



# Traction cable screened RADOX® TENUIS-TW/S EMC

## General properties :

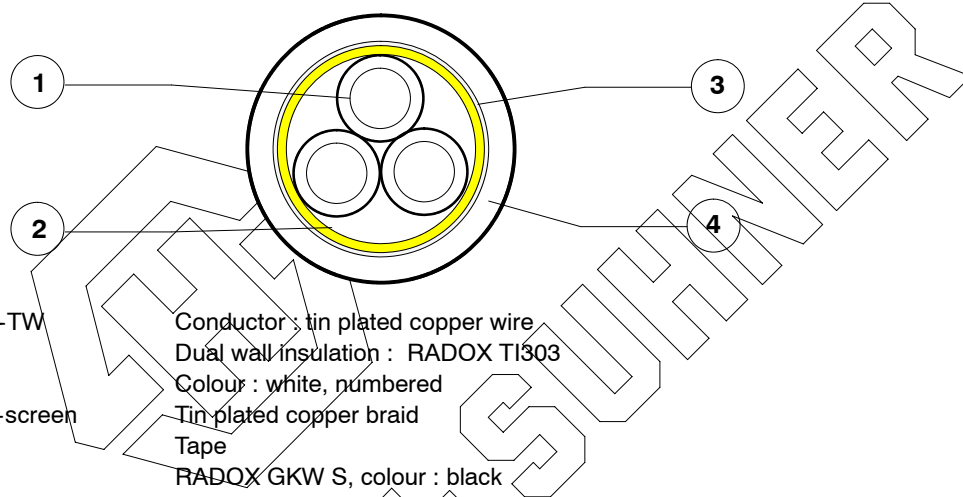
Dual wall insulation of high-tech-polymers with excellent electrical properties; resistant to high and low temperature, oil, acid, alkali, ozone and weathering; limited fire hazard properties, low smoke, halogen free, flame retardant, low toxicity, soldering iron resistant; flexible, easy to strip.

## Application :

For permanently protected installation, inside and outside railway rolling stock, busses and other vehicles to connect fixed and sporadic moved parts using DC or AC technologies.

Due to the thin wall insulation and to the comprehensive as well as excellent characteristics these cables are especially suitable as compact lead wires for systems.

For applications with high bending frequencies, such as bogie or connections between wagons, it is recommended to use the specially developed H+S cable families.



- 1. Cores TENUIS-TW  
Conductor : tin plated copper wire  
Dual wall insulation : RADOX TI303  
Colour : white, numbered
- 2. Standard EMC-screen  
Tin-plated copper braid
- 3. Wrapping  
Tape
- 4. Sheath  
RADOX GWK S, colour : black

Printing on sheath : H + S xxxxxxxx-zzzzzz RADOX TENUIS-TW/S EMC 600/1000 V n x ... mm<sup>2</sup>  
 Production lot number  
 Part number

## Technical data:

Voltage rating cond.-earth	U <sub>0</sub>	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 <sub>m</sub>	1200	V AC
maximum permissible Voltage rating DC cond.-earth	V <sub>0</sub>	900	V DC
maximum permissible Voltage rating DC cond.-cond.		1500	V DC
Test voltage, 5 min		3500	V AC
		8400	V DC

Operating temperature			
fixed installation		- 40 ... + 120	°C
free installation / sporadic movement		- 25 ... + 90	°C

Min. bending radius *)			
fixed	at bending angle ≤ 90°	all D	2 x D
	at bending angle > 90°	D ≤ 12 mm	3 x D
	at bending angle > 90°	D > 12 mm	4 x D
free installation / sporadic movement		D ≤ 12 mm	6 x D
		D > 12 mm	8 x D

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

Copyright 2011 Huber + Suhner AG. This document may not be copied nor be passed on to third parties without our written permission.  
 Uncontrolled copy when printed (will not be updated).  
 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.

**HUBER+SUHNER**  
 Wire+Cable Division  
 CH-8330 Pfäffikon  
 +41 (0)1 952 22 11  
 +41 (0)1 952 26 40  
[www.hubersuhner.com](http://www.hubersuhner.com)



# Traction cable screened RADOX® TENUIS-TW/S EMC

## The cables are in conformity with:

<b>Fire protection on railway vehicles, hazard level</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 50266-2-5 (EN 50305, 9.1.1)
Vertical flame spread, bunched, D ≥ 12 mm .....	L ≤ 2.5 m .....	EN 50266-2-4
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
<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 / F0 .....	NF F16-101
Vertical flame spread .....	50 < L ≤ 540 mm .....	NF C32-970, 2.1
Vertical flame spread, bunched .....	L ≤ 300 mm .....	NF C32-970, 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 50266-2-5 (EN 50305, 9.1.1)
Vertical flame spread, bunched, D ≥ 12 mm .....	L ≤ 2.5 m .....	EN 50266-2-4
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
<b>Fire protection on railway vehicles, hazard level</b> .....	<b>HL1 - HL3</b> .....	<b>CEN/TS 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 50266-2-5 (EN 50305, 9.1.1)
Vertical flame spread, bunched, D ≥ 12 mm .....	L ≤ 2.5 m .....	EN 50266-2-4
Smoke density .....	T ≥ 70 % .....	EN 61034-2
Toxicity .....	CIT <sub>c</sub> ≤ 0.75 .....	CEN/TS 45545-2, An. C.16.4

## Additional regulations:

H+S: 567 046 Thin wall → RADOX® TENUIS-TW Part 1 - General requirements  
RADOX® TENUIS-TW Part 2 - Single core cables  
RADOX® TENUIS-TW Part 3 - Multi core cables

H+S: 581998 Traction cable TENUIS-TW/S current rating for multi core cables

H+S: 582716 addendum to data sheet 568354

General Properties, design according to EN 50306

EN 50355 Guide to Use



# Traction cable screened RADOX®TENUIS-TW/S EMC

Cable size n x mm <sup>2</sup>	Conductor Constr.* n x mm		Core dia. <sub>nom</sub> mm	Cable dia. <sub>nom</sub> mm	R <sub>20</sub> * max Ω/km	Fire load kJ/m	Wight copper kg / 100m		H + S Part No.
	dia. <sub>nom</sub> mm	dia. <sub>nom</sub> mm					copper	cable	
2 X 1.5	19 X 0.31	1.52	2.17	6.5 ± 0.3	13.7	563	4.2	8.6	12568172
3 X 1.5	19 X 0.31	1.52	2.17	6.8 ± 0.3	13.7	580	5.5	9.5	12568173
3 G 1.5	19 X 0.31	1.52	2.17	6.8 ± 0.3	13.7	585	5.6	9.6	12583730
4 X 1.5	19 X 0.31	1.52	2.17	7.4 ± 0.3	13.7	665	6.9	11.8	12568174
4 G 1.5	19 X 0.31	1.52	2.17	7.4 ± 0.3	13.7	675	7.0	11.5	12583731
5 X 1.5	19 X 0.31	1.52	2.17	8.3 ± 0.3	13.7	890	8.6	14.2	12582053
5 G 1.5	19 X 0.31	1.52	2.17	8.3 ± 0.3	13.7	850	8.6	14.1	12583732
6 X 1.5	19 X 0.31	1.52	2.17	9.0 ± 0.3	13.7	1020	12.0	16.8	12581465
6 G 1.5	19 X 0.31	1.52	2.17	9.0 ± 0.3	13.7	1010	10.3	16.5	12583733
7 X 1.5	19 X 0.31	1.52	2.17	10.0 ± 0.3	13.7	1270	12.5	20.3	12583734
7 G 1.5	19 X 0.31	1.52	2.17	10.0 ± 0.3	13.7	1270	12.5	20.3	12583735
8 X 1.5	19 X 0.31	1.52	2.17	11.0 ± 0.4	13.7	1610	15.3	23.9	12586408
10 X 1.5	19 X 0.31	1.52	2.17	11.4 ± 0.4	13.7	1490	17.0	29.2	12583544
12 X 1.5	19 X 0.31	1.52	2.17	12.1 ± 0.4	13.7	1700	21.0	31.4	12582054
18 X 1.5	19 X 0.31	1.52	2.17	14.4 ± 0.4	13.7	2490	30.5	45.2	12582056
27 X 1.5	19 X 0.31	1.52	2.17	17.0 ± 0.5	13.7	3240	43.6	62.1	12582057