Traction cable
RADOX TENUIS-TW 600V MM

Product description:

RADOX TENUIS-TW 600V MM	Multicore cables, unscreened
Nominal voltage:	600 / 1000 V AC
Hazard level:	M (extra low temperature, extra oil and extra fuel resistant)

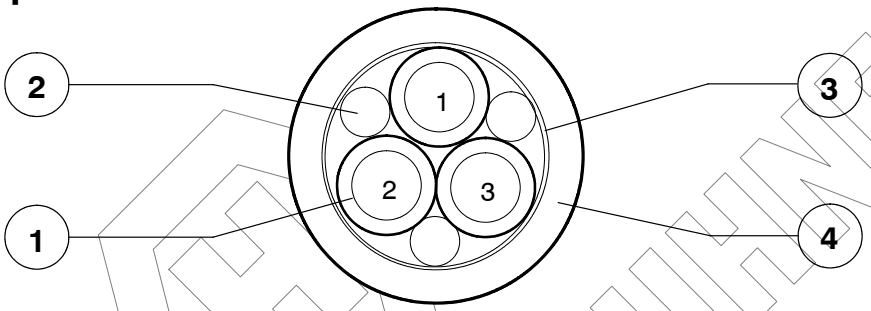
General features:

Halogen free, electron-beam cross-linked cables with improved behaviour in case of fire, easy to strip, soldering iron 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.	RADOX TENUIS-TW 600V cores	Conductor:	stranded tin plated copper, acc. to EN 50306-2
		Insulation:	RADOX EI 303
		Colours:	white, black numbered green-yellow (optional)
2.	Filler (optional)	RADOX 125 REC	
3.	Separator (optional)	Tape	
4.	Sheath	RADOX EM 104, acc. to EN 50264-1 Colour: black, yellow marked	

Marking: HUBER+SUHNER RADOX TENUIS-TW 600V nX[cross section] MM [part. no. + batch. no.] [date of manufacture] [prod.-place]

Technical Data :

Voltage rating cond.-earth	U_0	600	V AC
Voltage rating cond.-cond.	U	1000	V AC
maximum permissible Voltage rating AC cond.-earth		720	V AC
maximum permissible Voltage rating AC cond.-cond.	U_m	1200	V AC
maximum permissible Voltage rating DC cond.-earth	V_0	900	V DC
maximum permissible Voltage rating DC cond.-cond.		1500	V DC
Test voltage		3500	V AC
		8400	V DC

Temperature range

fixed installation	- 50 ... + 120	°C
sporadic movement	- 25 ... + 90	°C

Min. bending radius

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

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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 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:

Fire protection on railway vehicles, category	**Ia, Ib, II**	**BS 6853, GM/RT 2130**
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_0 ≤ BS 6853	BS 6853 An. D.8.7
Toxicity	R ≤ 1.0	BS 6853 An. B.1
Fire protection on railway vehicles, hazard level	**HL1 - HL3**	**EN 45545**
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
Fire protection on railway vehicles, level of protection	**1 - 4**	**DIN 5510**
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, insulation	ITC ≤ 6	EN 50305, 9.2
Toxicity, filler and sheath	ITC ≤ 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 ≤ 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
Fire protection on railway vehicles	**Fulfilled**	**NFPA 130**
Vertical flame spread, bunched	L ≤ 1.5 m	UL 1685, 12 (FT4 exp.)
Smoke density	TSR ≤ 150 m^2, PSRR ≤ 0.40 m^2/s	UL 1685, 12 (FT4 exp.)
Fire protection on railway vehicles, hazard level	**LR1 - LR4**	**UNI CEI 11170**
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, insulation	ITC ≤ 6	EN 50305, 9.2
Toxicity, filler and sheath	ITC ≤ 3	EN 50305, 9.2
Fire protection on railway vehicles	**Fulfilled**	**NFPA 130**
Vertical flame spread, bunched	L ≤ 1.5 m	UL 1685, 12 (FT4 exp.)
Smoke density	TSR ≤ 150 m^2, PSRR ≤ 0.40 m^2/s	UL 1685, 12 (FT4 exp.)
Requirement of hazard level code M	(according 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°C	

Applicable documents:
581998 current rating for multi core cables

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Cons-truction n x mm²	Conductor Dia.nom. mm	Core Dia.nom. mm	Cable Dia. mm	R_{20} max. Ω/km	Fireload nom. kJ/m	Weight nom. Copper kg / 100m	Weight nom. Cable kg / 100m	H+S Part No.
4x0.25	0.61	1.17	4.5 ± 0.3	88.5	322	0.9	3.0	85 064 923
4x0.25 *)	0.61	1.17	4.95 ±0.15	88.5	385	0.9	3.6	85 024 776

*) higher sheath thickness

Cons-truction n x mm²	Conductor Dia.nom. mm	Core Dia.nom. mm	Cable Dia. mm	R_{20} max. Ω/km	Fireload nom. kJ/m	Weight nom. Copper kg / 100m	Weight nom. Cable kg / 100m	H+S Part No.
2x0.5	0.88	1.42	4.4 ± 0.2	40.1	300	0.9	3.1	12 568 036
3x0.5	0.88	1.42	4.6 ± 0.2	40.1	329	1.4	3.6	12 568 037
4x0.5	0.88	1.42	5.0 ± 0.2	40.1	385	1.8	4.4	12 568 038
5x0.5	0.88	1.42	5.5 ± 0.2	40.1	473	2.3	5.4	12 566 304
6x0.5	0.88	1.42	6.0 ± 0.2	40.1	569	2.7	6.4	12 568 039
9x0.5	0.88	1.42	7.3 ± 0.3	40.1	792	4.1	9.1	12 583 000
12x0.5	0.88	1.42	7.6 ± 0.3	40.1	862	5.5	10.7	12 585 961
15x0.5	0.88	1.42	8.6 ± 0.3	40.1	1102	6.9	13.5	12 583 667
16x0.5	0.88	1.42	8.6 ± 0.3	40.1	1102	7.3	13.9	84 096 896
25x0.5	0.88	1.42	10.5 ± 0.4	40.1	1623	11.5	20.9	12 583 001
2x2x0.5	0.88	1.42	6.8 ± 0.3	40.1	654	1.8	6.4	12 568 040
4x2x0.5	0.88	1.42	8.5 ± 0.3	40.1	966	3.6	10.3	12 568 041
6x2x0.5	0.88	1.42	10.2 ± 0.4	40.1	1451	5.5	14.9	84 097 766
2x0.75	1.09	1.62	4.75 ± 0.3	26.7	343	1.4	3.8	12 568 047
3x0.75	1.09	1.62	5.15 ± 0.3	26.7	401	2.1	4.8	12 568 048
3G0.75	1.09	1.62	5.15 ± 0.3	26.7	401	2.1	4.8	12 583 990
4x0.75	1.09	1.62	5.6 ± 0.3	26.7	468	2.8	5.9	12 568 049
4G0.75	1.09	1.62	5.6 ± 0.3	26.7	468	2.8	5.9	12 583 992
5G0.75	1.09	1.62	6.3 ± 0.3	26.7	599	3.5	7.4	12 583 991
6x0.75	1.09	1.62	6.75 ± 0.3	26.7	707	4.2	8.7	12 568 050
8x0.75	1.09	1.62	7.8 ± 0.3	26.7	978	5.6	11.5	12 584 272
10x0.75	1.09	1.62	8.1 ± 0.3	26.7	935	7.0	12.8	12 585 274
12x0.75	1.09	1.62	8.4 ± 0.3	26.7	1006	8.4	14.5	84 111 116
4x2x0.75	1.09	1.62	9.5 ± 0.3	26.7	1200	5.6	13.9	84 097 783

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Cons-truction n x mm²	Conductor Dia.nom. mm	Core Dia.nom. mm	Cable Dia. mm	R_{20} max. Ω/km	Fireload nom. kJ/m	Weight nom. Copper kg / 100m	Weight nom. Cable kg / 100m	H+S Part No.
36x0.75	1.09	1.62	14.1 ± 0.4	26.7	2600	25.5	41.6	85 070 303
2x1	1.23	1.77	5.1 ± 0.2	20.0	391	1.8	4.6	12 568 052
3x1	1.23	1.77	5.4 ± 0.2	20.0	434	2.7	5.6	12 568 053
4x1	1.23	1.77	5.8 ± 0.2	20.0	492	3.6	6.8	12 568 054
6x1	1.23	1.77	7.3 ± 0.3	20.0	814	5.4	10.5	12 568 055
7x1	1.23	1.77	8.0 ± 0.3	20.0	994	6.3	12.4	12 585 459
8x1	1.23	1.77	8.3 ± 0.3	20.0	1093	7.2	13.8	84 121 018
10x1	1.23	1.77	8.7 ± 0.3	20.0	1055	9.0	15.5	12 581 348
12x1	1.23	1.77	9.1 ± 0.3	20.0	1151	10.8	17.7	12 584 271
16x1	1.23	1.77	10.4 ± 0.4	20.0	1524	14.4	23.5	12 584 654
19x1	1.23	1.77	11.6 ± 0.4	20.0	1925	17.2	28.4	12 585 980
25x1	1.23	1.77	12.8 ± 0.4	20.0	2234	22.6	35.6	12 581 349
2x2x1	1.23	1.77	8.0 ± 0.3	20.0	886	3.6	9.6	12 583 421
2x1.5	1.49	2.17	6.0 ± 0.3	13.7	519	2.6	6.3	12 568 098
3x1.5	1.49	2.17	6.3 ± 0.3	13.7	572	3.9	7.8	12 568 099
3G1.5	1.49	2.17	6.3 ± 0.3	13.7	572	3.9	7.8	12 582 026
4x1.5	1.49	2.17	6.9 ± 0.3	13.7	670	5.2	9.6	12 568 100
4G1.5	1.49	2.17	6.9 ± 0.3	13.7	672	5.2	9.6	12 583 172
5x1.5	1.49	2.17	7.8 ± 0.3	13.7	884	6.6	12.2	12 581 350
5G1.5	1.49	2.17	7.8 ± 0.3	13.7	884	6.6	12.2	12 582 027
6x1.5	1.49	2.17	8.45 ± 0.3	13.7	1058	7.9	14.4	12 582 028
7x1.5	1.49	2.17	9.1 ± 0.3	13.7	1253	9.2	16.8	12 583 724
7G1.5	1.49	2.17	9.1 ± 0.3	13.7	1253	9.2	16.8	12 582 029
8x1.5	1.49	2.17	10.3 ± 0.4	13.7	1639	10.6	20.5	12 582 030
9G1.5	1.49	2.17	10.6 ± 0.4	13.7	1474	11.9	21.1	12 584 489
10x1.5	1.49	2.17	10.6 ± 0.4	13.7	1443	13.2	22.1	12 582 031
12x1.5	1.49	2.17	11.1 ± 0.4	13.7	1639	15.8	25.8	12 583 725
16x1.5	1.49	2.17	12.6 ± 0.4	13.7	2130	21.1	33.8	12 583 726

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Cons-truction n x mm²	Conductor Dia.nom. mm	Core Dia.nom. mm	Cable Dia. mm	R_{20} max. Ω/km	Fireload nom. kJ/m	Weight nom. Copper kg / 100m	Weight nom. Cable kg / 100m	H+S Part No.
18x1.5	1.49	2.17	13.4 ± 0.4	13.7	2449	23.8	38.2	85 063 742
20x1.5	1.49	2.17	14.0 ± 0.4	13.7	2697	26.5	42.1	12 586 297
25x1.5	1.49	2.17	15.5 ± 0.5	13.7	3059	33.1	51.0	84 103 977
25G1.5	1.49	2.17	15.5 ± 0.5	13.7	3057	33.1	51.0	12 582 033
30x1.5	1.49	2.17	16.7 ± 0.5	13.7	3606	39.7	60.6	12 586 298
50x1.5	1.49	2.17	21.5 ± 0.5	13.7	5894	66.4	99.8	85 063 739
58x1.5	1.49	2.17	22.6 ± 0.5	13.7	6100	76.7	113.6	85 070 511
2x2.5	1.96	2.75	7.3 ± 0.3	8.21	766	4.4	9.8	12 568 101
3x2.5	1.96	2.75	7.8 ± 0.3	8.21	854	6.6	12.2	12 582 034
3G2.5	1.96	2.75	7.8 ± 0.3	8.21	854	6.6	12.2	12 582 035
4x2.5	1.96	2.75	8.7 ± 0.3	8.21	1049	8.8	15.5	12 566 306
4G2.5	1.96	2.75	8.7 ± 0.3	8.21	1051	8.8	15.6	12 583 173
5x2.5	1.96	2.75	9.4 ± 0.3	8.21	1249	11.0	18.7	12 581 346
5G2.5	1.96	2.75	9.4 ± 0.3	8.21	1249	11.0	18.7	12 585 007
6x2.5	1.96	2.75	10.6 ± 0.4	8.21	1628	13.2	23.2	12 581 347
7G2.5	1.96	2.75	11.5 ± 0.4	8.21	1960	15.4	27.3	12 583 995
16x2.5	1.96	2.75	15.8 ± 0.5	8.21	3239	35.3	54.6	85 002 904
18x2.5	1.96	2.75	16.8 ± 0.5	8.21	3712	39.7	61.6	85 063 743
20x2.5	1.96	2.75	17.6 ± 0.5	8.21	4126	44.1	68.1	12 585 070
30x2.5	1.96	2.75	20.9 ± 0.5	8.21	5418	66.2	97.5	12 584 363
36x2.5	1.96	2.75	22.5 ± 0.5	8.21	6408	79.6	115.8	12 584 406
4x4	2.46	3.35	10.2 ± 0.4	5.09	1442	14.0	22.9	12 585 458

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Cables with colored cores:

Cons-truction n x mm²	Con-ductor Dia.nom mm	Core colors	Core Dnom mm	Cable Dia. mm	R20 max Ω/km	Fireload nom. kJ/m	Weight Copper Cable kg/100m		H + S Part No.
2V0.5	0.88	BN-BU	1.42	4.4 ± 0.2	40.1	300	0.9	3.1	12 584 136
3V0.5	0.88	BN-BU-BK	1.42	4.6 ± 0.2	40.1	329	1.4	3.6	12 584 137
4V0.5	0.88	BN-BU-BK-WH	1.42	5.0 ± 0.2	40.1	385	1.8	4.4	12 584 138
5V0.5	0.88	BN-BU-BK-WH-GY	1.42	5.5 ± 0.2	40.1	473	2.3	5.4	12 585 752
6V0.5	0.88	BN-BU-BK-WH-GY-RD	1.42	6.0 ± 0.2	40.1	568	2.8	6.4	84 118 473
6V0.5	0.88	BN-BU-BK-WH-GY-RD	1.42	6.0 ± 0.2	40.1	568	2.8	6.4	84 118 473
2V1	1.23	BU-RD	1.77	5.1 ± 0.2	20.0	381	1.8	4.5	84 090 409

Cores : Core details according to H+S Datasheet 564 264
R_{20} : Conductor resistance according to EN 50306-2
C': Capacity per unit length, core/core
V: Colored cores
G: earth = green-yellow