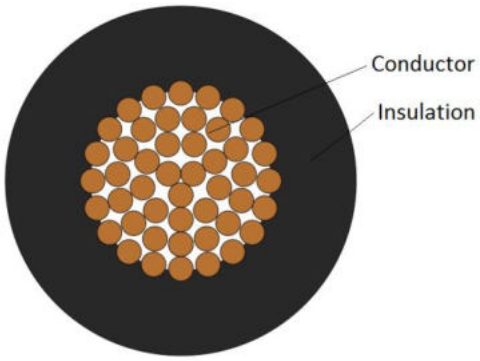
Application

ÖLFLEX® TRAIN 331 are halogen-free, highly flame retardant cables for use in railway vehicles and buses.
They are designed for fixed installation and for applications, where limited movement may occur. They are particularly used in areas, where human and animal life as well as valuable property are exposed to high risk of fire hazards.
ÖLFLEX® TRAIN 331 are oil-, fuel-, acid- and alkali resistant acc. to EN 50264-3-1.

Application range:
railway vehicles and buses: connecting lamps, heating equipment, switchgear, terminal boxes and power supply

Design



Design	acc. to EN 50264-3-1, 600 V, M for cables ≥ 1 mm²
Norm references	EN 50264-3-1. Code designation M M = extra low temperature, extra oil and fuel resistant
Classification	EN 45545-2: Hazard Level HL1, HL2, HL3 (only for cables 0.5 mm² – 240 mm²) NF F 16-101: only for black cables (1 mm² - 300 mm²) and GNYE cables (1 mm² – 95 mm²) Internal Category A1, A2, B External Category A1, A2, B Category C for flame propagation Category F0 for smoke
Conductor	fine wire strands of tinned copper acc. to IEC 60228 resp. EN IEC 60228, Class 5
Core isolation	electron beam cross-linked polymer compound EI 109 acc. to EN 50264-1
Core identification	black, GN/YE, red, blue, grey, brown, green, yellow, orange, white, violet

Electrical properties at 20 °C

Nominal voltage	U_0 / U:	0.6/1 kV AC
Max. permissible operating voltage:	U_m: V_0:	1.2 kV AC 0.9 kV DC
Test voltage	3.5 kV AC; 8.4 kV DC	

Mechanical and thermal properties

Min. bending radius	Cable diameter ≤ 12.0 mm: 4 x outer diameter for cautions bending: 3 x outer diameter (one bend at end of core) Cable diameter > 12.0 mm: 5 x outer diameter for cautions bending: 4 x outer diameter (one bend at end of core)
Temperature range	-40 °C up to +90 °C max. conductor temp. up to +120 °C max. conductor temp. (20.000h) up to +145 °C max. conductor temp. (3.000h) -50 °C acc. to GOST 33326-2015 and GOST 20.57.406-81 (method 203-1 und 205-1)
Short circuit temperature	max. +200°C (5s)

Fire protection acc. to EN 50264-1 / EN 45545-2 (only for cables 0.5 mm² – 240 mm²):

Classification	EN 45545-2: Hazard Level HL1, HL2, HL3
Flammability	Flame retardant acc. to IEC 60332-1-2 resp. EN 60332-1-2 No flame propagation acc. to: ≥ 12 mm: IEC 60332-3-24 resp. EN 60332-3-24 > 6 mm and < 12mm: IEC 60332-3-25 resp. EN 60332-3-25 ≤ 6 mm: EN 50305
Smoke density	acc. to EN 50264-1, light transmission: min. 70% acc. to IEC 61034-2 resp. EN 61034-2
Halogen-free	acc. to IEC 60754-1 resp. EN 60754-1 (chlorine and bromine) acc. to EN 60684-2 (fluorine)
Corrosivity	acc. to EN 50264-1, pH ≥ 4.3 and conductivity ≤ 10 µS/mm acc. to IEC 60754-2 resp. EN 60754-2
Toxicity	acc. to EN 50264-1 (≤ 3) acc. to EN 50305 acc. to EN 45545-2 (≤ 6)

Fire protection acc. to NF (only for black cables 1mm² - 300 mm² and GNYE cores 1 mm²– 95 mm²):

Classification	NF F 16-101: Internal Category A1, A2, B External Category A1, A2, B Category C for flame propagation Category F0 for smoke
Flammability	acc. to NF C 32-070, Category C1 and C2
Smoke density	acc. to NF X 10-702
Toxicity	acc. to NF X 70-100

Fire protection acc. to NFPA 130:

Flammability Vertical-Tray Fire-Propagation	FT4/IEEE1202 acc. to UL1685 (only for 1.5 mm² – 70 mm²)

Smoke release	acc. to UL 1685

Material properties

Ozone resistance	acc. to EN 50264-3-1, method B acc. to EN 50305
Mineral oil resistance	acc. to EN 50264-3-1
Fuel resistance	acc. to EN 50264-3-1
Acid and alkali resistance	acc. to EN 50264-3-1
UV resistance	Acc. to EN 50525-1 are cables with black sheath suitable for a permanent outdoor use.
Tests	acc. to EN 50264-3-1
EU Directives	These cables are conform to the EU-Directives 2014/35/EC (Low Voltage Directive)
Environmental information	These cables meet the substance-specific requirements of the EU Directive 2011/65/EU (RoHS).

Conductor cross section [mm²]	Max. wire ø [mm]	Max. conductor resistance (20°C) [Ohm/km]	Conductor ø reference value [mm]	Core ø [mm]	Fire load reference value [kJ/m]	Weight [kg/km]
0.5	0.21	40.1	0.95	**2.15** ±0.2	68	9
0.75	0.21	26.7	1.15	**2.35** ±0.2	78	12
1	0.21	20.0	1.3	**2.6** ±0.2	84	15
1.5	0.26	13.7	1.6	**3.0** ±0.2	118	22
2.5	0.26	8.21	2.0	**3.4** ±0.2	143	33
4	0.31	5.09	2.7	**4.0** ±0.2	170	49
6	0.31	3.39	3.2	**4.5** ±0.2	199	70
10	0.41	1.95	4.2	**5.5** ±0.2	253	112
16	0.41	1.24	5.2	**6.7** ±0.2	330	174
25	0.41	0.795	6.5	**8.4** ±0.2	528	273
35	0.41	0.565	7.7	**9.6** ±0.2	617	374
50	0.41	0.393	9.7	**11.5** ±0.3	833	531
70	0.51	0.277	11.4	**13.4** ±0.3	1077	739
95	0.51	0.210	13.4	**15.3** ±0.3	1233	988
120	0.51	0.164	15.0	**17.0** ±0.3	1473	1243
150	0.51	0.132	17.0	**19.2** ±0.4	1915	1558
185	0.51	0.108	18.5	**21.2** ±0.4	2445	1927
240	0.51	0.0817	22.0	**24.2** ±0.4	2968	2487
300	0.51	0.0654	23.2	**27.5** ±0.5	3321	3085