

## Current rating – HIKRA Solar Cable

*It is explicitly referred to the fact that HIS carefully reviewed and maintained data, but no guarantee for accuracy or completeness can be granted. The user of this data is not exempted from his obligation, to verify himself the data with regard on these aspects.*

### 1. General Information

When used in accordance with the instructions, HIKRA® solar cables have a life expectancy of over 25 years. This document helps as an introduction to the standards IEC 60216, IEC60287, IEC 60364 and the requirement profile for cables for DKE PV systems for the calculation of the current carrying capacity\*.

Factors influencing the current carrying capacity of HIKRA® solar cables:

- Conductor material (Copper, Aluminium)
- Surface treatment (bare, tinned)
- Conductor cross-section
- Insulation Material
- Ambient temperature
- Installation type (free in the air, in the cable duct, underground installation)
- Accumulation (distance between circuits, multi-core cables, bundles)

### 2. Calculation of current rating during permanent operation for direct buried cables

$$I = I_N * f_1 * f_2 * f_3$$

by

$I[A]$  = Current rating in continuous duty under operating conditions

$I_N[A]$  = Current rating in continuous duty under standard conditions [see table 1]

$f_1[]$  = Reduction factor in case of higher ambient temperature of direct buried cable [see table 2]

$f_2[]$  = Reduction factor in case of cable accumulation of direct buried cable [see table 3]

$f_3[]$  = Conversion factors for specific thermal resistances of the soil [see table 4]

Nominal cross section	Current rating - laying at 60° C free in air		
	Single - free in air	Single - on surfaces	Two with opposite contact - on surfaces
mm <sup>2</sup>	A	A	A
1,5	30	29	24
2,5	41	39	33
4	55	52	44
6	70	67	57
10	98	93	79
16	132	125	107
25	176	167	142
35	218	207	176

Table 1. Continuous duty under standard conditions (60°C free in air)

1	2
Ground temperature °C	Permissible operating temperature at conductor 90°C
	Reduction factors
10	1,07
15	1,04
20	1,00
25	0,96
30	0,93
35	0,89
40	0,85
45	0,80
50	0,76
55	0,71
60	0,65
65	0,60
70	0,53
75	0,46
80	0,38

Table 2. Reduction factors for ambient temperatures different from 20° C for the current carrying capacity of cables buried in the ground

1	2	3	4	5	6
Number of circuits	Distance from cable to cable (a)*				
	Zero (with touch)	A cable diameter	0,125 m	0,25 m	0,5 m
2	0,75	0,80	0,85	0,90	0,90
3	0,65	0,70	0,75	0,80	0,85
4	0,60	0,60	0,70	0,75	0,80
5	0,55	0,55	0,65	0,70	0,80
6	0,50	0,55	0,60	0,70	0,80

\*multi core cable 

\*single core cable 

NOTE: The values given apply to a laying depth of 0.7 m and a specific thermal resistance of the ground of 2.5 Km/W.

Table 3. Reduction factor in case of cable accumulation of direct buried cable

1	2	3	4	5	6
Specific thermal resistance, Km/W	1,0	1,5	2,0	2,5	3,0
Conversion factors	1,18	1,10	1,05	1,00	0,96

NOTE: The conversion factors apply to cables and installation cables with sheath in buried electrical installation pipes or cable ducts. The conversion factors are larger for cables directly buried in the ground with a specific thermal resistance of less than 2,5 Km/W. If more precise values are required, these can be calculated using the procedures in IEC 60287 or taken from DIN VDE 0276-1000 (VDE 0276-1000)

Table 4. Conversion factors for specific thermal resistances of the soil different from 2.5 K - m/W for the current carrying capacity of cables