



# Traction cable

## RADOX TENUIS-TW 600V M

### Product description:

|                         |                                                                   |
|-------------------------|-------------------------------------------------------------------|
| RADOX TENUIS- TW 600V M | Single cores with thin wall insulation                            |
| Nominal voltage:        | 600 / 1000 V AC                                                   |
| Hazard level:           | M (extra low temperature resistant, extra oil and fuel resistant) |

### General features:

Halogen-free electron-beam cross linked cores with improved behaviour in case of fire, easy to strip, soldering resistant and flexible. Compliant with the requirements of the EN 50306-2 standard.

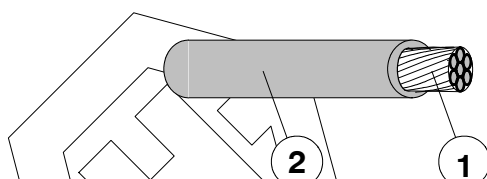
### Application:

The cores are intended for fixed installation inside railway vehicles or for installation in applications where limited alternating bending stresses occur during operation.

The requirements contained in the EN 50355 and EN 50343 standards are applicable with regard to installation.

The cores are used as sub-components in RADOX TENUIS- TW multicore cables.

### General composition of cable :



1. Conductor: stranded tin plated copper, acc. to EN 50306-2
2. Insulation: RADOX EI 303  
Colors: white or green - yellow, black marked

Marking: HUBER+SUHNER RADOX TENUIS- TW 600V 1X[cross section] M [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                                  |       | - 50 ... + 120 | °C   |
| Min. bending radius                                |       |                |      |
| fixed installation                                 |       | 3 x D          |      |
| sporadic movement                                  |       | 4 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 60811-1-4 Par. 8, respectively low temperature behaviour tests according to GOST 20.57.406-81, method 204-1 and GOST 17491-80. (fixed installation)

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

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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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### 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                                    | $50 < L \leq 540$ mm                                               | EN 60332-1-2            |
| Vertical flame spread, bunched, $D \leq 6$ mm            | $L \leq 1.5$ m                                                     | EN 50305, 9.1.2         |
| Smoke density                                            | $T \geq 70$ %                                                      | EN 61034-2              |
| Toxicity                                                 | $ITC \leq 6$                                                       | EN 50305, 9.2           |
| <b>Fire protection on railway vehicles, hazard level</b> | <b>1 - 4</b>                                                       | <b>DIN 5510</b>         |
| 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         |
| 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           |
| <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                                    | $50 < L \leq 540$ 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 |
| <b>Fire protection on railway vehicles</b>               | <b>Fulfilled</b>                                                   | <b>NFPA 130</b>         |
| Vertical flame spread, bunched                           | $L \leq 1.5$ m                                                     | UL 1685, 12 (FT4 exp.)  |
| Smoke density                                            | $TSR \leq 150$ m <sup>2</sup> , $PSRR \leq 0.40$ m <sup>2</sup> /s | UL 1685, 12 (FT4 exp.)  |
| <b>Fire protection on railway vehicles, hazard level</b> | <b>LR1 - LR4</b>                                                   | <b>UNI CEI 11170</b>    |
| 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         |
| 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           |
| <b>Requirement of hazard level code M</b>                |                                                                    |                         |
| Extra low temperature                                    | - 40°C                                                             |                         |
| Extra oil resistance                                     | IRM 902, 24h, 100°C                                                |                         |
| Extra fuel resistance                                    | IRM 903, 168h, 70°C                                                |                         |

### Applicable documents:

- 581 997 Current rating for single core cables



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| Core size<br>mm <sup>2</sup> | Conductor<br>Construction<br>n x mm | nom.<br>Dia.<br>mm | Core dia.<br>mm | R <sub>20</sub><br>max.<br>Ω/km | C <sub>H2O</sub><br>nom.<br>pF/m | Fireload<br>nom.<br>kJ/m | Weight nom.<br>Copper Cable<br>kg / 100m |      | Colour           | H+S<br>Part No.                        |
|------------------------------|-------------------------------------|--------------------|-----------------|---------------------------------|----------------------------------|--------------------------|------------------------------------------|------|------------------|----------------------------------------|
| 0.5                          | 19x0.18                             | 0.88               | 1.42±0.03       | 40.1                            | 356                              | 37                       | 0.45                                     | 0.60 | WH<br>BK         | 12 564 379<br>85 026 405               |
| 0.75                         | 19x0.23                             | 1.09               | 1.62±0.03       | 26.7                            | 430                              | 43                       | 0.69                                     | 0.86 | WH<br>BK         | 12 566 838<br>85 026 406               |
| 1                            | 19x0.26                             | 1.23               | 1.77±0.03       | 20.0                            | 470                              | 50                       | 0.88                                     | 1.09 | WH<br>GNYE<br>BK | 12 561 500<br>12 581 111<br>12 581 116 |
| 1.5                          | 19x0.31                             | 1.49               | 2.17±0.03       | 13.7                            | 459                              | 74                       | 1.3                                      | 1.60 | WH<br>GNYE<br>BK | 12 564 381<br>12 581 112<br>85 026 407 |
| 2.5                          | 19x0.40                             | 1.96               | 2.75±0.05       | 8.21                            | 509                              | 113                      | 2.16                                     | 2.62 | WH<br>GNYE<br>BK | 12 564 382<br>12 581 113<br>85 026 408 |
| 4                            | 56x0.30                             | 2.46               | 3.35±0.05       | 5.09                            | 565                              | 133                      | 3.45                                     | 3.98 | WH<br>GNYE<br>BK | 12 581 455<br>12 581 487<br>85 026 409 |

R<sub>20</sub>: Conductor resistance according to EN 50306-2

C<sub>H2O</sub>: Capacity in water