



LSHF Cables

Low Smoke Halogen Free
safety cables





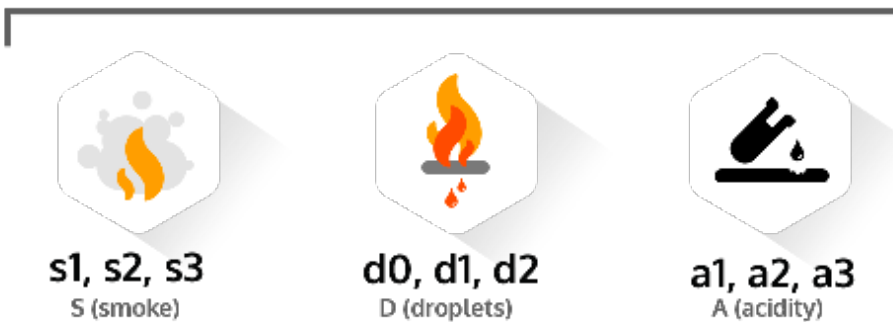
CPR classes

The CPR applies to all products intended to be used permanently in construction.

These classes refer to combustible cables in ascending order of fire growth rate (FIGRA) and heat release. All of these cables also comply with the flame non-propagation test in accordance with UNE-EN 60332-1-2.



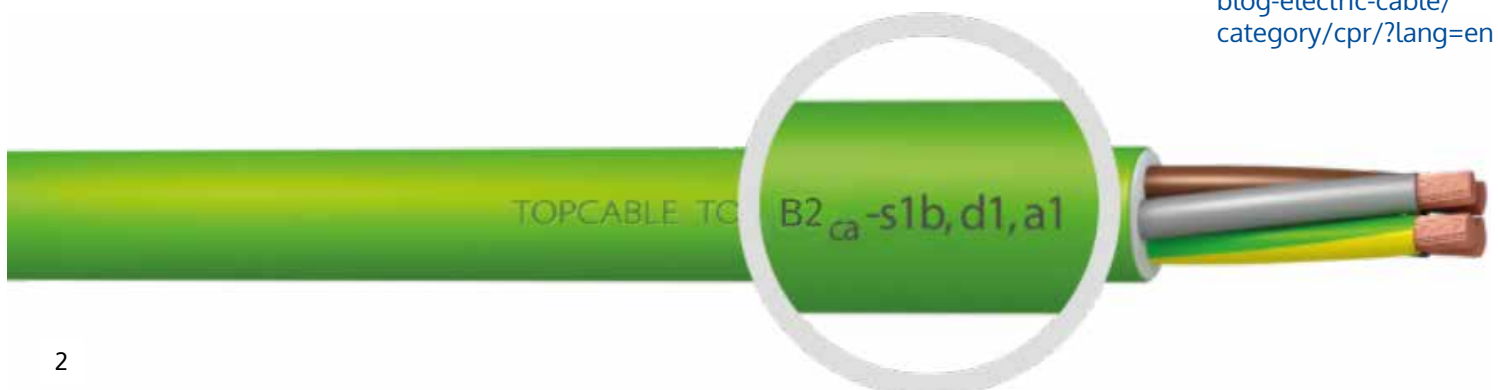
B_{2ca} -s1b, d1, a1



More info on CPR:



[www.topcable.com/
blog-electric-cable/
category/cpr/?lang=en](http://www.topcable.com/blog-electric-cable/category/cpr/?lang=en)







CONSTRUCTION

Conductor

Electrolytic annealed copper conductor, class 5 (flexible), according to EN 60228 and IEC 60228.

Insulation

Cross-linked polyethylene type XLPE according to IEC 60502-1 and type DIX-3 according to HD 603. The standard identification of insulated conductors according to HD 308 is the following:

1 x	Natural
2 x	Blue + Brown
3 G	Blue + Brown + Green/Yellow
3 x	Brown + Black + Grey
3 x + 1 x	Brown + Black + Grey + Blue (reduced cross-section)
4 G	Brown + Black + Grey + Green/Yellow
4 x	Brown + Black + Grey + Blue
5 G	Brown + Black + Grey + Blue + Green/Yellow
6 or more	Black numbered + Green/Yellow

Outer sheath

Low Smoke Halogen Free (LSHF) polyolefin outer sheath. Green colour.

APPLICATION

Toxfree® ZH RZ1-K (AS) / YMz1Kf is a LSHF safety cable. In the event of fire, it does not emit toxic gases, nor does it give off corrosive gases, avoiding any possible damage to people or electronic equipment. For these reasons it is highly recommended for use in public places such as: hospitals, schools, museums, airports, bus terminals, shopping centers, offices, laboratories, etc.

CHARACTERISTICS



Electrical performance

Low voltage: 0,6/1 kV



Thermal performance

Maximum service temperature: 90°C.

Maximum short-circuit temperature: 250°C (max. 5 s).

Minimum service temperature: -40°C (fixed and protected installations)

Minimum installation and handling temperature: -0°C.



Fire performance

Flame non-propagation according to IEC 60332-1 / EN 60332-1.

Fire non-propagation according to EN 60332-3 / IEC 60332-3 and EN 50399.

Reaction to fire CPR: B2_{ca} -s1a, d1, a1 or C_{ca} -s1a,d1,a1, according to EN 50575. (see cross-section).

Low Smoke Halogen Free according to EN 60754-1 / IEC 60754-1.

Low smoke emission according to EN 61034 / IEC 61034:

Light transmittance > 80%.

Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.



Mechanical performance

Minimum bending radius: 5x cable diameter.

Impact resistance: AG2 Medium severity.



Environmental performance

Chemical & Oil resistance: acceptable.

UV Resistant according to EN 50618.

Water resistance: AD5 Jets.



Installation conditions

Open Air.

Buried.

In conduit.

STANDARDS / COMPLIANCE



According to

IEC 60502-1 / UNE 21123-4.



Standards and approvals

AENOR / KEMA-KEUR / RoHS / CE.



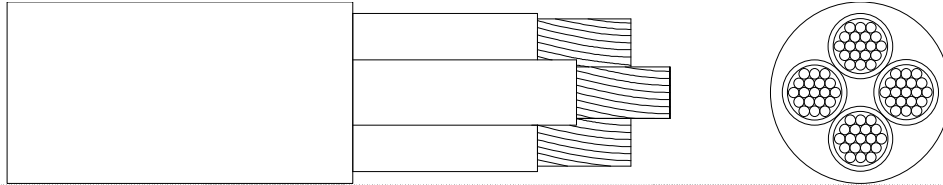
CPR (Construction Products Regulation)

B2_{ca} -s1a, d1, a1 (according to cross-section) or

C_{ca} -s1a, d1, a1 (according to cross-section).



DIMENSIONS & ADMISSIBLE INTENSITIES



Cross-section (mm ²)	Diameter (mm)	Weight (kg/km)	Open air (A) ¹	Buried (A) ²	Voltage drop (V/A · km) ³
1 x 2,5	7,1	75	39	35	20,3
1 x 4	7,6	95	53	46	12,6
1 x 6	8,2	120	68	58	8,41
1 x 10	9,1	165	93	77	4,87
1 x 16	10,1	225	124	100	3,08
1 x 25	11,3	305	161	129	1,98
1 x 35	12,2	400	200	155	1,41
1 x 50	13,9	535	242	183	0,984
1 x 70	15,8	730	310	225	0,693
1 x 95	17,6	945	377	270	0,525
1 x 120	19,5	1.185	437	306	0,410
1 x 150	21,7	1.470	504	343	0,328
1 x 185	23,8	1.770	575	387	0,270
1 x 240	26,7	2.310	679	448	0,204
1 x 300	29,5	2.905	783	502	0,163
1 x 400	34,2	3.825	930	592	0,123
1 x 500	37,9	4.885	1.070	670	0,097
1 x 630	43,1	6.410	1.232	762	0,073
2 x 1,5	9,3	125	26	27	33,9
2 x 2,5	9,8	145	36	35	20,3
2 x 4	10,8	190	49	46	12,6
2 x 6	11,8	245	63	58	8,41
2 x 10	13,6	355	86	77	4,87
2 x 16	15,3	495	115	100	3,08
3 G 1,5	10,4	155	26	27	33,9
3 G 2,5	10,9	190	36	35	20,3
3 G 4	11,9	240	49	46	12,6
3 G 6	13,0	310	63	58	8,41
3 G 10	14,8	450	86	77	4,87
3 x 16	16,8	645	115	100	3,08
3 x 25	21,4	1.020	149	129	1,98
3 x 35	23,8	1.345	185	155	1,41
3 x 50	27,2	1.825	225	183	0,984
3 x 70	30,3	2.470	289	225	0,693
3 x 95	35,2	3.245	352	270	0,525
3 x 120	39,1	4.095	410	306	0,410
3 x 150	43,9	5.105	473	343	0,328
3 x 185	48,6	6.195	542	387	0,270
3 x 16 + 1 x 10	19,1	800	115	100	3,08
3 x 25 + 1 x 16	22,5	1.165	149	129	1,98
3 x 35 + 1 x 16	24,4	1.480	185	155	1,41
3 x 50 + 1 x 25	28,6	2.050	225	183	0,984
3 x 70 + 1 x 35	32,9	2.815	289	225	0,693
3 x 95 + 1 x 50	37,1	3.690	352	270	0,525
3 x 120 + 1 x 70	40,8	4.700	410	306	0,410
3 x 150 + 1 x 70	45,9	5.725	473	343	0,328
3 x 185 + 1 x 95	51,4	7.000	542	387	0,270
3 x 240 + 1 x 120	58,6	9.185	641	448	0,204
3 x 300	61,0	10.180	741	502	0,163

TOXFREE[®] ZH

RZ1-K (AS) / YMz1Kf

Cross-section (mm ²)	Diameter (mm)	Weight (kg/km)	Open air (A) ¹	Buried (A) ²	Voltage drop (V/A · km) ³
4 G 1,5	11,2	180	26	27	33,9
4 G 2,5	11,9	225	36	35	20,3
4 G 4	12,9	290	49	46	12,6
4 G 6	14,3	380	63	58	8,41
4 G 10	16,3	565	86	77	4,87
4 x 16	18,8	815	115	100	3,08
4 x 25	23,8	1.275	149	129	1,98
4 x 35	25,9	1.700	185	155	1,41
4 x 50	30,1	2.310	225	183	0,984
4 x 70	34,8	3.185	289	225	0,693
4 x 95	39,9	4.185	352	270	0,525
4 x 120	44,8	5.305	410	306	0,410
4 x 150	49,3	6.548	473	343	0,328
4 x 185	54,8	7.965	542	387	0,270
4 x 240	61,7	10.370	641	448	0,204
4 x 300	68,0	13.055	741	502	0,163
5 G 1,5	12,6	230	26	27	33,9
5 G 2,5	13,2	275	36	35	20,3
5 G 4	14,4	355	49	46	12,6
5 G 6	15,9	470	63	58	8,41
5 G 10	18,0	685	86	77	4,87
5 G 16	20,9	1.000	115	100	3,08
5 G 25	25,9	1.550	149	129	1,98
5 G 35	28,3	2.050	185	155	1,41
5 G 50	33,7	2.840	225	183	0,984
5 G 70	38,6	3.905	289	225	0,693
5 G 95	43,5	5.080	352	270	0,525
5 G 120	49,5	6.395	410	306	0,410
5 G 150	55,1	7.935	473	343	0,328
5 G 185	61,1	9.665	542	387	0,270
5 G 240	68,8	12.620	641	448	0,204

¹ Reference method F for single-core and method E for multicore cables according to IEC 60364-5-52 in open air at 30°C ambient temperature.

² Reference method D2 according to IEC 60364-5-52. Directly buried at 0,7 m depth with soil thermal resistivity of 2,5 K·m/W and 20°C of ground temperature.

³ At maximum service temperature and $\cos\phi=1$.

For all cables is supposed a single-phase circuit.

SHORT-CIRCUIT CURRENT-CARRYING CAPACITIES

Time (s)	0,1	0,2	0,3	0,5	1	1,5	2	2,5	3
A/mm²	452	320	261	202	143	117	101	90	83

CORRECTION FACTORS FOR AIR TEMPERATURE

Air T. (°C)	20	25	30	35	40	45	50	55	60
Factor	1,08	1,04	1	0,96	0,91	0,87	0,82	0,76	0,71

CORRECTION FACTORS FOR GROUND TEMPERATURE

Ground T. (°C)	10	15	20	25	30	35	40	45	50
Factor	1,07	1,04	1	0,96	0,93	0,89	0,85	0,8	0,76

CORRECTION FACTORS FOR SOIL THERMAL RESISTIVITY

Moisture degree of soil	Very damp	Slightly damp	Slightly dry	Dry	Very dry
Thermal Resist. (K·m/W)	1	1,5	2	2,5	3
Factor	1,50	1,28	1,12	1	0,90

Other correction factors (for grouping cables, for harmonic currents), that are not in this specification, can be applied. Further information can be found in IEC 60364-5-52.



Cca

APPLICATION

Toxfree[®] Plus RZ1-K (AS+) is a fire resistant cable, specially designed to ensure the power supply to emergency circuits in the event of fire. During a fire you need critical circuits to work for life safety (signalling lights, fume extractors, acoustic alarms, water pumps, etc) and a secure plant shutdown. For this reason, its use is highly recommended in public places such as: hospitals, tunnels, offices, production plants, laboratories, hotels, etc...

CONSTRUCTION

Conductor

Electrolytic annealed copper conductor, class 5 (flexible), according to EN 60228 and IEC 60228.

Insulation

Mica tape + Cross-linked polyethylene insulation type DIX-3 according to HD 603.

The standard identification of insulated conductors according to HD 308 is the following:

1 x	Natural
2 x	Blue + Brown
3 x	Brown + Black + Grey
3 x + 1 x	Brown + Black + Grey + Blue (reduced cross-section)
4 x	Brown + Black + Grey + Blue
5 G	Brown + Black + Grey + Blue + Green/Yellow

Outer sheath

Fireproof polyolefin outer sheath with low smoke and halogen free fumes under fire conditions. Orange colour.

CHARACTERISTICS

⚡ Electrical performance

Low voltage 0,6/1 kV.

🌡 Thermal performance

Maximum service temperature: 90°C.

Maximum short-circuit temperature: 250°C (max. 5 s).

Minimum service temperature: -40°C (fixed and protected installations).

Minimum installation and handling temperature: -0°C

🔥 Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.

Fire non-propagation according to EN 60332-3 / IEC 60332-3.

Fire resistant (PHI20) minimum 120 minutes at 840 oC:

- According to IEC 60331-2 / EN 50200 for cable diameter ≤ 20 mm.
- According to IEC 60331-1 / EN 50362 for cable diameter > 20 mm.

Fire resistant 180 minutes at 950oC (cat C) category C, W & Z according to BS6387 (300/500V).

LSHF (Low Smoke Halogen Free) according to EN 60754-1 / IEC 60754-1.

Low smoke emission according to EN 61034 / IEC 61034:

Light transmittance > 60%

Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.

Reaction to fire CPR: C_{ca}-s1b, d1, a1 according to EN 50575.

⤵ Mechanical performance

Minimum bending radius: 5x cable diameter.

Impact resistance: AG2 Medium severity.

STANDARDS / COMPLIANCE

📄 **According to**
IEC 60502-1

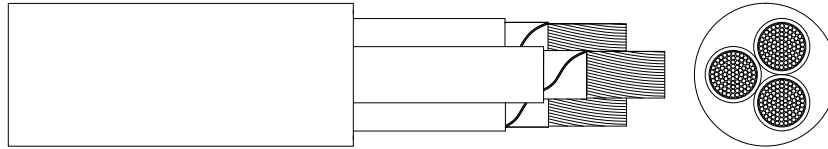
🔗 **Standards and approvals**
RoHS / CE

🛡️ **CPR (Construction Products Regulation)**
C_{ca}-s1b, d1, a1



TOXFREE[®] PLUS 331 ZH RZ1-K (AS+)

DIMENSIONS & ADMISSIBLE INTENSITIES



Cross-section (mm ²)	Diameter (mm)	Weight (kg/km)	Open air (A) ¹	Buried (A) ²	Voltage drop (V/A · km) ³
1 x 2,5	7,4	80	39	35	20,3
1 x 4	7,9	100	53	46	12,6
1 x 6	8,4	125	68	58	8,41
1 x 10	9,4	170	93	77	4,87
1 x 16	10,4	230	124	100	3,08
1 x 25	11,8	315	161	129	1,98
1 x 35	13,0	415	200	155	1,41
1 x 50	14,4	550	242	183	0,984
1 x 70	16,2	745	310	225	0,693
1 x 95	18,0	960	377	270	0,525
1 x 120	20,2	1.205	437	306	0,410
1 x 150	22,1	1.490	504	343	0,328
1 x 185	24,3	1.790	575	387	0,270
1 x 240	26,9	2.320	679	448	0,204
1 x 300	30,0	2.950	783	502	0,163
1 x 400	34,8	3.815	930	592	0,123
1 x 500	38,5	4.865	1.070	670	0,097
1 x 630	43,7	6.385	1.232	762	0,073
2 x 1,5	10,2	150	26	27	33,9
2 x 2,5	10,4	165	36	35	20,3
2 x 4	11,4	215	49	46	12,6
2 x 6	12,3	270	63	58	8,41
2 x 10	14,6	395	86	77	4,87
2 x 16	16,6	550	115	100	3,08
3 G 1,5	11,3	185	26	27	33,9
3 G 2,5	11,6	210	36	35	20,3
3 G 4	12,5	265	49	46	12,6
3 G 6	13,5	340	63	58	8,41
3 G 10	15,3	480	86	77	4,87
3 x 16	17,7	685	115	100	3,08
3 x 25	22,5	1.075	149	129	1,98
3 x 35	25,5	1.425	185	155	1,41
3 x 50	28,3	1.895	225	183	0,984
3 x 70	31,1	2.535	289	225	0,693
4 G 1,5	12,2	215	26	27	33,9
4 G 2,5	12,4	250	36	35	20,3
4 G 4	13,6	320	49	46	12,6
4 G 6	15,1	420	63	58	8,41
4 G 10	17,1	605	86	77	4,87
4 x 16	19,5	860	115	100	3,08
4 x 25	25,0	1.345	149	129	1,98
4 x 35	27,3	1.765	185	155	1,41
4 x 50	31,3	2.395	225	183	0,984
4 x 70	36,2	3.285	289	225	0,693
4 x 95	40,4	4.230	352	270	0,525
4 x 120	46,0	5.390	410	306	0,410
4 x 150	50,6	6.675	473	343	0,328
4 x 185	56,5	8.150	542	387	0,270
4 x 240	62,2	10.465	641	448	0,204
5 G 1,5	13,6	265	26	27	33,9
5 G 2,5	13,8	300	36	35	20,3
5 G 4	15,0	385	49	46	12,6
5 G 6	16,4	500	63	58	8,41
5 G 10	18,6	725	86	77	4,87
5 G 16	21,5	1.045	115	100	3,08
5 G 25	27,2	1.630	149	129	1,98
5 G 35	30,5	2.155	185	155	1,41
5 G 50	35,0	2.945	225	183	0,984

¹ Reference method F for single-core and method E for multicore cables according to IEC 60364-5-52 in open air at 30°C ambient temperature.

² Reference method D2 according to IEC 60364-5-52. Directly buried at 0,7 m depth with soil thermal resistivity of 2,5 K-m/W and 20°C of ground temperature.

³ At maximum service temperature and cosφ=1. For all cables is supposed a single-phase circuit.

SHORT-CIRCUIT CURRENT-CARRYING CAPACITIES

Time (s)	0,1	0,2	0,3	0,5	1	1,5	2	2,5	3
A/mm²	452	320	261	202	143	117	101	90	83

CORRECTION FACTORS FOR AIR TEMPERATURE

Air T. (°C)	20	25	30	35	40	45	50	55	60
Factor	1,08	1,04	1	0,96	0,91	0,87	0,82	0,76	0,71

CORRECTION FACTORS FOR GROUND TEMPERATURE

Ground T. (°C)	10	15	20	25	30	35	40	45	50
Factor	1,07	1,04	1	0,96	0,93	0,89	0,85	0,80	0,76

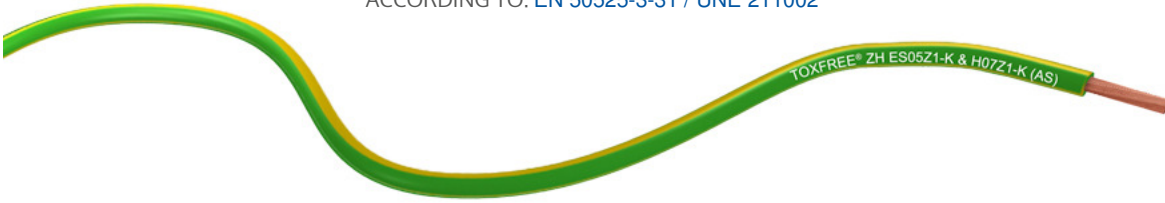
CORRECTION FACTORS FOR SOIL THERMAL RESISTIVITY

Moisture degree of soil	Very damp	Slightly damp	Slightly dry	Dry	Very dry
Thermal Resist. (K·m/W)	1	1,5	2	2,5	3
Factor	1,50	1,28	1,12	1	0,90

Other correction factors (for grouping cables, for harmonic currents), that are not in this specification, can be applied. Further information can be found in IEC 60364-5-52.

Flexible and halogen free power cable for electrical panel wiring.

ACCORDING TO: EN 50525-3-31 / UNE 211002



B2ca

APPLICATION

Toxfree[®] ES05Z1-K/H05Z1-K & H07Z1-K is a LSHF safety cable. In the event of fire, it does not emit toxic gases, nor does it give off corrosive gases, avoiding any possible damage to people or electronic equipment. For these reasons it is highly recommended for use in public places such as: hospitals, schools, museums, airports, bus terminals, shopping malls, offices, laboratories, etc.

CONSTRUCTION

Conductor

Electrolytic annealed copper conductor, class 5 (flexible) according to EN 60228 and IEC 60228.

Insulation

Polyolefin insulation, halogen free and low smoke under fire conditions, type T1Z1 according to UNE 211002, type T17 according to EN 50363-7 and UL 1581 (table 47.1).

The standard identification of insula-ted conductors is the following:

Blue	RAL 5015
Brown	RAL 8003
Black	RAL 9005
Red	RAL 3000
Green/Yellow	RAL 6018/1021
Grey	RAL 7000
Dark Blue	RAL 5010
White	RAL 9010

Other colours available on request.

CHARACTERISTICS

- ⚡ **Electrical performance**
Low voltage 300/500 V · 450/750 V.
Rated Voltage: ES05Z1-K/H05Z1-K (up to 1 mm²): 300/500 V.
H07Z1-K (from 1,5 mm² onwards): 450/750 V.
- 🌡️ **Thermal performance**
Maximum service temperature: 70°C.
Maximum short-circuit temperature: 160°C (max. 5 s).
Minimum service temperature: -40°C (fixed and protected installations).
- 🔥 **Fire performance**
Flame non-propagation according to EN 60332-1/IEC 60332-1.
Fire non-propagation according to EN 60332-3/IEC 60332-3/EN 50399.
Reaction to fire CPR: B2ca -s1a, d1, a1, according to EN 50575.
LSHF (Low Smoke Halogen Free) according to EN 60754-1/IEC 60754-1.
Low smoke emission according to EN 61034/IEC 61034:
Light transmittance > 80%.
Low corrosive gases emission according to EN 60754-2/IEC 60754-2.
- 📏 **Mechanical performance**
Minimum bending radius: 5x cable diameter.
- 🌍 **Environmental performance**
Chemical & Oil resistance: Acceptable.
Water resistance: AD3 Sprays.

STANDARDS / COMPLIANCE

- 📄 **According to**
EN 50525-3-31 / UNE 211002
- 🌐 **Standards and approvals**
HAR / AENOR / BUREAU VERITAS / RoHS / CE
- 🏗️ **CPR (Construction Products Regulation)**
B2ca - s1a, d1, a1



DIMENSIONS & ADMISSIBLE INTENSITIES



Cross-section (mm ²)	Diameter (mm)	Weight (Kg/km)	In conduit 2 cond. (A) ¹	In conduit 3 cond. (A) ¹	Voltage drop (V/A · km) ²
1 x 0,75	2,3	11	11	-	62,4
1 x 1	2,5	13	14	-	46,8
1 x 1,5	2,9	20	17,5	15,5	31,9
1 x 2,5	3,6	30	24	21	19,2
1 x 4	4,1	45	32	28	11,9
1 x 6	4,7	65	41	36	7,92
1 x 10	6,0	110	57	50	4,58
1 x 16	7,0	160	76	68	2,90
1 x 25	8,8	250	101	89	1,87
1 x 35	9,9	340	125	110	1,33
1 x 50	11,8	480	151	134	0,926
1 x 70	13,5	660	192	171	0,653
1 x 95	15,6	875	232	207	0,494
1 x 120	17,0	1.100	269	239	0,386
1 x 150	18,9	1.375	300	262	0,310
1 x 185	21,5	1.680	341	296	0,254
1 x 240	24,5	2.205	400	346	0,192

¹Reference method B1 for two and three loaded conductors installed in conduit on a wall according to IEC60364-5-52 in open air at 30°C ambient temperature.

² At 70°C conductor temperature, cos φ= 1 and single-phase circuit.

SHORT-CIRCUIT CURRENT-CARRYING CAPACITIES

Time (s)	0,1	0,2	0,3	0,5	1	1,5	2	2,5	3
A/mm ²	364	257	210	163	115	94	81	73	66

CORRECTION FACTORS TEMPERATURE

Air T. (°C)	20	25	30	35	40	45	50	55	60
Factor	1,12	1,06	1	0,94	0,87	0,79	0,71	0,61	0,5



Cca

APPLICATION

Toxfree® RZ1MZ1-K (AS) is a LSHF is a safety cable. In case of fire, it does not emit toxic or corrosive gases, protecting people and avoiding possible damage to electronic equipment. Therefore its use is recommended for public places, in hazardous areas with explosive gas atmospheres (ATEX), and installations where the cable is subject to risk of mechanical aggression.

CONSTRUCTION

Conductor

Electrolytic annealed copper conductor, class 5 (flexible), according to EN 60228 and IEC 60228.

Insulation

Cross-linked polyethylene type DIX-3 according to HD 603 and type XLPE according to IEC 60502-1. The standard identification of insulated conductors according to HD 308 is:

1 x	Natural
2 x	Blue + Brown
3 G	Blue + Brown + Green/Yellow
3 x	Brown + Black + Grey
4 G	Brown + Black + Grey + Green/Yellow
4 x	Brown + Black + Grey + Blue
5 G	Brown + Black + Grey + Green/Yellow + Blue
6 or more	Black numbered + Green/Yellow

Armour bedding

Low smoke zero halogen (LSHF) polyolefin separation sheath.







Armour

Galvanized steel wire armour. Aluminium armour is used in single core cables to avoid parasite currents that may overheat the cable.




Outer sheath

Low Smoke Halogen Free (LSHF) polyolefin type ST8 according to IEC 60502-1. Black colour.

CHARACTERISTICS

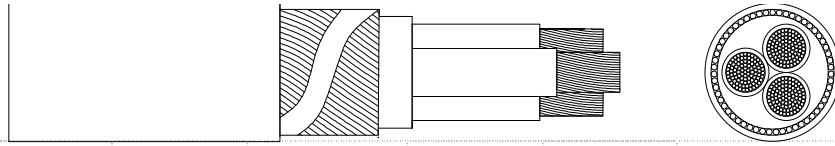
-  **Electrical performance**
Low voltage: 0,6/1 kV
-  **Thermal performance**
Maximum service temperature: 90°C.
Maximum short-circuit temperature: 250°C (max. 5 s).
Minimum service temperature: -50 °C according to GOST 31996.
Minimum installation and handling temperature: 0 °C
-  **Fire performance**
Flame non-propagation according to EN 60332-1 and IEC 60332-1.
Fire non-propagation according to EN 60332-3, IEC 60332-3 and EN 50399.
Reaction to fire CPR: C_{ca}-s1b, d1, a1, according to EN 50575.
Low Smoke Halogen Free according to EN 60754-1 and IEC 60754.
Low smoke emission according to EN 61034 and IEC 61034:
Light transmittance > 60%.
Low corrosive gases emission according to EN 60754-2 and IEC 60754-2.
-  **Mechanical performance**
Minimum bending radius: 10 x cable diameter.
Impact resistance: AG4 High severity.
Rodent proof.
-  **Environmental performance**
Chemical & Oil resistance: acceptable.
Hydrocarbon resistant
UV Resistant according to EN 50618.
Potentially explosion hazard locations (ATEX)
Water resistance: AD5 Jets.
-  **Installation conditions**
Open Air.
Buried.
In Conduit.

STANDARDS / COMPLIANCE

-  **According to**
IEC 60502-1.
-  **Standards and approvals**
CE / RoHS.
-  **CPR (Construction Products Regulation)**
C_{ca} -s1b, d1, a1.



DIMENSIONS & ADMISSIBLE INTENSITIES



Cross-section (mm ²)	Diameter (mm)	Weight (kg/km)	Open air (A) ¹	Buried (A) ²	Voltage drop (V/A · km) ³
1 x 10	14,6	341	93	77	4,87
1 x 16	15,3	405	124	100	3,08
1 x 25	17,6	550	161	129	1,98
1 x 35	18,7	665	200	155	1,41
1 x 50	20,3	825	242	183	0,984
1 x 70	22,0	1.050	310	225	0,693
1 x 95	23,8	1.275	377	270	0,525
1 x 120	25,5	1.545	437	306	0,410
1 x 150	27,6	1.855	504	343	0,328
1 x 185	29,7	2.190	575	387	0,270
1 x 240	32,5	2.765	679	448	0,204
1 x 300	37,7	3.405	783	502	0,163
1 x 400	42,1	4.440	930	592	0,123
1 x 500	45,8	5.810	1.070	670	0,097
1 x 630	51,6	7.545	1.232	762	0,073
1 x 800	61,1	9.760	1.426	870	0,056
2 x 1,5	11,9	270	26	27	33,9
2 x 2,5	12,8	315	36	35	20,3
2 x 4	13,9	385	49	46	12,6
2 x 6	14,9	455	63	58	8,41
2 x 10	17,0	615	86	77	4,87
2 x 16	19,3	820	115	100	3,08
2 x 25	25,5	1.495	149	129	1,98
2 x 35	27,6	1.785	185	155	1,41
3 G 1,5	12,6	295	26	27	33,9
3 G 2,5	13,5	350	36	35	20,3
3 G 4	14,6	430	49	46	12,6
3 G 6	15,9	520	63	58	8,41
3 G 10	18,1	735	86	77	4,87
3 x 16	22,7	1.345	115	100	3,08
3 x 25	26,3	1.800	149	129	1,98
3 x 35	29,3	2.245	185	155	1,41
3 x 50	32,7	2.875	225	183	0,984
4 G 1,5	13,4	355	26	27	33,9
4 G 2,5	14,3	400	36	35	20,3
4 G 4	15,8	500	49	46	12,6
4 G 6	17,2	610	63	58	8,41
4 G 10	19,7	870	86	77	4,87
4 x 16	24,5	1.505	115	100	3,08

TOXFREE[®] ZH RZ1MZ1-K (AS)

Cross-section (mm ²)	Diameter (mm)	Weight (kg/km)	Open air (A) ¹	Buried (A) ²	Voltage drop (V/A · km) ³
4 x 25	29,0	2.040	149	129	1,98
4 x 35	31,2	2.505	185	155	1,41
4 x 50	36,2	3.305	225	183	0,984
4 x 70	42,3	5.100	289	225	0,693
4 x 95	46,3	6.170	352	270	0,525
4 x 120	51,5	7.690	410	306	0,410
4 x 150	57,1	9.240	473	343	0,328
4 x 185	62,6	10.955	542	387	0,270
4 x 240	69,6	13.720	641	448	0,204
5 G 1,5	14,1	370	26	27	33,9
5 G 2,5	15,3	455	36	35	20,3
5 G 4	17,0	580	49	46	12,6
5 G 6	18,5	735	63	58	8,41
5 G 10	23,5	1.325	86	77	4,87
5 G 16	26,6	1.755	115	100	3,08
5 G 25	31,2	2.385	149	129	1,98
5 G 35	34,2	3.010	185	155	1,41
5 G 50	39,3	3.995	225	183	0,984
5 G 70	45,5	5.960	289	225	0,693
7 G 1,5	14,6	420	26	27	33,9
7 G 2,5	16,1	535	36	35	20,3
10 G 1,5	17,7	570	26	27	33,9
10 G 2,5	19,8	725	36	35	20,3
12 G 1,5	17,4	580	26	27	33,9
12 G 2,5	22,2	1.065	36	35	20,3
16 G 1,5	21,6	995	26	27	33,9
18 G 1,5	22,8	1.070	26	27	33,9
19 G 1,5	22,8	1.080	26	27	33,9
24 G 1,5	24,4	1.235	26	27	33,9
37 G 1,5	28,0	1.580	26	27	33,9

¹ Reference method F for single-core and method E for multicore cables according to IEC 60364-5-52 in open air at 30°C ambient temperature.

² Reference method D2 according to IEC 60364-5-52. Directly buried at 0,7 m depth with soil thermal resistivity of 2,5 K-m/W and 20°C of ground temperature.

³ At maximum service temperature and $\cos\phi=1$.

For all cables is supposed a single-phase circuit.

SHORT-CIRCUIT CURRENT-CARRYING CAPACITIES

Time (s)	0,1	0,2	0,3	0,5	1	1,5	2	2,5	3
A/mm²	452	320	261	202	143	117	101	90	83

CORRECTION FACTORS FOR AIR TEMPERATURE

Air T. (°C)	20	25	30	35	40	45	50	55	60
Factor	1,08	1,04	1	0,96	0,91	0,87	0,82	0,76	0,71

CORRECTION FACTORS FOR GROUND TEMPERATURE

Ground T. (°C)	10	15	20	25	30	35	40	45	50
Factor	1,07	1,04	1	0,96	0,93	0,89	0,85	0,8	0,76

CORRECTION FACTORS FOR SOIL THERMAL RESISTIVITY

Moisture degree of soil	Very damp	Slightly damp	Slightly dry	Dry	Very dry
Thermal Resist. (K·m/W)	1	1,5	2	2,5	3
Factor	1,50	1,28	1,12	1	0,90

Other correction factors (for grouping cables, for harmonic currents), that are not in this specification, can be applied. Further information can be found in IEC 60364-5-52.

Top Cable, an **international manufacturer** of industrial and power cables

Top Cable is a recognized manufacturer of electric cables, always meeting the highest expectations that contractors, developers, grid operators, panel manufacturers and integrators demand when designing a solar installation. The company has supplied cables to worldwide solar installations from residential installations to large scale rooftops, floating solar projects or ground farms.

All Top Cable's manufacturing plants are based around Barcelona, Spain. The organization is a medium-sized, family-owned company manufacturing electric cables on an international scale, with offices and warehouses located around the globe. Therefore, we guarantee customer proximity on a global level.

Customers around the world appreciate Top Cable as a technically leading manufacturer of solar cables of outstanding quality. Customers receive their solar deliveries on schedule from the company's main logistics centre located in Barcelona.

Large PV cable stocks are available there to ensure short lead times and shipment flexibility. Top Cable also manages several solar cable stocks across their worldwide offices and warehouses to avoid out-of-stock situations in the supply chain.

Our PV cables are TÜV certified, meeting the most stringent solar specifications. Check other National Electric Code requirements and PV certificates with your Top Cable technical sales expert.



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Innovation

Our R&D Centre and laboratories were established to provide research work and to enable us to constantly provide high-performance cables that are suited for multiple applications in various industries.

Being conscious of the importance of optimal costing, Top Cable has opted for the integration of our processes, through focusing each of our production centres into a specialized production unit, while coordinating with one another to optimize common resources.

Our technical staff are professionally trained and assure the highest quality in the cable production process.



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