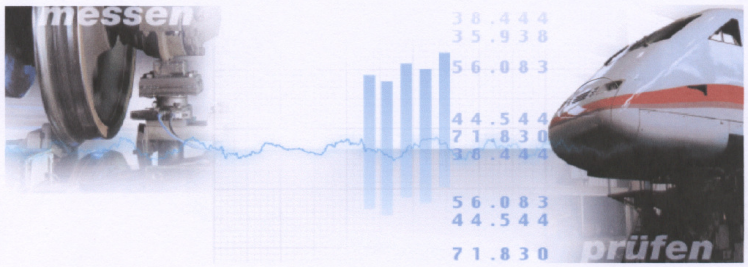
Die Bahn DB

The testing division is associated partner
of the nominated body for interoperability
of railway-systems.

Deutsche Bahn AG
Technik / Beschaffung
DB Systemtechnik
Prüfstelle
Pionierstraße 10
D – 32423 Minden

Test Report

Fire Testing pursuant to DIN 54 837



Test Report: 06-P-4010-TZF91-PR-127/01
Date: 27.04.06

Department: DB Systemtechnik
Instandhaltung, Betriebsfestigkeit,
Regelwerke
Instandhaltung, RAMS
Bahntechnikerring 74
14774 Brandenburg-Kirchmöser

249966 QM

Anwendung eines durch die DQS GmbH
Deutsche Gesellschaft zur Zertifizierung von Managementsystemen
zertifizierten Qualitätsmanagementsystems

Contens

1 Details of the remit

- Assignment: Performance of fire-testing
- Reference: Your order N°: 030945/MB from 05.04.06
- Commissioning party: Adaptaflex Ltd.
  Station Road Coleshill
  Birmingham
  B46 1 HT
- Testing department: DB Systemtechnik
  Instandhaltung, Betriebsfestigkeit, Regelwerke
  Instandhaltung, RAMS
  Bahntechnikerring 74
  D-14774 Brandenburg - Kirchmöser
- Pages: 6 pages of test Report
- Distribution list: 1 original Adaptaflex Ltd.
  1 copy TZF 91

2 Description of the test object

- Reference number: 06-127-05/1271 (samples 1-5)
- Date of receipt: 10.04.2006
- Materal designation: conduit **PAFL 13**
- Dimensions: length: 500 mm
  outer diameter: 13,1 mm
  inner diameter: 9,5 mm
- Retention time of the test samples: 1 year from date of this report on

3 Testing

3.1 Details of testing

- Test procedure: **DIN 54 837 (draft 09/2003)**
  Testing of materials, small components
  and component sections for rail vehicles
  Determination of burning behaviour using
  a gas burner

- Evaluation: **DIN 5510 part 2 (draft 09/2003)**
  Preventive fire protection in railway vehicles
  Part 2: Fire behaviour and fire side effects of
  materials and parts;
  Classifications, requirements and test methods

3.2 Performance of testing

- Conditioning: > 48h at 23°C ± 3°C / 50% rel. humidity
- Inflaming side: outside
- Date of testing: 19.04.2006
- Tester: Schiller

4 Results

			Einzelwert für Probe Nr.					
Sample number			**1**	**2**	**3**	**4**	**5**	**Mean value**
Inflaming of the sample point of time in		[s]	10	10	10	10	10	**10**
Duration of burning in		[s]	170	170	170	170	170	**170**
Duration of afterburn in after removal of external flame		[s]	0	0	0	0	0	**0**
Duration of afterglow in after removal of external flame		[s]	0	0	0	0	0	**0**
Maximum flame height in		[cm]	10	10	10	10	10	**10**
Specimen parts falling off	not burning	[yes/no]	yes	yes	yes	yes	yes	**yes**
	burning	[yes/no]	yes	yes	yes	yes	yes	**yes**
	time	[s]	0	3	2	0	3	**2**
Optical density of smoke	maximum in	[%]	2	1	1	1	1	**1**
	reached after	[s]	32	26	23	33	30	**29**
	integral in	[%*min]	3,1	3,0	3,1	2,5	3,4	**3,0**
Destroyed area length in		[cm]	14	16	12	12	22	**15**
Specimen extinguished		[yes/no]	no	no	no	no	no	**no**
burn through		[yes/no]	yes	yes	yes	yes	yes	**yes**
after		[s]	30	34	29	26	24	**29**

- Observation: not one

- Assessment pursuant to DIN 5510, part 2:

Flammability class:	S 4
Smoke-development class:	SR 2
Melt-drip class:	ST 2

- Remarks: not one

5 Signatures

für Dr. Trockels, head TZF 91

Schiller, tester in charge

noticed:

testing department

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2 Description of the test object

- Reference number: 06-127-05/1272 (samples 1-5)
- Date of receipt: 10.04.2006
- Materal designation: conduit **PACL 54**
- Dimensions: length: 500 mm
  outer diameter: 54,2 mm
  inner diameter: 46,7 mm
- Retention time of the test samples: 1 year from date of this report on

3 Testing

3.1 Details of testing

• Test procedure:	**DIN 54 837 (draft 09/2003)** Testing of materials, small components and component sections for rail vehicles Determination of burning behaviour using a gas burner
• Evaluation:	**DIN 5510 part 2 (draft 09/2003)** Preventive fire protection in railway vehicles Part 2: Fire behaviour and fire side effects of materials and parts; Classifications, requirements and test methods

3.2 Performance of testing

• Conditioning:	> 48h at 23°C ± 3°C / 50% rel. humidity
• Inflaming side:	outside
• Date of testing:	19.04.2006
• Tester:	Schiller

4 Results

Sample number			Einzelwert für Probe Nr. 1	2	3	4	5	**Mean value**
Inflaming of the sample point of time in		[s]	6	6	6	6	6	**6**
Duration of burning in		[s]	174	174	246	174	261	**206**
Duration of afterburn in after removal of external flame		[s]	0	0	72	0	87	**32**
Duration of afterglow in after removal of external flame		[s]	0	0	0	0	0	**0**
Maximum flame height in		[cm]	16	16	16	16	16	**16**
Specimen parts falling off	not burning	[yes/no]	yes	yes	yes	yes	yes	**yes**
	burning	[yes/no]	yes	yes	yes	yes	yes	**yes**
	time	[s]	14	3	6	34	8	**13**
Optical density of smoke	maximum in	[%]	2	2	2	3	2	**2**
	reached after	[s]	54	62	168	140	276	**140**
	integral in	[%*min]	0,9	1,1	1,4	1,3	1,3	**1,2**
Destroyed area length in		[cm]	12	11	14	15	15	**13**
Specimen extinguished		[yes/no]	no	no	no	no	no	**no**
burn through		[yes/no]	yes	yes	yes	yes	yes	**yes**
after		[s]	55	52	56	52	49	**53**

- Observation: not one

- Assessment pursuant to DIN 5510, part 2:

Flammability class:	S 3
Smoke-development class:	SR 2
Melt-drip class:	ST 2

- Remarks: The classification in the flammability class S3 based of the afterburntime > 10 s.

5 Signatures

i.V. Dr. Trockels, head TZF 91

Schiller, tester in charge

noticed:

testing department