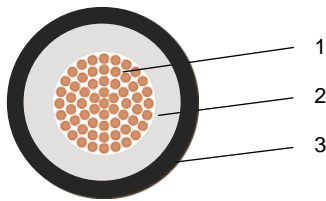


## Technical datasheet

### BETAtans® 4 GWK-ENX EN 50264-3-1 1800 V M



#### Product description

Halogen free, double-insulated, electron-beam cross-linked lead wire with improved fire performance. This cable fulfils the requirements of EN 50264-3-1 class M and it is highly resistant to UV, oil and fuel, as well to elevated temperatures. The excellent thermal properties permit a longer life time and increased current ratings.

#### Application

This cable is used for protected installations inside and outside of rail vehicles, buses and other rail vehicles. Due to the double-insulated design, this cable is qualified for short circuit and earth fault-proof applications. It is suitable for the wiring of electric engines, switch and auxiliary boards, converters and distribution boxes. For installation the guidelines of EN 50355 and EN 50343 must be considered.

#### Construction

1. conductor	tinned fine copper strands according to VDE 0295 / IEC 60228 class 5
2. insulation colour	polyolefine copolymer electron-beam cross-linked, Comp 752; EI 109 according to EN 50264-3-1 white
3. outer sheath colour	polyolefine copolymer electron-beam cross-linked, Comp 752; EI 109 according to EN 50264-3-1 black, other colours as blue, orange, red are available upon request
marking	<b>LEONI BETATRANS 4 GWK-ENX EN 50264-3-1 1800 V ..... M CCHDA ..... - ..... .....</b> 1. 2. 3. 4.
	1. cross section e. g. 4
	2. part no. e. g. 312901
	3. production order no. e. g. 1181089
	4. production date e. g. 130519

#### Product properties

nominal voltage	$U_0/U$	1.8/3 kV AC
max. voltage	$U_{0m}$	2.16 kV AC
max. voltage	$U_m$	3.6 kV AC
max. voltage	$V_0$	2.7 kV DC
max. voltage	$V_m$	5.4 kV DC
testing voltage		6.5 kV AC (50 Hz / 5 min.)
max. conductor temperature	fixed installation sporadically moved short circuit	+120 °C (20,000 h / at 50 % elongation) +90 °C +280 °C / 5 sec.
min. ambient temperature	fixed installation	
min. bending radius	$\varnothing < 10$ mm $\varnothing > 10$ mm all cables	> 3 x $\varnothing$ > 4 x $\varnothing$ > 5 x $\varnothing$ -40 °C -40 °C -50 °C
min. ambient temperature	sporadically moved all cables	> 8 x $\varnothing$ -40 °C

#### Technical data

weights, dimensions and conductor resistances	doc. no.: 11092
current ratings	doc. no.: 12092

## Technical datasheet

### BETrans® 4 GKW-ENX EN 50264-3-1 1800 V M

#### Fire performance for rolling stock

vertical flame propagation for a single insulated wire or cable  
 vertical flame spread of bunched wires or cables > 6 < 12 mm  
 vertical flame spread of bunched wires or cables < 6 mm  
 smoke density  
 toxicity of smoke  
 absence of halogens  
  
 corrosivity of gases

#### EN 45545-2

EN 60332-1-2  
 EN 60332-3-25  
 EN 50305  
 EN 61034-2  
 EN 50305  
 EN 50267-2-1  
 EN 60684-2  
 EN 50267-2-2  
 EN 50267-2-2

#### hazard level HL1 - HL3

carbonisation > 50 and ≤ 540 mm  
 carbonisation < 2.5 m  
 carbonisation < 1.5 m  
 transmittance > 70 %  
 ITC ≤ 3  
 HCl and HBr < 0.5 %  
 HF < 0.1 %  
 pH > 4.3  
 conductivity < 10 µS / mm

#### Fire performance for rolling stock

vertical flame propagation for a single insulated wire or cable  
 vertical flame spread of bunched wires or cables > 6 < 12 mm  
 vertical flame spread of bunched wires or cables < 6 mm  
 smoke density  
 toxicity of smoke  
 absence of halogens  
  
 corrosivity of gases

#### EN 50264-1

EN 60332-1-2  
 EN 60332-3-25  
 EN 50305  
 EN 61034-2  
 EN 50305  
 EN 50267-2-1  
 EN 60684-2  
 EN 50267-2-2  
 EN 50267-2-2

carbonisation > 50 and ≤ 540 mm  
 carbonisation < 2.5 m  
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 transmittance > 70%  
 ITC ≤ 6  
 HCl and HBr < 0.5 %  
 HF < 0.1 %  
 pH > 4.3  
 conductivity < 10 µS / mm

#### Fire performance for rolling stock

vertical flame propagation for bunched wires or cables  
 smoke release

#### NFPA130

FT 4/IEEE 1202  
 UL 1685

carbonisation ≤ 1.5 m  
 peak smoke rate ≤ 0.25 m<sup>2</sup> / s  
 total smoke released ≤ 95 m<sup>2</sup>

#### Material properties

resistance to ozone  
  
 resistance to cold  
 resistance to oil  
 resistance to fuel  
 resistance to acid  
 resistance to alkali  
 low fire load  
 limiting oxygen index (LOI)  
  
 resistance to UV

#### EN 50264-3-1

EN 50264-3-1  
  
 EN 60811-504  
 EN 60811-404  
 EN 60811-404  
 EN 60811-404  
 EN 60811-404  
 DIN 51900  
 ISO 4589-2  
 ASTM D 2863  
 EN 50618

#### hazard level M

72 h / 40 °C, method B  
 volume concentration 200x10<sup>-6</sup>  
 - 40 °C  
 72 h / 100 °C, IRM 902  
 168 h / 70 °C, IRM 903  
 168 h / 23 °C, n-Oxalic acid  
 168 h / 23 °C, n-NaOH  
  
 > 30 %  
 > 30 %  
 > 2000 h

#### Technical prescriptions concerning the burning behaviour

resistance to flame propagation

#### UN/ECE-R 118

ISO 6722-1

combustion duration ≤ 70 sec.  
 length of unburned area ≥ 50 mm

#### Approvals










































































Swiss Federal Railways

The national standards as BS 6853, DIN 5510-2, PN-K-02511, UNI CEI 11170 had been withdrawn and replaced by EN 45545-2.

All information regarding properties, technical data, etc. are without obligation. Dimensions and weights are reference values. All information can be changed at any time and without prior notice.

## Dimensions and weights

### BETrans<sup>®</sup> 4 GW-ENX EN 50264-3-1 1800 V M

cross section [mm <sup>2</sup> ]	part no.	part no.	part no.	part no.	part no.	conductor		mean thickness	core	R <sub>20</sub> [mΩ/m]	weight	fire load
	black	light blue	brown	green	yellow	construction	nom.-Ø	of insulation	outer- Ø		approx.	approx.
						[n x mm]	[mm]	[mm]	[mm]		[kg/km]	[kWh/m]
1.5	312899					30 x 0.25	1.45 ± 0.07	2.00	5.45 ± 0.10	13.70	45	0.127
2.5	312900					50 x 0.25	1.95 ± 0.08	2.00	5.95 ± 0.20	8.21	58	0.146
4	312901					52 x 0.30	2.55 ± 0.10	2.00	6.55 ± 0.20	5.09	76	0.169
6	312902					78 x 0.30	3.10 ± 0.10	2.00	7.10 ± 0.20	3.39	98	0.190
10	312903					74 x 0.40	4.10 ± 0.20	2.00	8.10 ± 0.20	1.95	141	0.227
16	312904					119 x 0.40	5.00 ± 0.20	2.00	9.00 ± 0.30	1.24	198	0.261
25	312905					181 x 0.40	6.20 ± 0.20	2.00	10.20 ± 0.30	0.795	283	0.306
35	312906					257 x 0.40	7.70 ± 0.20	2.00	11.70 ± 0.30	0.565	390	0.385
50	312907					371 x 0.40	9.70 ± 0.20	2.00	13.70 ± 0.30	0.393	544	0.492
70	312908					336 x 0.50	11.20 ± 0.20	2.00	15.20 ± 0.40	0.277	732	0.565
95	312909					444 x 0.50	12.80 ± 0.30	2.20	17.20 ± 0.40	0.210	959	0.682
120	312910					570 x 0.50	14.60 ± 0.30	2.20	19.00 ± 0.40	0.164	1190	0.758
150	312911					708 x 0.50	16.40 ± 0.30	2.20	20.80 ± 0.40	0.132	1474	0.911
185	312912					864 x 0.50	17.90 ± 0.30	2.40	22.70 ± 0.50	0.108	1767	1.002
240	312913					1147 x 0.50	20.70 ± 0.30	2.40	25.50 ± 0.50	0.0817	2302	1.136
300	312914					1443 x 0.50	23.30 ± 0.50	2.40	28.10 ± 0.50	0.0654	2839	1.212
400	312915					1887 x 0.50	26.30 ± 0.60	2.60	31.50 ± 0.50	0.0495	3696	1.473

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