

# Traction cable

## RADOX 9 GKW-AX (EN 50264-3-1) 3600V M

Product description:

**RADOX 9 GKW-AX (EN 50264-3-1) 3600V M** Single core cables with reduced wall insulation dimensions  
 Nominal voltage: 3600 / 6000 V AC  
 Hazard level: M (extra low temperature, extra oil and extra fuel resistant)

General features:

Halogen free, electron-beam crosslinked cables with improved behaviour in case of fire, easy to strip, soldering resistant and flexible. Excellent ozone, chemical, weather and UV resistance (for black). The cables are in accordance with EN 50264-3-1, but significantly thinner.

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. Conductor              | Stranded tin plated copper, acc. to EN 60228 cl. 5      |
| 2. Separator (optional)   | Tape  |
| 3. Insulation inner layer | RADOX EI 110, colour: red                               |
| 4. Insulation outer layer | RADOX EI 109, colour: black, unless otherwise specified |

Marking:

[a] HUBER+SUHNER RADOX 9 GKW-AX (EN 50264-3-1) 3600V [b] M [c]-[d] [e] [f] [g]

|  |                      |
|--|----------------------|
|  | example:             |
| [a] Meter marking (in m)                   | = 001234 = m         |
| [b] Construction                           | 1X150                |
| [c] Part number                            | 12345678             |
| [d] Batch number                           | 1234567              |
| [e] Production week and year               | 03-2017              |
| [f] Production place (only if China)       | CN                   |
| [g] CRCC certification (only if available) | CRCC10218P11529R1M-2 |

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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 cond.-earth . . . . .                        | $U_0$ . . . . . | 3600 . . . . .           | V AC |
| Voltage rating cond.-cond. . . . .                          | $U$ . . . . .   | 6000 . . . . .           | V AC |
| maximum permissible Voltage rating AC cond.-earth . . . . . |                 | 4300 . . . . .           | V AC |
| maximum permissible Voltage rating AC cond.-cond . . . . .  | $U_m$ . . . . . | 7200 . . . . .           | V AC |
| maximum permissible Voltage rating DC cond.-earth . . . . . | $V_0$ . . . . . | 5400 . . . . .           | V DC |
| maximum permissible Voltage rating DC cond.-cond. . . . .   |                 | 9000 . . . . .           | V DC |
| Test voltage. . . . .                                       |                 | 11000 . . . . .          | V AC |
| Temperature range . . . . .                                 |                 | - 50 ... + 125 . . . . . | °C   |

Min. bending radius

|                              |                                       |       |
|------------------------------|---------------------------------------|-------|
| fixed installation . . . . . | cable diameter $\leq$ 12 mm . . . . . | 3 x D |
|                              | cable diameter > 12 mm . . . . .      | 4 x D |
| sporadic movement . . . . .  | cable diameter $\leq$ 12 mm . . . . . | 4 x D |
|                              | cable diameter > 12 mm . . . . .      | 5 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.

The cables are in conformity with:

|  |                                |                   |
|--|--------------------------------|-------------------|
| <b>Fire protection on railway vehicles, hazard level . . . .</b> | <b>HL1 - HL3 . . . . .</b>     | <b>EN 45545-2</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   |
| 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        |
| Toxicity . . . . .   | $ITC \leq 6$ . . . . .         | EN 50305, 9.2     |

|  |  |                        |
|--|--|------------------------|
| <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>Requirement of hazard level code M . . . . .</b> | (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:

- 586554 Current rating for single core cables

# Traction cable

## RADOX 9 GKW-AX (EN 50264-3-1) 3600V M

Table 1A: Customized Types RADOX 9 GKW-AX (EN 50264-3-1) 3600V M

| Core Size<br>[mm <sup>2</sup> ] | Conductor <sup>1)</sup>  |                   |                                   | Tape<br>optional | Core <sup>2)</sup> |           | Fire Load<br>nom.<br>[kJ/m] | Combustible Material<br>nom.<br>[kg/100m] | Cable Weight<br>nom.<br>[kg/100m] | H+S Part No. |
|---------------------------------|--------------------------|-------------------|-----------------------------------|------------------|--------------------|-----------|-----------------------------|---|-----------------------------------|--------------|
|                                 | Type<br>nom.<br>[n x mm] | Ø<br>nom.<br>[mm] | R <sub>20</sub><br>max.<br>[Ω/km] |                  | Ø<br>[mm]          | Colours   |                             |   |                                   |              |
| 1X1.5                           | 37 x 0.22                | 1.50              | 13.7                              | no               | 4.5±0.1            | <b>BK</b> | 315                         | 2.2                                       | 3.5                               | 12537829     |
|                                 |                          |                   |                                   |                  |                    | GY        |                             |   |                                   | 84096994     |
| 1X2.5                           | 61 x 0.23                | 1.90              | 8.21                              | no               | 5.1±0.1            | <b>BK</b> | 405                         | 2.7                                       | 4.9                               | 12537830     |
| 1X4                             | 61 x 0.28                | 2.40              | 5.09                              | no               | 5.7±0.1            | <b>BK</b> | 490                         | 3.3                                       | 6.8                               | 12537831     |
| 1X6                             | 84 x 0.30                | 2.90              | 3.39                              | no               | 6.3±0.1            | <b>BK</b> | 580                         | 3.9                                       | 9                                 | 12537832     |
| 1X10                            | 80 x 0.40                | 3.80              | 1.95                              | no               | 7.5±0.15           | <b>BK</b> | 780                         | 5.4                                       | 14                                | 12545520     |
|                                 |                          |                   |                                   |                  |                    | OG        |                             |   |                                   | 12583017     |
| 1X16                            | 121 x 0.40               | 5.30              | 1.24                              | yes              | 9.4±0.15           | <b>BK</b> | 1195                        | 8   | 21                                | 12544525     |
| 1X25                            | 189 x 0.40               | 6.60              | 0.795                             | yes              | 11.0±0.3           | <b>BK</b> | 1590                        | 10  | 30                                | 12547257     |
|                                 |                          |                   |                                   |                  |                    | OG        |                             |   |                                   | 85088677     |
| 1X35                            | 266 x 0.40               | 7.70              | 0.565                             | yes              | 12.6±0.3           | <b>BK</b> | 2035                        | 13  | 42                                | 12547260     |
| 1X50                            | 378 x 0.40               | 9.20              | 0.393                             | yes              | 14.6±0.3           | <b>BK</b> | 2660                        | 17  | 58                                | 12545521     |
| 1X70                            | 348 x 0.50               | 11.4              | 0.277                             | yes              | 16.7±0.3           | <b>BK</b> | 3065                        | 19  | 78                                | 12547262     |
| 1X95                            | 456 x 0.50               | 12.9              | 0.210                             | yes              | 18.7±0.3           | <b>BK</b> | 3765                        | 24  | 101                               | 12547264     |
| 1X120                           | 570 x 0.50               | 14.5              | 0.164                             | yes              | 21.0±0.3           | <b>BK</b> | 4730                        | 30  | 128                               | 12545522     |
| 1X150                           | 722 x 0.50               | 16.0              | 0.132                             | yes              | 23.2±0.3           | <b>BK</b> | 5820                        | 36  | 158                               | 12547268     |
| 1X185                           | 874 x 0.50               | 17.8              | 0.108                             | yes              | 25.0±0.3           | <b>BK</b> | 6360                        | 40  | 190                               | 12545523     |
| 1X240                           | 1147 x 0.50              | 20.8              | 0.0817                            | yes              | 28.0±0.3           | <b>BK</b> | 7145                        | 45  | 241                               | 12547678     |
| 1X300                           | 1443 x 0.50              | 23.0              | 0.0654                            | yes              | 30.8±0.3           | <b>BK</b> | 8590                        | 54  | 298                               | 12551573     |
| 1X400                           | 1952 x 0.50              | 26.5              | 0.0495                            | yes              | 35.3±0.5           | <b>BK</b> | 10935                       | 68  | 398                               | 12564160     |

<sup>1)</sup> Conductor according to EN 60228

<sup>2)</sup> Core colour in bold is the H+S standard core colour