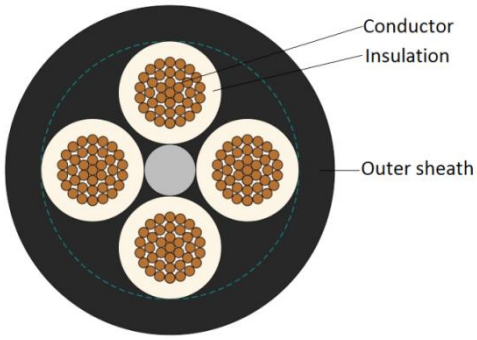
Application

ÖLFLEX® TRAIN 310 TW-P are halogen-free, highly flame retardant cables with reduced insulation wall thickness for use in railway vehicles.
They are designed for fixed and protected installation, further for applications, where limited movement may occur.
They are particularly used in areas, where human life as well as valuable property are exposed to high risk of fire hazards.
ÖLFLEX® TRAIN 310 TW-P are oil-, fuel- , acid- and alkali resistant acc. to EN 50306-4.

Application range:
railway vehicles, control and monitoring circuits as well as locking circuits and internal wiring of equipment in trains and locomotives

Design



Design	according to EN 50306-4, class 1P
Norm references	EN 50306-4 bzw. VDE 0260-306-4. Code designation MM MM = extra low temperature, extra oil and fuel resistant
Classification	EN 45545-2: Hazard Level HL1, HL2, HL3 NF F 16-101: Internal Category A1, A2, B External Category A1, A2, B Category C for flame propagation Category F0 for smoke
Conductor	tinned- copper strand, 19 or 37 wires, SRC (Special Round Conductor) acc. to EN 50306-2
Core isolation	electron beam cross-linked polymer compound acc. to EN 50306-2
Core identification	white cores with black numbers acc. to DIN EN 50334 resp. VDE 0293-334
Outer sheath	electron beam cross-linked polymer compound, halogen free and flame retardant, S2 acc. to EN 50306-1 colour: Black, similar RAL 9005

Electrical properties

Nominal voltage	U_0 / U: 300/500 V AC according to EN 50306 U_m: 550V AC according to EN 50306 U_0 / U: 600/1000 V AC
Test voltage	core / core: 3.5 kV AC or 8.4 kV DC

Mechanical and thermal properties

Min. bending radius	Cable diameter ≤ 12.0 mm for cautions bending: 3 x cable diameter (one bend at end of core) fixed installation: 4 x cable diameter occasional flexing: 5 x cable diameter Cable diameter > 12.0 mm for cautions bending: 4 x cable diameter (one bend at end of core) fixed installation: 5 x cable diameter occasional flexing: 6 x cable diameter
Temperature range	fixed installation: -45 °C up to +125 °C max. conductor temp. (20.000h) occasional flexing: -35 °C up to +105 °C max. conductor temp. - 50° according to GOST 33326-2015 and GOST 20.57.406-81 (method 203-1 und 205-1)
Short circuit temperature	max. +160°C (5s)

Fire protection according to EN 50306-4 / EN 45545:

Classification	EN 45545-2: Hazard Level HL1, HL2, HL3
Flammability No flame propagation acc. to	acc. to EN 60332-1-2 resp. VDE 0482-332-1-2 ≥ 12 mm: EN 60332-3-24 resp. VDE 0482-332-3-24 > 6 mm und < 12mm: EN 60332-3-25 resp. VDE 0482-332-3-25 ≤ 6 mm: EN 50305, clause 9.1.2
Smoke density	acc. to EN 50306-1, light transmission: min. 70% acc. to IEC 61034-2; EN 61034-2
Halogen-free	acc. to IEC 60754-1; EN 60754-1; EN 50267-2-1 (chlorine and bromine) acc. to EN 60684-2 (fluorine)
Corrosivity	acc. to EN 50264-1, pH ≥ 4.3 and conductivity ≤ 10µS/mm acc. to IEC 60754-2; EN 60754-2; EN 50267-2-2
Toxicity (< 6)	acc. to EN 50305

Fire protection according to NF:

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
Smoke release	acc. to UL 1685

Material properties

Ozone resistance	acc. to EN 50306, method A or B
Mineral oil resistance	acc. to EN 50306
Fuel resistance	acc. to EN 50306
Acid and alkali resistance	acc. to EN 50306
UV resistance	acc. to EN 50525-1 (VDE 0285-525-1) are cables with black sheath suitable for a permanent outdoor use.
Tests	acc. to EN 50306-2 and EN 50306-4
EU Directives	These cables are conform to the EU-Directives 2014/35/EC (Low Voltage Directive)

Art. No.	Number of cores x cross section [mm²]	Conductor [n x mmø]	Max. conductor resistance (20°C) [Ohm/km]	Conductor ø reference value [mm]	Core ø reference value [mm]	Outer ø [mm]	Fire load reference value [kWh/m]	Weight [kg/km]
15310000	4X0.5	19x0.18	40.1	0.9	1.4	**4.6 ± 0.5**	0.10	42
15310001	7X0.5	19x0.18	40.1	0.9	1.4	**5.4 ± 0.5**	0.13	64
15310002	13X0.5	19x0.18	40.1	0.9	1.4	**7.8 ± 0.5**	0.26	120
15310003	19X0.5	19x0.18	40.1	0.9	1,4	**8.6 ± 0.5**	0.30	157
15310004	37X0.5	19x0.18	40.1	0.9	1.4	**11.4 ± 0.6**	0.48	285
15310005	4X0.75	37x0.16*	26.7	1.1	1.6	**5.1 ± 0.5**	0.12	55
15310006	7X0.75	37x0.16*	26.7	1.1	1.6	**6.0 ± 0.5**	0,15	84
15310007	13X0.75	37x0.16*	26.7	1.1	1.6	**8.7 ± 0.5**	0.31	162
15310008	19X0.75	37x0.16*	26.7	1.1	1.6	**9.6 ± 0.6**	0.35	214
15310009	37X0.75	37x0.16*	26.7	1.1	1.6	**12.8 ± 0.6**	0.57	392
15310010	48X0.75	37x0.16*	26.7	1.1	1.6	**14.7 ± 0.8**	0.65	489
15310011	4X1	37x0.18*	20.0	1.2	1.7	**5.4 ± 0.5**	0.13	68
15310012	7X1	37x0.18*	20.0	1.2	1.7	**6.5 ± 0.5**	0.17	106
15310013	13X1	37x0.18*	20.0	1.2	1.7	**9.3 ± 0.6**	0.34	200
15310014	19X1	37x0.18*	20.0	1.2	1.7	**10.4 ± 0.6**	0.38	267
15310015	37X1	37x0.18*	20.0	1.2	1.7	**13.9 ± 0.6**	0.64	498
15310016	4X1.5	37x0.23*	13.7	1.6	2.2	**6.5 ± 0.5**	0.18	98
15310017	7X1.5	37x0.23*	13.7	1.6	2.2	**8.2 ± 0.5**	0.31	170
15310018	13X1.5	37x0.23*	13.7	1.6	2.2	**11.3 ± 0.6**	0.48	295
15310019	19X1.5	37x0.23*	13.7	1.6	2.2	**12.6 ± 0.6**	0.55	396
15310020	37X1.5	37x0.23*	13.7	1.6	2.2	**17.0 ± 0.8**	0.88	728
15310021	2X2.5	37x0.30*	8.21	2.1	2.8	**7.2 ± 0.5**	0.26	106
15310022	3X2.5	37x0.30*	8.21	2.1	2.8	**7.6 ± 0.5**	0.26	131
15310023	4X2.5	37x0.30*	8.21	2.1	2.8	**8.4 ± 0.5**	0.31	165

* These cables may be supplied in 19 strand conductors.