



# Solar Cables

Power cables for  
**Rooftop installations**

# Rooftop PV installations

---

**Rooftop PV systems provide a clean and increasingly affordable option for building owners and occupants to produce their electricity. For this reason, Rooftop Solar installation market is growing exponentially on a global scale. This trend is expected to continue going forward in the coming years, as building designers and engineers are considering solar rooftop installations more frequently on new buildings.**

The choice of a solar cable does not only depend on whether it is manufactured according to standards. Manufacturing according to standards does not mean using the right materials, nor does it mean that the cable will afterwards fulfil the purpose for which it was intended.

Out of the 28 pages of the reference solar standard EN 50618 (excluding index), 12 are for tests and trials to be carried out on the cable. Certifying a cable not only implies manufacturing according to a standard but also that an external certifying body carries out all these tests so that it can control the quality of the final product manufactured and ensure its functionality.

Also, a **CPR certificate is required for local buildings** and in most cases, not only an E<sub>ca</sub> declaration type is the one allowed to get legal permission to connect the solar modules to the distribution panels.

Top Cable

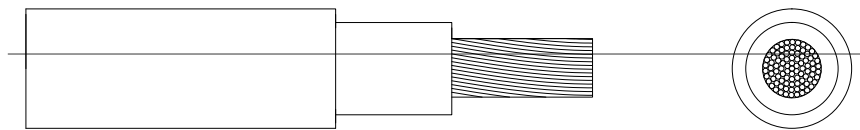


# TOPSOLAR<sup>®</sup> PV H1Z2Z2-K

TÜV solar PV cable.

BASED ON: EN 50618 / IEC 62930 / UTE C 32-502

## DESIGN



### Conductor

Class 5 (flexible) tinned copper, based on EN 60228 and IEC 60228.

### Insulation

Low smoke zero halogen (LSZH) cross-linked rubber insulation.

### Outer sheath

Low smoke zero halogen (LSZH) cross-linked rubber outer sheath, red or black colour.

## APPLICATIONS

The **Topsolar<sup>®</sup> PV H1Z2Z2-K** cable, which is TÜV certified according to IEC 62930 and EN 50618, is suitable for both fixed and mobile solar installations (solar farms, rooftop solar installations and floating plants).

It is a highly flexible cable compatible with all major connectors and especially designed for the connection of photovoltaic panels. This versatile single-conductor cable is designed to meet the varying needs of the solar industry. Suitable for wet, damp and humid locations.

TOP CABLE TOPSOLAR PV H1Z2Z2-K



## FEATURES

---



### Electrical performance

Low voltage 1,5/1,5 1kV (1,8) kV DC.



### Based on

EN 50618/ IEC 62930 / UTE C 32-502.



### Standards and approvals

TÜV / RETIE / CE / RoHS.



### CPR (Construction Products Regulation)

C<sub>ca</sub> -s1b, d2, a1.



### Thermal performance

Maximum service temperature: 120°C.

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

Minimum service temperature: -40°C (fixed and protected installations).



### Fire performance

Flame non-propagation based on EN 60332-1 and IEC 60332-1.

Reaction to fire CPR: C<sub>ca</sub> -s1b, d2, a1, according to EN 50575.

LSZH (Low Smoke Zero Halogen) based on UNE-EN 60754-1 and IEC 60754-1.

Low smoke emission based on EN 61034 and IEC 61034: Light transmittance > 60%.

Low corrosive gases emission based on UNE-EN 60754-2 and IEC 60754-2.



### Mechanical performance

Minimum bending radius: x3 cable diameter.

Impact resistance: AG2 Medium severity.



### Chemical performance

Chemical & Oil resistance: Excellent.

Grease & mineral oils resistance: Excellent.

**UV** UV Resistant based on EN 50618.

**O<sub>3</sub>** Ozone resistant based on EN 50618.



### Water performance

Water presence: AD8 submerged.



### Other

Meter by meter marking.

Estimated lifetime 30 years based on UNE-EN 60216-2.

 Optional: rodent proof and termite proof.



### Installation conditions

Open Air.

Buried.



### Packaging

Available in rolls (lengths of 100 m) and reels.

DOWNLOAD DoP



# Top Cable



## DECLARATION OF PERFORMANCE DECLARACIÓN DE PRESTACIONES

DoP Nr/ n°: **TC054** Rev.1



**Code of the product-type / Código de producto tipo:**  
TOPSOLAR PV C H1Z2Z2-K

**Identification of the product / Identificación del producto de construcción:**  
H1Z2Z2-K full range according to EN 50618

**Intended use/s: / Uso/s previsto/s:**

Supply of electricity in buildings and other civil engineering works with the objective of limiting the generation and spread of fire and smoke. Power Cables.

*Suministro de electricidad en edificios y otras obras de ingeniería civil con el objetivo de limitar la generación y propagación de fuego y humo. Cables de potencia.*

**Authorized representative: / Representante autorizado:** N/A

**System/s of AVCP: / Sistema/s de EVCP:**

System 1+ / Sistema 1+

**Harmonized standard: / Norma armonizada:**

EN 50575:2014 and EN 50575:2014/A1: 2016

**Notified body/ies: / Organismo/s notificado/s:**

AENOR – 0099

**Manufacturer / Fabricante:**

TOP CABLE S.A.  
Leonardo da Vinci, 1  
08191 Rubí (Barcelona) SPAIN  
Tel. +34 93 588 09 11  
Fax: +34 93 588 04 11  
Email: [ventas@topcable.com](mailto:ventas@topcable.com)

Notified product certification body issued the Certificate of Constancy of Performances for characteristics of reaction to fire.

*Organismo notificado de certificación de producto que ha emitido el Certificado de Constancia de las Prestaciones para las características de reacción al fuego.*

**Declared performances: / Prestaciones declaradas:**

Essential characteristics / Características esenciales

Reaction to fire / Reacción al fuego

Dangerous substances / sustancias peligrosas

Performance / Prestaciones

**C<sub>ca</sub> - s1b, d2, a1**

NPD (Non Performance declaration / Prestación no determinada)

The performance of the product identified above is in conformity with the set of declared performances. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

*Las prestaciones del producto identificado anteriormente son conformes con el conjunto de prestaciones declaradas. La presente declaración de prestaciones se emite, de conformidad con el Reglamento (UE) n° 305/2011, bajo la responsabilidad exclusiva del fabricante arriba identificado.*

**Signed for and on behalf of the manufacturer by / Firmado por y en nombre del fabricante por:**

Felipe DIAZ RUBIO,  
Technical Department



Rubí (Barcelona) Spain, 30/04/2020

# Zertifikat

# Certificate



Zertifikat Nr. *Certificate No.*  
R 60113828

Blatt *Page*  
0001

Ihr Zeichen *Client Reference*

Unser Zeichen *Our Reference*

Ausstellungsdatum

*Date of Issue*

0010--21243325 001

13.10.2016

(day/mo/yr)

Genehmigungsinhaber *License Holder*

TOP CABLE S.A.  
P.A.E. Can Sant Joan  
Leonardo da Vinci 1  
08191 Rubi - Barcelona  
Spain

Fertigungsstätte *Manufacturing Plant*

AKAN Cables S.L.  
P.L. Plans de la Sala, Parcela 11  
08650 Barcelona  
Spain

Prüfzeichen *Test Mark*

Geprüft nach *Tested acc. to*

EN 50618:2014



Zertifiziertes Produkt (Geräteidentifikation)

*Certified Product (Product Identification)*

Lizenzentgelte - Einheit

*License Fee - Unit*

## PV-Cables

Identification: TOPSOLAR PV H1Z2Z2-K  
Code designation: H1Z2Z2-K  
Rated diameter: 2,5 mm<sup>2</sup>; 4,0 mm<sup>2</sup>; 6,0 mm<sup>2</sup>;  
10,0 mm<sup>2</sup>; 16,0 mm<sup>2</sup>; 25,0 mm<sup>2</sup>  
Rated voltage: AC U0/U 1,0/1,0 kV  
Rated voltage: DC 1500 V (conductor-conductor and  
conductor-earth)  
Max. permitted voltage: DC 1,8 kV  
Light transmission: 82,1 %  
Ambient temperature: -40 °C to +90 °C  
max. Core temperature: +120 °C @ 20.000 h  
Material of Insulation: Halogene Free thermosetting rubber  
Material of Sheath: Halogene Free thermosetting rubber  
Colour of Sheath: black

16

16

Dem Zertifikat liegt unsere Prüf- und Zertifizierungsordnung zugrunde und es bestätigt die Konformität des Produktes mit den oben genannten Standards und Prüfgrundlagen. Zusätzliche Anforderungen in Ländern, in denen das Produkt in Verkehr gebracht werden soll, müssen zusätzlich betrachtet werden. Die Herstellung des zertifizierten Produktes wird überwacht.  
This certificate is based on our Testing and Certification Regulation and states the conformity of the product with the standards and testing requirements as indicated above. Any additional requirements in countries where the product is going to be marketed have to be considered additionally. The manufacturing of the certified product is subject to surveillance.

TÜV Rheinland LGA Products GmbH, Tillystraße 2, 90431 Nürnberg

Tel.: +49 221 806-1371 e-mail: cert-validity@de.tuv.com  
Fax: +49 221 806-3935 http://www.tuv.com/safety

Zertifizierungsstelle

Guido Volberg





# Zertifikat

# Certificate



Zertifikat Nr. *Certificate No.*  
R 60113828

Blatt *Page*  
0002

<i>Ihr Zeichen Client Reference</i>	<i>Unser Zeichen Our Reference</i>	<i>Ausstellungsdatum Date of Issue</i>	<i>Date of Issue</i>
	0010--21243325 002	29.11.2016	(day/mo/yr)

**Genehmigungsinhaber *License Holder***  
TOP CABLE S.A.  
P.A.E. Can Sant Joan  
Leonardo da Vinci 1  
08191 Rubi - Barcelona  
Spain

**Fertigungsstätte *Manufacturing Plant***  
AKAN Cables S.L.  
P.L. Plans de la Sala, Parcela 11  
08650 Barcelona  
Spain

**Prüfzeichen *Test Mark***



**Geprüft nach *Tested acc. to***  
EN 50618:2014

**Zertifiziertes Produkt (Geräteidentifikation)  
*Certified Product (Product Identification)***

**Lizenzentgelte - Einheit  
*License Fee - Unit***

**PV-Cables**

as page 0001  
Amendment

additional Colour of sheath: RED

*Dem Zertifikat liegt unsere Prüf- und Zertifizierungsordnung zugrunde und es bestätigt die Konformität des Produktes mit den oben genannten Standards und Prüfgrundlagen. Zusätzliche Anforderungen in Ländern, in denen das Produkt in Verkehr gebracht werden soll, müssen zusätzlich betrachtet werden. Die Herstellung des zertifizierten Produktes wird überwacht.  
This certificate is based on our Testing and Certification Regulation and states the conformity of the product with the standards and testing requirements as indicated above. Any additional requirements in countries where the product is going to be marketed have to be considered additionally. The manufacturing of the certified product is subject to surveillance.*

**TÜV Rheinland LGA Products GmbH, Tillystraße 2, 90431 Nürnberg**

Tel.: +49 221 806-1371 e-mail: cert-validity@de.tuv.com  
Fax: +49 221 806-3935 http://www.tuv.com/safety

Zertifizierungsstelle



Guido Volberg

# High-performance cables for **PV generation**

---

**Worldwide environmental concerns are accelerating the growth of solar power generation. Cables used in solar generation differ from those used in industrial installations in the sense that they must be designed to withstand harsh environmental conditions like rain, long-term exposure to ozone and sunlight, extreme temperature fluctuations and direct ultraviolet (UV) rays.**

Building a quality, safe and profitable solar PV plant with a good return on investment (RoI) is the most important objective of investors, project owners and also developers. **Cables only represent around 4-5% of a solar project cost, but it can have a significant impact on the power output.** Cabling is often not considered to be a critical factor, however improper design and/or poor cable selection can lead to safety hazards, reduced power output, and other performance issues that may jeopardize the overall lifetime of a PV system.

On the contrary, a proper cable selection and management are vital to the health of the PV system as it contributes to minimize maintenance, optimize safety and enable longer-lasting PV systems.

To maintain longevity performance and reliability of the PV system, solar cables must have been specifically engineered to optimize efficiency and minimize line losses. All cables in PV installations should be developed to resist UV, ozone, sand abrasion and

water absorption, as well as provide excellent flexibility for extreme low weather conditions and deformation resistance during prolonged exposure at high temperatures. Regardless of their size, all PV installations require high-quality cables that provide excellent mechanical properties and superior sunlight resistance for outdoor installations, easy handling and, depending on the installation type (PV farm or PV floating farm) extra flexibility as well as maximum water performance.

Cable certification is paramount to ensuring the economic viability of PV power systems. The industry has seen a variety of cable designs and practices, many of which may not necessarily support long-term solar needs. In recent years, manufacturers in the photovoltaic industry have upgraded their technology, increasing the operating voltage up to 1500V in DC.

# Top Cable



# Top Cable



# Cables especially engineered to meet the **most exigent solar requirements**

---

**Top Cable has specifically engineered superior electric performance PV cables that resist to UV rays, ozone, sand abrasion and water absorption, as well as provide excellent flexibility for extreme weather conditions during prolonged exposure at sunlight.**

The company is continuously developing new cable solutions for new incoming markets to meet its customers' most demanding needs in solar power generation. The solar plants are conceived, designed and manufactured to have 25 years durability and recent Tribunal considers a useful life of 35 years. Of course some minor investment will be needed from the beginning to reach a 35 years lifetime.

For solar tracking panels, our **Topsolar® H1Z2Z2-K cables** have been designed with a rubber cross-linked insulation and outer sheath that makes the cable extremely flexible, as the panels will be moving along with the sun. These cables also meet the most stringent global standards for halogen-free, fire-retardant, and low-corrosive gas emissions, are AD8, direct burial and TÜV certified according to EN 50618 and IEC 62930.

Top Cable has developed an **Aluminium cable** specifically engineered for all types of underground and open-air solar installations, that provides extra durability and prevents the premature ageing of the cable, providing longevity performance and reliability of the PV investment.

In order to connect the PV installation to substations and the power grid we have developed a complete range of **high-performance Medium Voltage cables**.



# Planning and designing a **PV Plant**

---

**When planning and designing a PV plant certain factors need to be considered, including the size of the solar array, its geographical location, and other site-specific considerations.**

## **1. PV Plant with string box**

In a large solar photovoltaic installation using central inverter and combiner/string box, multiple solar modules are connected in series in a string to build the voltage up to proper levels. Then the power is transmitted in DC from string box that combines the output of multiple strings of PV modules for connection to the central inverter.

- The solar cable must be certified according to EN 50618.
- The aluminium cable must be UV Resistant, directly buried and the cable must support voltage test according to EN 50618.

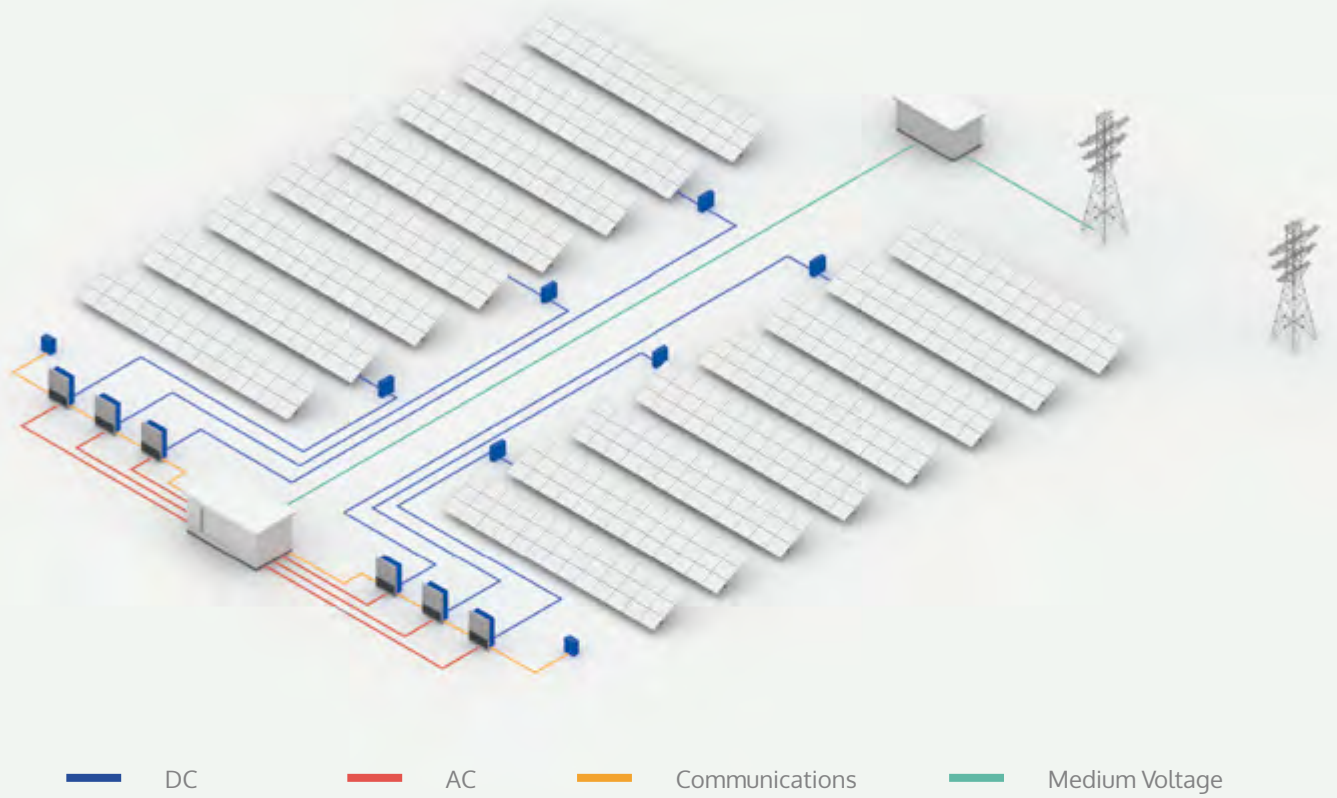
## **2. PV Plant with string inverter**

An increasing number of ground-mount PV systems are built using String Inverter technology. The preference of string inverters over central inverters continues to grow because of the benefits of the modular power electronics design.

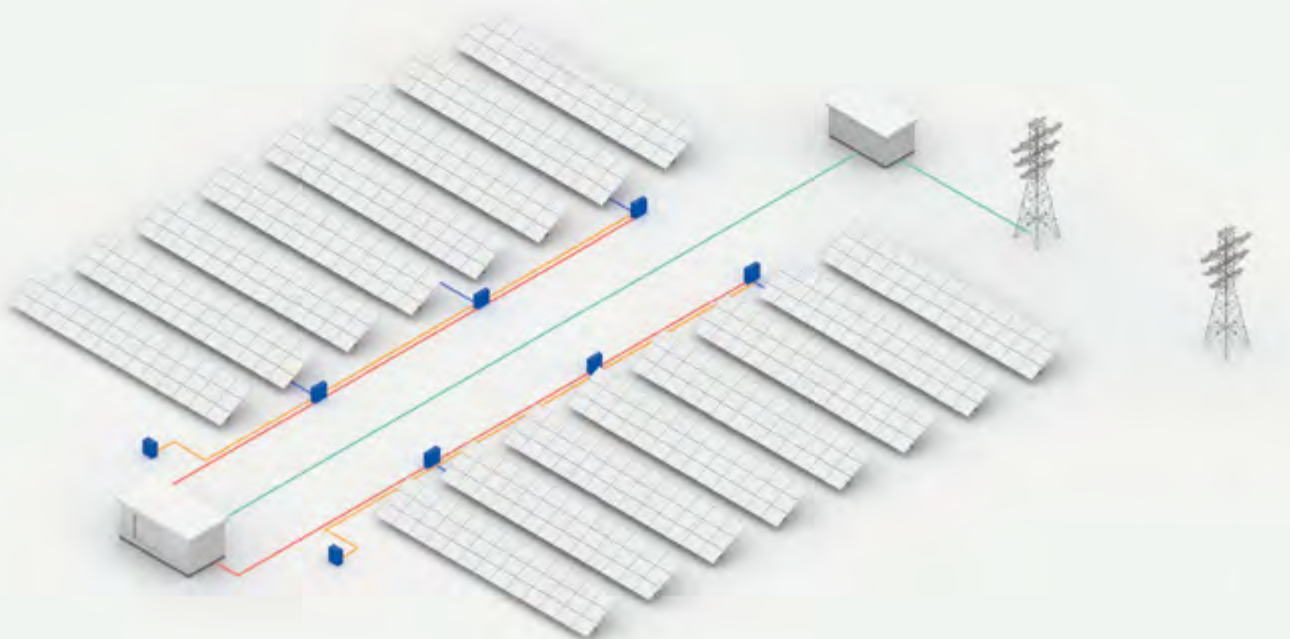
As the previous installation, multiple solar modules are connected in series in a string to build the voltage up to proper levels. Then the power is transmitted in AC from string inverter that combines the output of multiple strings of PV modules for connection to the power station.

- The solar cable must be certified according to EN 50618.
- The aluminium cable must be UV Resistant, directly buried and support voltage test 1,8/3 kV according to IEC 60502-1.

# 1. PV Plant with string box



# 2. PV Plant with string inverter



# Top Cable





# Cables for floating PV Farms

---

**Floating solar arrays are gaining popularity all over the world. They are the perfect pairing to existing hydropower infrastructures: addressing the intermittent nature of the sun or helping when water availability is running low.**

Floating PV plants are likely to be installed on locations such as industrial water ponds, mine lakes, irrigation/ desalination reservoirs, dams, canals, retentions ponds, etc.

## Cables on a floating PV plant:



Withstand **severe environmental conditions** (corrosion, weather, cold environments).



Must be **waterproof** (AD8 - permanently).



Must be **extremely flexible**, mechanically strong, as well as torsion and abrasion-resistant.



Shall **not spread toxic chemicals** when in contact with water.



Must be **UV and ozone resistant**.

For these reasons, rubber cables are the best choice on a floating PV plant.

# Top Cable



# Topsolar<sup>®</sup>:

## A complete range of cables for solar installations

---

**At Top Cable you will find a reliable manufacturer and supplier for all power cables required on PV installations. Our comprehensive range of solar cables covers from cable selection or design, project management with our technical expertise to logistics and after-sales service support.**

Top Cable is committed to manufacturing products under the highest quality standards and in offering an excellent service to its customers worldwide, highlighting:



Total traceability in our product range.



Cables specifically designed for solar installations.



Worldwide recognized certificates.



Full product range up to 66kV.



CPR certified cables.



After-sales service support.



Large solar cable stock.

Solar cables engineered  
to meet the most exigent  
**safety requirements.**

---





**Top Cable**

# Top Cable, an **international manufacturer** of industrial and power cables

---

**Top Cable is a recognized manufacturer of electric cables, always meeting the highest expectations that contractors, developers, grid operators, panel manufacturers and integrators demand when designing a solar installation. The company has supplied cables to worldwide solar installations from residential installations to large scale rooftops, floating solar projects or ground farms.**

All Top Cable's manufacturing plants are based around Barcelona, Spain. The organization is a medium-sized, family-owned company manufacturing electric cables on an international scale, with offices and warehouses located around the globe. Therefore, we guarantee customer proximity on a global level.

Customers around the world appreciate Top Cable as a technically leading manufacturer of solar cables of outstanding quality. Customers receive their solar deliveries on schedule from the company's main logistics centre located in Barcelona.

Large PV cable stocks are available there to ensure short lead times and shipment flexibility. Top Cable also manages several solar cable stocks across their worldwide offices and warehouses to avoid out-of-stock situations in the supply chain.

Our PV cables are TÜV certified, meeting the most stringent solar specifications. Check other National Electric Code requirements and PV certificates with your Top Cable technical sales expert.

# Top Cable



**Top Cable**







# Innovation

---

**Our R&D Centre and laboratories were established to provide research work and to enable us to constantly provide high-performance cables that are suited for multiple applications in various industries.**

Being conscious of the importance of optimal costing, Top Cable has opted for the integration of our processes, through focusing each of our production centres into a specialized production unit, while coordinating with one another to optimize common resources.

Our technical staff are professionally trained and assure the highest quality in the cable production process.



# Top Cable | Solar Cables

---

Leonardo Da Vinci nr.1  
08191 Rubí (Barcelona) Spain  
Tel + 34 93 586 21 68  
+ 34 93 586 21 69  
sales@topcable.com  
[www.topcable.com](http://www.topcable.com)

