



# Traction cable

## RADOX 4 GWK-AX 1800V M

### Product description:

**RADOX 4 GWK-AX 1800V M** Single core cables with reduced wall thickness  
 Nominal voltage: 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. The cables are in accordance to EN 50264-3-1, but significantly thinner until 25 mm<sup>2</sup>.

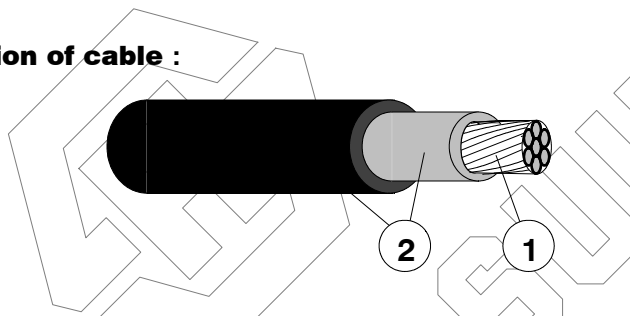
### Application :

The cables are intended for permanent installation in rail vehicles or for applications in which a limited alternating bending stress occur during service.

Guidelines for selection and installation are described in the standards EN 50355 and EN 50343.

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

### General composition of cable :



1. Conductor : stranded tin plated copper, acc. to EN 60228 cl. 5
  2. Insulation : inner layer RADOX EI 110, colour: white  
 outer layer RADOX EI 109, colour : black (see Table 1), coloured (see Table 2)
- Cable marking : HUBER+SUHNER RADOX 4 GWK-AX 1800V 1X[cross section] M [part No.] - [batch No.] [prod.- place]

### 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		- 50 ... + 120	°C

### Min. bending radius

fixed	D ≤ 12 mm	3 x D
	D > 12 mm	4 x D
sporadic movement	D ≤ 12 mm	4 x D
	D > 12 mm	5 x D

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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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### NB:

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, 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.

### 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, category</b> .....	<b>A1, A2, B</b> .....	<b>NF F16-101</b>
Fire protection on railway vehicles, class .....	C / F1 .....	NF F16-101
Vertical flame spread .....	50 < L ≤ 540 mm .....	NF C32-070, 2.1
Vertical flame spread, bunched .....	L ≤ 300 mm .....	NF C32-070, 2.2
Smoke index .....	I.F. ≤ 5 .....	X10-702-2, NF X70-100-1
<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, category</b> .....	<b>Ia, Ib, II</b> .....	<b>BS 6853, GM/RT 2130</b>
Vertical flame spread .....	50 < L ≤ 540 mm .....	EN 60332-1-2
Vertical flame spread, bunched .....	L ≤ 2.5 m .....	EN 50266, BS 6853 An. D.8.7
Smoke density .....	A <sub>0</sub> ≤ BS 6853 .....	BS 6853 An. D.8.7
Toxicity .....	R ≤ 1.0 .....	BS 6853 An. B.1
<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.)



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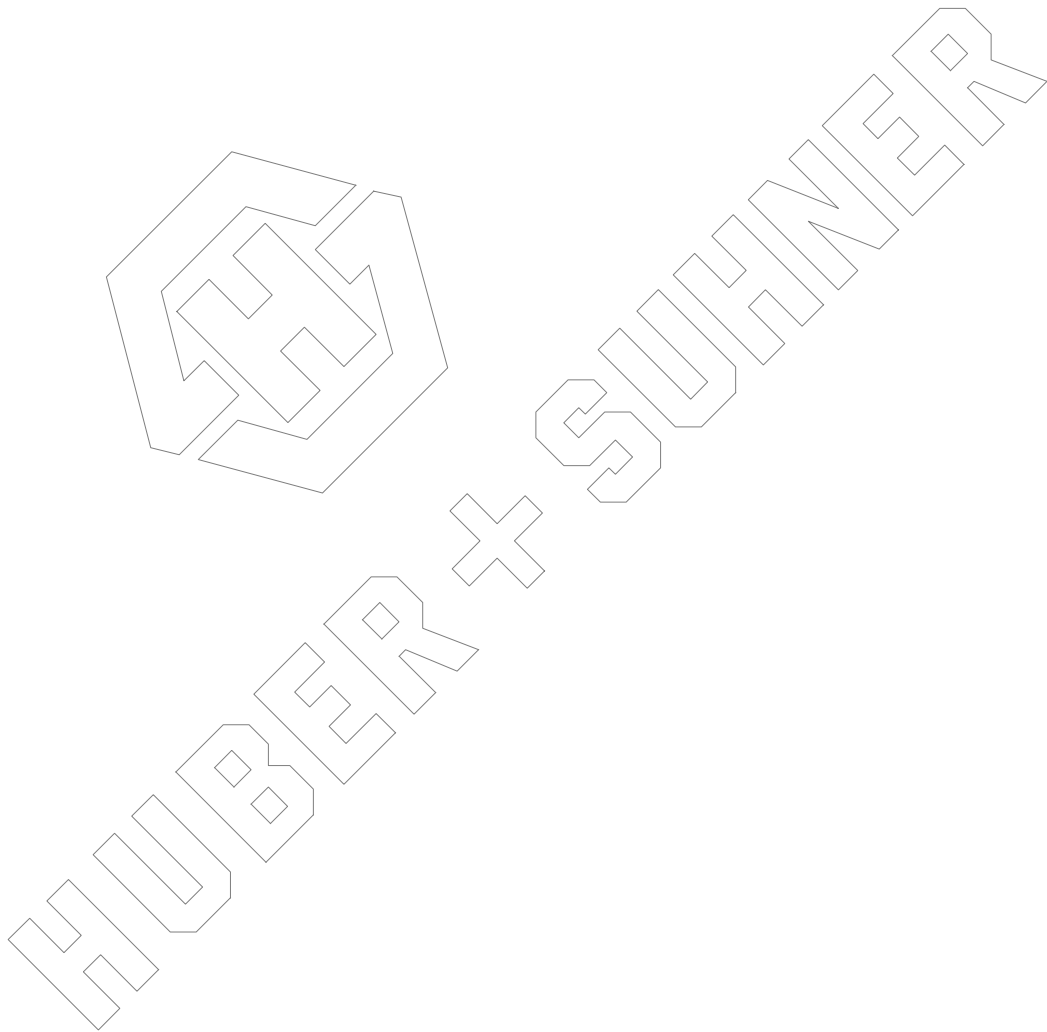
### Requirement of hazard level code M

(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°

### Applicable documents :

H+S 557 578	Current rating for single core cables
Doc.No. 0000356416	Technical Specification RADOX 4/9 GWK- AX





# Traction cable

## RADOX 4 GW-AX 1800V M

**Table 1 :** Isolation outer layer colour: black

Cable type mm <sup>2</sup>	Conductor nom		Cable dia. mm	R <sub>20</sub> <sup>1)</sup> max Ω / km	C <sub>H<sub>2</sub>O</sub> <sup>2)</sup> nom pF/m	Fireload nom kJ / m	Weight nom		H+S Part. Nr.
	construction n x mm	D mm					copper kg / 100m	cable kg / 100m	
0.5	19x0.18	0.88	2.45±0.10	38.5	236	91	0.44	1.1	84 118 052
0.75	24x0.18	1.10	2.65±0.10	26.7	276	102	0.70	1.4	84 118 059
1	37x0.18	1.22	3.00±0.10	20.0	266	132	0.88	1.8	12 555 986
1.5	37x0.23	1.52	3.35±0.10	13.7	307	157	1.4	2.5	12 536 686
2.5	61x0.23	1.94	3.75±0.10	8.21	362	187	2.2	3.5	12 536 692
4	61x0.29	2.40	4.50±0.10	5.09	396	257	3.5	5.2	12 536 694
6	84x0.30	2.93	5.20±0.15	3.39	419	334	5.2	7.4	12 536 696
10	80x0.40	3.89	6.40±0.15	1.95	488	467	9.1	12	12 545 527
16	119x0.40	5.30	8.40±0.20	1.24	535	801	13	19	12 545 528
25	182x0.40	6.60	10.2±0.3	0.795	565	1125	21	28	12 545 529
35	266x0.40	7.80	11.7±0.3	0.565	607	1457	30	40	12 545 530
50	378x0.40	9.30	13.5±0.3	0.393	660	1737	43	54	12 545 531
70	348x0.50	11.4	15.8±0.3	0.277	755	2178	61	75	12 545 532
95	444x0.50	12.9	17.5±0.3	0.210	808	2549	78	95	12 545 533
120	570x0.50	14.9	19.8±0.3	0.164	862	3118	100	120	12 544 522
150	722x0.50	16.8	22.1±0.3	0.132	894	3474	127	150	12 545 534
185	874x0.50	18.3	24.0±0.3	0.108	903	4432	153	182	12 544 523
240	1147x0.50	21.1	27.0±0.3	0.0817	994	5225	201	235	12 547 684
300	1443x0.50	23.7	29.9±0.4	0.0654	1060	6106	251	291	12 552 906
400	1952x0.50	27.3	34.1±0.5	0.0495	1115	7639	342	392	12 555 997

1) conductor resistance according to EN 60228

2) capacity in water



# Traction cable

## RADOX 4 GWK-AX 1800V M

**Table 2 :** Isolation outer layer colour: see table

Cable type mm <sup>2</sup>	Conductor nom		Cable dia. mm	R <sub>20</sub> <sup>1)</sup> max Ω / km	C <sub>H2O</sub> <sup>2)</sup> nom pF/m	Fireload nom kJ / m	Weight nom		Colour	H+S Part. Nr.
	construction n x mm	D mm					copper	cable		
0.5	19x0.18	0.88	2.45±0.10	38.5	236	91	0.44	1.1	bn	84 118 053
									bu	84 118 056
									gy	84 118 058
									rd	84 118 057
0.75	24x0.18	1.10	2.65±0.10	26.7	276	102	0.70	1.4	rd	85 070 897
1	37x0.18	1.22	3.00±0.10	20.0	266	132	0.88	1.8	ye	12 586 321
1.5	37x0.23	1.52	3.35±0.10	13.7	307	157	1.4	2.5	ye	12 562 189
									bu	12 543 842
									gy	12 567 226
									rd	12 555 769
2.5	61x0.23	1.94	3.75±0.10	8.21	362	187	2.2	3.5	ye	85 067 621
									bu	85 067 625
									rd	12 554 310
									gy	84 091 279
									bn	12 584 664
4	61x0.29	2.40	4.50±0.10	5.09	396	270	3.5	5.3	wh	85 023 707
									rd	12 559 555
									bu	85 066 538
									ye	85 067 561
6	84x0.30	2.93	5.2±0.15	3.39	419	334	5.2	7.4	wh	84 090 550
									bu	12 568 594
									rd	12 582 984
10	80x0.40	3.89	6.4±0.15	1.95	488	467	9.1	12	bu	85 067 547
									ye	85 067 546
									rd	12 582 985
16	119x0.40	5.30	8.4±0.20	1.24	535	801	13	19	ye	85 067 521
									bu	85 067 520
									rd	12 566 008
25	182x0.40	6.60	10.2±0.3	0.795	565	1125	21	28	rd	12 568 968



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## RADOX 4 GW-AX 1800V M

**Table 2 :** Isolation outer layer colour: see table

Cable type mm <sup>2</sup>	Conductor nom		Cable dia. mm	R <sub>20</sub> <sup>1)</sup> max Ω / km	C <sub>H2O</sub> <sup>2)</sup> nom pF/m	Fireload nom kJ / m	Weight nom		Colour	H+S Part. Nr.
	construction n x mm	D mm					copper	cable		
35	266x0.40	7.80	11.7±0.3	0.565	607	1457	30	40	rd	12 568 008
									bu	85 019 626
									ye	85 019 627
50	378x0.40	9.30	13.5±0.3	0.393	660	1737	43	54	rd	12 582 459
70	348x0.50	11.4	15.8±0.3	0.277	755	2178	61	75	rd	12 566 010
95	444x0.50	12.9	17.5±0.3	0.210	808	2549	78	95	rd	12 582 460
120	570x0.50	14.9	19.8±0.3	0.164	862	3118	100	120	rd	85 070 815
150	722x0.50	16.8	22.1±0.3	0.132	894	3474	127	150	ye	85 067 495
									bu	85 067 494
									rd	85 067 468
185	874x0.50	18.3	24.0±0.3	0.108	903	4432	153	182	rd	12 559 659

1) conductor resistance according to EN 60228

2) capacity in water

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