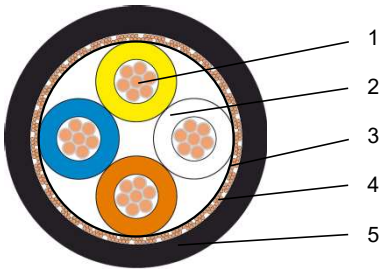
Technical datasheet

BETAtrans® DATA-ENX C-flex 100 Ω CAT 5 / 5e FOAM black part no.: 312667
1 x (4 x AWG 22/7)St blue, yellow, white, orange



Product description

Halogen free, electron-beam cross linked 100 MHz databus cable with improved fire performance and high resistance to temperature. This cable fulfils the fire protection standard for railway vehicles EN 45545-2 (HL1 - HL3). The transmission rate of this cable is better than for category 5 according to EN 50288 and IEC 61156. The cable sheath complies with the EM 104 requirements of EN 50264-1, EN 50306-1 and class M according to EN 50306-4. In the harsh train environment it performs with excellent resistance to UV, oils and fuels.

Application

This cable is used for fixed and protected installation inside of rail vehicles and buses. It is optimised for data transfer applications class D with the rate up to 1 GbE according to IEEE 802.3. Current supply (up to 350/600 mA) and voltage (up to 48 V) can be provided via PoE/PoE+ (according to IEEE 802.3af/at), considering ISO/IEC TS 29125 for the cable layout.

Construction

1.	conductor	tinned fine copper strands AWG 22 construction 7 x 0.254 mm according to ASTM	Ø: 0.75 ± 0.05 mm
2.	insulation	cellular PE, Comp 717 colours: blue, yellow, white, orange	Ø: 1.40 ± 0.10 mm
3.	wrapping	plastic tape	
4.	shielding	aluminium-bonded polyester tape with tinned fine copper braid single core diameter 0.12 mm	Ø: 4.40 ± 0.20 mm
5.	sheath	electron-beam cross-linked polyolefine copolymer, Comp 752 corresponds to EN 50306-1 and EN 50264-1 type EM104	Ø: 6.60 ± 0.20 mm
	colour	black	
	min. wall thickness	1.00 mm	
	printing	**STUDERCABLES.COM BETATRANS DATA-ENX C-FLEX 100 OHM CAT 5/5E FOAM (EN 50306-4)** **1 X (4 X AWG 22)ST CCHDA ….. - ….. …..**	

	1.	2.	3.
1. part no.	312667		
2. production no.	e.g. 1218780		
3. production date	e.g. 051119		

Product properties

nominal voltage		125 V
testing voltage	core - core	1000 VAC (50 Hz / 1 min.)
	core - shielding	1000 VAC (50 Hz / 1 min.)
temperature range	fixed installation	-40 °C up to +85 °C
	free installation	-25 °C up to +70 °C
min. bending radius	fixed installation	> 5 x Ø
	free installation	> 6 x Ø
max. tensile strength	installation	≤ 60 N
	operating	≤ 15 N

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cable weight	61 kg / km
fire load	0.258 kWh / m

Electromagnetic characteristics

coupling resistor*	at 1 MHz	13 mΩ / m
coupling resistor *	10 - 100 MHz	8 mΩ / m
coupling attenuation*	up to 1000 MHz	90 db
unbalanced attenuation near end	1 up to 100 MHz	≥ 40 - 10 x log (*f*) dB
screening attenuation*	up to 1000 MHz	60 db

Electrical characteristics at +20 C°

bandwidth		200 MHz
DC resistance		≤ 54.4 Ω / km
unbalanced resistance		< 2 %
insulation resistance		≥ 5 GΩ x km
operating capacity*	core - core	44 nF / km
unbalanced capacity to earth*		1500 pF / km
envelope velocity*		0.75 c
propagation delay*		440 ns / 100 m
skew*	at 100 MHz	2 ns / 100 m
propagation velocity		0.197 m / ns
characteristic impedance	at 100 MHz	100 ± 5 Ω

* nominal value

frequency [MHz]	attenuation [dB/10m]		NEXT [dB]		PS-NEXT [dB]		EL-FEXT [dB/10m]		PS-ELFEXT [dB/10m]		Return loss [dB]	
	typ.	max.[1]	typ.	min.[1]	typ.	min.[1]	typ.	min.[1]	typ.	min.[1]	typ.	min.[1]
1	0.15	0.32	76	65	73	62	91	64	88	61	25	---
4	0.33	0.60	71	56	68	53	76	52	73	49	25	23
10	0.53	0.95	64	50	61	47	68	44	65	41	28	25
16	0.69	1.21	60	47	57	44	64	40	61	37	28	25
31.25	0.99	1.71	56	43	53	40	58	34	55	31	27	23.6
62.5	1.45	2.48	52	38	49	35	52	28	49	25	26	21.5
100	1.88	3.2	48	35	45	32	47	24	44	21	25	20.1
155	2.36	---	45	---	42	---	42	---	39	---	25	---
200	2.73	---	42	---	39	---	37	---	34	---	23	---

[1] EN 50288-2-2/IEC 61156-6

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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 > 6 < 12 mm	EN 60332-3-25	carbonisation < 2.5 m
smoke density	EN 61034-2	transmittance > 70 %
toxicity of gases	EN 50305	insulation ITC ≤ 6 sheath ITC ≤ 3
absence of halogens	EN 50267-2-1	HCl und 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** **EN 50306-1**	
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 > 6 < 12 mm	EN 60332-3-25	carbonisation < 2.5 m
smoke density	EN 61034-2	transmittance > 70 %
toxicity of gases	EN 50305	insulation ITC ≤ 6 sheath 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

Fire performance for rolling stock	**NFPA130**	
vertical flame propagation for bunched wires or cables	FT 4/IEEE 1202	carbonisation ≤ 1.5 m
smoke release	UL 1685	peak smoke rate ≤ 0.25 m² / s total smoke released ≤ 95 m²

Material properties of sheath	**EN 50264-1** **EN 50306-1**	**EM 104**
resistance to ozone	EN 60811-403	72 h / 40 °C, method B volume concentration 200x10^{-6}
high resistance to cold	EN 60811-504	- 40 °C
high resistance to oil	EN 60811-404	72 h / 100 °C, IRM 902
resistance to fuel	EN 60811-404	168 h / 70 °C, IRM 903
resistance to acid	EN 60811-404	168 h / 23 °C, n-Oxalic
resistance to alkaline	EN 60811-404	168 h / 23 °C, n-NaOH
low fire load	DIN 51900	
resistance to UV	EN 50618	> 2000 h

Technical prescriptions concerning the burning behaviour	**UN/ECE-R 118**	
resistance to flame propagation	ISO 14572	combustion duration ≤ 70 sec. length of unburned area ≥ 50 mm

Approvals

Swiss Federal Railways

The national standards as BS 6853, DIN 5510-2, NF F 16-101, PN-K-02511, UNI CEI 11170 had been withdraw 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.