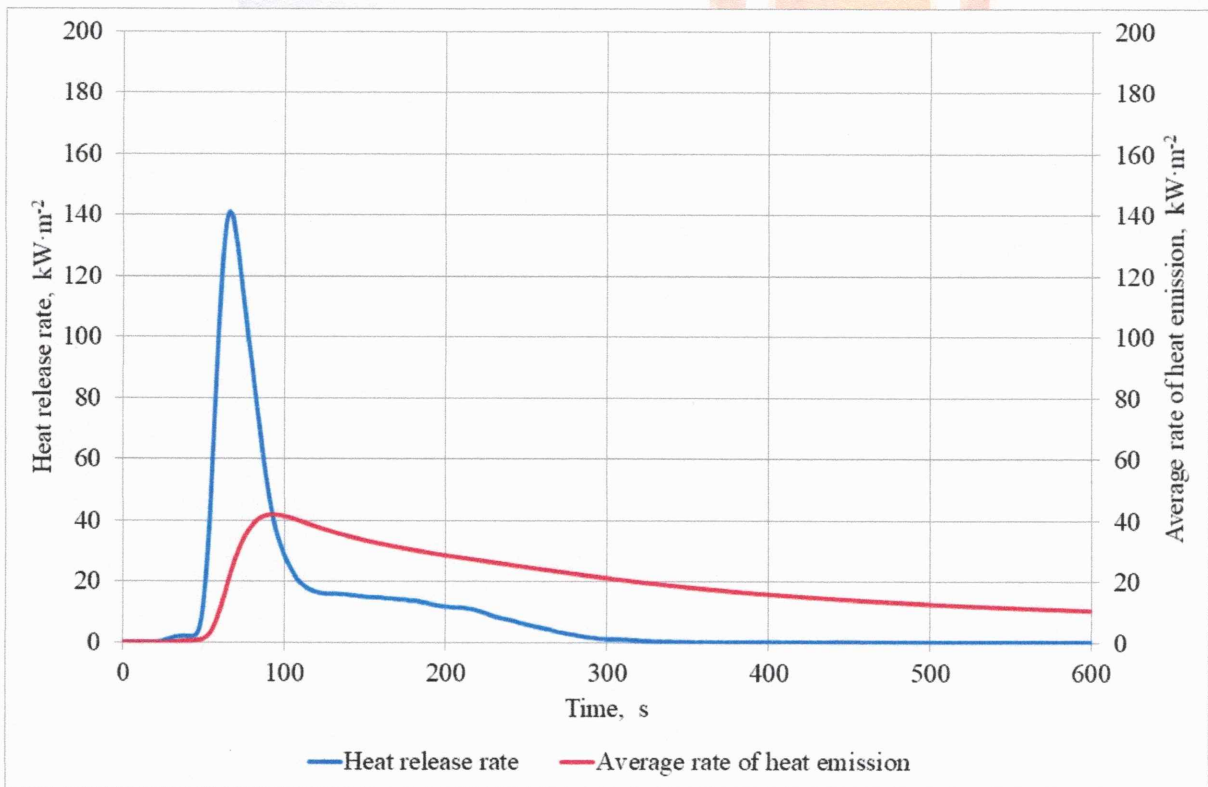


Figure 3.3. The relation of heat release rate and the time – specimen 3

**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 <sup>-2</sup>	MARHE	kW·m <sup>-2</sup>	40,2	75	50	50	0,54	0,80	0,80
	T10.03 EN ISO 5659-2: 25 kW·m <sup>-2</sup>	D <sub>s</sub> max	-	120	300	300	200	0,40	0,40	0,60
	T11.02 EN ISO 5659-2: 25 kW·m <sup>-2</sup>	CIT <sub>G</sub> (4)	-	0,03	1,2	0,9	0,75	0,03	0,03	0,04
		CIT <sub>G</sub> (8)	-	0,06	1,2	0,9	0,75	0,05	0,07	0,08

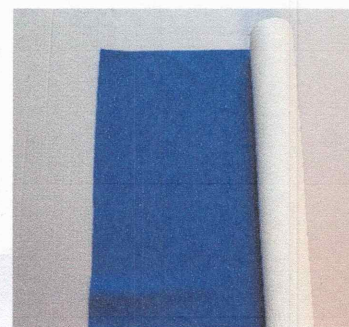
The tested product fulfils the requirement of R21 according to EN 45545-2:2013+A1:2015 for hazard level HL1, HL2 and HL3.

**5. Remaining required information**

**Date of receipt of samples:** 03.11.2020

**System of the sampling:** sponsor took and delivered samples.

**Description of the test material:** Sponsor delivered one piece of blue synthetic leather marked as: "Product Code:12601 / Batch No: TD/Z1765A", dimensions of 880x1140 mm, thickness of 1,0-1,2 mm and weight per unit area 660-680 g/m<sup>2</sup>. Laboratory cut out all samples for tests from one delivered piece.



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

**Declaring:** 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.

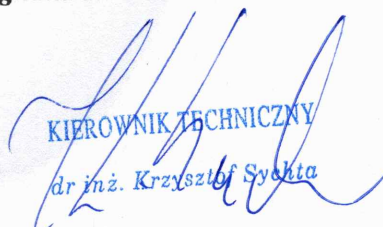
**Operators:**

dr hab.  Zygmunt Sychta

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**Signature:**

  
mgr inż. Krzysztof Sychta  
KIEROWNIK TECHNICZNY

Date and place of test - 09.11.2020, Police