GRANDCABLE

PHOTOVOLTAIC CABLE SYSTEMS
PRODUCT CATALOGUE

EN 50618:2014 · EN 60228 CLASS 5

H1Z2Z2-K

Single Core Photovoltaic Cable · Cross-Linked Halogen-Free



1.5	1.0/1.0	90/120	25
KV · DC RATED	KV · AC	°C · CONDUCTOR	YR · DESIGN LIFE

Jiangsu Grand Cable Co., Ltd.
Photovoltaic Cable Systems · Yixing, Jiangsu, China

Standard & type designation

H1Z2Z2-K is the harmonised European designation for electric cables for photovoltaic systems to EN 50618:2014 — low smoke halogen-free, flexible single-core power cables with cross-linked insulation and sheath, for the d.c. side of PV systems with a nominal voltage of 1.5 kV DC.

H	Harmonised designation (CENELEC)
1	Voltage code — 1.5 kV DC · 1.0 kV AC
Z2	Insulation — cross-linked, halogen-free
Z2	Outer sheath — cross-linked, halogen-free
–K	Flexible conductor — class 5, tinned copper

> The designation is defined in EN 50618 §6.3. The standard size range is 1.5 – 240 mm², covering both residential string cabling and large utility-scale plants. Insulation and sheath compounds are cross-linked (thermoset), as required by the standard.

Verification & test programme

- Voltage test on completed cable — AC 6.5 kV or DC 15 kV, 5 min (type test) · AC 10 kV (routine test, 100 % of production length)
- Damp heat — 1 000 h at 90 °C / 85 % RH (EN 60068-2-78), change max −30 %
- UV weathering — 720 h (360 cycles) to EN 50289-4-17 Method A, ≥ 70 % retention
- Ozone resistance — EN 60811-403 Method A or EN 50396 Method B — no cracking
- Cold bending and cold shock at −40 °C — no cracking
- Dynamic penetration — $F_{min} = 150 \times \sqrt{d_L}$ (Annex D)
- Long-term d.c. resistance — 240 h in water at DC 1.8 kV
- Smoke emission — EN 61034-2, light transmittance ≥ 60 %

Supply programme

Single core 1.5 – 240 mm² · Tinned copper, class 5 · Cross-linked LSZH · Low smoke, EN 61034-2 · UV tested, 720 h · 25-year design life

Applications

Direct current side of photovoltaic power supply systems — rooftop and ground-mounted arrays, utility-scale solar plants, industrial and agricultural installations. Indoor and outdoor use, in equipment with protective insulation (Class II) and in explosion hazard areas.

Installation

Fixed installation or freely suspended and movable. Suitable for installation in cable trays and conduits, on and in walls, between module arrays, string and junction boxes and inverters. Flexible at low temperature for fast on-site handling.

Certification

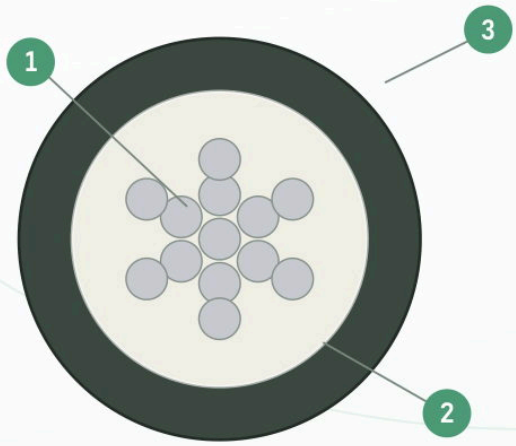
EN 50618 is the harmonised European product standard; market practice additionally requires third-party certification (TÜV Rheinland or VDE) together with a CPR Declaration of Performance. Test documentation accompanies each delivery.

Construction

Single core construction with a finely stranded tinned copper conductor — flexible for fast installation on roofs, in trays and behind module arrays. Cross-linked halogen-free compounds give a 25-year outdoor design life.

1. **Conductor** — tinned flexible copper, class 5 to EN 60228.
2. **Insulation** — cross-linked halogen-free compound (XLPO) (HFFR-LSZH).
3. **Outer sheath** — cross-linked halogen-free compound (XLPO), black (HFFR-LSZH).

> Insulation and sheath are halogen-free: HCl ≤ 0.5 %, pH ≥ 4.3, conductivity ≤ 10 µS/mm. Cross-linked for a 120 °C temperature index (EN 60216-1, 20 000 h).



Cross-section — single core, schematic; numbers refer to the layers listed opposite.

Standards

- EN 50618:2014 — electric cables for photovoltaic systems
- EN 60228 class 5 — metal-coated flexible copper conductors
- EN 60332-1-2 — vertical flame propagation
- EN 50289-4-17 Method A — UV weathering, 720 h
- EN 61034-2 — smoke density, ≥ 60 % light transmittance
- EN 50525-1 Annex B — halogen-free

Technical data

Rated voltage	DC 1.5 kV (conductor–conductor and conductor–earth) · AC 1.0/1.0 kV
Max. system DC voltage	1.8 kV
Voltage test, 5 min	AC 6.5 kV or DC 15 kV
Ambient temperature	−40 °C to +90 °C
Max. conductor temperature	90 °C continuous · 120 °C for max. 20 000 h
Short-circuit temperature	250 °C, 5 s max.
Design service life	At least 25 years
Smoke emission	EN 61034-2 — light transmittance ≥ 60 %
Conductor range	1.5 – 240 mm²

UV weathering & ozone

720 h (360 cycles) to EN 50289-4-17 Method A (xenon-arc) — tensile strength and elongation at break retained ≥ 70 %. Ozone to EN 60811-403 Method A. Damp heat 1 000 h at 90 °C / 85 % RH to EN 60068-2-78 — change max −30 %.

Cold performance

Cold bending and cold shock at −40 °C — no cracking. Sheath surface resistance ≥ 10^9 Ω. Halogen-free per Annex B test methods (EN 50267 / EN 50525-1).

H1Z2Z2-K — dimensions, weights & current ratings

Dimensions & weights

Single core · tinned flexible copper conductor · cross-linked halogen-free insulation and sheath

Section mm²	Insulation mm	Sheath mm	O.D. max mm	Weight kg/km	R 20 °C max Ω/km
1 × 1.5	0.7	0.8	5.4	37	13.7
1 × 2.5	0.7	0.8	5.9	49	8.21
1 × 4	0.7	0.8	6.6	67	5.09
1 × 6	0.7	0.8	7.4	92	3.39
1 × 10	0.7	0.8	8.8	134	1.95
1 × 16	0.7	0.9	10.1	199	1.24
1 × 25	0.9	1	12.5	305	0.795
1 × 35	0.9	1.1	14	428	0.565
1 × 50	1	1.2	16.3	577	0.393
1 × 70	1.1	1.2	18.7	778	0.277
1 × 95	1.1	1.3	20.8	1028	0.210
1 × 120	1.2	1.3	22.8	1280	0.164
1 × 150	1.4	1.4	25.5	1598	0.132
1 × 185	1.6	1.6	28.5	1983	0.108
1 × 240	1.7	1.7	32.1	2541	0.0817

Insulation and sheath thickness and maximum O.D. per EN 50618:2014, Table 1; weights per Grand Cable design. D.C. resistance: maximum values at 20 °C for metal-coated (tinned) class 5 conductors per EN 60228.

Rated current

Ambient temperature 60 °C · maximum conductor temperature 120 °C · single core d.c. circuit

Section mm²	In free air A	On a surface A	Two cores adjacent 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
50	276	262	221
70	347	330	278
95	416	395	333
120	488	464	390
150	566	538	453
185	644	612	515
240	775	736	620

Rated currents per EN 50618:2014, Table A.3 — ambient 60 °C, conductor 120 °C. Grouping reduction per IEC 60364-5-52, Table B.52-17.

Derating & system guidance

Ambient temperature correction

Correction factors for a conductor temperature of 120 °C: ≤ 60 °C — 1.00 · 70 °C — 0.91 · 80 °C — 0.82 · 90 °C — 0.71 · 100 °C — 0.58 · 110 °C — 0.41.

System voltage

Rated 1.5 kV DC between conductors as well as between conductor and earth; AC 1.0/1.0 kV. Maximum permitted d.c. system voltage 1.8 kV — suitable for 1 000 V and 1 500 V d.c. plants.

How to specify

Information needed	Example
Type designation	H1Z2Z2-K · EN 50618:2014
Rated voltage	DC 1.5 kV · AC 1.0/1.0 kV
Number of cores × cross-section	1 × 6 mm²
Sheath colour	Black (other colours on request)
Options and delivery	Drum lengths and cut lengths · cable ends sealed against moisture ingress

Quality & testing

Routine tests — every production length

Absence-of-faults voltage test with AC 10 kV carried out on 100 % of the production length, plus conductor resistance measurement to EN 60228 before despatch.

Certification & documentation

EN 50618 product standard with third-party certification (TÜV Rheinland or VDE) as required by the market. Type test reports and detailed test documentation issued on request.

Packing & delivery

Drums & lengths

Supply on wooden or steel drums in standard or agreed cut lengths. Cable ends are sealed against moisture ingress; drums are battened and marked for identification.

Export packing

Drum lagging and additional weather protection available for sea freight and long-term outdoor storage. Delivery ex works or CIF — Incoterms 2020 — as agreed.

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