



# Traction cable

## RADOX 3 GWK 300V MM S FR RW

### Product description:

RADOX 3 GWK 300V MM S FR RW : multi core cables with flame barrier and overall screen

Nominal voltage: 300 / 500 V AC

Hazard level: M (extra low temperature, extra oil and extra fuel resistant)

### General Properties :

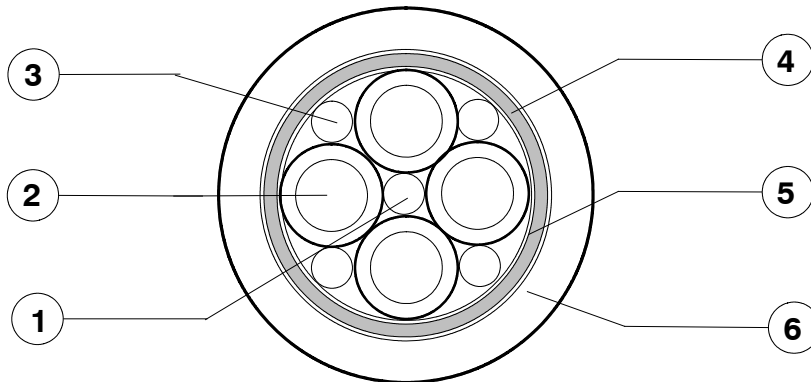
Halogen free, electron- beam cross- linked cables with improved behaviour in case of fire and maintains circuit integrity , easy to strip, soldering resistant and flexible.

### 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.

### General composition of cable:



1. Center	RADOX 125 REC
2. RADOX 3 GWK 300V FR RW Cores	Conductor: stranded tin plated copper according EN 60228 cl. 5 Flame barrier: MICA - tape Insulation: RADOX EI 201 Colour: grey; black numbered
3. Filler	RADOX 125 REC
4. EMC- screen optimised	Tin plated copper braid
5. Separator	Tape
6. Sheath	RADOX EM 104 Colour: black; yellow marked

### Marking:

[a] HUBER+SUHNER RADOX 3 GWK 300V [b] MM S FR RW [c]-[d] [e] [f]

	example:
[a] Meter marking (in m)	= 1234 = m
[b] Construction	2X150
[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	..... $U_0$ .....	300	.....	V AC
Voltage rating cond.- cond.	..... $U$ .....	500	.....	V AC
maximum permissible Voltage rating AC cond.- earth	.....	360	.....	V AC
maximum permissible Voltage rating AC cond.- cond.	..... $U_m$ .....	600	.....	V AC
maximum permissible Voltage rating DC cond.- earth	..... $V_0$ .....	450	.....	V DC
maximum permissible Voltage rating DC cond.- cond.	.....	750	.....	V DC
Test voltage	.....	2000	.....	V AC
Temperature range	.....	- 50 ... + 120	.....	°C
Min. bending radius *)				
fixed installation	.....	cable diameter $\leq$ 10 mm	.....	3 x D
		cable diameter $>$ 10 mm	.....	4 x D
sporadic movement	.....	cable diameter $\leq$ 10 mm	.....	5 x D
		cable diameter $>$ 10 mm	.....	6 x D

### 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 60811-504/505, 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:

#### Isolation receipt in the case of fire

Resistance to fire with mechanical shock,  $D \leq 20$  mm ..... 30 Min. .... EN 50200

#### Fire protection on railway vehicles, hazard level ..... HL1 - HL3 ..... EN 45545

Vertical flame spread .....  $50 < L \leq 540$  mm ..... EN 60332-1-2  
Vertical flame spread, bunched,  $D \leq 6$  mm .....  $L \leq 1.5$  m ..... EN 50305, 9.1.2  
Vertical flame spread, bunched,  $6 < D < 12$  mm .....  $L \leq 2.5$  m ..... EN 50305, 9.1.1 (EN 60332-3-25)  
Vertical flame spread, bunched,  $D \geq 12$  mm .....  $L \leq 2.5$  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 .....  $50 < L \leq 540$  mm ..... EN 60332-1-2  
Vertical flame spread, bunched,  $D \leq 6$  mm .....  $L \leq 1.5$  m ..... EN 50305, 9.1.2  
Vertical flame spread, bunched,  $6 < D < 12$  mm .....  $L \leq 2.5$  m ..... EN 60332-3-25  
Vertical flame spread, bunched,  $D \geq 12$  mm .....  $L \leq 2.5$  m ..... EN 60332-3-24  
Smoke density .....  $T \geq 60$  % ..... EN 61034-2  
Corrosivity of combustion gases .....  $pH \geq 4.3$ ,  $C \leq 10$   $\mu$ S/mm EN 50267-2-2  
Amount of halogen acid gas .....  $HCl + HBr \leq 0.5$  % ..... EN 50267-2-1  
Content of fluorine .....  $HF \leq 0.1$  % ..... EN 60684-2, 45.2  
Toxicity, insulation .....  $ITC \leq 6$  ..... EN 50305, 9.2  
Toxicity, filler and sheath .....  $ITC \leq 3$  ..... EN 50305, 9.2

#### Fire protection on railway vehicles, hazard level ..... LR1 - LR4 ..... UNI CEI 11170

Vertical flame spread .....  $50 < L \leq 540$  mm ..... EN 60332-1-2  
Vertical flame spread, bunched,  $D \leq 6$  mm .....  $L \leq 1.5$  m ..... EN 50305, 9.1.2  
Vertical flame spread, bunched,  $6 < D < 12$  mm .....  $L \leq 2.5$  m ..... EN 60332-3-25  
Vertical flame spread, bunched,  $D \geq 12$  mm .....  $L \leq 2.5$  m ..... EN 60332-3-24  
Smoke density .....  $T \geq 70$  % ..... EN 61034-2  
Corrosivity of combustion gases .....  $pH \geq 4.3$ ,  $C \leq 10$   $\mu$ S/mm EN 50267-2-2  
Amount of halogen acid gas .....  $HCl + HBr \leq 0.5$  % ..... EN 50267-2-1  
Toxicity, insulation .....  $ITC \leq 6$  ..... EN 50305, 9.2  
Toxicity, filler and sheath .....  $ITC \leq 3$  ..... EN 50305, 9.2

#### Fire protection on railway vehicles, category ..... A1, A2, B ..... NF F16-101

Fire protection on railway vehicles, class ..... C / F1 ..... NF F16-101  
Vertical flame spread .....  $50 < L \leq 540$  mm ..... NF C32-070, 2.1  
Vertical flame spread, bunched .....  $L \leq 300$  mm ..... NF C32-070, 2.2  
Smoke index ..... I.F.  $\leq 5$  ..... X10-702-2, NF X70-100-1

### Applicable documents :

EN 50355 Guide to use  
EN 50343 Installation rules  
H+S 564 900 Technical Datasheet RADOX 3 GWK 300V FR RW



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## RADOX 3 GWK 300V MM S FR RW

Cable type 1) n x mm <sup>2</sup>	Conductor dia. nom. mm	Core 2) dia. nom. mm	Screen nom.		Cable dia. mm	R <sub>20</sub> 3) max. Ω/km	Z <sub>T</sub> max. mΩ/m	C' 4) core/ core/ screen pF/m		Fire load nom. kJ/m	Weight nom.		H+S Part No.
			dia. mm	cross section mm <sup>2</sup>				core/ core/ screen	kg/ copper kg/100m		kg/ cable		
2x0.5	0.88	2.00	4.6	1.4	6.0±0.3	40.1	150	180	315	405	2.3	5.9	12 566 709
14x0.5	0.88	2.00	9.7	4.0	11.8±0.4	40.1	50	180	315	1565	10	23	85 102 843
24x0.5	0.88	2.00	13	7.1	15.5±0.5	40.1	30	180	315	2330	18	37	85 022 939
2x2x0.5	0.88	2.00	8.2	3.29	10.1±0.4	40.1	70	180	315	935	5.0	14	12 566 714
3x2x0.5	0.88	2.00	8.6	3.85	10.5±0.4	40.1	60	180	315	1190	6.5	17	12 585 599
4x2x0.5	0.88	2.00	10.5	5.55	12.5±0.4	40.1	60	180	315	1330	9.0	21	12 585 096
6x2x0.5	0.88	2.00	13	7.9	15.2±0.5	40.1	60	180	315	1865	13	31	12 567 021
7x2x0.5	0.88	2.00	11.4	5.9	13.6±0.4	40.1	60	180	315	1560	12	27	12 566 367
2x0.75	1.10	2.25	5.2	1.5	6.4±0.3	26.7	140	190	335	480	2.9	7.0	12 564 627
4x0.75	1.10	2.25	6.2	2.1	7.5±0.3	26.7	100	190	335	605	4.8	9.7	12 564 628
6x0.75	1.10	2.25	7.6	2.9	9.05±0.3	26.7	80	190	335	895	7.1	14	12 568 276
8x0.75	1.10	2.25	8.4	3.3	10.2±0.4	26.7	70	190	335	980	8.8	17	12 566 544
12x0.75	1.10	2.25	10.5	5.1	12.4±0.4	26.7	60	190	335	1525	13	25	12 566 278
3x2x0.75	1.10	2.25	9.1	3.25	11.1±0.4	26.7	50	190	335	1324	7.6	17.6	85 011 100
4x2x0.75	1.10	2.25	11.5	6.3	13.7±0.4	26.7	40	190	335	1813	12	26	85 021 421
5x2x0.75	1.10	2.25	12.5	7.9	14.7±0.4	26.7	60	190	335	1600	14	30	12 565 935
6x2x0.75	1.10	2.25	14.3	9.1	16.9±0.5	26.7	55	190	335	2420	17	38	12 566 366
2x1	1.22	2.50	5.6	1.7	7.1±0.3	20.0	120	190	335	630	3.6	8.5	12 567 871
4x1	1.22	2.50	7.0	2.3	8.5±0.3	20.0	70	190	335	830	6.0	13	12 584 298
8x1	1.22	2.50	10.7	5.55	12.6±0.4	20.0	40	190	335	1905	13	27	12 583 521
4x2x1	1.22	2.50	12.8	7.1	15.0±0.5	20.0	40	190	335	2085	15	31	12 585 097
4x4x1	1.22	2.50	10.6	16.4	19.3±0.5	20.0	25	190	335	4164	25.1	56.2	85 032 218 5)

5) 3 GWK 300V 4x4x1 MM S FR RW UIC, cable construction according to UIC 558 (16-core connection cable); numbering of cores: 1,4,2,3 / 5,8,6,7 / 9,12,10,11 / 14,20,15,16



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Cable type 1) n x mm <sup>2</sup>	Conductor dia. nom. mm	Core 2) dia. nom. mm	Screen nom.		Cable dia. mm	R <sub>20</sub> 3) max. Ω/km	Z <sub>T</sub> max. mΩ/m	C' 4) core/ core/ screen		Fire load nom. kJ/m	Weight nom.		H+S Part No.
			dia.	cross section mm <sup>2</sup>				core/ core/ pF/m	screen		copper	cable	
2x1.5	1.49	2.80	6.3	2.0	7.8±0.3	13.7	90	200	350	670	4.6	11	12 566 485
3x1.5	1.49	2.80	6.8	2.0	8.3±0.3	13.7	90	200	350	720	6.1	13	12 566 486
5G1.5	1.49	2.80	8.6	3.25	10.5±0.4	13.7	50	200	350	1259	10	19.6	85 021 405
6x1.5	1.49	2.80	9.4	3.7	11.3±0.4	13.7	65	200	350	1285	12	23	12 566 487
8x1.5	1.49	2.80	11.6	6.4	13.9±0.4	13.7	40	200	350	2390	17.2	34.7	85 068 044
12X1.5	1.49	2.80	12.6	7.1	14.8±0.4	13.7	40	200	350	2156	23.3	40	84 141 395
12G1.5	1.49	2.80	12.6	7.1	14.8±0.4	13.7	40	200	350	2156	23.3	40	85 021 350
20x1.5	1.49	2.80	16.4	10.2	18.9±0.5	13.7	40	200	350	2940	37	64	12 566 488
2x2.5	1.94	3.20	7.2	2.8	8.8±0.3	8.21	80	200	350	935	7.2	14	12 566 545
3x2.5	1.94	3.20	7.6	2.8	9.25±0.3	8.21	80	200	350	955	9.4	17	85 115 708

- 1) X: one colour, numbered  
G: one green- yellow core, others one colour, numbered  
2) Cores: Tolerances of core diameter see H+S Datasheet 564 900  
3) R<sub>20</sub>: Conductor resistance according to EN 60228  
4) C': Capacity per unit length