TECHNICAL DATASHEET

BETATRANS ® 3 GKW-ENX FE180 CC-FLEX 150/250 V MM S (PAIRFLEX)

Product description

Halogen free, electron-beam cross-linked connection- and power cable with EMC optimised shielding, circuit integrity and improved fire performance. This cable fulfils the requirements of the railway rolling stock standard EN 50264-3-2 and has high resistance to UV, oil, fuel and high resistance to temperature. The excellent thermal properties of insulation material result in expectation of higher life time as well in elevation of current rating capacity.

Application

This cable is meant for protected installations inside and outside of rail vehicles and buses. This cable which keeps its function for a limited period of time during fire impacts is used for the connection of emergency lamps, smoke exhaust systems and electrical appliances. For installation the guidelines of EN 50355 and EN 50343 must be considered.

Construction

conductor	tinned fine copper strands according to VDE 0295 / IEC 60228 class 5
flame barrier	phlogopite tape
insulation	polyolefine copolymer electron-beam cross-linked, Comp 752 corresponds to EI 109 according to EN 50264-1
colour	grey with numbers printed in black, other colours upon request
filler	optional
shielding	pairs individually screened with aluminium foil, overall screen with tinned fine copper braid
sheath	polyolefine copolymer electron-beam cross-linked, Comp 752 corresponds to EM 104 according to EN 50264-1
marking	LEONI BETATRANS 3 GKW-ENX FE 180 C-FLEX (EN 50264-3-2) 600 V ….. S CCHDA ….. - ….. - ….. (1. 2. 3. 4.)

1. Construction	e. g. 2X2x0,75
2. Part no.	e. g. 313222
3. Production order no.	e. g. 1252197
4. Production date	e. g. 180319

Product properties

nominal voltage	U0/U	0.6/1 kV AC
max. voltage	U0m	0.72 kV AC
max. voltage	Um	1.2 kV AC
max. voltage	V0	0.9 kV DC
max. voltage	Vm	1.8 kV DC
testing voltage	conductor / conductor	3.5 kV AC (50 Hz / 5 min.)
	conductor / shielding	3.5 kV AC (50 Hz / 5 min.)
max. conductor temperature	fixed installation	+120 °C (20`000 h / at 50 % elongation)
	short circuit	+280 °C / 5 sec.
min. ambient temperature	fixed installation	-40 °C
min. bending radius	fixed installation	> 6 x Ø

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Fire performance for rolling stock	**EN 45545-2**	**hazard level HL1 - HL3**
vertical flame propagation for a single insulated wire or cable	EN 60332-1-2	carbonisation > 50 and ≤ 540 mm
vertical flame spread of bunched wires or cables > 12 mm	EN 60332-3-24	carbonisation < 2.5 m
vertical flame spread of bunched wires or cables > 6 < 12 mm	EN 60332-3-25	carbonisation < 2.5 m
vertical flame spread of bunched wires or cables < 6 mm	EN 50305	carbonisation < 1.5 m
smoke density	EN 61034-2	transmittance > 70 %
toxicity of smoke	EN 50305	ITC ≤ 6
absence of halogens	EN 50267-2-1	HCl and HBr < 0.5 %
	EN 60684-2	HF < 0.1 %
corrosivity of gases	EN 50267-2-2	pH > 4.3
	EN 50267-2-2	conductivity < 10 µS/mm

Fire performance for rolling stock	**EN 50264-1**	
vertical flame propagation for a single insulated wire or cable	EN 60332-1-2	carbonisation > 50 and ≤ 540 mm
vertical flame spread of bunched wires or cables > 12 mm	EN 60332-3-24	carbonisation < 2.5 m
vertical flame spread of bunched wires or cables > 6 < 12 mm	EN 60332-3-25	carbonisation < 2.5 m
vertical flame spread of bunched wires or cables < 6 mm	EN 50305	carbonisation < 1.5 m
smoke density	EN 61034-2	transmittance > 70%
toxicity of smoke	EN 50305	ITC ≤ 3
absence of halogens	EN 50267-2-1	HCl and HBr < 0.5 %
	EN 60684-2	HF < 0.1 %
corrosivity of gases	EN 50267-2-2	pH > 4.3
	EN 50267-2-2	conductivity < 10 µS/mm

Circuit integrity (Uo)	EN 50200	120 min.
	IEC 60331-21	180 min.

Material properties	**EN 50264-3-2**	**hazard level MM**
resistance to ozone	EN 50264-3-2	72h/40 °C, method B volume concentration $200x10^{-6}$
high resistance to cold	EN 60811-504	- 40 °C
high resistance to oil	EN 60811-404	72h/100 °C, IRM 902
high resistance to fuel	EN 60811-404	168h/70 °C, IRM 903
resistance to acid	EN 60811-404	168h/23 °C, n-Oxalic acid
resistance to alkaline	EN 60811-404	168h/23 °C, n-NaOH
low fire load	DIN 51900	
limiting oxygen index (LOI)	ISO 4589-2	> 30 %
	ASTM D 2863	> 30 %
resistance to UV	EN 50618	> 2000 h

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cable-construction	colour	nom. wall thickness core	core-Ø	nom. wall thickness jacket	outer-Ø approx.	weight	fire load
n x mm²		mm	mm	mm	mm	kg/km	kWh/m
1 X 2 x 0,5	NR	0,53	2,50	0,75	7,3 ±1,0	63	0,11
2 X 2 x 0,5	NR	0,53	2,50	0,90	11,6 ±1,5	121	0,23
3 X 2 x 0,5	NR	0,53	2,50	0,95	12,3 ±1,5	151	0,28
4 X 2 x 0,5	NR	0,53	2,50	1,0	13,6 ±1,5	190	0,35
5 X 2 x 0,5	NR	0,53	2,50	1,05	14,9 ±1,5	230	0,43
6 X 2 x 0,5	NR	0,53	2,50	1,10	16,4 ±1,5	276	0,54
7 X 2 x 0,5	NR	0,53	2,50	1,20	18,3 ±1,5	355	0,69
8 X 2 x 0,5	NR	0,53	2,50	1,20	19,8 ±1,5	408	0,80
10 X 2 x 0,5	NR	0,53	2,50	1,40	21,4 ±1,5	460	0,84
12 X 2 x 0,5	NR	0,53	2,50	1,40	22,2 ±1,5	492	0,85
14 X 2 x 0,5	NR	0,53	2,50	1,50	23,7 ±2,0	559	1,0
16 X 2 x 0,5	NR	0,53	2,50	1,50	24,8 ±2,0	621	1,10
19 X 2 x 0,5	NR	0,53	2,50	1,60	26,4 ±2,0	706	1,24
20 X 2 x 0,5	NR	0,53	2,50	1,70	28,1 ±2,0	793	1,48
24 X 2 x 0,5	NR	0,53	2,50	1,80	31,0 ±2,0	893	1,66
30 X 2 x 0,5	NR	0,53	2,50	1,90	33,4 ±2,0	1112	1,92
1 X 2 x 0,75	NR	0,55	2,90	0,75	8,0 ±1,0	76	0,13
2 X 2 x 0,75	NR	0,55	2,90	1,0	12,0 ±1,5	176	0,37
3 X 2 x 0,75	NR	0,55	2,90	1,0	14,0 ±1,5	188	0,34
4 X 2 x 0,75	NR	0,55	2,90	1,10	15,6 ±1,5	241	0,45
5 X 2 x 0,75	NR	0,55	2,90	1,15	17,4 ±1,5	318	0,57
6 X 2 x 0,75	NR	0,55	2,90	1,20	18,9 ±1,5	375	0,69
7 X 2 x 0,75	NR	0,55	2,90	1,40	21,0 ±1,5	460	0,91
8 X 2 x 0,75	NR	0,55	2,90	1,40	22,5 ±1,5	531	1,06
10 X 2 x 0,75	NR	0,55	2,90	1,50	24,6 ±2,0	572	1,06
12 X 2 x 0,75	NR	0,55	2,90	1,60	25,6 ±2,0	630	1,12
14 X 2 x 0,75	NR	0,55	2,90	1,60	27,0 ±2,0	712	1,25
16 X 2 x 0,75	NR	0,55	2,90	1,70	28,7 ±2,0	809	1,45
19 X 2 x 0,75	NR	0,55	2,90	1,80	30,4 ±2,0	915	1,61
20 X 2 x 0,75	NR	0,55	2,90	1,80	32,2 ±2,0	1062	1,87
24 X 2 x 0,75	NR	0,55	2,90	2,0	35,9 ±2,5	1198	2,16
30 X 2 x 0,75	NR	0,55	2,90	2,10	38,3 ±2,5	1424	2,47
1 X 2 x 1,0	NR	0,60	3,05	0,80	8,5 ±1,0	88	0,15
2 X 2 x 1,0	NR	0,60	3,05	1,0	14,0 ±1,5	198	0,40
3 X 2 x 1,0	NR	0,60	3,05	1,05	14,9 ±1,5	220	0,39
4 X 2 x 1,0	NR	0,60	3,05	1,15	16,7 ±1,5	283	0,51
5 X 2 x 1,0	NR	0,60	3,05	1,20	18,7 ±1,5	370	0,65
6 X 2 x 1,0	NR	0,60	3,05	1,40	20,5 ±1,5	453	0,84
7 X 2 x 1,0	NR	0,60	3,05	1,40	22,3 ±1,5	537	1,01
8 X 2 x 1,0	NR	0,60	3,05	1,50	24,0 ±1,5	621	1,22
10 X 2 x 1,0	NR	0,60	3,05	1,60	26,5 ±2,0	678	1,22

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cable-construction	colour	nom. wall thickness core	core-Ø	nom. wall thickness jacket	outer-Ø approx.	weight	fire load
n x mm²		mm	mm	mm	mm	kg/km	kWh/m
12 X 2 x 1,0	NR	0,60	3,05	1,60	27,2 ±2,0	737	1,24
14 X 2 x 1,0	NR	0,60	3,05	1,70	28,9 ±2,0	848	1,45
16 X 2 x 1,0	NR	0,60	3,05	1,80	30,8 ±2,0	965	1,68
19 X 2 x 1,0	NR	0,60	3,05	1,90	32,8 ±2,0	1142	1,86
20 X 2 x 1,0	NR	0,60	3,05	1,90	34,4 ±2,0	1244	2,15
24 X 2 x 1,0	NR	0,60	3,05	2,10	38,5 ±2,5	1423	2,48
30 X 2 x 1,0	NR	0,60	3,05	2,20	39,6 ±2,5	1702	2,83
1 X 2 x 1,5	NR	0,63	3,35	0,80	9,7 ±1,0	112	0,19
2 X 2 x 1,5	NR	0,63	3,35	1,10	16,5 ±1,5	269	0,56
3 X 2 x 1,5	NR	0,63	3,35	1,20	17,9 ±1,5	319	0,54
4 X 2 x 1,5	NR	0,63	3,35	1,20	19,8 ±1,5	398	0,68
5 X 2 x 1,5	NR	0,63	3,35	1,40	22,1 ±1,5	508	0,91
6 X 2 x 1,5	NR	0,63	3,35	1,50	24,4 ±2,0	612	1,15
7 X 2 x 1,5	NR	0,63	3,35	1,60	26,5 ±2,0	729	1,42
8 X 2 x 1,5	NR	0,63	3,35	1,70	28,9 ±2,0	863	1,75
10 X 2 x 1,5	NR	0,63	3,35	1,80	31,6 ±2,0	979	1,71
12 X 2 x 1,5	NR	0,63	3,35	1,90	32,8 ±2,0	1067	1,79
14 X 2 x 1,5	NR	0,63	3,35	1,90	35,0 ±2,0	1196	2,02
16 X 2 x 1,5	NR	0,63	3,35	2,0	36,7 ±2,5	1357	2,32
19 X 2 x 1,5	NR	0,63	3,35	2,1	38,8 ±2,5	1536	2,57
20 X 2 x 1,5	NR	0,63	3,35	2,20	41,2 ±2,5	1716	3,06
24 X 2 x 1,5	NR	0,63	3,35	2,40	46,0 ±2,5	1957	3,50
30 X 2 x 1,5	NR	0,63	3,35	2,40	48,8 ±2,5	2317	3,91
1 X 2 x 2,5	NR	0,68	3,95	0,90	11,5 ±1,5	154	0,26
2 X 2 x 2,5	NR	0,68	3,95	1,20	19,7 ±1,5	385	0,75
3 X 2 x 2,5	NR	0,68	3,95	1,40	22,0 ±1,5	443	0,76
4 X 2 x 2,5	NR	0,68	3,95	1,50	23,6 ±2,0	565	0,98
5 X 2 x 2,5	NR	0,68	3,95	1,60	26,4 ±2,0	707	1,27
6 X 2 x 2,5	NR	0,68	3,95	1,70	29,0 ±2,0	858	1,59
7 X 2 x 2,5	NR	0,68	3,95	1,80	31,1 ±2,0	1085	2,02
8 X 2 x 2,5	NR	0,68	3,95	1,90	34,5 ±2,0	1248	2,43
10 X 2 x 2,5	NR	0,68	3,95	2,10	37,7 ±2,5	1355	2,39
12 X 2 x 2,5	NR	0,68	3,95	2,10	39,0 ±2,5	1477	2,44
14 X 2 x 2,5	NR	0,68	3,95	2,20	41,2 ±2,5	1692	2,81
16 X 2 x 2,5	NR	0,68	3,95	2,20	43,9 ±2,5	1913	3,18
19 X 2 x 2,5	NR	0,68	3,95	2,40	46,5 ±2,5	2185	3,57
20 X 2 x 2,5	NR	0,68	3,95	2,60	49,7 ±2,5	2472	4,38
24 X 2 x 2,5	NR	0,68	3,95	2,80	55,1 ±2,5	2796	4,91
30 X 2 x 2,5	NR	0,68	3,95	2,80	58,5 ±2,5	3322	5,48

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