Application

ÖLFLEX® SOLAR H1 BUR cables are weather- and UV-resistant photovoltaic cables.

These cross-linked, halogen-free and double-insulated solar cables are suitable for permanent outdoor use and especially for the interconnection of grounded and ungrounded photovoltaic power systems. They are applicable for the connection of solar panels among themselves and as extension cable between the individual module strings or the DC/AC inverter.

Recommended use of cables for PV systems acc. to IEC 62930 and EN 50618:
Intended for use in PV installations e.g. acc. to IEC 60364-7-712 resp. HD 60364-7-712.
They are intended for permanent use outdoor and indoor, for free movable, free hanging and fixed installation.
It is also permitted to install the cables in conduit or trunking systems.

Halogen free low smoke cables are intended to reduce the risks for people and goods in the event of fire, for example in buildings.
They are suitable for the application in /at equipment with protective insulation (protection class II).
They are inherently short-circuit and earth fault proof acc. to IEC 60364-5-52.
The expected period of use under normal usage conditions as specified in IEC 62930 and EN 50618 is at least 25 years.

Based on UL's Impact-Resistance and Crushing-Resistance Test and an additional AD8 rating ÖLFLEX® SOLAR H1 BUR cables will be suitable for the installation underground if the cable is laid in a cable trench acc. to VDE 0891-6, Section 4.2, or comparable standards.
Wiring systems shall be selected and erected so as to minimize the damage arising from mechanical stress, e.g. by impact, penetration or compression during installation, use or maintenance.
For underground use, installation in conduits is allowed acc. to IEC 60364-5-52, chapter 522.3.
Additional tensile force or shearing during installation and operation has to be ruled out.

Design

Design	Sheathed single core cable acc. to IEC 62930 and EN 50618
Code Designation	62930 IEC 131: 1x2.5 mm² to 1x35 mm² H1Z2Z2-K: 1x2.5 mm² to 1x35 mm²
Certification	TÜV Rheinland certificate with No. R 50598420, R 60176265, R 50462071 (62930 IEC 131) TÜV Rheinland certificate with No. R 5059841B, R 60176265, R 50345247 (H1Z2Z2-K) CPR: EN 13501-6 and EN 50575 Classification of fire behaviour Dca-s2,d2,a1-: 1x4 mm² to 1x10 mm² (article/dimension range see www.lappkabel.com/cpr)
Conductor	Fine wire strands of tinned copper acc. to IEC 60228 resp. EN IEC 60228, class 5
Core insulation	cross-linked polyolefin co-polymer acc. to IEC 62930 and EN 50618, halogen free Colour: White
Outer sheath	cross-linked polyolefin co-polymer acc. to IEC 62930 and EN 50618, halogen free Colour: black or blue or red

Electrical properties

Rated voltage U_0/U	1.0/1.0 kV AC RMS acc. to IEC 62930 and EN 50618 1.5/1.5 kV DC acc. to IEC 62930 and EN 50618
Max. permissible operating voltage	1.8 kV DC acc. to IEC 62930 and EN 50618
Test voltage	6.5 kV AC acc. to IEC 62930 and EN 50618
Current carrying rating	IEC 62930, Table A.3 & A.4 and EN 50618, Table A.3 & A.4

Mechanical and thermal properties

Minimum ambient temperature fixed installation	-40 °C	
Conductor temperature, fixed installation	up to +90 °C	maximum conductor temperature during normal continuous operation acc. to IEC 62930 and EN 50618
	up to +120 °C	(maximum conductor temperature limited to 20.000 hours acc. to IEC 60216-2) acc. to IEC 62930 and EN 50618
Minimum temperature, during installation and handling	-25 °C acc. to IEC 62930 and EN 50618	
Max. storage temperature	+45 °C acc. to IEC 62930 +40 °C acc. to EN 50618	
Max. short circuit temperature	+250 °C (5s) acc. to IEC 62930 and EN 50618	
Minimum bending radius, occasional flexing	4 x outer diameter for outer diameter ≤ 12 mm 5 x outer diameter for outer diameter > 12 mm	
Minimum bending radius, stationary use	3 x outer diameter for outer diameter ≤ 12 mm 4 x outer diameter for outer diameter > 12 mm	
Weather/UV resistance	acc. to IEC 62930, Appendix E and EN 50618, Appendix E	
Ozone resistance	acc. to IEC 62930 and EN 50618	
Halogen-free	acc. to IEC 62930 and EN 50618 acc. to IEC 60754-1 resp. EN 60754-1 and IEC 60754-2 resp. EN 60754-2	
Smoke density	acc. to IEC 62930 and EN 50618 acc. to IEC 61034-2 resp. EN 61034-2	
Flammability	flame retardant acc. to IEC 60332-1-2 resp. EN 60332-1-2	
Acid and alkali resistance	acc. to IEC 62930 and EN 50618 acc. to IEC 60811-404 resp. EN 60811-404 (oxalic acid and sodium hydroxide solution)	
Underground use	acc. to UL 854, Section 23 (Impact Resistance Test) acc. to UL 854, Section 24 (Crushing Resistance Test)	
Presence of water	Permanent submersion AD8 acc. to IEC 62440 and IEC 60364-5-51, tested acc. to EN-50525-2-21, appendix D and E	

General requirements	These cables are conform to the EU Directive 2014/35/EU (Low Voltage Directive) A part of these cables (see www.lappkabel.com/cpr) are classified acc. to the EU-Regulation no. 305/2011 (CPR).
Environmental information	These cables meet the substance-specific requirements of the EU Directive 2011/65/EU (RoHS)

Ampacity acc. to EN 50618

Ampacity acc. to EN 50618, Table A.3 at 60 °C ambient temperature			
	Single cable free in air	Single cable on surfaces	2 loaded cables touching, on a surface
[mm²]	[A]	[A]	[A]
1 x 2.5	41	39	33
1 x 4	55	52	44
1 x 6	70	67	57
1 x 10	98	93	79
1 x 16	132	125	107
1 x 25	176	167	142
1 x 35	218	207	176

Conversion factors for different ambient temperatures:

Ambient temperature [°C]	Conversion factor
bis 60	1.00
70	0.92
80	0.84
90	0.75

For installation in groups, the reduction factors for current rating acc. to HD 60364-5-52, Table B.52.17 shall apply.

Ampacity acc. to IEC 62930

Ampacity acc. to IEC 62930, Table A.3 at 30 °C ambient temperature			
	Single cable free in air	Single cable on surfaces	2 loaded cables touching, on a surface
[mm²]	[A]	[A]	[A]
1 x 2.5	42	40	33
1 x 4	57	54	45
1 x 6	72	69	58
1 x 10	98	96	80
1 x 16	132	130	107
1 x 25	183	174	138
1 x 35	227	215	171

Conversion factors for different ambient temperatures:

Ambient temperature [°C]	Conversion factor
0	1.22
10	1.15
20	1.08
30	1.00
40	0.91
50	0.82
60	0.71
70	0.58

For installation in groups, the reduction factors for current rating acc. to IEC 60364-5-52, Table B.52.17 shall apply.

Ampacity acc. to IEC 60364-5-52

Ampacity acc. to IEC 60364-5-52, at 20 °C ground temperature		
	Table B.52.3 D1 (one DC circuit) when laid inside channel/duct/conduit which is buried ground	**Table B.52.3 D2 (one DC circuit) when directly buried in cable trench**
[mm²]	**[A]**	**[A]**
1 x 2.5	33	35
1 x 4	43	46
1 x 6	53	58
1 x 10	71	77
1 x 16	91	100
1 x 25	116	129
1 x 35	139	155

For installation in groups, the reduction factors for current rating acc. to IEC 60364-5-52, Table B.52.18 resp. Table B.52.19 shall apply.

Please also note the national implementation of the ampacity.

Voltage drop

Calculated voltage drop in the DC circuit (DC side of the inverter).

	DC (ohmic) resistance, IEC 60228, cl.5, 20 °C	**Calculated voltage drop**									
		30 °C	40 °C	50 °C	60 °C	70 °C	80 °C	90 °C	100 °C	110 °C	120 °C
[mm²]	[Ohm/km]	[mV/Am]	[mV/Am]	[mV/Am]	[mV/Am]	[mV/Am]	[mV/Am]	[mV/Am]	[mV/Am]	[mV/Am]	[mV/Am]
1 x 2.5	8.21	8.53	8.86	9.18	9.50	9.83	10.15	10.47	10.8	11.12	11.44
1 x 4	5.09	5.29	5.49	5.69	5.89	6.09	6.29	6.49	6.69	6.89	7.10
1 x 6	3.39	3.52	3.66	3.79	3.92	4.06	4.19	4.32	4.46	4.59	4.73
1 x 10	1.95	2.03	2.10	2.18	2.26	2.33	2.41	2.49	2.56	2.64	2.72
1 x 16	1.24	1.29	1.34	1.39	1.44	1.48	1.53	1.58	1.63	1.68	1.73
1 x 25	0.795	0.826	0.858	0.889	0.920	0.952	0.983	1.014	1.046	1.077	1.108
1 x 35	0.565	0.587	0.610	0.632	0.654	0.676	0.699	0.721	0.743	0.765	0.788

Assumed linear temperature coefficient of the electrical resistance of Cu (approx. purity: 99.9 %) at 20°C: 0.00393·K^{-1}.
These informative calculation examples are noncommittal, simplified and not covered by any warranty/liability.
The effects of frequency and the geometry of the lateral circuits are not considered, but these calculations focus only on variations in DC resistance due to changes in conductor temperature.