



Traction cable

RADOX JUMPER 3600V MM

Product description:

RADOX JUMPER 3600V MM Single core cables with standard wall thickness
 Nominal voltage: 3600 / 6000 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.

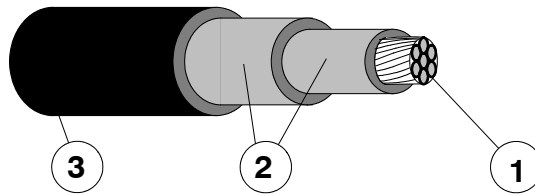
Application:

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 : inside: RADOX EI 110, colour : white
 outside: RADOX EI 109, colour : white
3. Sheath : RADOX EM 104J colour : black
 Marking : HUBER+SUHNER RADOX JUMPER 3600V 1X[*cross section*] MM [part. No. + batch. No.]

Technical Data:

Voltage rating cond.- earth U_0 3600 V AC
 Voltage rating cond.- cond. U 6000 V AC
 maximum permissible Voltage rating AC cond.- earth 4300 V AC
 maximum permissible Voltage rating AC cond.- cond. ... U_m 7200 V AC
 maximum permissible Voltage rating DC cond.- earth . V_0 5400 V DC
 maximum permissible Voltage rating DC cond.- cond. 9000 V DC

Test voltage 12000 V AC

Temperature range

fixed installation - 50 ... + 110 °C
 installation with restricted movement¹⁾ - 40 ... + 110 °C
 free installation - 30 ... + 110 °C

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

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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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Min. bending radius *)

fixed installation	at bending angle $\leq 90^\circ$	all D	2 x D
	at bending angle $> 90^\circ$	$D \leq 10 \text{ mm}$	3 x D
	at bending angle $> 90^\circ$	$D > 10 \text{ mm}$	4 x D
installation with restricted movement			8 x D
free installation			8 x D

smaller bending radius on request

*) 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- 1- 4 Par. 8

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

The cables are in conformity with:

Fire protection on railway vehicles, hazard level	HL1 - HL3	EN 45545
Vertical flame spread	$50 < L \leq 540 \text{ mm}$	EN 60332- 1- 2
Vertical flame spread, bunched, $D \leq 6 \text{ mm}$	$L \leq 1.5 \text{ m}$	EN 50305, 9.1.2
Vertical flame spread, bunched, $6 < D < 12 \text{ mm}$	$L \leq 2.5 \text{ m}$	EN 50305, 9.1.1 (EN 60332- 3- 25)
Vertical flame spread, bunched, $D \geq 12 \text{ mm}$	$L \leq 2.5 \text{ m}$	EN 60332- 3- 24
Smoke density	$T \geq 70 \%$	EN 61034- 2
Toxicity	$ITC \leq 6$	EN 50305, 9.2
Fire protection on railway vehicles, level of protection	1 - 4	DIN 5510
Vertical flame spread	$50 < L \leq 540 \text{ mm}$	EN 60332- 1- 2
Vertical flame spread, bunched, $D \leq 6 \text{ mm}$	$L \leq 1.5 \text{ m}$	EN 50305, 9.1.2
Vertical flame spread, bunched, $6 < D < 12 \text{ mm}$	$L \leq 2.5 \text{ m}$	EN 60332- 3- 25
Vertical flame spread, bunched, $D \geq 12 \text{ mm}$	$L \leq 2.5 \text{ m}$	EN 60332- 3- 24
Smoke density	$T \geq 60 \%$	EN 61034- 2
Corrosivity of combustion gases	$\text{pH} \geq 4.3, C \leq 10 \mu\text{S}/\text{mm}$	EN 50267- 2- 2
Amount of halogen acid gas	$\text{HCl} + \text{HBr} \leq 0.5 \%$	EN 50267- 2- 1
Content of fluorine	$\text{HF} \leq 0.1 \%$	EN 60684- 2, 45.2
Toxicity	$ITC \leq 3$	EN 50305, 9.2
Fire protection on railway vehicles, hazard level	LR1 - LR4	UNI CEI 11170
Vertical flame spread	$50 < L \leq 540 \text{ mm}$	EN 60332- 1- 2
Vertical flame spread, bunched, $D \leq 6 \text{ mm}$	$L \leq 1.5 \text{ m}$	EN 50305, 9.1.2
Vertical flame spread, bunched, $6 < D < 12 \text{ mm}$	$L \leq 2.5 \text{ m}$	EN 60332- 3- 25
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Smoke density	$T \geq 70 \%$	EN 61034- 2
Corrosivity of combustion gases	$\text{pH} \geq 4.3, C \leq 10 \mu\text{S}/\text{mm}$	EN 50267- 2- 2
Amount of halogen acid gas	$\text{HCl} + \text{HBr} \leq 0.5 \%$	EN 50267- 2- 1
Toxicity	$ITC \leq 3$	EN 50305, 9.2
Test Eh, hammer test	20 J	EN60068- 2- 75, IEC 60068- 2- 75
Requirement of hazard level code M	(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 ²	Conductor		Core-D D _{nom} mm	Cable dia. mm	R ₂₀ ¹⁾ max. Ω/km	C _{H2O} ²⁾ nom pF/m	Fire load nom. kJ/m	Weight nom.		H + S Part. Nr.
	construction n x mm	D _{nom.} mm						copper	cable	
16	266 x 0.30	6.0	10.6	13.5 ± 0.3	1.220	420	2770	16	33	84 119 315
25	518 x 0.25	7.6	12.4	15.5 ± 0.3	0.779	490	3600	25	46	84 123 219
35	700 x 0.25	8.7	13.6	17.0 ± 0.3	0.554	530	4220	32	58	84 123 220
50	854 x 0.28	10.9	16.5	20.5 ± 0.3	0.385	590	5710	45	82	84 123 221
70	1008 x 0.30	12.2	18.0	22.0 ± 0.3	0.271	630	6830	63	106	84 123 222
95	1316 x 0.30	14.1	20.3	24.5 ± 0.4	0.206	670	7660	82	134	84 124 429
120	960 x 0.40	16.2	22.5	27.5 ± 0.4	0.164	740	10310	109	174	84 124 430
150	880 x 0.40 + 588 x 0.30	17.6	24.2	29.0 ± 0.4	0.132	760	11230	136	207	84 123 223
185	1520 x 0.40	19.7	26.3	31.5 ± 0.4	0.108	810	12420	172	251	84 124 426

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