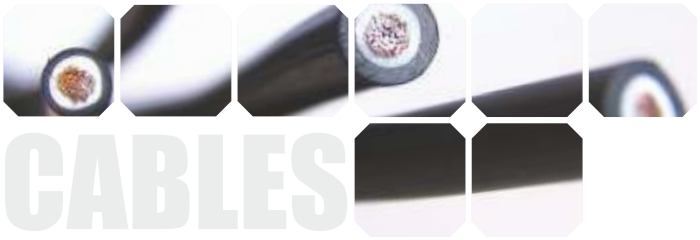

energy matters®

CABLES list

Solar cables are halogen-free, double insulated, chemically cross-linked, UV resistant, and meet the requirements of the German electrical commission (DKE). And they carry a mechanical and electrical warranty lasting 25 years! Quality that pays off — for planners, technicians and customers.

CODE	No. of cores x cross-section in mm^2	External diameter approx. (± 0.2mm)	Copper quantity, Kg/Km	Weight, approx. in Kg/Km	Sheath colour
CBHIS1HIKRAS4	1x4.0	5.2	38.4	59	black/red/blue
CBHIS1HIKRAS6	1x6.0	5.9	57.6	81	black/red/blue

TECHNICAL DATA

- Approvals | DKE (PV1-F), TüV 2 PfG. 1169/0807 (R 60033853)
- Temperature range flexible | fixed: -25 ºC to +125 ºC | -50 ºC to +150 ºC
- Minimum bending radius flexible | fixed: 10x cable dia. | 4x cable dia.
- Short-circuit-proof up to 200°C/5s
- Nominal voltage [U0/U]: AC 600 / 1.000 V | DC 900 / 1.500 V
- Test voltage: AC 6.500 kV / DC 15kV
- Max. Voltage 1.800 V (conductor/conductor not grounded system, non-loaded circuit)

CONSTRUCTION

- Tin-plated copper strand, fine wire per IEC 60228 class 5
- Polyolefin, double insulates
- Insulation / Chemically cross-linked special compound

FEATURES

- UV-, ozone-, acid, alkali- and weather-resistance
- Flame-retardant, halogen-free
- Good abrasion resistance, robust
- Highly flexible for high mechanical stress
- RoHS and REACH-conformant
- Sheath colours: black / red / blue
- 25-year factory warranty from date of delivery. The warranty conditions for solar cable apply for intended use, installation and operating conditions.

energy matters®

SOLAR CABLE quality

The requirements for cables in the PV sector are extraordinary and are rising: Heat, humidity, sparks, acid and chemicals, mechanical stress.
In PV-systems, standard cables are pushed beyond there capacity.
The creeping cable death is programmed and the nightmare of every PV system operator.

Variants of PV cables:
- more costly cable with beta-ray cross-linking
- cheaper cable with chemical cross-linking or simple rubber insulation

The German independent test institute TÜV does not specify which type of "cross-linking" needs to be applied, as long as it has "passed" the TÜV test. The UV test is 27 hours.

Disadvantages of the chemically cross-linked or rubber cable:

Long-term the product changes over the months and years after production, it is impossible to maintain the properties of the cable. For example car tires (chemically cross-linked), after longer periods of not being used go hard and can no longer be used. Higher temperatures under load or even indirect solar radiation can also provoke accelerated aging.

Radiation technology is used as a finishing effect where treated materials do not melt or flow, even at higher operating temperatures or when soldering cables together. Only few manufacturers can produce beta-ray cross-linked cables because an electron irradiation facility is required and acquisition costs and operating costs are high. Moreover, special component knowledge is required (material + cross-linking need to be matched).

During manufacture of irradiated cables the extrusion process is not connected to the cross-linking. The cable is exposed to an electron irradiation facility for "hot linking" after production in an additional step. The cross-linking is done by high energy beta-radiation absorbed in the cable. This gives rise to radicals which chemically react with each other and establish a "link" between the molecules of a polymer. The molecular structures changes with long-chain polymers and cross-connections. With an increasing degree of cross-linking, the moment of softening shifts to higher temperatures. Simultaneously, the heat and chemical resistance rises without a negative effect on long-term properties. The material properties of the cable are optimized, giving the cable its mechanical thermal and chemical properties for a high performance. After this radiation treatment, the cable is fit for the growing quality demand in the PV sector.

THE FOLLOWING IMPROVEMENTS CAN BE ACHIEVED BY BETA-RAY CROSS-LINKING:

MECHANICAL PROPERTIES

- increase of the E-modulus (= flexibility)
- An increase in strength (especially long-term strength)
- decrease of breakage-elongation
- Reduction of cold flow (creep)
- increase of hardness
- Improving alternate bending and abrasion resistance
- improving the tear strength
- Improvement of environmental stress breakage

THERMAL PROPERTIES

- Increase in heat resistance (heat pressure test)
- improvement of the properties in case of fire (Increasing the resistance to flames and heat)

CHEMICAL PROPERTIES

- Improved resistance to chemicals (solvents and cleaners)
- decrease in the swelling behavior

Rubber or chemically cross-linked

Beta-ray cross-linked