

Test report no. 2019-1656

issued 17.07.2019

Applicant: ELMO SWEDEN AB
51281 SVENLJUNGA
Sweden

Date of order: 05.06.2019
Date of sampling: No official sampling of the tested product by a representative from Warringtonfire Frankfurt GmbH
Date of delivery: 12.06.2019
Date of test: 27.06.2019 and 16.07.2019

Order

1. Testing the heat release-, smoke production- and mass loss rate of a material according to DIN ISO 5660 (Cone-Calorimeter).
2. Testing the smoke density and toxicity of a material in the test chamber according to EN ISO 5659-2 (NBS-Box)
3. Classification according to DIN EN 45545-2 2016.

Description / designation of the test object

Product name: ELMOTRANSPORT

Description of the relevant test procedure

ISO 5660-1 - 2015

ISO 5659-2 – 2017

1. Description of the test material

1.1 Details of the customer:

Product name: ELMOTRANSPORT

Product description:

Main Components: Leather

Thickness: 1,2 – 1,4 mm

Grossweight: 800-1000 gr/m²

Color: black

Intended end use of product: Seating

1.2 By the specimen preparation by Warringtonfire Frankfurt GmbH determined values:

Material: Leather

Color: black

Thickness: avg. 1,34 mm

Grossweight: avg. 1075 g/m²

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Testing after conditioning at 23°C and 50 % humidity for at least 48 h respectively until the weight constancy has been reached

2. Test results

2.1 Test results Cone-Calorimeter according to ISO 5660

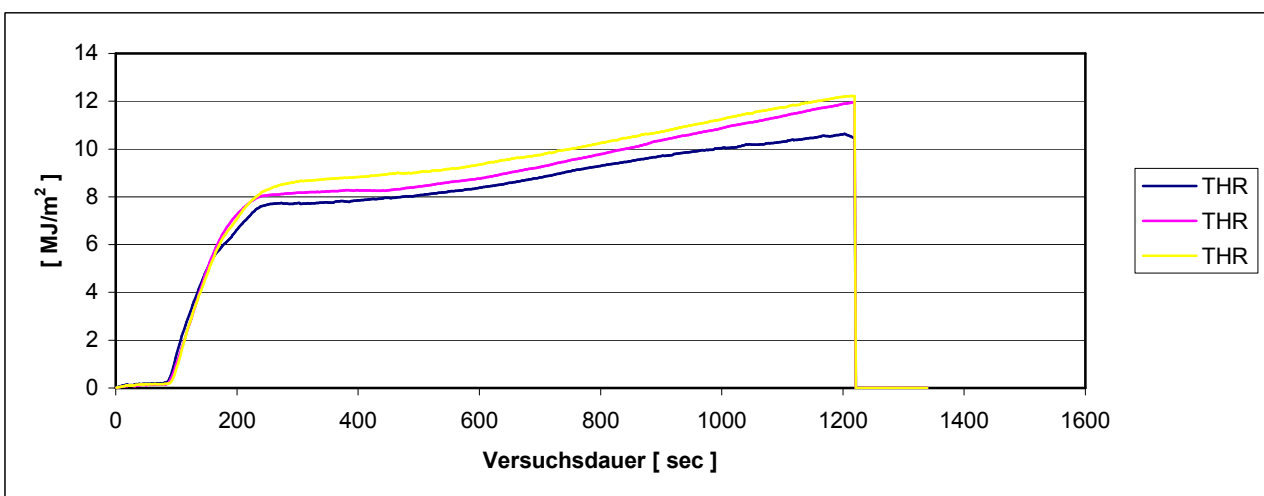
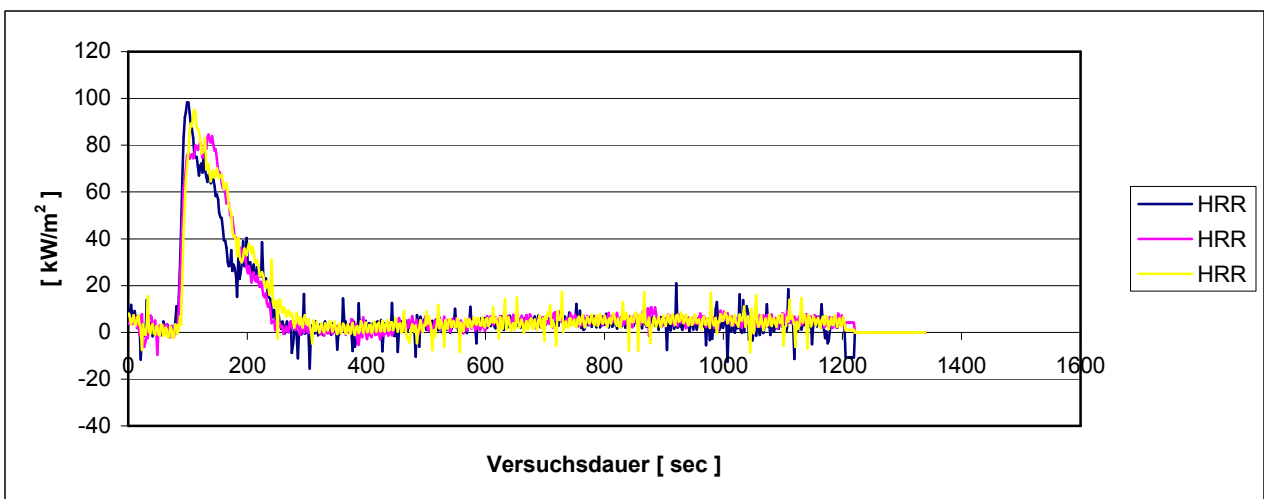
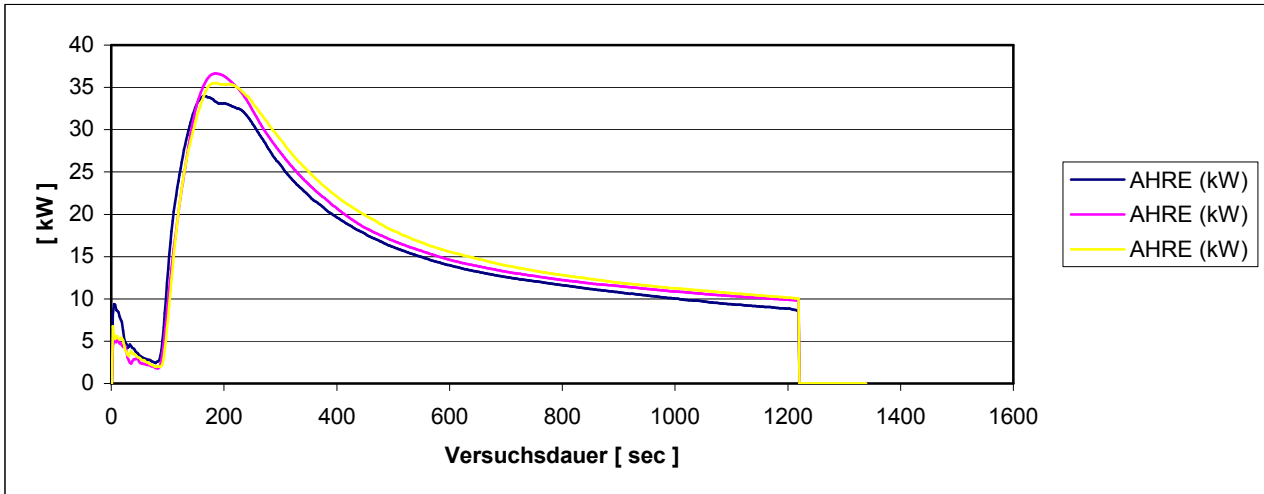
Clima storage (23°C/50%r.F.): >48h
 Nominal heat flux [KW/m²]: 25
 Heat flux calibration constant C: 0.04
 Testroom temperature / -humidity: 22°C / 35% humidity

Single test results of 3 tests:

		Specimen 1	Specimen 2	Specimen 3	Average
Time to ignition	[s]	76	81	87	81,33
Mass of specimen	[g]	10,75	10,82	10,92	10,83
Mass loss rate	[g/m ² s]	1,34	1,16	1,06	1,19
Mass loss	[g]	9,01	7,92	8,03	8,32
Marhe after start	[KW/m ²]	33,98	36,65	35,52	35,39
Heat release rate (180 s)	[KW/m ²]	41,55	44,10	45,97	43,88
Heat release rate (300 s)	[KW/m ²]	25,18	27,10	28,70	26,99
Heat release rate (top)	[KW/m ²]	98,42	84,50	95,23	92,72
Effective heat of combustion	[MJ/Kg]	11,40	14,91	15	13,77
Total heat release THR	THR	10,63	11,96	12,22	11,60
Specific extinction area	[m ² /Kg]	587,47	557,30	462,93	535,90
Carbon monoxid	[g/g]	0,17	0,15	0,23	0,18
Carbon dioxid	[g/g]	1,13	1,31	1,33	1,26
Total smoke production	TSP	559,50	478,25	410,52	482,75
End of test	[s]	1338	1338	1338	1338

Remarks: Wire grid used in accordance to ISO 5660-1 (03-2015) section 7.5

2.2.1 Diagrams:



2.3 Test results NBS-Box according to ISO 5659:

Clima storage (23°C/50%r.F.): >48h
 Testmodus: 25 KW/m²
 Test duration: 600 s
 Testroom temperature/humidity: 23°C / 35% humidity

		Specimen 1	Specimen 2	Specimen 3	Average
Initial mass	[g]	6,4	6,2	6,3	6,3
Final mass	[g]	2,5	2,3	2,3	2,37
Mass loss	[g]	3,9	3,9	4	3,93
Mass loss	[%]	60,9	62,9	63,5	62,43
Max. spec. opt. density up to 4 minutes	DS	179,56	137,1	204,72	173,79
Max. spec. opt. density	DS	211,8	170,6	231,03	204,48
Time to max. opt. density	[s]	342	390	351	361
Valeur obscurcissement fumée	VOF4 [min]	255,88	167,66	263,01	228,85
Conventional Index of Toxicity	(CIT) 4 min	0,3800	0,3912	0,4184	0,3965
Conventional Index of Toxicity	(CIT) 8 min	0,4181	0,4450	0,4542	0,4391
Time to ignition	[s]	80	80	75	-
Time to extinguishing	[s]	210	225	237	-

Remarks: Wire grid used in accordance to ISO 5660-1 (03-2015) section 7.3.5

2.3.1 Measurement of the smoke density:

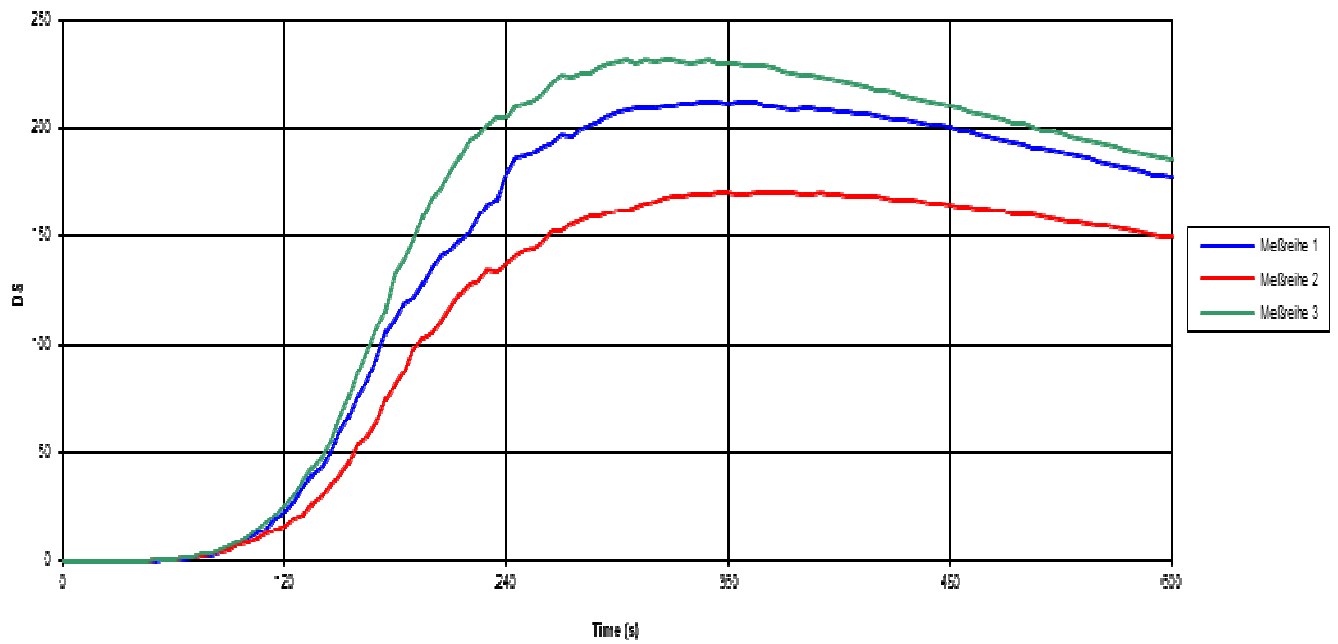
specimen	weight [g]	ignition [s]	extinguish [s]
1	6,4	80	210
2	6,2	80	225
3	6,3	75	237

	DS Probe	DS Probe	DS Probe
Minutes	1	2	3
1	0,68	1,01	1,10
2	23,51	16,93	26,33
3	111,91	81,17	133,21
4	179,56	137,10	204,72
5	207,42	161,33	229,84
6	210,54	170,20	229,14
7	207,42	338,72	221,11
8	199,81	164,23	209,73
9	188,67	157,02	197,30
10	177,01	149,10	184,93

DS max 4 Minute	179,56	137,10	204,72
DS max	211,8	170,6	231,03
VOF4	255,88	167,66	263,01

2.3.2 Smoke density diagram:

Specific Optical Density Graph 25 Kw fl



2.3.3 Measurement of the toxicity:

Analytic procedure:	Measurement of the toxicity with FTIR at 25 kW/m ²					
	Temperature sample extraction point: <40 °C					
conditioning: (23°C/50% humidity):	>48	h	Testroom temperature / humidity	23	°C	35 %

Gas	Specimen no.	conc. after 4 min ppm	conc. after 8 min ppm
Carbon dioxid CO ₂	1	5863	7539
	2	6066	7879
	3	6127	7767
	average	6019	7728
Carbon monoxid CO	1	82	105
	2	70	96
	3	83	103
	average	78	101
Hydrogen fluride HF	1	0	0
	2	0	0
	3	0	0
	average	0	0
Hydrogen chloride HCl	1	0	0
	2	0	0
	3	0	0
	average	0	0
Hydrogen cyanide HCN	1	16	20
	2	15	19
	3	17	21
	average	16	20
Nitrous gases NO-NO ₂	1	63	72
	2	65	77
	3	70	78
	average	66	76
Sulfur Dioxid Hydrogen sulfide SO ₂ -H ₂ S	1	47	43
	2	47	44
	3	48	43
	average	47	43
Hydrogen bromide HBR	1	20	18
	2	22	21
	3	23	22
	average	22	20

3. Assessment

The material described in chapter 1 complies after the executed tests with the requirements of the class **HL 2** according to EN 45545-2-2016 for **R21 - material**.

Table 5 – Set of material requirements, R21 (F1A; F1B; F1E; F3)

Test method reference	Parameter Unit	Requirement Definition	HL 1	HL 2	HL 3	Result average
T03.02 ISO 5660-1: 25 kWm-2	MARHE kWm-2	Maximum	75	50	50	35,39
T10.03 EN ISO 5659-2: 25 kWm-2	Ds max. dimensionless	Maximum	300	300	200	204,48
T11.02 EN ISO 5659-2: 25 kWm-2	CITG dimensionless	Maximum	1,2	0,9	0,75	0,3965 (4 min.)
						0,4391 (8 min.)

4. Special comment

The fire test result is valid for the in section 1 described material.

A test which qualifies any product or surface shall also qualify any product or surface which differs in colour and/ or pattern.

In the composition with other materials (for example coatings, substrate) the burning behaviour could be influenced unfavourable so that the classification above is not valid any longer.

The burning behaviour in combination with other materials must be tested separately.

Frankfurt, the 17.07.2019

R. Berger

H. Schmid / R. Berger
Tester in Charge

P. Scheinkönig

P. Scheinkönig
Senior Test Officer



We refer to the Regulation (EU) No. 1302/2014 of the Commission of 18 November 2014 concerning a technical specification for interoperability of the subsystem "Vehicles - locomotives and passenger cars" of the rail system in the European Union. To demonstrate the conformity of a material with a standard it has to get renew every five years.

The results of the tests relate only to the behaviour of the test specimen which is designated on the top.

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This test report is a translation of the German version 2019-1656 (issued 17.07.2019). In case of doubt only the German version is valid

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