

TOP SOLAR PV ZZ-F (AS) PV1-F 0,6/1 kV (1,8 kV DC)

1. Object

This document defines the design and manufacturing characteristics of the cables type TOP SOLAR PV ZZ-F (AS) PV1-F 0,6/1 kV (1,8 kV DC) manufactured by Top Cable.

2. Design

This type of cables are designed, manufactured and tested according to the latest revision of TÜV 2 PfG 1169/08.2007 standard and UTE C-32 502 standard.

Approvals available:

TÜV-Certificate-No: R60029306

3. Applications

Flexible cables suitable for mobile and fixed installation. Suitable for connection between photovoltaic panels, and photovoltaic panels to the AC inverter. Suitable for indoor and outdoor use. These cables meet the HD 605/A1 weather-UV test.

The materials used in the construction of these cables exceed the thermal endurance test specified in the standard EN 60216 for +120 °C (temperature index). Compliance with this test provides that, with proper installation, operation and maintenance, the estimated life of the cable is 30 years at 90 °C. Suitable for submerged installations (AD8).

4. Characteristics

Nominal voltage: AC: 0,6/1 kV; DC: 1,8 kV

Ambient temperature range: -40 °C to + 90 °C

Maximum conductor temperature: 120 °C

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

Minimum bending radius static: 3 x cable Ø (Ø cable < 12 mm)

4 x cable Ø (Ø cable >12 mm)

Minimum bending radius mobile: 5 x cable Ø

No flame propagation: EN 60332-1-2 / IEC 60332-1-2

Halogen free: according to EN 60754 / IEC 60754

HCl content < 0,5%

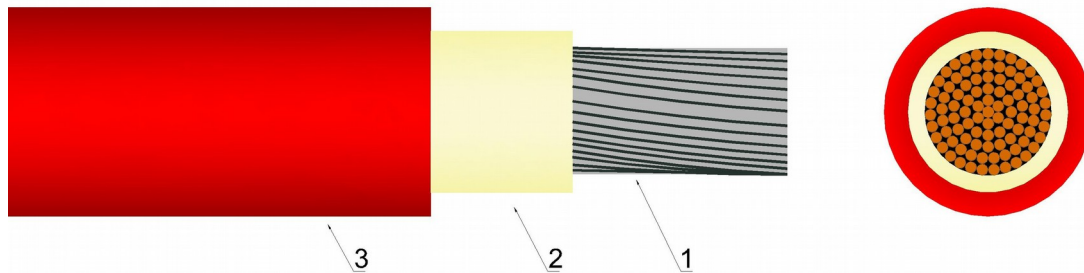
pH > 4,3

conductivity < 10 µS/mm

Smoke density: light transmittance > 60% (according to EN 61034 / IEC 61034)

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5. General make-up of the cable



5.1 Conductor (1)

Electrolytic annealed tinned copper conductor, class 5 according to EN 60228 / IEC 60228.

5.2 Insulation (2)

Halogen free thermosetting rubber insulation, type EI6 according to EN 50363-1, according to table 4 of the TÜV Standard and according to table 6 of the UTE Standard.

5.3 Outer sheath (3)

Halogen free thermosetting rubber outer sheath, type EM8 according to EN 50363-6, according to table 4 of TÜV Standard and according to table 6 of UTE Standard. Red or black colour.

6. Current-carrying capacities

6.1 Nominal current-carrying capacities

Table 1 show the current-carrying capacities and electric parameters detailed for every cable.

Current-carrying capacities, in amperes, are calculated according to TÜV 2 PfG 1169/08.2007, and for the following conditions:

- Single cables free in air installation: one single-core cable and ambient temperature of 60 °C; with adequate ventilation (supported by cleats and hangers or on perforated tray).
- Single cable on surfaces installation: one single-core cable directly on a wall with low thermal conductivity, ambient temperature of 60 °C.
- To cables adjacent on surfaces installation: ambient temperature of 60 °C.
- In all cases it is supposed a direct current circuit.

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Voltage drop is calculated with conductor temperature of 120 °C.

For conditions other than this apply the adequate correction factors (point 6.2).

Cross-section mm ²	Single cable free in air A	Single cable on surfaces A	To cables adjacent on surface A	Voltage drop V/A·km
1 x 1,5	30	29	24	38,0
1 x 2,5	41	39	33	23,0
1 x 4	55	52	44	14,3
1 x 6	70	67	57	9,49
1 x 10	98	93	79	5,46
1 x 16	132	125	107	3,47
1 x 25	176	167	142	2,23
1 x 35	218	207	176	1,58
1 x 50	276	262	221	1,10
1 x 70	347	330	278	0,772
1 x 95	416	395	333	0,585
1 x 120	488	464	390	0,457
1 x 150	566	538	453	0,368
1 x 185	644	612	515	0,301
1 x 240	775	736	620	0,228

Table 1

6.2 Correction factors

The current-carrying capacities must be multiplied with the adequate correction factor when the installation conditions differs from point 6.1

Correction factors for air temperatures other than 60°C.

Air Temp. (°C)	Up to 60	70	80	90	100	110
Factor	1	0,91	0,82	0,71	0,58	0,41

Table 2

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7. Dimensions

Table 3 show diameters and weight detailed for every cable.

Cross-section mm ²	Outer Ø ⁽¹⁾ mm	Weight kg/km
1 x 1,5	4,3	35
1 x 2,5	4,8	45
1 x 4	5,3	60
1 x 6	5,9	80
1 x 10	7,0	120
1 x 16	8,2	180
1 x 25	10,8	295
1 x 35	11,9	390
1 x 50	13,5	530
1 x 70	15,2	725
1 x 95	17,0	930
1 x 120	18,7	1.175
1 x 150	21,0	1.475
1 x 185	23,5	1.805
1 x 240	26,3	2.345

Table 3

(1) The tolerances on the nominal outer diameters are:

- 0,1+0,2 mm for cables with outer diameter $d \leq 7$ mm.
- 0,1+0,3 mm for cables with outer diameter $7 < d < 10$ mm.
- 0,3+0,5 mm for cables with outer diameter $d \geq 10$ mm.