

Test Report No.: 11504 / 40047

Date: 06.03.2015

BASF SE  
Brandschutztechnik  
G-PMF/A - A521  
D-67056 Ludwigshafen

**Test according to**

**ISO 4589 Part 2 : 2006-06**

**Plastics - Determination of burning behaviour by oxygen index Part 2: Ambient-temperature test**

Client:

NORRES-Schlauchtechnik GmbH & Co. KG

Am Stadthafen 12-18

45881 Gelsenkirchen

The results refer exclusively to the tested samples.

As an accredited Test Laboratory, the BASF SE Fire Safety Technology Test Centre is authorized to conduct fire tests in accordance with DIN EN ISO/IEC 17025 : 2005.

DAkKS-Register-No.: D-PL-14121-07-00



Deutsche  
Akkreditierungsstelle  
D-PL-14121-07-00

# BASF – Fire Safety Technology

Test according to ISO 4589 Part 2 : 2006-06  
Plastics - Determination of burning behaviour by oxygen index  
Part 2: Ambient-temperature test

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Receipt of order: 14.11.2014  
Receipt of samples: 01.12.2014  
Date of test: 09.12.2014

1. **Material:** (information supplied by client)

AIRDUC PUR 352 SE RAILWAY  
AIRDUC PUR 352 SE RAILWAY PLUS

Colour:

End use application:

2. **Summary of results and classification:**


Limiting Oxygen Index (LOI)	[%]	29,4
Classification according to DIN EN 45545-2:2013-08, R22, R23, R24, with respect to test acc. to EN ISO 4589-2		HL 1+2

**Remarks:**


Report dtd. 09.12.2014 changed upon customer's request. Developmental product was renamed to brand name.  
For a final classification, additional tests are required.

**Any conclusions we draw about the fire safety of the materials we test are based exclusively on the results of the test under the conditions described.  
The extent to which such conclusions can be applied to non-tested material under non-standard conditions is the sole responsibility of the customer and is done so at his own risk.**

BASF Fire Safety Technology

  
Dr. Henn  
Head of Laboratory

Ludwigshafen, 06.03.2015

  
Kaiser  
Technician

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### 3. Material:

#### Information supplied by client

AIRDUC PUR 352 SE RAILWAY  
AIRDUC PUR 352 SE RAILWAY PLUS

Construction: Polyurethane TPU flame retardant, reinforced with steel wire, glass aluminium laminated

#### Additional details from test laboratory

Colour: black

### 4. Samples:

#### Sample size (determined by BASF test laboratory):

Length:	146,30	[mm]	Weight:	13,13	[g]
Width:	53,40	[mm]	Weight per unit area:	0,83	[kg/m <sup>2</sup> ]
Thickness:		[mm]	Density:		[kg/m <sup>3</sup> ]
Outer diameter:		[mm]			
Inner diameter:		[mm]	Remarks:		

#### Pre-conditioning:

	Conditions	Duration days
Client: (information supplied by client)		
Test laboratory:	Standard 23/50 ISO 554	8

#### Sample preparation:

Exposed surface: Waved surface

Test gas temperature: 22°C  
(start of test)

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## 5. Test results:

Sample type: V - For flexible film or sheet  
Procedure (Ignition method) B - Propagating ignition

### 5.1 Preliminary determination of Oxygen concentration (Increment d = 1 Vol. %)

Oxygen [Vol.%]	28,0	32,0	31,1	29,0	30,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Duration of burning [s]	20	69	93	34	157							
Burning distance [mm]	8	80	80	10	80							
Event (X or O)	O	X	X	O	X							

### 5.2 Determination of Oxygen concentration (Increment d = 0,2 Vol. %)

N <sub>T</sub> -Series												
N <sub>L</sub> -Series (8.6.1 – 8.6.2)							(8.6.3)				c <sub>r</sub>	
Oxygen [Vol.%]	29,00	29,20	29,40				29,60	29,40	29,20	29,40	29,60	
Duration of burning [s]	40	19	61				81	125	54	35	28	
Burning distance [mm]	11	5	20				80	80	25	10	5	
Event (X or O)	O	O	O				X	X	O	O	X	
(Table 4): k-Factor with corrected sign:						-0,75						
<b>Oxygen Index:</b>						[%]	<b>29,4</b>					
Standard deviation σ :						[%]	0,152					

The following requirement by ISO 4589-2 section 8.6.4 was fulfilled:

$$\frac{2\hat{\sigma}}{3} < d < 1,5\hat{\sigma} \quad 2/3 s < 0,2 < 0,228$$

According to aforementioned requirements, determination of limiting Oxygen concentration did not have to be repeated.

### Observations:

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## 6. Test equipment:

Test apparatus	PK 0007
Caliper gauge	MB 0029
Balance	MW 0007
Analyzer	MA 0002
Stop watch	MU 0045

## 7. Requirements:

Standard ISO 4589 Part 2 does not define any requirements.

Requirements by other standards:

Standard	Criteria	Requirements	
DIN EN 45545-2:2013-08*	Set of requirements R22, R23, R24	HL 1 and 2	LOI ≥ 28%
		HL 3	LOI ≥ 32%
DIN CEN/TS 45545-2:2009-07	Set of requirements R23, R24, R25	HL 1 and 2	LOI ≥ 28%
		HL 3	LOI ≥ 32%
DIN 5510 – 2:2009-05, section 5.2.2.4	Small electrical parts with a combustible material mass of 50 or 300 g (accessible / not accessible by passengers), which are arranged with a spacing of ≤ 20 cm behind, next to or above one another		LOI ≥ 28%
	Materials used in electrical equipment that is not accessible to passengers		LOI ≥ 30%
NF F 16-101, section 6.1.3	„I“ classification  (in conjunction with test acc. to IEC 60695-2-10)	I 0	LOI ≥ 70%
		I 1	LOI ≥ 45%
		I 2	LOI ≥ 32%
		I 3	LOI ≥ 28%
		I 4	LOI ≥ 20%
BS 6853	Tables 7 + 8	Vehicle category Ia and Ib	LOI ≥ 34 %
		Vehicle category II	LOI ≥ 28 %
TSI Freight waggon (2006)**	Section 4.2.7.2.2.4. Material requirement		LOI ≥ 26 %

\* = EN 45545-2 (2013/03)

\*\*from edition 2013-04, no more requirements regarding LOI



The Chemical Company

EINGEGANGEN 16. MRZ. 2015

BASF SE, 67056 Ludwigshafen, Deutschland

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09.03.2015  
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**Prüfbericht Nr. 11504/40047**

Sehr geehrter Herr Mankiewicz!

Anbei übersenden wir Ihnen den o. g. korrigierten Bericht.

Falls Sie Rückfragen hierzu haben, bitte ich Sie, mich unter der angegebenen Nummer anzurufen.

Mit freundlichen Grüßen

Katja Grosse-Brömer

Anlagen  
Prüfbericht 11504/40047

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