TOXFREE® PLUS 331 ZH RZ1-K (AS+) FR2

LSHF and fire resistant power cable, for emergency circuits.

ACCORDING TO: IEC 60502-1 / UNE 211025

$B2_{ca}$

C_{ca}



APPLICATION

Toxfree® Plus 331 ZH 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, class 5 (flexible) according to EN 60228 and IEC 60228.

Insulation
Mica tape + Cross-linked polyethylene 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

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

CHARACTERISTICS

Electrical performance
Low voltage: 0,6/1 kV.

Thermal performance
Maximum conductor 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 and EN 50399.
Fire resistant (PH120) minimum 120 minutes at 840 °C:
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 category C (180 minutes at 950°C), W & Z according to BS 6387.
Fire resistant category Rf 1h30 or Rf 1h (according to cross-section) according to NBN S21-300-1.
Reaction to fire CPR: $B2_{ca}$-s1a,d1,a1 or C_{ca}-s1b,d1,a1 according to EN 50575 (see cross-section).
Low Smoke Halogen Free according to EN 60754-1 / IEC 60754-1.
Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.
Low smoke emission according to EN 61034 / IEC 61034:
Light transmittance > 60%.

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 211025

Standards and approvals
AENOR / RoHS / CE

CPR (Construction Products Regulation)
$B2_{ca}$-s1a,d1,a1 (according to cross-section) or
C_{ca}-s1b,d1,a1 (according to cross-section)

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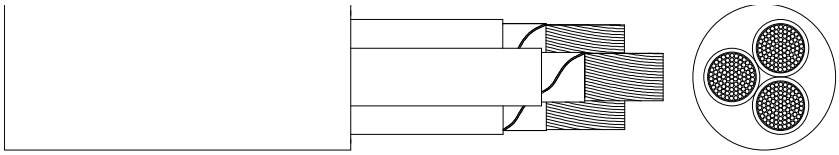
DIMENSIONS & ADMISSIBLE INTENSITIES



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	940	592	0,123
1 x 500	38,5	4.865	1.083	670	0,097
1 x 630	43,7	6.385	1.254	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
3 x 400	74,8	13.750	886	592	0,123
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

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Cross-section (mm^2)	Diameter (mm)	Weight (kg/km)	Open air (A) [1]	Buried (A) [2]	Voltage drop (V/A · km) [3]
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
5 G 70	40,2	4.040	289	225	0,693
5 G 95	45,6	5.260	352	270	0,525
5 G 120	51,8	6.650	410	306	0,410
5 G 150	57,4	8.245	473	343	0,328
5 G 185	63,5	10.000	542	387	0,270
5 G 240	68,3	12.780	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 conductor temperature and cosφ=1.
In all cases are supposed a single-phase circuit.

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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.

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