



Testing. Advising. Assuring.

# Test Report

## No. 2014-1098

issued 22.01.2014

**Applicant:** National Gummi AB  
Krontorpsvägen 14  
302 65 Halmstad  
Sweden

**Date of order:** 09.10.2013  
**Date of sampling:** No official taking out of the samples from a representative of the Exova Warringtonfire, Frankfurt  
**Date of delivery:** 09.10.2013  
**Date of the tests:** 05.11.2013 und 06.11.2013 und 03.12.2013  
**Testnumber:** 2013-2161

**Order:**

1. Determining of the oxygen index according to ISO 4589-2
2. Testing the smoke density of a material in the test chamber according to EN ISO 5659-2 (NBS-Box)
3. Testing the toxicity of a material according to NF X 70 - 100-1 und 2 600°C
4. Classification according to EN 45545-2:2013 (E)

**Description / designation of the test object**

Fire grade EPDM 211171

**Description of the relevant test procedure**

EN ISO 4589 - 2

EN ISO 5659-2 - 2012

NF X 70 – 100 : 2006

(Carried out in subcontract by: Exova Warringtonfire UK, Holmesfield Road, Warrington WA1 2DS)

EN 45545-2:2013 (E)

## 1. Description of the test material

### 1.1 Details of the customer:

Material designation: Fire grade EPDM 211171

Intended area of Application: Railway applicatios

### 1.2 By the specimen preparation by Exova Warringtonfire, Frankfurt determined values:

Material:	Rubber in stripes and plates	
Specimen fo	EN ISO 5659-2	EN ISO 4589
Dimensions:	75 x 75 x 21 mm	150 x 10 x 4,1 mm
Colour:	schwarz	schwarz
Square weight:	IM 28,1 kg/m <sup>2</sup>	5,7 kg/m <sup>2</sup>

Testing after climatic storage at 23°C and 50 % humidity.

## 2. Test results

### 2.1 Test sheet according to ISO 4589-2 (ASTM D 2863):

Thickness: 4.1 mm

Clima storage (23°C/50%r.F.): >88h Testroom temperature / -humidity: 21°C / 40% rel. LF

Specimen No.	Oxygen Content in [%]	Burning time [ s ]	Destroyed length [ mm ]
1	28	>180*	13
2	28	>180*	19
3	28	>180*	22
4	27	73	2
5	27	122	10
6	27	104	9

Remarks: Ignition from above  
\* = Sample extinguished

Determined oxygen index: 28 %

### 2.2.1 Test results NBS-Box according to ISO 5659

Clima storage (23°C/50% r.F.): >24 h  
 Testmodus: 25 KW/m<sup>2</sup> flaming  
**Test duration:** 1200 s  
**Testroom temperature/humidity:** 21°C / 40% rel. LF

Single values of the 3 tests:

		<b>Sampel 1</b>	<b>Sampel 2</b>	<b>Sampel 3</b>	<b>average</b>
<b>Sample weight before test</b>	<b>[g]</b>	162,4	158	160,7	<b>160,37</b>
<b>Sample weight after test</b>	<b>[g]</b>	156,8	152,3	154,8	<b>154,63</b>
<b>Weight loss</b>	<b>[g]</b>	5,6	5,7	5,9	<b>5,73</b>
<b>Weight loss</b>	<b>[%]</b>	3,4	3,6	3,7	<b>3,57</b>
<b>max. spec. opt. thickness until 4 min.</b>	<b>DS</b>	20,56	25,68	21,29	<b>22,51</b>
<b>max. spec. opt. thickness</b>	<b>DS</b>	67,69	60,05	45,95	<b>57,9</b>
<b>Time to the max. opt. thickness</b>	<b>[s]</b>	1201	972	1181	<b>1118</b>
<b>Valeur obscurcissement fumée</b>	<b>VOF4 [min]</b>	24,02	21	22,85	<b>22,62</b>
<b>Time for ignition</b>	<b>[s]</b>	101	105	98	-
<b>Time for extinction</b>	<b>[s]</b>	>1200	>1200	>1200	-

Remarks: none

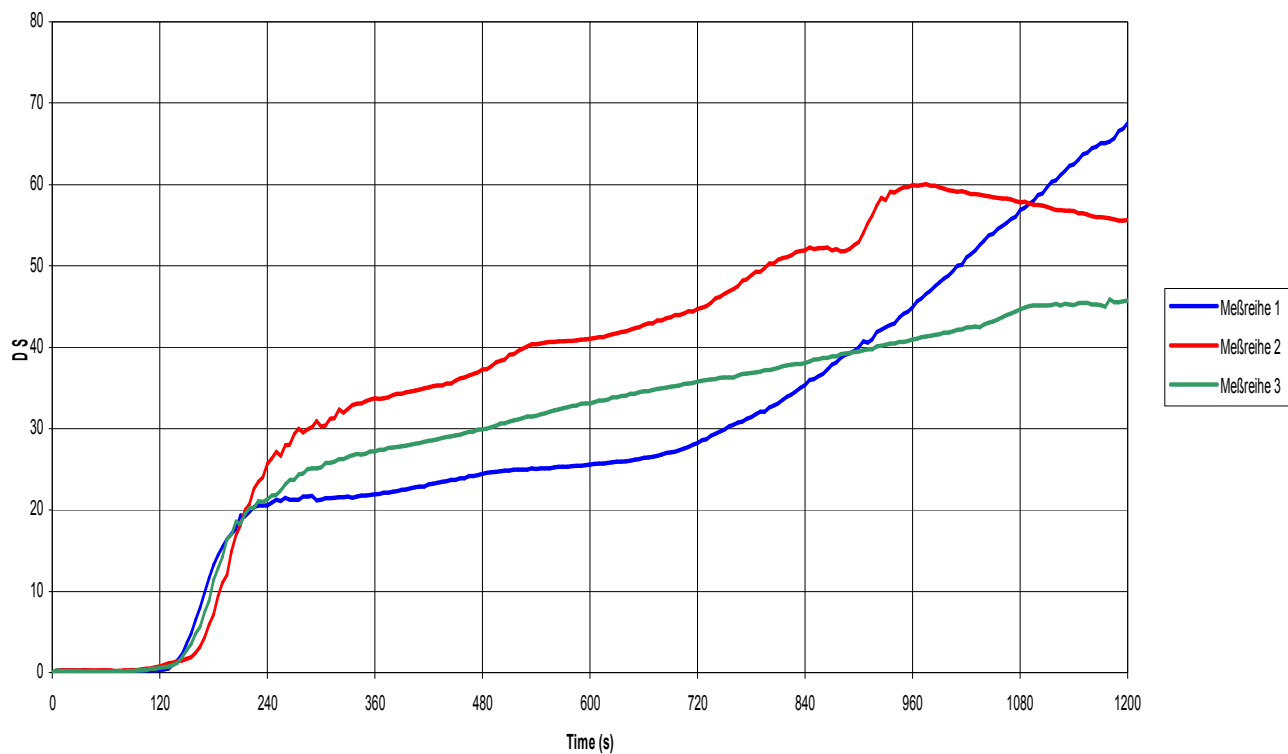
**2.2.2 Measurement of the smoke density:**

Specimen	weight [ g ]	igniton [ s ]	extinction [ s ]
1	162,4	101	>1200
2	158	105	>1200
3	160,7	98	>1200

minutes	DS specimen	DS specimen	DS specimen
	1	2	3
1	0	0	0
2	0	1	1
3	13	7	11
4	21	26	21
5	21	30	25
6	22	34	27
7	23	70	29
8	24	37	30
9	25	40	32
10	26	41	33
11	26	43	35
12	28	45	36
13	31	49	37
14	35	52	38
15	40	53	39
16	45	60	41
17	51	59	42
18	57	58	45
19	62	57	45
20	68	56	46
<b>DS max 4 minutes</b>	20,56	25,68	21,29
<b>VOF4</b>	24,02	21	22,85

**2.2.3 Diagram: Measurement of the smoke density:**

**Specific Optical Density Graph 25 Kw fl**



**2.3 Toxicity measurement:**

<b>Analysis method:</b>	Toxicity measurement according to NFX 70-100 2006
-------------------------	---

(Carried out in subcontract by: Exova Warringtonfire UK, Holmesfield Road, Warrington WA1 2DS)

<b>GASES</b>	<b>Conc. (mg/g)</b>	<b>NF F 16-101 reference values, cc (mg/m<sup>3</sup>)</b>	<b>CIT<sub>NLP</sub></b>
CO CARBON MONOXIDE	171,16	1750	0,12
CO <sub>2</sub> CARBON DIOXIDE	1546,34	90000	0,02
HCL HYDROGEN CHLORIDE	0,12	150	0,00
HBR HYDROGEN BROMIDE	ND	170	0.00
HCN HYDROGEN CYANIDE	0,32	55	0,01
HF HYDROGEN FLUORIDE	ND	17	0.00
SO <sub>2</sub> SULPHUR DIOXIDE	9,50	260	0,04
NO <sub>x</sub> NITROUS OXIDES	ND	N/A	0.00
<b>Result</b>			<b>0,19</b>

\*ND= (not – detected)

\*ND= (nicht festgestellt)

### 3. Assessment:

After the tests, the in chapter 1 described material fulfills the requirements of the class **HL 2** according to EN 45545-2:2013 (E) for **R22, R23 and R24**

Table 5 – Set of material requirements, R22 (IN16; EL2; EL6A; EL7A; M2)

Test method reference	Parameter Unit	Requirement Definition	HL 1	HL 2	HL 3	Result average
T01 EN ISO 4589-2: OI	oxygen-content Vol.-%	minimum	28	28	32	<b>28</b>
T10.01 EN ISO 5659-2: 25 kW/m <sup>2</sup>	D <sub>s</sub> max. dimensionless	maximum	600	300	150	<b>57,9</b>
T12NF X70-100-1 and -2 600°C	CIT <sub>NLP</sub> Dimensionless	maximum	1,2	0,9	0,75	<b>0,19</b>

Table 5 – Set of material requirements, R23 (EX12; EL5; EL6B; EL7B; M3)

Test method reference	Parameter Unit	Requirement Definition	HL 1	HL 2	HL 3	Result average
T01 EN ISO 4589-2: OI	oxygen-content Vol.-%	minimum	28	28	32	<b>28</b>
T10.01 EN ISO 5659-2: 25 kW/m <sup>2</sup>	D <sub>s</sub> max. dimensionless	maximum	-	300	150	<b>57,9</b>
T12NF X70-100-1 and -2 600°C	CIT <sub>NLP</sub> Dimensionless	maximum	-	1,8	1,5	<b>0,19</b>

Table 5 – Set of material requirements, R24

Test method reference	Parameter Unit	Requirement Definition	HL 1	HL 2	HL 3	Result average
T01 EN ISO 4589-2: OI	oxygen-content Vol.-%	minimum	28	28	32	<b>28</b>

n.e. = not executed



### Special comment

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

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

The burning behaviour in composition with other materials has to be tested separately.

Frankfurt, 22.01.2014



M. Ronzheimer / H. Anders  
Tester of Charge



Dipl.-Ing. T. Zachäus  
Laboratory Supervisor

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

Test reports are only allowed to be published or reproduced, not changed in form and tenor without permission of the Exova Warringtonfire, Frankfurt.

The abridged account of a test report is only allowed with the agreement of ther Exova Warringtonfire, Frankfurt.

This test report is a translation of the German version 2014-1098 (issued 22.01.2014). In case of doubt only the German version is valid

This test report contains 9 pages