



# Traction cable

## RADOX JUMPER 1800V M

### Product description:

#### RADOX JUMPER 1800V M

Nominal voltage:

Single core cables with standard wall thickness  
1800 / 3000 V AC

Hazard level:

M (extra low temperature, extra oil and extra fuel resistant)

### General properties:

Halogen free, electron-beam cross-linked cables with improved behaviour in case of fire, easy to strip, soldering resistant and flexible.

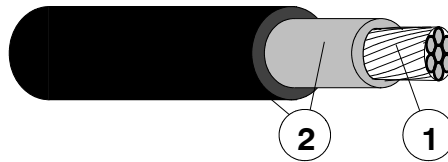
### Application:

Jumper cables are for use in rolling stock where permanent bending stresses occur during service, e.g. as inter vehicle jumper cable, bogie drop cable etc., without torsional stress.

Guidelines for selection and installation are described in the standard EN 50343.

For unscreened cables the guidelines of EN 50153 shall be followed.

### General composition of cable:



1. Conductor : specially stranded tin plated copper, acc. to EN 60228 cl. 5
2. Insulation :  
inner layer RADOX EI 110, colour : white  
outer layer RADOX EM 104J, colour : see table

### Marking:

[a] HUBER+SUHNER RADOX JUMPER 1800V [b] M [c]-[d] [e] [f]


		example:
[a]	Meter marking (in m)	= 1234 = m
[b]	Construction	1X150
[c]	Part number	12345678
[d]	Batch number	1234567
[e]	Production week and year	03- 2017
[f]	Production place (only if China)	CN


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The product fulfils the test and specification requirements described in this document for the stated areas of application and operating conditions. HUBER+SUHNER AG does not expressly or implicitly guarantee performance under additional or changed conditions. Deviations are to be agreed upon in writing.

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### Technical Data:

Voltage rating cond.- earth	U <sub>0</sub>	1800	V AC
Voltage rating cond.- cond.	U	3000	V AC
maximum permissible Voltage rating AC cond.- earth		2100	V AC
maximum permissible Voltage rating AC cond.- cond.	U <sub>m</sub>	3600	V AC
maximum permissible Voltage rating DC cond.- earth	V <sub>0</sub>	2700	V DC
maximum permissible Voltage rating DC cond.- cond.		4500	V DC

Test voltage ..... 6500 ..... V AC

#### Temperature range

fixed installation ..... - 50 ... + 110 ..... °C

installation with restricted movement<sup>1)</sup> ..... - 40 ... + 110 ..... °C

free installation ..... - 30 ... + 110 ..... °C

<sup>1)</sup> With a maximum movement of the freely movable cable length +/- 75 mm per 1 meter of cable length

#### Min. bending radius \*)

fixed ..... at bending angle ≤ 90° ..... all D ..... 2 x D

..... at bending angle > 90° ..... D ≤ 10 mm ..... 3 x D

..... at bending angle > 90° ..... D > 10 mm ..... 4 x D

installation with restricted movement ..... 8 x D

free installation ..... 8 x D

\*) provided that careful and competent handling is used in combination with proven fixture methods

### Conditions:

The upper temperature limit is determined by long term ageing according to EN 50305 Par. 7 and extrapolation to 20,000 hours. The lower temperature limit is determined by bending and elongation tests according to EN 60811-504/505, respectively low temperature behaviour tests for static conditions, e.g. for fixed installation according to GOST 20.57.406-81 - method 204-1 and GOST 17491-80.

The specified bending radii require a careful and proper handling using proven fastening technologies.



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### The cables are in conformity with:

<b>Fire protection on railway vehicles, hazard level</b> .....	<b>HL1 - HL3</b> .....	<b>EN 45545</b>
Vertical flame spread .....	50 < L ≤ 540 mm .....	EN 60332-1-2
Vertical flame spread, bunched, D ≤ 6 mm .....	L ≤ 1.5 m .....	EN 50305, 9.1.2
Vertical flame spread, bunched, 6 < D < 12 mm .....	L ≤ 2.5 m .....	EN 50305, 9.1.1 (EN 60332-3-25)
Vertical flame spread, bunched, D ≥ 12 mm .....	L ≤ 2.5 m .....	EN 60332-3-24
Smoke density .....	T ≥ 70 % .....	EN 61034-2
Toxicity .....	ITC ≤ 6 .....	EN 50305, 9.2
<b>Fire protection on railway vehicles, level of protection</b> .	<b>1 - 4</b> .....	<b>DIN 5510</b>
Vertical flame spread .....	50 < L ≤ 540 mm .....	EN 60332-1-2
Vertical flame spread, bunched, D ≤ 6 mm .....	L ≤ 1.5 m .....	EN 50305, 9.1.2
Vertical flame spread, bunched, 6 < D < 12 mm .....	L ≤ 2.5 m .....	EN 60332-3-25
Vertical flame spread, bunched, D ≥ 12 mm .....	L ≤ 2.5 m .....	EN 60332-3-24
Smoke density .....	T ≥ 60 % .....	EN 61034-2
Corrosivity of combustion gases .....	pH ≥ 4.3, C ≤ 10 μS/mm .....	EN 50267-2-2
Amount of halogen acid gas .....	HCl + HBr ≤ 0.5 % .....	EN 50267-2-1
Content of fluorine .....	HF ≤ 0.1 % .....	EN 60684-2, 45.2
Toxicity .....	ITC ≤ 3 .....	EN 50305, 9.2
<b>Fire protection on railway vehicles, hazard level</b> .....	<b>LR1 - LR4</b> .....	<b>UNI CEI 11170</b>
Vertical flame spread .....	50 < L ≤ 540 mm .....	EN 60332-1-2
Vertical flame spread, bunched, D ≤ 6 mm .....	L ≤ 1.5 m .....	EN 50305, 9.1.2
Vertical flame spread, bunched, 6 < D < 12 mm .....	L ≤ 2.5 m .....	EN 60332-3-25
Vertical flame spread, bunched, D ≥ 12 mm .....	L ≤ 2.5 m .....	EN 60332-3-24
Smoke density .....	T ≥ 70 % .....	EN 61034-2
Corrosivity of combustion gases .....	pH ≥ 4.3, C ≤ 10 μS/mm .....	EN 50267-2-2
Amount of halogen acid gas .....	HCl + HBr ≤ 0.5 % .....	EN 50267-2-1
Toxicity .....	ITC ≤ 3 .....	EN 50305, 9.2
<b>Fire protection on railway vehicles</b> .....	<b>Fulfilled</b> .....	<b>NFPA 130</b>
Vertical flame spread, bunched .....	L ≤ 1.5 m .....	UL 1685, 12 (FT4 exp.)
Smoke density .....	TSR ≤ 150 m <sup>2</sup> , PSRR ≤ 0.40 m <sup>2</sup> /s .....	UL 1685, 12 (FT4 exp.)
<b>Test Eh, hammer test</b> .....	20 J .....	EN60068-2-75, IEC 60068-2-75
<b>Requirement of hazard level code M</b> .....	(acc. to EN 50264-1 or EN 50306-1)	
Extra low temperature .....	- 40 °C	
Extra oil resistance .....	IRM 902, 72h, 100°C	
Extra fuel resistance .....	IRM 903, 168h, 70°	



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**Table:**

Cross section nom mm <sup>2</sup>	Conductor construction		Cable dia. mm	R <sub>20</sub> <sup>1)</sup> max. Ω/km	C <sup>2)</sup> nom pF/m	Fire load nom. kJ/m	Weight nom. copper cable kg / 100m		Colour	H + S Part. Nr.
	n x mm	D <sub>nom.</sub> mm								
16	266 x 0.30	6.0	11.0 ± 0.3	1.22	390	1670	16	26	BK	12 585 829
25	518 x 0.25	7.6	12.5 ± 0.3	0.795	480	1940	25	36	BK	84 101 651
35	700 x 0.25	8.7	13.5 ± 0.3	0.554	538	2115	32	45	BK	84 097 272
50	854 x 0.28	10.9	16.0 ± 0.3	0.385	635	2685	45	64	BK	84 095 698
70	1008 x 0.30	12.2	17.5 ± 0.3	0.271	683	3065	63	85	BK	84 095 709
95	1316 x 0.30	14.1	19.5 ± 0.3	0.206	756	3560	82	107	BK OG	84 098 661 85 094 182
120	960 x 0.40	16.2	21.5 ± 0.3	0.164	867	3925	109	139	BK	84 101 650
150	880x0.40+588x0.30	17.6	23.0 ± 0.3	0.132	906	4340	136	169	BK	84 094 779
185	1520 x 0.40	19.7	25.0 ± 0.3	0.108	1010	4720	172	207	BK	12 585 830
240	1920 x 0.40	22.9	29.5 ± 0.4	0.0817	950	8600	218	266	BK	85 112 996
300	2400 x 0.40	25.1	32.0 ± 0.4	0.0654	1761	9570	274	327	BK	85 029 757

- 1) conductor resistance according to IEC 60228  
2) capacity in water typical value