

# Cable catalogue for electric power distribution

**Top Cable**



# Top Cable

Driving your energy

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- 109 X-VOLT® FR-N20XA8E-AR
- 110 X-VOLT® TSLF





























**Top Cable**















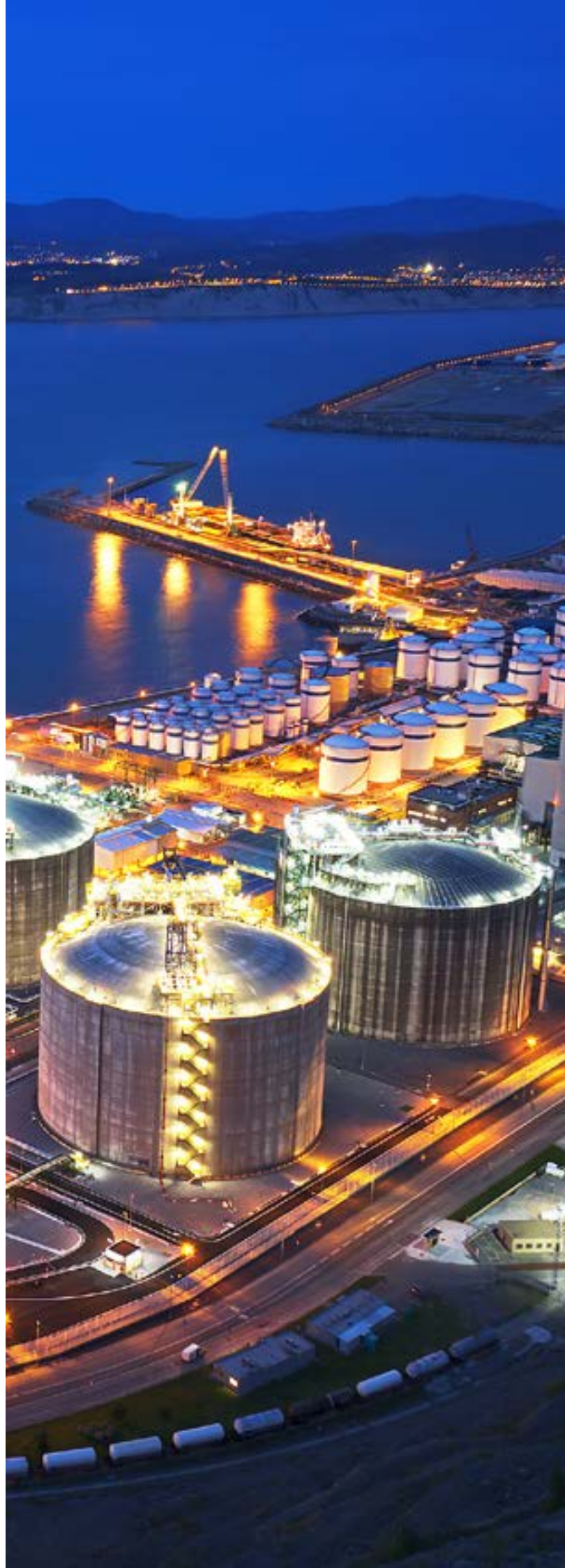
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Technology Center



# INTRODUCTION

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# A TEAM COMMITTED TO MANUFACTURING **CABLES OF THE HIGHEST STANDARD**

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Teamwork is at the core of everything we do. Just like our cables, our carefully selected workforce is bound together by strength of purpose. We are committed to investing in the skills and wellbeing of our human capital, which ensures our electric cables are manufactured to the highest standards for our clients worldwide.

All Top Cable products meet the standards set by European certifying bodies. We pride ourselves on high company standards and select the best raw materials, adopt rigorous quality control systems and employ the latest technology for all our products.

Teamwork centred on excellence is why Top Cable is one of Europe's leading cable manufacturers.

**Top Cable**









# VALUE ADDED SERVICE

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We value our clients, and prompt service comes as standard. As we continue to improve the customer experience, we have invested in two state-of-the-art logistics centres that boast the latest warehouse management systems. These sophisticated infrastructures enable our clients to make significant reductions to their storage, distribution and administration costs.

Top Cable are a reliable manufacturer and supplier of a comprehensive range of industrial power cables. We also offer expert technical support with design and cable selection, as well as project management and logistics through to after-sales service support.

**Top Cable**







# AN **INTEGRATED** MANUFACTURING PROCESS

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Since its founding in 1985, Top Cable has continued to invest in technological advancement through ongoing R&D&I programmes. We develop new cable solutions for new incoming markets, meeting our customers' most pressing needs. As our reputation goes before us, customers worldwide appreciate Top Cable as a leading technical cable manufacturer of outstanding quality.

We established our Top Cable Design & Development Centre with research laboratories to support our constant drive to deliver high-performance cables suitable for multiple applications in various industries.







# EUROPEAN CONSTRUCTION PRODUCTS REGULATION

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The Construction Products Regulation (CPR) was issued 1st July 2016 by the European Union. Its purpose is to ensure that the manufacture and selection of materials used in construction across the European Union meet recognised quality standards. By harmonising EU standards, higher safety levels for fire and dangerous substances are created, as well as greater clarity and traceability of the materials used in construction.

The CPR applies to all products intended for use in construction in public places, housing, civil engineering works, electrical connections for buildings, or external lighting. When you choose Top Cable products, the compliance of your cables with the current CPR requirements is guaranteed, giving you certainty you can rely on.



**Top Cable**







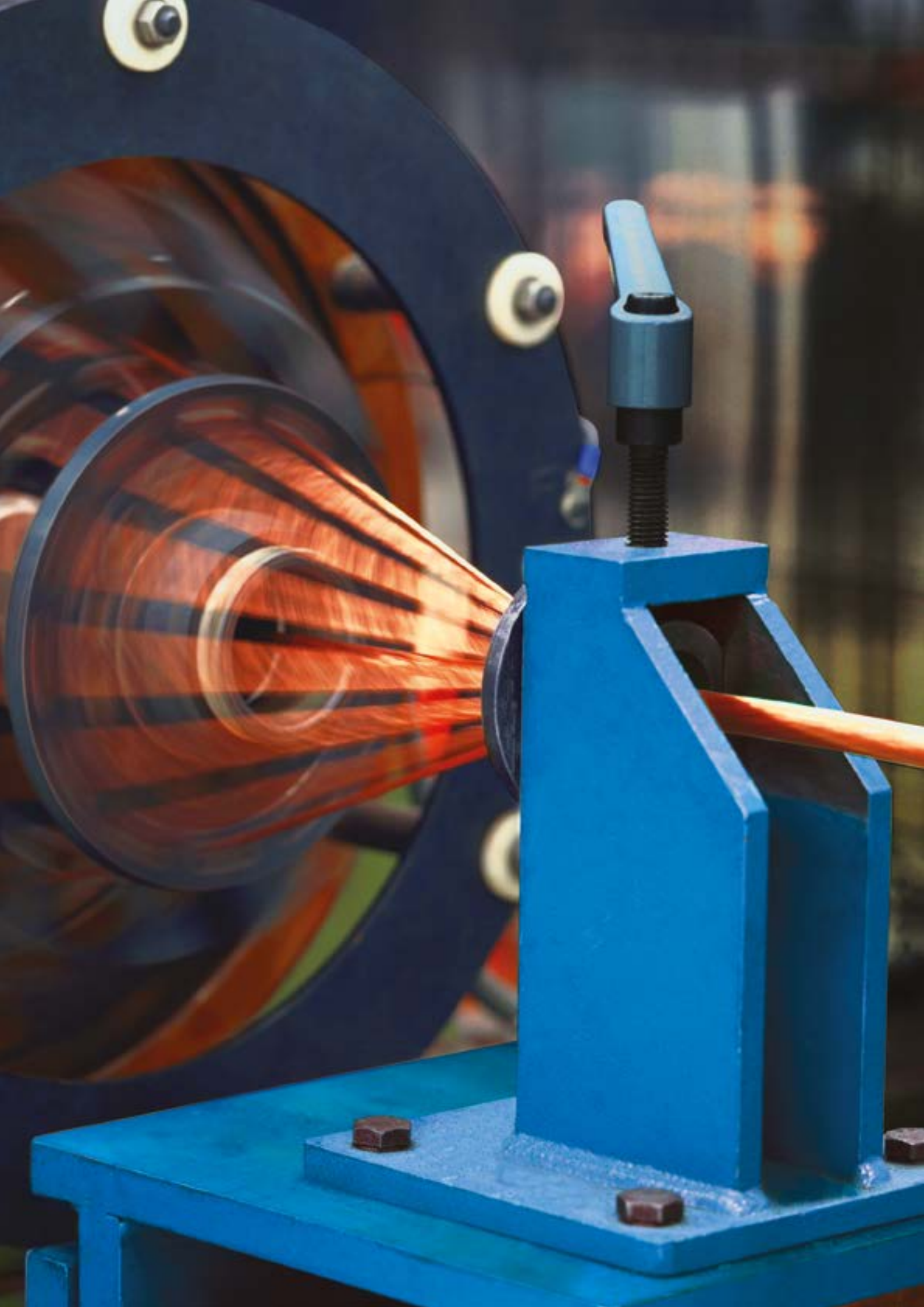
# MEDIUM VOLTAGE CABLES MANUFACTURER

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Our medium voltage product range is produced at our plant close to the vibrant city of Barcelona, using state of the art technology and the latest generation of machinery.

The factory is equipped with a modern Research, Development and Innovation centre staffed by a team of cable production experts. The Centre designs and produces cables according to most international quality standards, and conducts development testing and certification of medium voltage cables.









# A COMPREHENSIVE CABLE RANGE

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We manufacture a broad selection of cables that range from control cables for specialised applications to larger power cables for medium voltage applications across various industries. We supply cables for construction projects, railway, mining, marine, aeronautical, military, OEMs, and renewable energy plants.

Conductors are available for manufacture in copper and aluminium, with insulating materials varying depending on the application. We select each cable component according to specific requirements, and then the end product is manufactured to the highest specifications, meeting international standards such as ISO 9002, IEC, EN and CE.







# OUR CORPORATE **SOCIAL & ENVIRONMENTAL** RESPONSIBILITIES

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Any statements we could make about sales growth, benefits or assets would be misplaced if we as a company lacked awareness of our social and environmental responsibilities.

Top Cable is committed to protecting the environment and we express this belief by using processes that are friendly to the environment through all stages of our production. Sustainable Social Development is an essential goal for our company, and we work to educate the general public on the importance of sustaining our green planet for future generations.



# PRODUCT RANGE

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## RUBBER **CABLES**

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**Top Cable**



E<sub>ca</sub>



## APPLICATION

Xtrem® H07RN-F rubber cables are designed to supply power to low voltage appliances including electric motors and submersible pumps in deep water installations, as well as many other electrical equipment.

Thanks to its extraordinary flexibility and mechanical strength, the Xtrem® H07RN-F cable is ideal for power transmission in both fixed installation or mobile service.

The use nominal voltage up to 1000 V is accepted in fixed protected assemblies.

Top Cable Xtrem® H07RN-F cables are designed to power all types of electrical equipment including motors and submersible pumps in deep water installations (AD8).

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible) according to EN 60228 and IEC 60228.

### Insulation

Thermosetting rubber, type EI7 according to EN 50363-1.

The standard identification according to HD 308 and EN 50334 is the following:

|           |  |
|-----------|--|
| 1 x       | Natural                                    |
| 2 x       | Blue + Brown                               |
| 3 G       | Blue + Brown + Green/Yellow                |
| 3 x       | Brown + Black + Grey                       |
| 4 G       | Brown + Black + Grey + Green/Yellow        |
| 4 x       | Brown + Black + Grey + Blue                |
| 5 G       | Brown + Black + Grey + Blue + Green/Yellow |
| 5 x       | Brown + Black + Grey + Black + Blue        |
| 6 or more | Black numbered + Green/Yellow              |

### Outer sheath

Thermosetting flexible rubber, type EM2 according to EN 50363-2-1. Black colour.

## CHARACTERISTICS



### Electrical performance

Low voltage: 450/750 V.



### Thermal performance

Maximum conductor temperature: 90°C.

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

Minimum service temperature: -40°C (fixed and protected installations) and -25°C (mobile use).



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.

Reaction to fire CPR: E<sub>ca</sub> according to EN 50575.



### Mechanical performance

Minimum bending radius:

3x cable diameter < 12 mm.

4x cable diameter ≥ 12 mm.

Impact resistance: AG2 Medium severity.



### Environmental performance

Chemical & Oil resistance: Excellent.

Grease & mineral oils resistance: Excellent.

UV Resistant according to EN 50618.

Water resistance: AD8 Submersion.

Cable for submersible pumps in drinkable water according to AS/ NZS 4020.

Deep wells. AWQC.



### Installation conditions

Open Air.

Submersible pumps cable.



### Other

Meter by meter marking.

## STANDARDS / COMPLIANCE



### According to

EN 50525-2-21 / IEC 60092-353 / IEC 60245-4



### Standards and approvals

HAR / AENOR / DNV / RoHS / CE



### CPR (Construction Products Regulation)

E<sub>ca</sub>

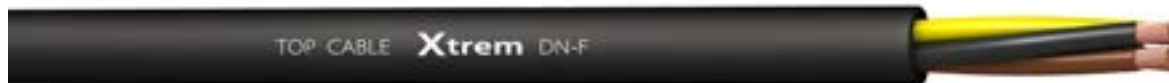




# XTREM® DN-F 0,6/1 kV

Flexible rubber cable, for industrial use.

BASED ON: UNE 21150



E<sub>ca</sub>

## APPLICATION

Xtrem® DN-F is a flexible and rubber cable for mobile heavy duty.  
Suitable for installations in dry, damp or wet locations, outdoors, for hazardous areas with explosive gas atmospheres, machines in industrial workshops, motors and transportable machines; on construction sites and for agricultural exploitations.  
Suitable for submerged installations (AD8).

## CONSTRUCTION

### Conductor

Electrolytic annealed copper class 5 (flexible) according to EN 60228 and IEC 60228.

### Insulation

Thermosetting rubber type EPR according to IEC 60502-1.

The standard identification according to HD 308 is the following:

|           |  |
|-----------|--|
| 1 x       | Natural                                    |
| 2 x       | Blue + Brown                               |
| 3 G       | Blue + Brown + Green/Yellow                |
| 3 x       | Brown + Black + Grey                       |
| 4 G       | Brown + Black + Grey + Green/Yellow        |
| 4 x       | Brown + Black + Grey + Blue                |
| 5 G       | Brown + Black + Grey + Blue + Green/Yellow |
| 6 or more | Black numbered + Green/Yellow              |

### Outer sheath

Thermosetting flexible rubber type SEI according to IEC 60502-1.  
Black colour.

## CHARACTERISTICS



### Electrical performance

Low voltage: 0,6/1 KV.



### Thermal performance

Maximum conductor temperature: 90°C.  
Maximum short-circuit temperature: 250°C (max. 5 s).  
Minimum service temperature: -40°C (fixed and protected installations) and -25°C (mobile use).



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.  
Reaction to fire CPR: E<sub>ca</sub> according to EN 50575.



### Mechanical performance

Minimum bending radius:  
3x cable diameter < 12 mm.  
4x cable diameter ≥ 12 mm.  
Impact resistance: AG2 Medium severity.



### Environmental performance

Chemical & Oil resistance: Excellent.  
Grease & mineral oils resistance: Excellent.  
UV Resistant according to EN 50618.  
Water resistance: AD8 Submersion.  
Submersible pumps in drinkable water according to AS/NZS 4020.  
Deep wells.  
Drinkable water. AWQC.



### Installation conditions

Open Air.  
Submersible pumps cable.



### Other

Meter by meter marking.

## STANDARDS / COMPLIANCE



Based on  
UNE 21150



Standards and approvals  
RoHS / CE



CPR (Construction Products Regulation)  
E<sub>ca</sub>





**B<sub>2ca</sub> / C<sub>ca</sub>**

## APPLICATION

Toxfree® Xtrem ZH H07ZZ-F (AS) is a flexible cable for mobile service, suitable for installations where low smoke and halogen free fumes under fire conditions are required. The use nominal voltage up to 1000 V is accepted in fixed protected assemblies. Suitable for installations where the cable must withstand medium mechanical stress, for machines in industrial and agricultural workshops, for motors and transportable machines on construction sites, for windmills and for agricultural applications.

- Industrial use.
- Mobile use.
- Windmills.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible) according to EN 60228 and IEC 60228.

### Insulation

Halogen free thermosetting rubber, type EI8 according to EN 50363-5.

The standard identification according to HD 308, is the following:








|           |  |
|-----------|--|
| 1 x       | Natural                                    |
| 2 x       | Blue + Brown                               |
| 3 G       | Blue + Brown + Green/Yellow                |
| 4 G       | Brown + Black + Grey + Green/Yellow        |
| 5 G       | Brown + Black + Grey + Blue + Green/Yellow |
| 6 or more | Black numbered + Green/Yellow              |

### Outer sheath

Halogen free thermosetting flexible rubber, type EM8 according to EN 50363-6.

Black colour.

## CHARACTERISTICS

-  **Electrical performance**  
Low voltage: 450/750 V.
-  **Thermal performance**  
Maximum conductor temperature: 90°C.  
Maximum short-circuit temperature: 250°C (max. 5 s).  
Minimum temperature in mobile service: -40°C.
-  **Fire performance**  
Flame non-propagation according to EN 60332-1 / IEC 60332-1.  
Fire non-propagation according to EN 60332-3-24 / IEC 60332-3-24 and EN 50399.  
Reaction to fire CPR: B<sub>2ca</sub>-s1b, d1, a1 or C<sub>ca</sub>-s1b, d2, a1 according to EN 50575 (see cross-section).  
Halogen free according to EN 60754-1 / IEC 60754-1.  
Low corrosive gases emission according to UNE-EN 60754-2 / IEC 60754-2.  
Low smoke emission according to EN 61034 / IEC 61034:  
Light transmittance > 60%.
-  **Mechanical performance**  
Minimum bending radius: 3x cable diameter < 12 mm.  
4x cable diameter ≥ 12 mm.  
Impact resistance: AG2 Medium severity.
-  **Environmental performance**  
Chemical & Oil resistance: Excellent.  
Grease & mineral oils resistance: Excellent.  
Water resistance: AD7 immersion.
-  **Installation conditions**  
Open Air.  
In conduit.
-  **Other**  
Meter by meter marking.

## STANDARDS / COMPLIANCE



According to  
EN 50525-3-21



Standards and approvals  
HAR / AENOR / CE



CPR (Construction Products Regulation)  
B<sub>2ca</sub>-s1b, d1, a1. (according to cross-section) or  
C<sub>ca</sub>-s1b, d2, a1. (according to cross-section)







## APPLICATION

Topweld® H01N2-D is a harmonized, flexible, rubber welding cable specially designed for transmitting high currents between the welding generator and the electrode.

Its flexibility makes using the welding tool easier and it also prevents knots from forming in the cable that could cause the internal conductor to break.

It can also be used in automatic welding and machine tools, conveyor systems and production or assembly lines, for example in automobile assembly lines.

- Welding.
- Industrial use.
- Mobile use.
- Robotics.
- Conveyors.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class D (extra-flexible) according to EN 50525-2-81.

### Insulation

Flexible rubber, type EM5, according to EN 50363-2-2.  
Black colour.

## CHARACTERISTICS



### Electrical performance

Low voltage: 100/100 V.



### Thermal performance

Maximum conductor temperature: 85°C.

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

Minimum service temperature: -20°C (mobile use).



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.



### Mechanical performance

Minimum bending radius: 5x cable diameter.

Impact resistance: AG2 Medium severity.



### Environmental performance

Chemical & Oil resistance: Excellent.

Grease & mineral oils resistance: Excellent.



### Installation conditions

Open Air.



### Other

Meter by meter marking.

## STANDARDS / COMPLIANCE



According to  
EN 50525-2-81



Standards and approvals  
HAR / AENOR / RoHS / CE





## PANEL WIRE **CABLES**

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**B2<sub>ca</sub>**

## APPLICATION

Topflex<sup>®</sup>V-K H05V-K & H07V-K cable has been specially designed for installations that require a flexible cable due to the complex nature of their layout.

This cable is especially suitable for domestic wiring.

It may also be used for equipment wiring, distributors, cabinets and lighting.

It is also recommended for installation under false ceilings. Cables with cross section up to 1 mm<sup>2</sup> are especially suited for signalling and monitoring installations.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible) according to EN 60228 and IEC 60228.

### Insulation

Extra sliding flexible polyvinyl chloride type T11 according to EN 50363-3.

The standard identification of insulated conductors is the following:

|              |               |
|--------------|---------------|
| Blue         | RAL 5012      |
| Brown        | RAL 8003      |
| Black        | RAL 9005      |
| Red          | RAL 3000      |
| Green/Yellow | RAL 6018/1021 |
| Grey         | RAL 7000      |
| Dark Blue    | RAL 5010      |
| White        | RAL 9010      |
| Orange       | RAL 2003      |
| Violet       | RAL 4005      |
| Pink         | RAL 3015      |

Other colours available on request.

## CHARACTERISTICS



### Electrical performance

Low voltage 300/500 V · 450/750 V.

Rated Voltage: H05V-K (up to 1 mm<sup>2</sup>): 300/500 V.

H07V-K (from 1,5 mm<sup>2</sup> onwards): 450/750 V.



### Thermal performance

Maximum conductor temperature: 70°C.

Maximum short-circuit temperature: 160°C (max. 5 s).

Minimum installation and handling temperature: 5°C.

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



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.

Reaction to fire CPR: E<sub>ca</sub> according to EN 50575.

Reduced halogen emission. Chlorine < 15%.



### Mechanical performance

Minimum bending radius: 5x cable diameter.



### Environmental performance

Chemical & Oil resistance: Acceptable.



### Installation conditions

In conduit.



### Other

Meter by meter marking. (from 10 mm<sup>2</sup> onwards).

## STANDARDS / COMPLIANCE



### According to

EN 50525-2-31 / IEC 60227-3



### Standards and approvals

HAR / AENOR / SEC / RoHS / CE



### CPR (Construction Products Regulation)

E<sub>ca</sub>





**B2<sub>ca</sub>**

### APPLICATION

Toxfree® ES05Z1-K (AS)/H05Z1-K & H07Z1-K (AS) Type 2 is a LSHF safety cable. In the event of fire, it does not emit toxic gases, nor does it give off corrosive gases, avoiding any possible damage to people or electronic equipment.

For these reasons it is highly recommended for use in public places such as: hospitals, schools, museums, airports, bus terminals, shopping malls, offices, laboratories, etc.

### CONSTRUCTION

#### Conductor

Electrolytic annealed copper, class 5 (flexible) according to EN 60228 and IEC 60228.

#### Insulation

Polyolefin, halogen free and low smoke under fire conditions, type TIZI according to UNE 211002 and type T17 according to EN 50363-7.

The standard identification of insulated conductors is the following:

|              |               |
|--------------|---------------|
| Blue         | RAL 5015      |
| Brown        | RAL 8003      |
| Black        | RAL 9005      |
| Red          | RAL 3000      |
| Green/Yellow | RAL 6018/1021 |
| Grey         | RAL 7000      |
| Dark Blue    | RAL 5010      |
| White        | RAL 9010      |

Other colours available on request.

### CHARACTERISTICS



#### Electrical performance

Low voltage: 300/500 V and 450/750 V.

Rated Voltage: ES05Z1-K/H05Z1-K (up to 1 mm<sup>2</sup>): 300/500 V.

H07Z1-K (from 1,5 mm<sup>2</sup> onwards): 450/750 V.



#### Thermal performance

Maximum conductor temperature: 70°C.

Maximum short-circuit temperature: 160°C (max. 5 s).

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



#### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.

Fire non-propagation according to EN 60332-3 / IEC 60332-3 and EN 50399.

Reaction to fire CPR: B2ca-s1a, d1, a1 (cable H07Z1-K from 1,5 mm<sup>2</sup> to 240 mm<sup>2</sup>) according to EN 50575.

Low smoke halogen free according to EN 60754-1 / IEC 60754-1.

Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.

Low smoke emission according to EN 61034 / IEC 61034:

Light transmittance > 80%.



#### Mechanical performance

Minimum bending radius: 5x cable diameter.



#### Environmental performance

Chemical & Oil resistance: Acceptable.

### STANDARDS / COMPLIANCE



#### According to

EN 50525-3-31 / UNE 211002



#### Standards and approvals

HAR / AENOR / BUREAU VERITAS / RoHS / SEC / CE



#### CPR (Construction Products Regulation)

B2ca-s1a, d1, a1 (cable H07Z1-K from 1,5 mm<sup>2</sup> to 240 mm<sup>2</sup>)







E<sub>ca</sub>

### APPLICATION

Topflex® MS Tri-rated H07V2-K cable has been designed for the internal wiring of electrical cabinets, switch boards and small electrical devices.

Due to its manufacturing characteristics, it can be used in conduit or in flexible motor ducts, transformers and other machinery in general.

- Industrial use.
- Electrical panel wiring.

### CONSTRUCTION

#### Conductor

Electrolytic annealed copper, class 5 (flexible), according to EN 60228, IEC 60228 and BS 6360.

#### Insulation

Flexible PVC, extra sliding, high service temperature type T13 according to EN 50363-3 and Class 43 UL 1581.

The special characteristics of the material ensure good easy-slide properties to the cable.

The standard identification of insulated conductors is the following:

|              |               |
|--------------|---------------|
| Blue         | RAL 5012      |
| Brown        | RAL 8003      |
| Black        | RAL 9005      |
| Red          | RAL 3000      |
| Green/Yellow | RAL 6018/1021 |
| Grey         | RAL 7000      |
| Dark Blue    | RAL 5010      |
| White        | RAL 9010      |
| Orange       | RAL 2003      |
| Violet       | RAL 4005      |
| Pink         | RAL 3015      |

### CHARACTERISTICS



#### Electrical performance

Low voltage: According to EN (H05V2-K) 300/500 V  
According to EN (H07V2-K) 450/750 V  
According to BS (CK) 600/1000 V  
According to UL (AWM) 600 V  
According to CSA (TEW) 600 V



#### Thermal performance

Maximum conductor temperature: 90°C according to EN and BS,  
105°C according to UL and CSA.  
Maximum short-circuit temperature: 160°C (max 5 s).  
Minimum service temperature: -40°C (fixed and protected installations).



#### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1 and VW-1, FT1 and FT2 according to UL 2556.  
Reaction to fire CPR: Eca according to EN 50575.



#### Mechanical performance

Minimum bending radius: 5x cable diameter.



#### Environmental performance

Chemical & Oil resistance: Acceptable.  
Water resistance: AD3 Sprays.



#### Installation conditions

In conduit.



#### Other

Meter by meter marking (from 10 mm<sup>2</sup> onwards).



#### Packaging

These cables are supplied in reels, barrels or bulk drums.

| CROSS SECTION              | PACKAGING                             |
|----------------------------|---------------------------------------|
| 0,50-6 mm <sup>2</sup>     | 100 m reels (or barrels upon request) |
| 10-16 mm <sup>2</sup>      | 100 m reels or bulk drums             |
| 25 mm <sup>2</sup> onwards | bulk drums                            |

### STANDARDS / COMPLIANCE



#### According to

EN 50525-2-31 / UL 758 / CSA C22.2 / BS 6231



#### Standards and approvals

HAR / AENOR / UL LISTED / RoHS / CE



#### CPR (Construction Products Regulation)

E<sub>ca</sub>



# TOXFREE® ZH H05Z-K & H07Z-K

Flexible and halogen free 90°C cable for  
electrical panel wiring.

ACCORDING TO: EN 50525-3-41



**D<sub>ca</sub>**

## APPLICATION

Toxfree® ZH H05Z-K & H07Z-K is a flexible cable for fixed and protected installations.

It is highly recommended for use in public places such as: hospitals, schools, museums, airports, bus terminals, shopping malls, offices, laboratories, etc.

Not suitable for wet places or immersed.

- Domestic use.
- Public places.
- Electrical panel wiring.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible) according to EN 60228 and IEC 60228.

### Insulation

Halogen free thermosetting flexible rubber, type EI5 according to EN 50363-5.

The standard identification of insulated conductors is the following:

|              |               |
|--------------|---------------|
| Blue         | RAL 5015      |
| Brown        | RAL 8003      |
| Black        | RAL 9005      |
| Red          | RAL 3000      |
| Green/Yellow | RAL 6018/1021 |
| Grey         | RAL 7000      |
| White        | RAL 9010      |

Other colours available on request.

## CHARACTERISTICS



### Electrical performance

Low voltage: 300/500 V.

450/750 V.

Rated Voltage:

H05Z-K (up to 1 mm<sup>2</sup>): 300/500 V.

H07Z-K (from 1,5 mm<sup>2</sup> onwards): 450/750 V.



### Thermal performance

Maximum conductor temperature: 90°C.

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

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



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.

Reaction to fire CPR: D<sub>ca</sub>-s1b, d1, a1 according to EN 50575 (see cross-section).

Low Smoke Zero Halogen according to EN 60754-1 / IEC 60754-1.

Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.

Low smoke emission according to EN 61034 / IEC 61034:

Light transmittance > 60%.



### Mechanical performance

Minimum bending radius: 5x cable diameter.



### Environmental performance

Chemical & Oil resistance: Acceptable.



### Installation conditions

In conduit.

## STANDARDS / COMPLIANCE



According to  
EN 50525-3-41



Standards and approvals  
HAR / AENOR / RoHS / CE



CPR (Construction Products Regulation)  
D<sub>ca</sub>-s1b, d1, a1 (according to cross-section)







**B2<sub>ca</sub>**

## APPLICATION

Toxfree® ZH H07Z1-U/R Type 2 is a LSHF safety cable. In the event of fire, it does not emit toxic gases, nor does it give off corrosive gases, avoiding any possible damage to people or electronic equipment. For these reasons it is highly recommended for use in public places such as: hospitals, schools, museums, airports, bus terminals, shopping malls, offices, laboratories, etc.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 1 (H07Z1-U) or class 2 (H07Z1-R) according to EN 60228 and IEC 60228.

### Insulation

Polyolefin, halogen free and low smoke under fire conditions, type T1Z1 according to UNE 211002 and type T17 according to EN 50363-7. The standard identification of insulated conductors is the following:

|              |               |
|--------------|---------------|
| Blue         | RAL 5015      |
| Brown        | RAL 8003      |
| Black        | RAL 9005      |
| Red          | RAL 3000      |
| Green/Yellow | RAL 6018/1021 |
| Grey         | RAL 7000      |
| Dark Blue    | RAL 5010      |
| White        | RAL 9010      |

Other colours available on request.

## CHARACTERISTICS



### Electrical performance

Low voltage: 450/750 V.



### Thermal performance

Maximum conductor temperature: 70°C.

Maximum short-circuit temperature: 160°C (max. 5 s).

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



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.

Fire non-propagation according to EN 60332-3 / IEC 60332-3 and EN 50399.

Reaction to fire CPR: B2ca-s1a, d1, a1, according to EN 50575.

Low Smoke Halogen Free according to EN 60754-1 / IEC 60754-1.

Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.

Low smoke emission according to EN 61034 / IEC 61034:

Light transmittance > 80%.



### Mechanical performance

Minimum bending radius: 5x cable diameter.



### Environmental performance

Chemical & Oil resistance: Acceptable.

## STANDARDS / COMPLIANCE



### According to

EN 50525-3-31 / UNE 211002



### Standards and approvals

HAR / AENOR / RoHS / CE



### CPR (Construction Products Regulation)

B2ca-s1a, d1, a1





# XLPE / PVC POWER **CABLES**

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E<sub>ca</sub>

## APPLICATION

Powerflex® RV-K cable is suitable for all types of low voltage industrial-type connections, in urban grids, building installations, etc.

Its high flexibility makes the installation process substantially easier and, as a result, is particularly suitable for use in difficult layouts. It can be buried or installed in a tube as well as outdoors without requiring additional protection.

This cable can withstand damp conditions including total submersion in water (AD8).

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible) according to EN 60228 and IEC 60228.

### Insulation

Cross-linked polyethylene type DIX-3 according to HD 603-1 and type XLPE according to IEC 60502-1.

The standard identification of insulated conductors according to HD 308 is the following:

|           |   |
|-----------|---|
| 1 x       | Natural   |
| 2 x       | Blue + Brown  |
| 3 G       | Blue + Brown + Green/Yellow                         |
| 3 x       | Brown + Black + Grey                                |
| 3 x + 1 x | Brown + Black + Grey + Blue (reduced cross-section) |
| 4 G       | Brown + Black + Grey + Green/Yellow                 |
| 4 x       | Brown + Black + Grey + Blue                         |
| 5 G       | Brown + Black + Grey + Blue + Green/Yellow          |
| 6 or more | Black numbered + Green/Yellow                       |

### Outer sheath

Flexible PVC type DMV-18 according to HD 603-1 and type ST2 according to IEC 60502-1.  
Black colour.

## CHARACTERISTICS



### Electrical performance

Low voltage: 0,6/1 kV.



### Thermal performance

Maximum conductor temperature: 90°C.

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

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

Minimum installation and handling temperature: 0°C (on cable surface).



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.

Reaction to fire CPR: E<sub>ca</sub> according to EN 50575.

Reduced halogen emission. Chlorine < 15%.



### Mechanical performance

Minimum bending radius: 5x cable diameter.

Impact resistance: AG2 Medium severity.



### Environmental performance

Chemical & Oil resistance: Good.

UV Resistant according to UNE 211605.

Water resistance: AD8 Submersion.



### Installation conditions

Open Air.

Buried.

In conduit.

In tray.

## STANDARDS / COMPLIANCE



### According to

IEC 60502-1 / UNE 21123-2



### Standards and approvals

AENOR / BUREAU VERITAS / KEMA-KEUR / RoHS / CE



### CPR (Construction Products Regulation)

E<sub>ca</sub>



# POWERFLEX® PLUS YMvKf 0,6/1 kV

The universal cable for power transmission  
with improved fire proof properties.

ACCORDING TO: IEC 60502-1



C<sub>ca</sub>



## APPLICATION

Powerflex® Plus YMvKf cable is suitable for all types of industrial low voltage connections, urban grids, building installations, etc. This cable is fire retardant and is recommended for use in public places and hazardous industries. Its flexibility makes installation substantially easier, making it highly suitable for difficult layouts. This cable can also be used in buried installations or in tubes or outdoors without requiring additional protection. This cable withstands damp conditions and even total submersion in water (AD7).

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible) according to EN 60228 and IEC 60228.

### Insulation

Cross-linked polyethylene type XLPE according to IEC 60502-1. The standard identification of insulated conductors, according to HD 308 is the following:

|     |  |
|-----|--|
| 1 x | Black                                      |
| 2 x | Blue + Brown                               |
| 3 x | Blue + Brown + Grey                        |
| 4 G | Brown + Black + Grey + Green/Yellow        |
| 5 G | Brown + Black + Grey + Blue + Green/Yellow |

### Outer sheath

Flexible PVC type ST2 according to IEC 60502-1.  
Grey colour.

## CHARACTERISTICS



### Electrical performance

Low voltage 0,6/1kV.



### Thermal performance

Maximum conductor temperature: 90°C.  
Maximum short-circuit temperature: 250°C (max. 5 s).  
Minimum service temperature: -40°C (fixed and protected installations).



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.  
Fire non-propagation according to EN 60332-3-24 and EN 50399.  
Reaction to fire CPR: C<sub>ca</sub>-s2,d2,a3 according to EN 50575.  
Reduced halogen emission. Chlorine < 15%.



### Mechanical performance

Minimum bending radius during installation: 5x cable diameter.  
Minimum bending radius, fixed: 3x cable diameter.  
Impact resistance: AG2 Medium severity.



### Environmental performance

Chemical & Oil resistance: Acceptable.  
UV Resistant according to UNE 211605.  
Water resistance AD7 immersion.

## STANDARDS / COMPLIANCE



According to  
IEC 60502-1



Standards and approvals  
AENOR / BUREAU VERITAS / KEMA-KEUR / RoHS / CE



CPR (Construction Products Regulation)  
C<sub>ca</sub>-s2,d2,a3







E<sub>ca</sub>



## APPLICATION

Powerhard® F RVFV-K cable is especially suitable for fixed installations that may be subject to mechanical aggression. It is highly recommended for use in installations where the presence of rodents could imply a threat to the cable (such as warehouses, production plants and agricultural facilities). At the same time, its use is recommended for street lighting installations.

## CONSTRUCTION

### Conductor

Electrolytic copper, class 5 (flexible) according to EN 60228 and IEC 60228.

### Insulation

Cross-linked polyethylene type DIX-3 according to UNE-HD 603 and type XLPE according to IEC 60502-1.

The standard identification according to HD 308 is:

|           |   |
|-----------|---|
| 1 x       | Natural   |
| 2 x       | Blue + Brown  |
| 3 G       | Blue + Brown + Green/Yellow                         |
| 3 x       | Brown + Black + Grey                                |
| 3 x + 1 x | Brown + Black + Grey + Blue (reduced cross-section) |
| 4 G       | Brown + Black + Grey + Green/Yellow                 |
| 4 x       | Brown + Black + Grey + Blue                         |
| 5 G       | Brown + Black + Grey + Blue + Green/Yellow          |
| 6 or more | Black numbered + Green/Yellow                       |

### Separation sheath

PVC type DMV-18 according to UNE-HD 603 and type ST2 according to IEC 60502-1.

### Armour

Double steel or aluminium tape armour.

Aluminium armour is used in single-core cables to avoid parasite currents that may overheat the cable.

Steel tape armour is used in multicore cables.

### Outer sheath

Flexible PVC type DMV-18 according to UNE-HD 603 and type ST2 according to IEC 60502-1.

Black colour.

## CHARACTERISTICS



### Electrical performance

Low voltage: 0,6/1 kV.



### Thermal performance

Maximum conductor temperature: 90°C.

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

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

Minimum installation and handling temperature: 0°C.



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.

Reaction to fire CPR: Eca, according to EN 50575.

Reduced halogen emission. Chlorine < 15%.



### Mechanical performance

Minimum bending radius: 10x cable diameter.

Impact resistance: AG4 High severity.

Rodent proof.



### Environmental performance

Chemical & Oil resistance: Good.

UV Resistant according to UNE 211605.

Water resistance: AD7 immersion.



### Installation conditions

Open Air.

Buried.

In conduit.

## STANDARDS / COMPLIANCE



### According to

IEC 60502-1 / UNE 21123-2



### Standards and approvals

BUREAU VERITAS / RoHS / CE



### CPR (Construction Products Regulation)

E<sub>ca</sub>





E<sub>ca</sub>



## APPLICATION

POWERHAR® M RVhMVh-K cable is highly recommended for petrol stations, petrochemical plants, etc. It can also be used in production plants, agricultural facilities, street lighting and installations where the cable is subject to high mechanical aggression.

This cable is also available in hydrocarbon resistant version.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible) according to EN 60228 and IEC 60228.

### Insulation

Cross-linked polyethylene, type DIX-3 according to HD 603 and type XLPE according to IEC 60502-1.

The standard identification of insulated conductors according to HD 308, is the following:

|           |   |
|-----------|---|
| 1 x       | Natural   |
| 2 x       | Blue + Brown  |
| 3 G       | Blue + Brown + Green/Yellow                         |
| 3 x       | Brown + Black + Grey                                |
| 3 x + 1 x | Brown + Black + Grey + Blue (reduced cross-section) |
| 4 G       | Brown + Black + Grey + Green/Yellow                 |
| 4 x       | Brown + Black + Grey + Blue                         |
| 5 G       | Brown + Black + Grey + Blue + Green/Yellow          |
| 6 or more | Black numbered + Green/Yellow                       |

### Inner covering

PVC.

### Armour

Galvanized steel wire armour.

Aluminium armour is used in single-core cables to avoid parasite currents that may overheat the cable.

### Outer sheath

PVC type ST2 according to IEC 60502-1.

Black colour.

## CHARACTERISTICS

### Electrical performance

Low voltage 0,6/1 kV.

### Thermal performance

Maximum conductor temperature: 90°C.

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

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

Minimum installation and handling temperature: 0°C (on cable surface).

### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.

Reaction to fire CPR: Eca according to EN 50575.

Reduced halogen emission. Chlorine < 15%.

### Mechanical performance

Minimum bending radius: 10x cable diameter.

Impact resistance: AG4 High severity.

Rodent proof.

### Environmental performance

Chemical & Oil resistance: Good.

UV Resistant according to UNE 211605.

Water resistance: AD7 immersion.

### Installation conditions

Open Air.

Buried.

In conduit.

## STANDARDS / COMPLIANCE



According to  
IEC 60502-1



Standards and approvals  
BUREAU VERITAS / RoHS / CE



CPR (Construction Products Regulation)  
E<sub>ca</sub>







E<sub>ca</sub>

## APPLICATION

Powerhard® RV AL/ U-1000 AR2V cable is suitable for all types of underground networks for public power distribution, as well as low voltage connexions in industrial plants, urban networks, buildings, etc.

Due to its rigidity, its use is recommended in installations with a simple configuration where a flexible cable is not needed.

- Industrial use.
- Distribution network.

## CONSTRUCTION

### Conductor

Aluminium class 2 according to EN 60228 and IEC 60228.

### Insulation

Cross-linked polyethylene type DIX-3 according to HD 603, type XLPE according to IEC 60502-1 and compound insulation according to NF C 32-321.

The standard identification of insulated conductors according to HD 308, is the following:

|           |   |
|-----------|---|
| 1 x       | Natural   |
| 2 x       | Blue + Brown  |
| 3 x       | Brown + Black + Grey                                |
| 3 x + 1 x | Brown + Black + Grey + Blue (reduced cross-section) |
| 4 G       | Brown + Black + Grey + Green/Yellow                 |
| 4 x       | Brown + Black + Grey + Blue                         |

### Outer sheath

Flexible PVC type DMV-18 according to HD 603, type ST2 according to IEC 60502-1 and compound outer sheath according to NF C 32-321. Black colour.

## CHARACTERISTICS



### Electrical performance

Low voltage: 0,6/1 kV.



### Thermal performance

Maximum conductor temperature: 90°C.

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

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



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.

Category C2 according to NF C 32-070.

Reaction to fire CPR: E<sub>ca</sub> according to EN 50575.

Reduced halogen emission. Chlorine < 15%.



### Mechanical performance

Minimum bending radius: 5x cable diameter.

Impact resistance: AG3 High severity (<= 5J).



### Environmental performance

Chemical & Oil resistance: Good.

UV Resistant according to UNE 211605 and NF C 32-321.

Water resistance: AD8 Submersion.



### Installation conditions

Open Air.

Buried.

In conduit.

## STANDARDS / COMPLIANCE



### According to

UNE-HD 603-5N / NF C 32-321 / IEC 60502-1



### Standards and approvals

AENOR / NF-USE / RoHS / CE



### CPR (Construction Products Regulation)

E<sub>ca</sub>





# XLPE LSHF SAFETY **CABLES**

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**B2<sub>ca</sub>/C<sub>ca</sub>**



## APPLICATION

Toxfree® ZH N2XH Flex is a LSHF safety cable for fixed installations. In the event of fire, it does not emit toxic or corrosive gases, preventing any possible harm to people or electronic equipment. For these reasons this cable is highly recommended for use in public places such as hospitals, schools, museums, airports, bus terminals, shopping centers, offices, laboratories, etc.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible) according to EN 60228 and IEC 60228.

### Insulation

Cross-linked polyethylene, type XLPE according to IEC 60502-1. The standard identification of insulated conductors according to HD 308 is the following:

|         |   |
|---------|---|
| 1 x     | Natural   |
| 2 x     | Blue + Brown  |
| 3 G     | Blue + Brown + Green/Yellow                         |
| 3 x     | Brown + Black + Grey                                |
| 3 x+1 x | Brown + Black + Grey + Blue (reduced cross-section) |
| 4 G     | Brown + Black + Grey + Green/Yellow                 |
| 4 x     | Brown + Black + Grey + Blue                         |
| 5 G     | Brown + Black + Grey + Blue + Green/Yellow          |

### Outer sheath

Low smoke halogen free polyolefin. Black colour.

## CHARACTERISTICS

### Electrical performance

Low voltage: 0,6/1 kV

### Thermal performance

Maximum conductor temperature: 90°C.  
Maximum short-circuit temperature: 250°C (max. 5 s).  
Minimum service temperature: -40°C (fixed and protected installations).  
Minimum installation and handling temperature: 0°C (on cable surface).

### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.  
Fire non-propagation according to EN 60332-3 / IEC 60332-3 and EN 50399.  
Reaction to fire CPR: B2<sub>ca</sub>-s1a, d1, a1 or C<sub>ca</sub>-s1a, d1, a1, according to EN 50575 (see cross-section).  
Low Smoke Halogen Free according to EN 60754-1 / IEC 60754-1.  
Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.  
Low smoke emission according to EN 61034 / IEC 61034:  
Light transmittance > 80%.

### Mechanical performance

Minimum bending radius: 5x cable diameter.  
Impact resistance: AG2 Medium severity.

### Environmental performance

Chemical & Oil resistance: acceptable.  
UV Resistant according to EN 50618.  
Water resistance: AD8 Submersion.

### Installation conditions

Open Air.  
Buried.  
In conduit.

## STANDARDS / COMPLIANCE



According to  
IEC 60502-1



Standards and approvals  
KEMA-KEUR / / RoHS / CE



CPR (Construction Products Regulation)  
B2<sub>ca</sub>-s1a, d1, a1 (according to cross-section) or  
C<sub>ca</sub>-s1a,d1,a1 (according to cross-section)





**B2<sub>ca</sub> / C<sub>ca</sub>**

## APPLICATION

Toxfree® ZH RZ1-K (AS) / YMz1Kf is a LSHF safety cable. In the event of fire, it does not emit toxic gases, nor does it give off corrosive gases, avoiding any possible damage to people or electronic equipment. For these reasons it is highly recommended for use in public places such as: hospitals, schools, museums, airports, bus terminals, shopping centers, offices, laboratories, etc.

- Industrial use.
- Public places.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible) according to EN 60228 and IEC 60228.

### Insulation

Cross-linked polyethylene type XLPE according to IEC 60502-1 and type DIX-3 according to HD 603.

The standard identification of insulated conductors according to HD 308 is the following:

|           |   |
|-----------|---|
| 1 x       | Natural   |
| 2 x       | Blue + Brown  |
| 3 G       | Blue + Brown + Green/Yellow                         |
| 3 x       | Brown + Black + Grey                                |
| 3 x + 1 x | Brown + Black + Grey + Blue (reduced cross-section) |
| 4 G       | Brown + Black + Grey + Green/Yellow                 |
| 4 x       | Brown + Black + Grey + Blue                         |
| 5 G       | Brown + Black + Grey + Blue + Green/Yellow          |
| 6 or more | Black numbered + Green/Yellow                       |

### Outer sheath

Low smoke halogen free polyolefin, type ST8 according to IEC 60502-1 and type DMZ-E according to UNE 21123-4.  
Green colour.

## CHARACTERISTICS

- Electrical performance**  
Low voltage: 0,6/1 kV
- Thermal performance**  
Maximum conductor temperature: 90°C.  
Maximum short-circuit temperature: 250°C (max. 5 s).  
Minimum service temperature: -40°C (fixed and protected installations)  
Minimum installation and handling temperature: 0°C.
- Fire performance**  
Flame non-propagation according to IEC 60332-1 / EN 60332-1.  
Fire non-propagation according to EN 60332-3 / IEC 60332-3 and EN 50399.  
Reaction to fire CPR: B2<sub>ca</sub>-s1a,d1, a1 or C<sub>ca</sub>-s1a,d1,a1 according to EN 50575 (see cross-section).  
Low Smoke Halogen Free according to EN 60754-1 / IEC 60754-1.  
Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.  
Low smoke emission according to EN 61034 / IEC 61034:  
Light transmittance > 80%.
- Mechanical performance**  
Minimum bending radius: 5x cable diameter.  
Impact resistance: AG2 Medium severity.
- Environmental performance**  
Chemical & Oil resistance: Acceptable.  
UV Resistant according to EN 50618.  
Water resistance: AD8 Submersion.
- Installation conditions**  
Open Air.  
Buried.  
In conduit.

## STANDARDS / COMPLIANCE



According to  
IEC 60502-1 / UNE 21123-4



Standards and approvals  
AENOR / SEC / KEMA-KEUR / RoHS / CE



CPR (Construction Products Regulation)  
B2<sub>ca</sub>-s1a,d1,a1 (according to cross-section) or  
C<sub>ca</sub>-s1a,d1,a1 (according to cross-section)







**B2<sub>ca</sub>**

## APPLICATION

Toxfree® ZH YMz1K is a LSHF safety cable for fixed installations. In the event of fire, it does not emit toxic gases, nor does it give off corrosive gases, avoiding any possible damage to people or electronic equipment. For these reasons it is highly recommended for use in public places such as: hospitals, schools, museums, airports, bus terminals, shopping malls, offices, laboratories, etc.

- Industrial use.
- Public places.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 1 according to EN 60228 and IEC 60228.

### Insulation

Cross-linked polyethylene type XLPE according to HD 604.

The standard identification of insulated conductors, according to HD 308 is the following:

|     |  |
|-----|--|
| 1 x | Black                                      |
| 2 x | Blue + Brown                               |
| 3 G | Blue + Brown + Green/Yellow                |
| 4 G | Brown + Black + Grey + Green/Yellow        |
| 5 G | Brown + Black + Grey + Blue + Green/Yellow |

### Outer sheath

Low smoke halogen free polyolefin.

Grey colour, non-toxic and fire retardant.

## CHARACTERISTICS



### Electrical performance

Low voltage: 0,6/1 kV



### Thermal performance

Maximum conductor temperature: 90°C.

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

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



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.

Fire non-propagation according to EN 60332-3 / IEC 60332-3 and EN 50399.

Reaction to fire CPR: B2<sub>ca</sub>-s1a,d1,a1 according to 50575.

Low smoke halogen free according to EN60754-1 / IEC 60754-1.

Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.

Low smoke emission according to EN 61034 / IEC 61034:

Light transmittance > 80%.



### Mechanical performance

Minimum bending radius: 8x cable diameter.

Impact resistance: AG2 Medium severity.



### Environmental performance

Chemical & Oil resistance: Acceptable.

UV Resistant according to EN 50618.

Water resistance: AD5 Jets.

## STANDARDS / COMPLIANCE



### According to

HD 604 / DEKRA K 42D-1-5-C.



### Standards and approvals

AENOR / KEMA-KEUR / RoHS / CE



### CPR (Construction Products Regulation)

B2<sub>ca</sub>-s1a, d1, a1.





**B2<sub>ca</sub>/C<sub>ca</sub>**



## APPLICATION

Toxfree® ZH N1 X1G1 Flex is a LSHF safety cable. In the event of fire, it does not emit toxic gases, nor does it give off corrosive gases, avoiding any possible damage to people or electronic equipment. For these reasons it is highly recommended for use in public places such as: hospitals, schools, museums, airports, bus terminals, shopping centers, offices, laboratories, etc.

- Industrial use.
- Public places.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible) according to EN 60228 and IEC 60228.

### Insulation

Cross-linked polyethylene type XLPE according to IEC 60502-1 and type DIX-3 according to HD 603.

The standard identification of insulated conductors according to HD 308 is the following:

|           |   |
|-----------|---|
| 1 x       | Natural   |
| 2 x       | Blue + Brown  |
| 3 G       | Blue + Brown + Green/Yellow                         |
| 3 x       | Brown + Black + Grey                                |
| 3 x + 1 x | Brown + Black + Grey + Blue (reduced cross-section) |
| 4 G       | Brown + Black + Grey + Green/Yellow                 |
| 4 x       | Brown + Black + Grey + Blue                         |
| 5 G       | Brown + Black + Grey + Blue + Green/Yellow          |


### Outer sheath


Low smoke halogen free polyolefin, type ST8 according to IEC 60502-1.


Green colour.


## CHARACTERISTICS


 **Electrical performance**  
Low voltage: 0,6/1 kV

 **Thermal performance**  
Maximum conductor temperature: 90°C.  
Maximum short-circuit temperature: 250°C (max. 5 s).  
Minimum service temperature: -40°C (fixed and protected installations).  
Minimum installation and handling temperature: -0°C.




 **Fire performance**  
Flame non-propagation according to IEC 60332-1 / EN 60332-1.  
Fire non-propagation according to EN 60332-3 / IEC 60332-3 and EN 50399.  
Reaction to fire CPR: B2<sub>ca</sub>-s1a,d1, a1 or C<sub>ca</sub>-s1a,d1,a1 according to EN 50575 (see cross-section).  
Low smoke halogen free according to EN 60754-1 / IEC 60754-1.  
Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.  
Low smoke emission according to EN 61034 / IEC 61034:  
Light transmittance > 80%.

 **Mechanical performance**  
Minimum bending radius: 5x cable diameter.  
Impact resistance: AG2 Medium severity.

 **Environmental performance**  
Chemical & Oil resistance: Acceptable.  
UV Resistant according to EN 50618.  
Water resistance: AD8 Submersion.

 **Installation conditions**  
Open Air.  
Buried.  
In conduit.

## STANDARDS / COMPLIANCE

-  **Based on**  
NF-C 32-321  
**According to**  
IEC 60502-1
-  **Standards and approvals**  
AENOR / SEC / KEMA-KEUR / RoHS / CE / UKCA
-  **CPR (Construction Products Regulation)**  
B2<sub>ca</sub>-s1a,d1,a1 (according to cross-section) or  
C<sub>ca</sub>-s1a,d1,a1 (according to cross-section)







# TOXFREE<sup>®</sup> PLUS 331 ZH RZ1-K (AS+) FR2

LSHF and fire resistant power cable, for emergency circuits.  
ACCORDING TO: IEC 60502-1 / UNE 211025



**B2<sub>ca</sub> / C<sub>ca</sub>**



## APPLICATION

Toxfree<sup>®</sup> Plus 331 ZH RZ1-K (AS+) is a fire resistant cable, specially designed to ensure the power supply to emergency circuits in the event of fire. During a fire you need critical circuits to work for life safety (signalling lights, fume extractors, acoustic alarms, water pumps, etc) and a secure plant shutdown. For this reason, its use is highly recommended in public places such as: hospitals, tunnels, offices, production plants, laboratories, hotels, etc.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible) according to EN 60228 and IEC 60228.

### Insulation

Mica tape + Cross-linked polyethylene type DIX-3 according to HD 603.

The standard identification of insulated conductors according to HD 308 is the following:

|           |   |
|-----------|---|
| 1 x       | Natural   |
| 2 x       | Blue + Brown  |
| 3 G       | Blue + Brown + Green/Yellow                         |
| 3 x       | Brown + Black + Grey                                |
| 3 x + 1 x | Brown + Black + Grey + Blue (reduced cross-section) |
| 4 G       | Brown + Black + Grey + Green/Yellow                 |
| 4 x       | Brown + Black + Grey + Blue                         |
| 5 G       | Brown + Black + Grey + Blue + Green/Yellow          |

### Outer sheath

Fireproof polyolefin with low smoke and halogen free fumes under fire conditions.  
Orange colour.

## CHARACTERISTICS



### Electrical performance

Low voltage: 0,6/1 kV.



### Thermal performance

Maximum conductor temperature: 90°C.

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

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

Minimum installation and handling temperature: -0°C



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.

Fire non-propagation according to EN 60332-3 / IEC 60332-3 and EN 50399.

Fire resistant (PHI20) minimum 120 minutes at 840 °C:

According to IEC 60331-2 / EN 50200 for cable diameter ≤ 20 mm.

According to IEC 60331-1 / EN 50362 for cable diameter > 20 mm.

Fire resistant category C (180 minutes at 950°C), W & Z according to BS 6387.

Fire resistant category Rf 1h30 or Rf 1h (according to cross-section) according to NBN S21-300-1.

Reaction to fire CPR: B2<sub>ca</sub>-s1a,d1,a1 or C<sub>ca</sub>-s1b,d1,a1 according to EN 50575 (see cross-section).

Low Smoke Halogen Free according to EN 60754-1 / IEC 60754-1.

Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.

Low smoke emission according to EN 61034 / IEC 61034:

Light transmittance > 60%.



### Mechanical performance

Minimum bending radius: 5x cable diameter.

Impact resistance: AG2 Medium severity.



### Environmental performance

Chemical & Oil resistance: acceptable.

UV Resistant according to EN 50618.

Water resistance: AD5 Jets.



### Installation conditions

Open Air.

Buried.

In conduit.

## STANDARDS / COMPLIANCE



### According to

IEC 60502-1 / UNE 211025



### Standards and approvals

AENOR / RoHS / CE



### CPR (Construction Products Regulation)

B2<sub>ca</sub>-s1a,d1,a1 (according to cross-section) or

C<sub>ca</sub>-s1b,d1,a1 (according to cross-section)





## APPLICATION

Toxfree® ZH RZ1FZ1-K (AS) is an armoured LSHF safety cable. In case of fire, it does not emit toxic or corrosive gases, thereby protecting public health and avoiding any possible damage to electronic equipment.

Its use is highly recommended for public places, in installations with presence of rodents, and installations where the cable is subject to risk of mechanical aggression.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible), according to EN 60228 and IEC 60228.

### Insulation

Cross-linked polyethylene type XLPE according to IEC 60502-1 and type DIX-3 according to HD 603.

The standard identification of insulated conductors according to HD 308 is the following:

|           |  |
|-----------|--|
| 1 x       | Natural                                    |
| 2 x       | Blue + Brown                               |
| 3 G       | Blue + Brown + Green/Yellow                |
| 3 x       | Brown + Black + Grey                       |
| 4 G       | Brown + Black + Grey + Green/Yellow        |
| 4 x       | Brown + Black + Grey + Blue                |
| 5 G       | Brown + Black + Grey + Blue + Green/Yellow |
| 6 or more | Black numbered + Green/Yellow              |

### Separation sheath

Low smoke halogen free polyolefin.

### Armour

Double steel or aluminium tape armour.

Aluminium armour is used in single-core cables to avoid parasite currents that may overheat the cable.

Steel tape is used in the multicore cables.

### Outer sheath

Low smoke halogen free polyolefin type ST8 according to IEC 60502-1 and type DMZ-E according to UNE 21123-4.

Green colour.

## CHARACTERISTICS

### Electrical performance

Low voltage: 0,6/1 kV

### Thermal performance

Maximum conductor temperature: 90°C.

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

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

### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.

Fire non-propagation according to EN 60332-3 / IEC 60332-3 and EN 50399.

Reaction to fire CPR: C<sub>ca</sub>-s1b, d1, a1, according to EN 50575.

Low Smoke Halogen Free according to EN60754-1 / IEC60754-1.

Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.

Low smoke emission according to EN 61034 / IEC 61034:

Light transmittance > 60%.

### Mechanical performance

Minimum bending radius: 10x cable diameter.

Impact resistance: AG4 High severity.

Rodent proof.

### Environmental performance

Chemical & Oil resistance: acceptable.

UV Resistant according to EN 50618.

Water resistance: AD5 Jets.

### Installation conditions

Open Air.

Buried.

In conduit.

## STANDARDS / COMPLIANCE



According to  
IEC 60502-1 / UNE 21123-4



Standards and approvals  
RoHS / CE



CPR (Construction Products Regulation)  
C<sub>ca</sub>-s1b, d1, a1







## APPLICATION

Toxfree® RZ1MZ1-K (AS) is a LSHF is a safety cable. In case of fire, it does not emit toxic or corrosive gases, protecting people and avoiding possible damage to electronic equipment. Therefore, its use is recommended for public places, in hazardous areas with explosive gas atmospheres (ATEX), and installations where the cable is subject to risk of mechanical aggression.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible), according to EN 60228 and IEC 60228.

### Insulation

Cross-linked polyethylene type DIX-3 according to HD 603 and type XLPE according to IEC 60502-1.

The standard identification of insulated conductors according to HD 308 is:

|           |   |
|-----------|---|
| 1 x       | Natural   |
| 2 x       | Blue + Brown  |
| 3 G       | Blue + Brown + Green/Yellow                         |
| 3 x       | Brown + Black + Grey                                |
| 3 x + 1 x | Brown + Black + Grey + Blue (reduced cross-section) |
| 4 G       | Brown + Black + Grey + Green/Yellow                 |
| 4 x       | Brown + Black + Grey + Blue                         |
| 5 G       | Brown + Black + Grey + Green/Yellow + Blue          |
| 6 or more | Black numbered + Green/Yellow                       |

### Armour bedding

Low smoke halogen free polyolefin.

### Armour

Galvanized steel wire armour.

Aluminium armour is used in single core cables to avoid parasite currents that may overheat the cable.

### Outer sheath

Low smoke halogen free polyolefin, type ST8 according to IEC 60502-1.

Black colour.

## CHARACTERISTICS

### Electrical performance

Low voltage: 0,6/1 kV

### Thermal performance

Maximum conductor temperature: 90°C.  
Maximum short-circuit temperature: 250°C (max. 5 s).  
Minimum service temperature: -50 °C according to GOST 31996.  
Minimum installation and handling temperature: 0 °C

### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.  
Fire non-propagation according to EN 60332-3-24 / IEC 60332-3-24 and EN 50399.  
Reaction to fire CPR: C<sub>ca</sub>-s1b, d1, a1 according to EN 50575.  
Low smoke halogen free according to EN 60754-1 / IEC 60754-1.  
Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.  
Low smoke emission according to EN 61034 / IEC 61034:  
Light transmittance > 60%.

### Mechanical performance

Minimum bending radius: 10x cable diameter.  
Impact resistance: AG4 High severity.  
Rodent proof.

### Environmental performance

Chemical & Oil resistance: Acceptable.  
Hydrocarbon resistant.  
UV Resistant according to EN 50618.  
Potentially explosion hazard locations (ATEX).  
Water resistance: AD5 Jets.

### Installation conditions

Open Air.  
Buried.  
In Conduit.

## STANDARDS / COMPLIANCE



According to  
IEC 60502-1



Standards and approvals  
CE / RoHS



CPR (Construction Products Regulation)  
C<sub>ca</sub>-s1b, d1, a1





**B2<sub>ca</sub>**

## APPLICATION

Toxfree® ZH RZ1 (AS) Al is an aluminium LSHF cable for fixed installations.

These cables are specially recommended for installation in public places and in installations where safety is a priority.

## CONSTRUCTION

### Conductor

Aluminium class 2 according to EN 60228 and IEC 60228.

### Insulation

Cross-linked polyethylene type XLPE according to IEC 60502-1 and type DIX-3 according to HD 603.

The standard identification of insulated conductors according to HD 308 is the following:

|     |                             |
|-----|-----------------------------|
| 1 x | Natural                     |
| 3 x | Brown + Black + Grey        |
| 4 x | Brown + Black + Grey + Blue |

### Outer sheath

Low smoke halogen free polyolefin.

Green colour. Other outer sheath colours available on request.

## CHARACTERISTICS

### Electrical performance

Low voltage: 0,6/1 kV

### Thermal performance

Maximum conductor temperature: 90°C.

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

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

Minimum installation and handling temperature: -0°C.

### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.

Fire non-propagation according to EN 60332-3 / IEC 60332-3 and EN 50399.

Reaction to fire CPR: B2ca -s1a, d1, a1 (for single core cables) and B2ca -s1b, d1, a1 (for multicore cables) according to EN 50575.

Low smoke halogen free according to EN 60754-1 / IEC60754-1.

Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.

Low smoke emission according to EN 61034 / IEC 61034:

Light transmittance > 60%.

### Mechanical performance

Minimum bending radius: 5x cable diameter.

Impact resistance: AG2 Medium severity.

### Environmental performance

Chemical & Oil resistance: Acceptable.

UV Resistant according to UNE 211605 and EN 50618.

Water resistance: AD8 Submersion.

### Installation conditions

Open Air.

Buried.

In conduit.

## STANDARDS / COMPLIANCE



### According to

IEC 60502-1 / UNE 21123-4



### Standards and approvals

RoHS / CE



### CPR (Construction Products Regulation)

B2ca -s1a, d1, a1 (single core cables)

B2ca -s1b, d1, a1 (multicore cables).







**B2<sub>ca</sub>**

## APPLICATION

Toxfree® ZH Z1Z1-U is a LSHF safety cable. In the event of fire, it does not emit toxic gases, nor does it give off corrosive gases, avoiding any possible damage to people or electronic equipment. For these reasons it is highly recommended for use in public places such as: hospitals, schools, museums, airports, bus terminals, shopping malls, offices, laboratories, etc.

- Industrial use.
- Public places.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 1, according to EN 60228 and IEC 60228.

### Insulation

Low smoke halogen free (LSHF) polyolefin insulation.

The standard identification of insulated conductors according to HD 308 is the following:

- 3 G Brown + Blue + Green/Yellow
- 5 G Brown + Black + Grey + Blue + Green/Yellow

### Outer sheath

Low smoke halogen free (LSHF) polyolefin under fire conditions. Light grey colour.

## CHARACTERISTICS



### Electrical performance

Low voltage: 300/500 V.



### Thermal performance

Maximum conductor temperature: 70°C.  
Maximum short-circuit temperature: 160°C (max. 5 s).  
Minimum service temperature: -30°C (fixed installation).



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.  
Fire non-propagation according to EN 60332-3 / IEC 60332-3 and EN 50399.  
Reaction to fire CPR: B2<sub>ca</sub>-s1a,d1,a1, according to EN 50575.  
Low Smoke Zero Halogen according to EN 60754-1 / IEC 60754-1.  
Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.  
Low smoke emission according to EN 61034 / IEC 61034:  
Light transmittance > 80%.



### Mechanical performance

Minimum bending radius: 8x cable diameter.



### Environmental performance

Chemical & Oil resistance: Acceptable.  
UV Resistant according to EN 50618.  
Water resistance: AD5 jets.



### Other

Meter by meter marking.

## STANDARDS / COMPLIANCE



### According to

HD 604.5D / VDE 0250-215



### Standards and approvals

RoHS / CE.



### CPR (Construction Products Regulation)

B2<sub>ca</sub>-s1a,d1,a1





**B2<sub>ca</sub>**

### APPLICATION

Toxfree® ES05Z1-K (AS)/H05Z1-K & H07Z1-K (AS) Type 2 is a LSHF safety cable. In the event of fire, it does not emit toxic gases, nor does it give off corrosive gases, avoiding any possible damage to people or electronic equipment.

For these reasons it is highly recommended for use in public places such as: hospitals, schools, museums, airports, bus terminals, shopping malls, offices, laboratories, etc.

### CONSTRUCTION

#### Conductor

Electrolytic annealed copper, class 5 (flexible) according to EN 60228 and IEC 60228.

#### Insulation

Polyolefin, halogen free and low smoke under fire conditions, type TIZI according to UNE 211002 and type T17 according to EN 50363-7.

The standard identification of insulated conductors is the following:

|              |               |
|--------------|---------------|
| Blue         | RAL 5015      |
| Brown        | RAL 8003      |
| Black        | RAL 9005      |
| Red          | RAL 3000      |
| Green/Yellow | RAL 6018/1021 |
| Grey         | RAL 7000      |
| Dark Blue    | RAL 5010      |
| White        | RAL 9010      |

Other colours available on request.

### CHARACTERISTICS



#### Electrical performance

Low voltage: 300/500 V and 450/750 V.

Rated Voltage: ES05Z1-K/H05Z1-K (up to 1 mm<sup>2</sup>): 300/500 V.

H07Z1-K (from 1,5 mm<sup>2</sup> onwards): 450/750 V.



#### Thermal performance

Maximum conductor temperature: 70°C.

Maximum short-circuit temperature: 160°C (max. 5 s).

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



#### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.

Fire non-propagation according to EN 60332-3 / IEC 60332-3 and EN 50399.

Reaction to fire CPR: B2ca-s1a, d1, a1 (cable H07Z1-K from 1,5 mm<sup>2</sup> to 240 mm<sup>2</sup>) according to EN 50575.

Low smoke halogen free according to EN 60754-1 / IEC 60754-1.

Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.

Low smoke emission according to EN 61034 / IEC 61034:

Light transmittance > 80%.



#### Mechanical performance

Minimum bending radius: 5x cable diameter.



#### Environmental performance

Chemical & Oil resistance: Acceptable.

### STANDARDS / COMPLIANCE



#### According to

EN 50525-3-31 / UNE 211002



#### Standards and approvals

HAR / AENOR / BUREAU VERITAS / RoHS / SEC / CE



#### CPR (Construction Products Regulation)

B2ca-s1a, d1, a1 (cable H07Z1-K from 1,5 mm<sup>2</sup> to 240 mm<sup>2</sup>)







**B2<sub>ca</sub> / C<sub>ca</sub>**

## APPLICATION

Toxfree® Xtrem ZH H07ZZ-F (AS) is a flexible cable for mobile service, suitable for installations where low smoke and halogen free fumes under fire conditions are required. The use nominal voltage up to 1000 V is accepted in fixed protected assemblies. Suitable for installations where the cable must withstand medium mechanical stress, for machines in industrial and agricultural workshops, for motors and transportable machines on construction sites, for windmills and for agricultural applications.

- Industrial use.
- Mobile use.
- Windmills.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible) according to EN 60228 and IEC 60228.

### Insulation

Halogen free thermosetting rubber, type EI8 according to EN 50363-5.

The standard identification according to HD 308, is the following:

|           |  |
|-----------|--|
| 1 x       | Natural                                    |
| 2 x       | Blue + Brown                               |
| 3 G       | Blue + Brown + Green/Yellow                |
| 4 G       | Brown + Black + Grey + Green/Yellow        |
| 5 G       | Brown + Black + Grey + Blue + Green/Yellow |
| 6 or more | Black numbered + Green/Yellow              |

### Outer sheath

Halogen free thermosetting flexible rubber, type EM8 according to EN 50363-6.  
Black colour.

## CHARACTERISTICS



### Electrical performance

Low voltage: 450/750 V.



### Thermal performance

Maximum conductor temperature: 90°C.  
Maximum short-circuit temperature: 250°C (max. 5 s).  
Minimum temperature in mobile service: -40°C.



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.  
Fire non-propagation according to EN 60332-3-24 / IEC 60332-3-24 and EN 50399.  
Reaction to fire CPR: B2<sub>ca</sub>-s1b, d1, a1 or Cca-s1b, d2, a1 according to EN 50575 (see cross-section).  
Halogen free according to EN 60754-1 / IEC 60754-1.  
Low corrosive gases emission according to UNE-EN 60754-2 / IEC 60754-2.  
Low smoke emission according to EN 61034 / IEC 61034:  
Light transmittance > 60%.



### Mechanical performance

Minimum bending radius: 3x cable diameter < 12 mm.  
4x cable diameter ≥ 12 mm.  
Impact resistance: AG2 Medium severity.



### Environmental performance

Chemical & Oil resistance: Excellent.  
Grease & mineral oils resistance: Excellent.  
Water resistance: AD7 immersion.



### Installation conditions

Open Air.  
In conduit.



### Other

Meter by meter marking.

## STANDARDS / COMPLIANCE



According to  
EN 50525-3-21



Standards and approvals  
HAR / AENOR / CE



CPR (Construction Products Regulation)  
B2<sub>ca</sub>-s1b, d1, a1. (according to cross-section) or  
Cca-s1b, d2, a1. (according to cross-section)





**B2<sub>ca</sub>**

## APPLICATION

Toxfree® ZH H05Z1Z1-F is a LSHF safety cable. In the event of fire, it does not emit toxic gases, nor does it give off corrosive gases, avoiding any possible damage to people or electronic equipment. For these reasons it is highly recommended for use in public places such as: hospitals, schools, museums, airports, bus terminals, shopping malls, offices, laboratories, etc.

- Industrial use.
- Public places

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible) according to EN 60228 and IEC 60228.

### Insulation

Low smoke zero halogen polyolefin, type TI6 according to EN 50363-7.

The standard identification of insulated conductors according to HD 308 is the following:

|     |  |
|-----|--|
| 2 x | Blue + Brown                               |
| 3 G | Blue + Brown + Green/Yellow                |
| 3 X | Brown + Black + Grey                       |
| 4 X | Brown + Black + Grey + Blue                |
| 4 G | Brown + Black + Grey + Green/yellow        |
| 5 G | Brown + Black + Grey + Blue + Green/yellow |

### Outer sheath

Low Smoke Halogen Free polyolefin, type TM7 according to EN 50363-8.

White colour, non-toxic and fire retardant.

Other outer sheath colours available on request.

## CHARACTERISTICS



### Electrical performance

Low voltage: 300/500 V.



### Thermal performance

Maximum conductor temperature: 70°C.

Maximum short-circuit temperature: 160°C (max. 5 s).

Minimum service temperature: -30°C (static with protection).



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.

Fire non-propagation according to EN 60332-3 / IEC 60332-3 and EN 50399.

Reaction to fire CPR: B2<sub>ca</sub>-s1a,d1,a1 according to EN 50575.

Low Smoke Halogen Free according to EN 60754-1 / IEC 60754-1.

Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.

Low smoke emission according to EN 61034 / IEC 61034:

Light transmittance > 80%.



### Mechanical performance

Minimum bending radius: 8x cable diameter.



### Environmental performance

Chemical & Oil resistance: Acceptable.

Water resistance: AD5 Jets.



### Installation conditions

Open Air.

In conduit.

## STANDARDS / COMPLIANCE



According to  
EN 50525-3-11



Standards and approvals  
RoHS / CE



CPR (Construction Products Regulation)  
B2<sub>ca</sub>-s1a, d1, a1







## CONTROL & SCREENED **CABLES**

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Flexible cable for connecting small electrical appliances.

ACCORDING TO: EN 50525-2-11 / IEC 60227-5



E<sub>ca</sub>

## APPLICATION

Topflex® VV-F H05VV-F cable has been specially designed for connecting small home appliances such as vacuum cleaners, washing machines, refrigerators, etc.

It is recommended for household installations and can also be used for light mobile services.

These cables are also suitable for fixed applications in furniture, wall partitions, and in hollow spaces of prefabricated building parts.

- Mobile use.
- Domestic use.
- Domestic appliances.
- Temporary appliances.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible) according to EN 60228 and IEC 60228.

### Insulation

Flexible PVC, type TI2 according to EN 50363-3 and type PVC/D according to IEC 60227-1.

The standard identification of insulated conductors, according to UNE 21089-1 and HD 308 is the following:

- 2 x Blue + Brown
- 3 G Blue + Brown + Green/Yellow
- 4 G Brown + Black + Grey + Green/Yellow
- 5 G Brown + Black + Grey + Blue + Green/Yellow

### Outer sheath

Flexible PVC, type TM2 according to EN 50363-4-1 and type PVC/ST5 according to IEC 60227-1.

Grey, white or black are the standard outer sheath colours.

Other colours available on request.

## CHARACTERISTICS



### Electrical performance

Low voltage: 300/500 V.



### Thermal performance

Maximum conductor temperature: 70°C.

Maximum short-circuit temperature: 160°C (max. 5 s).

Minimum service temperature: 5°C



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.

Reaction to fire CPR: E<sub>ca</sub> according to EN 50575.

Low halogen emission. Chlorine < 15%.



### Mechanical performance

Minimum bending radius:

3 x cable diameter < 12 mm.

4 x cable diameter ≥ 12 mm.

Impact resistance: AG2 Medium severity.



### Environmental performance

Chemical & Oil resistance: Good.

Water resistance: AD5 Jets.



### Installation conditions

Open Air.

Buried.

In conduit.

## STANDARDS / COMPLIANCE



### According to:

EN 50525-2-11 / IEC 60227-5



### Standards and approvals

HAR / AENOR / SEC / RoHS / CE



### CPR (Construction Products Regulation)

E<sub>ca</sub>







**E<sub>ca</sub>**

## APPLICATION

Flexitel® 110 ES05VV-F is a flexible cable for mobile service. Suitable for the connection of machinery parts used in manufacturing, including machine tools.

Suitable for indoor use.

Its installation is recommended in fixed ducts.

- Mobile use.
- Domestic use.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible) according to EN 60228 and IEC 60228.

### Insulation

Flexible PVC, type T12 according to EN 50363-3

The standard identification of insulated conductors according to EN 50334 is the following:

6 or more Black numbered + Green/Yellow

### Outer sheath

Flexible PVC, type TM2 according to EN 50363-4-1.

Grey or black colour.

## CHARACTERISTICS



### Electrical performance

Low voltage: 300/500 V.

Test voltage: 2000 V / 5 min.



### Thermal performance

Maximum conductor temperature: 70°C.

Maximum short-circuit temperature: 160°C (max. 5 s).

Minimum service temperature: 0°C (mobile service) and -30°C (fixed installation).



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.

Reaction to fire CPR: E<sub>ca</sub> according to EN 50575.

Low halogen emission. Chlorine < 15%.



### Mechanical performance

Minimum bending radius: 5x cable diameter.

Impact resistance: AG2 Medium severity.



### Environmental performance

Chemical & Oil resistance: Good.

UV Resistant according to UNE 211605.

Water resistance: AD5 Jets.



### Installation conditions

Open Air.

Buried.

In conduit.

## STANDARDS / COMPLIANCE



### According to:

UNE 21031



### Standards and approvals

RoHS / CE



### CPR (Construction Products Regulation)

E<sub>ca</sub>





**E<sub>ca</sub>**



## APPLICATION

Flexitel® H05VV5-F is a cable for signalling and control systems. It is especially suitable for connecting industrial equipment and machine tools. Due to its properties, it is recommended for robotics and light mobile services. Its special vinyl outer sheath compound is particularly resistant to mineral oils and other chemical agents. It can be installed in either dry or humid environments.

- Industrial use.
- Mobile use.
- Robotics.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible) according to EN 60228 and IEC 60228.

### Insulation

Flexible PVC, type T12 according to EN 50363-3.

The standard identification of insulated conductors, according to EN 50334 and HD 308 is the following:

- 2 x Black numbered
- 3 or more Black numbered + Green/Yellow

### Outer sheath

Flexible and oil resistant PVC, type TM5 according to EN 50363-4-1. Grey colour.

## CHARACTERISTICS



### Electrical performance

Low voltage: 300/500 V.



### Thermal performance

Maximum conductor temperature: 70°C.  
Maximum short-circuit temperature: 160°C (max. 5 s).  
Minimum service temperature: 5°C



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.  
Reaction to fire CPR: E<sub>ca</sub> according to EN 50575.



### Mechanical performance

Minimum bending radius:  
3x cable diameter < 12 mm.  
4x cable diameter ≥ 12 mm.  
Impact resistance: AG2 Medium severity.



### Environmental performance

Chemical & Oil resistance: Excellent.  
Grease & mineral oils resistance: Excellent.  
Water resistance: AD5 Jets.



### Installation conditions

Open Air.  
In conduit.

## STANDARDS / COMPLIANCE



According to  
EN 50525-2-51 / IEC 60227



Standards and approvals  
HAR / AENOR / RoHS / CE



CPR (Construction Products Regulation)  
E<sub>ca</sub>







**E<sub>ca</sub>**

## APPLICATION

Flexitel® 200 VV-K cable is suitable for fixed installations with complex layouts where flexible cables are required. It is also ideal for connecting motors or frequency converters.

The characteristics of the outer sheath material make this cable extremely versatile as it provides a high level of protection in all types of environments.

- Industrial use

## CONSTRUCTION

### Conductor

Electrolytic annealed copper conductor class 5 (flexible) according to EN 60228 and IEC 60228.

### Insulation

Flexible PVC type PVC/A according to IEC 60502-1.

The standard identification of insulated conductors, according to HD 308 and HD 186 is the following:

|           |  |
|-----------|--|
| 1 x       | Natural                                    |
| 2 x       | Brown + Blue                               |
| 3 G       | Blue + Brown + Green/Yellow                |
| 3 x       | Brown + Black + Blue                       |
| 4 G       | Brown + Black + Blue + Green/Yellow        |
| 4 x       | Brown + Black + Grey + Blue                |
| 5 G       | Brown + Black + Grey + Blue + Green/Yellow |
| 6 or more | Black numbered + Green/Yellow              |

\* Other identifications are possible on request.


### Outer sheath


Flexible PVC type ST1 according to IEC 60502-1.


Black colour.


Other colours available on request.


## CHARACTERISTICS


-  **Electrical performance**  
Low voltage: 0,6/1 kV.

-  **Thermal performance**  
Maximum conductor temperature: 70°C.  
Maximum short-circuit temperature: 160°C (max. 5 s).  
Minimum service temperature: -40°C (fixed and protected installation).

-  **Fire performance**  
Flame non-propagation based on EN 60332-1 / IEC 60332-1.  
Reaction to fire CPR: E<sub>ca</sub> according to EN 50575.  
Low halogen emission. Chlorine < 15%.

-  **Mechanical performance**  
Minimum bending radius: 5x cable diameter.  
Impact resistance: AG2 Medium severity.

-  **Environmental performance**  
Chemical & Oil resistance: Good.  
UV Resistant according to UNE 211605, Annex A.2  
Water resistance: AD5 Jets.

-  **Installation conditions**  
Open Air.  
Buried.  
In conduit.

## STANDARDS / COMPLIANCE



**Based on:**  
IEC 60502-1



**Standards and approvals**  
RoHS / CE



**CPR (Construction Products Regulation)**  
E<sub>ca</sub>





**B2<sub>ca</sub>**

## APPLICATION

Toxfree® ZH Z1Z1-K (AS) is a LSHF safety cable. In the event of fire, it does not emit toxic gases, nor does it give off corrosive gases, avoiding any possible damage to people or electronic equipment. For these reasons it is highly recommended for use in public places such as: hospitals, schools, museums, airports, bus terminals, shopping malls, offices, laboratories, etc.

- Industrial use.
- Public places.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible) according to EN 60228 and IEC 60228.

### Insulation

Special low smoke and halogen free polyolefin.

The standard identification of insulated conductors according to HD 308 is the following:

6 G or more      Black numbered + Green/Yellow

### Outer sheath

Low smoke halogen free polyolefin, not toxic and fire retardant. Green colour.

Other outer sheath colours available on request.

## CHARACTERISTICS

### Electrical performance

Low voltage: 0,6/1 kV.

### Thermal performance

Maximum conductor temperature: 70°C.

Maximum short-circuit temperature: 160°C (max. 5 s).

Minimum service temperature: -40°C (static, with protection).

### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.

Fire non-propagation according to EN 60332-3 / IEC 60332-3 and EN 50399.

Reaction to fire CPR: B2<sub>ca</sub>-s1a, d1, a1 according to EN 50575.

Low smoke halogen free according to EN 60754-1 / IEC 60754-1.

Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.

Low smoke emission according to EN 61034 / IEC 61034:

Light transmittance > 80%.

### Mechanical performance

Minimum bending radius: 5x cable diameter.

Impact resistance: AG2 Medium severity.

### Environmental performance

Chemical & Oil resistance: Acceptable.

UV Resistant according to UNE 211605 and EN 50618.

Water resistance: AD5 Jets.

### Installation conditions

Open Air.

Buried.

In conduit.

## STANDARDS / COMPLIANCE



### Based on:

IEC 60502-1 / UNE 21123-4



### Standards and approvals

RoHS / CE



### CPR (Construction Products Regulation)

B2<sub>ca</sub>-s1a, d1, a1





**C<sub>ca</sub> / E<sub>ca</sub>**



## APPLICATION

Screenflex<sup>®</sup> 110/200 LiYCY VC4V-K is a screened control cable. It is used in all types of signal transmission connections where the voltage induced by an exterior electromagnetic field may affect the signal transmitted.

Its most common applications are control circuits, electronic equipment connections, computer systems, etc.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible) according to EN 60228 and IEC 60228.

### Insulation

Flexible PVC type TI2 according to EN 50363-3 and type PVC/A according to IEC 60502-1.

The standard identification of insulated conductors according to HD 308 and EN 50334 is the following:

|           |  |
|-----------|--|
| 1 x       | Natural                                    |
| 2 x       | Blue + Brown                               |
| 3 G       | Blue + Brown + Green/Yellow                |
| 3 x       | Brown + Black + Grey                       |
| 4 G       | Brown + Black + Grey + Green/Yellow        |
| 4 x       | Brown + Black + Grey + Blue                |
| 5 G       | Brown + Black + Grey + Green/Yellow + Blue |
| 6 or more | Black numbered + Green/Yellow.             |

Other identifications (JZ, OZ, J, O) are available on request.

### Screen

Aluminium-polyester tape screen with overlapping tinned copper braid, ensuring full screening coverage.

### Outer sheath

Flexible PVC type TM2 according to EN 50363-4-1 and type ST1 according to IEC 60502-1.

Black or grey colour (grey for fire non-propagation).

The ripcord allows you to gently tear the outer-sheath and remove it without damaging the screen.

## CHARACTERISTICS



### Electrical performance

Low voltage: 300/500 V. (up to 1,5 mm<sup>2</sup>).  
0,6/1 kV (from 2,5mm<sup>2</sup> onwards).



### Thermal performance

Maximum conductor temperature: 70°C.  
Maximum short-circuit temperature: 160°C (max. 5 s).  
Minimum service temperature: -40°C (static, with protection).



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.  
Fire non-propagation according to EN 60332-3 / IEC 60332-3 (only grey outer sheath).

Reaction to fire CPR according to EN 50575:

C<sub>ca</sub> -s2, d1, a3 (grey outer sheath 300/500 V)

C<sub>ca</sub> -s3, d1, a3 (grey outer sheath 0,6/1 kV).

E<sub>ca</sub> (black outer sheath).

Low halogen emission. Chlorine < 15%.



### Mechanical performance

Minimum bending radius: 5x cable diameter.  
Impact resistance: AG2 Medium severity.



### Environmental performance

Chemical & Oil resistance: Good.  
UV Resistant according to UNE 211605.  
Water resistance: AD5 Jets.

## STANDARDS / COMPLIANCE



### Based on

EN 50525 / IEC 60502-1



### Standards and approvals

RoHS / CE



### CPR (Construction Products Regulation)

C<sub>ca</sub> -s2, d1, a3 (grey outer sheath 300/500 V)

C<sub>ca</sub> -s3, d1, a3 (grey outer sheath 0,6/1 kV)

E<sub>ca</sub> (black outer sheath).







C<sub>ca</sub>



## APPLICATION

Toxfree® Z1C4Z1-K is a screened LSHF safety cable. In case of fire, it does not emit toxic or corrosive gases, thereby protecting public health and avoiding any possible damage to electronic equipment. For this reason, its use is highly recommended for public places and for all installations where it is necessary avoid to electric interference of nearby circuits.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible) according to EN 60228 and IEC 60228.

### Insulation

Special polyolefin with low smoke and halogen free fumes under fire conditions.

The standard identification of insulated conductors according to HD 308 is the following:

|           |  |
|-----------|--|
| 1 x       | Natural                                    |
| 2 x       | Blue + Brown                               |
| 3 G       | Blue + Brown + Green/Yellow                |
| 4 G       | Brown + Black + Grey + Green/Yellow        |
| 4 x       | Brown + Black + Grey + Blue                |
| 5 G       | Brown + Black + Grey + Green/Yellow + Blue |
| 6 or more | Black numbered + Green/yellow              |

### Screen

Coverage of 100% composed by aluminium-polyester tape and tinned copper braid.

### Outer sheath


Low smoke halogen free polyolefin fire retardant. Green colour.


Other outer sheath colours available on request.


The ripcord allows you to gently tear the outer sheath allowing you to gently peel it away without damaging the screen.


## CHARACTERISTICS


 **Electrical performance**  
Low voltage: 0,6/1 kV

 **Thermal performance**  
Maximum conductor temperature: 70°C.  
Maximum short-circuit temperature: 160°C (max. 5 s).  
Minimum service temperature: -40°C (static, with protection).

 **Fire performance**  
Flame non-propagation according to EN 60332-1 / IEC 60332-1.  
Fire non-propagation according to EN 60332-3 / IEC 60332-3 and EN 50399.  
Reaction to fire CPR: C<sub>ca</sub>-s1a, d1, a1 according to 50575.  
Low smoke halogen free according to EN 60754-1 / IEC 60754-1.  
Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.  
Low smoke emission according to EN 61034 / IEC 61034:  
Light transmittance > 80%.

 **Mechanical performance**  
Minimum bending radius: 5x cable diameter.  
Impact resistance: AG2 Medium severity.

 **Environmental performance**  
Chemical & Oil resistance: Acceptable.  
UV Resistant according to EN 50618.  
Water resistance: AD5 Jets.

 **Installation conditions**  
Open Air.  
Buried.  
In conduit.

## STANDARDS / COMPLIANCE



**Based on**  
IEC 60502-1 / UNE 21123-4



**Standards and approvals**  
RoHS / CE



**CPR (Construction Products Regulation)**  
C<sub>ca</sub>-s1a, d1, a1





E<sub>ca</sub>



# TOPDATA®

## VHOV-K (PAR-POS) & VOV-K (POS) 300/500V

Flexible instrumentation screened cable.

BASED ON: EN 50288-7



### APPLICATION

TopData® VHOV-K (PAR-POS) & VOV-K (POS) is a flexible screened cable for signalling and control on industrial machinery facilities. The collective screen (VOV-K) and individual and collective screen (VHOV-K) make them especially suitable for areas where electrical noise protection is required.

### CONSTRUCTION

#### Conductor

Electrolytic annealed copper, class 5 (flexible) according to EN 60228 and IEC 60228.

#### Insulation

Flexible PVC.

The standard identification of insulated conductors is the following:

2 x Pairs numbered (black + blue).

Other colours available on request.

#### Assembly of cores

Stranded conductors in pairs.

#### Individual screen (VHOV-K (PAR-POS))

Individual polyester (per pair) composed by aluminium / polyester tape with 100% coverage + tinned copper drain wire.

#### Assembly of pairs

Cabled in concentric layers.

#### Collective Screen

Aluminium / polyester tape with 100% coverage + tinned copper drain wire.

#### Outer sheath

Flexible PVC.

Black colour.

The ripcord allows you to gently tear the outer-sheath and remove it without damaging the screen.

### CHARACTERISTICS

#### Electrical performance

Low voltage: 300/500 V.

#### Thermal performance

Maximum conductor temperature: 70°C.

Maximum short-circuit temperature: 160°C (max. 5 s).

Minimum service temperature: -30°C (fixed and protected installations).

#### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.

Reaction to fire CPR: E<sub>ca</sub> according to EN 50575.

Low halogen emission. Chlorine < 15%.

#### Mechanical performance

Minimum bending radius: 5x cable diameter.

Impact resistance: AG2 Medium severity.

#### Environmental performance

Chemical & Oil resistance: Good.

UV Resistant according to UNE 211605.

Water resistance: AD5 Jets.

#### Installation conditions

Open Air.

Buried.

In conduit.

### STANDARDS / COMPLIANCE



Based on  
EN 50288-7



Standards and approvals  
RoHS / CE



CPR (Construction Products Regulation)  
E<sub>ca</sub>



# TOPDRIVE® VFD (EMC) ROZ1-K (AS) 0,6/1 kV

Flexible LSHF screened cable for  
Variable Frequency Drive cables (VFD cables).

ACCORDING TO: IEC 60502-1 / IEC 60092-353



C<sub>ca</sub>

## APPLICATION

TOPDRIVE® VFD (EMC) ROZ1-K (AS) cable has been specially designed for Variable Frequency Drive Motors and installations where it is necessary to limit the effects of electromagnetic interference (EMI). This is a flexible cable for fixed installations, for variable speed motors or pumps.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible), according to EN 60228 and IEC 60228.

### Protective Conductor

The ground conductor is divided into three conductors; the equivalent cross-section is approximately 50% of the section of the phase conductor.

For 4G cables, ground conductor has the same cross-section as the phase conductors.

### Insulation

Cross-linked polyethylene type XLPE according to IEC 60502-1, type HF XLPE 90°C according to IEC 60092-360.

The standard identification of insulated conductors is the following:  
3 x +3 G Grey + Brown + Black + Green/Yellow (3 G) (from 6 mm<sup>2</sup> onwards)

4 G Grey + Brown + Black + Green/Yellow (up to 4 mm<sup>2</sup>)

### Assembly of cores

For 3x+3G cables, the three phase conductors are cabled helically with the three protective conductors distributed in the interstices. For 4G cables, the three phase conductors and protection conductor are cabled helically.

### Screen

Aluminium-polyester tape screen helically placed over the insulated conductors. Over the tape there is a tinned copper braid screen. The tape and the braid act as a double screen to cut out all of the electromagnetic interference, with a minimum total section of 10% of the phase conductor, ensuring a total shielding coverage.

### Outer sheath

Polyolefin type ST8 according to IEC 60502-1 and type SHF1 according to IEC 60092-360.

Black colour.

The ripcord allows you to tear the outer sheath without damaging the screen.

## CHARACTERISTICS



### Electrical performance

Low voltage: 0,6/1 kV



### Thermal performance

Maximum conductor temperature: 90°C.

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

Maximum ambient temperature: 60 °C.

Minimum installation and handling temperature: 0 °C.

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



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.

Fire non-propagation according to EN 60332-3 / IEC 60332-3 and EN 50399.

Reaction to fire CPR: C<sub>ca</sub>-s1a, d1, a1 according to EN 50575.

Low Smoke Halogen Free according to EN 60754-1 / IEC 60754-1.

Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.

Low smoke emission according to EN 61034 / IEC 61034:

Light transmittance > 80%.



### Mechanical performance

Minimum bending radius during installation: 10x cable diameter.

Impact resistance: AG2 Medium severity.



### Environmental performance

Chemical & Oil resistance: Acceptable.

UV Resistant according to EN 50618.

Water resistance: AD5 Jets.



### Installation conditions

Being very performant cables there are, however, certain precautions that must be taken into account during installation:

- Always respect the bending radius of the cable. Radius below the minimums indicated can cause damage or breakage in the outer sheath.

- Precautions design of the laying. It is necessary that the laying of the cable is done in a careful way, taking care not to damage the outer sheath in irregular areas, sharp edges, etc.

- Fixings/Fastenings. Adapt fastenings so that the cable adopts a natural position in the laying to avoid stress concentration in the outer sheath. Allow a certain degree of freedom of movement in order to absorb possible movements produced by temperature variations. Open Air. Buried. In conduit.

## STANDARDS / COMPLIANCE



### According to

IEC 60502-1 / IEC 60092-353



### Standards and approvals

BUREAU VERITAS / DNV-GL / ABS /



### CPR (Construction Products Regulation)

C<sub>ca</sub>-s1a, d1, a1







C<sub>ca</sub>



## APPLICATION

TOPDRIVE® VFD (EMC) ROZ1-K (AS) cable has been specially designed for Variable Frequency Drive Motors and installations where it is necessary to limit the effects of electromagnetic interference (EMI). This is a flexible cable for fixed installations, for variable speed motors or pumps.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible), according to EN 60228 and IEC 60228.

### Protective Conductor

The ground conductor is divided into three conductors; the equivalent cross-section is approximately 50% of the section of the phase conductor.

### Insulation

Cross-linked polyethylene type XLPE according to IEC 60502-1 and type HF XLPE 90°C according to IEC 60092-351.

The standard identification of insulated conductors is the following:  
3 x +3 G Grey + Brown + Black + Green/Yellow (3 G) (from 6 mm<sup>2</sup> onwards)

### Assembly of cores

For 3x+3G cables, the three phase conductors are cabled helically with the three protective conductors distributed in the interstices.

### Screen

Aluminium-polyester tape screen helically placed over the insulated conductors. Over the tape there is a tinned copper braid screen. The tape and the braid act as a double screen to cut out all of the electromagnetic interference, with a minimum total section of 10% of the phase conductor, ensuring a total shielding coverage.

### Outer sheath

Polyolefin type ST8 according to IEC 60502-1 and type SHF1 according to IEC 60092-360.

Black colour.

The ripcord allows you to tear the outer sheath without damaging the screen.

## CHARACTERISTICS



### Electrical performance

Low voltage: 1,8/3 kV



### Thermal performance

Maximum conductor temperature: 90°C.

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

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



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.

Fire non-propagation according to EN 60332-3 / IEC 60332-3 and EN 50399.

Reaction to fire CPR: C<sub>ca</sub>-s1a, d1, a1 according to EN 50575.

Low Smoke Halogen Free according to EN 60754-1 / IEC 60754-1.

Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.

Low smoke emission according to EN 61034 / IEC 61034:

Light transmittance > 80%.



### Mechanical performance

Minimum bending radius: 10x cable diameter.

Impact resistance: AG2 Medium severity.



### Environmental performance

Chemical & Oil resistance: Acceptable.

UV Resistant according to EN 50618.

Water resistance: AD5 Jets.



### Installation conditions

Open Air.

Buried.

In conduit.

## STANDARDS / COMPLIANCE



### According to

IEC 60502-1 / IEC 60092-353



### Standards and approvals

BUREAU VERITAS / DNV-GL / ABS /



### CPR (Construction Products Regulation)

C<sub>ca</sub>-s1a, d1, a1





# SOLAR **CABLES**

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**C<sub>ca</sub>**

## APPLICATION

The TOPSOLAR® PV H1Z2Z2-K cable, which is TÜV certified according to EN 50618 and AENOR certified according to IEC 62930, it 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 specially 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.

- Solar PV installations string cable.

## CONSTRUCTION

### Conductor

Electrolytic annealed tinned copper, class 5 (flexible) according to IEC 60228 and EN 60228.

### Insulation

Halogen free cross-linked rubber according to table B1 in Annex B of EN 50618 and IEC 62930.

### Outer sheath

Halogen free cross-linked flexible rubber according to table B1 in Annex B of EN 50618 and IEC 62930.

Red or black colour.

## CHARACTERISTICS



### Electrical performance

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

1,0/1,0 kV AC.



### Thermal performance

Maximum conductor temperature: 90°C (120°C during 20.000 h).

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

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



### Fire performance

Flame non-propagation according to EN 60332-1-2 / IEC 60332-1-2.

Fire non-propagation according to EN 50399.

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

Low smoke halogen free according to EN 60754-1 / IEC 60754-1.

Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.

Low smoke emission according to EN 61034 / IEC 61034:

Light transmittance > 60%.



### Mechanical performance

Minimum bending radius:

4x cable diameter (cable diameter ≤ 8 mm)

5x cable diameter (8 < cable diameter ≤ 12 mm)

6x cable diameter (cable diameter > 12 mm).

Impact resistance: AG2 Medium severity.



### Environmental performance

Chemical & Oil resistance: Excellent.

Grease & mineral oils resistance: Excellent.

Ozone resistant according to EN 50618.

UV Resistant according to EN 50618 and IEC 62930.

Water resistance: AD7+ Immersion.

AD8 Submersion.



### Installation conditions

Open Air.

Buried.

In conduit.

## STANDARDS / COMPLIANCE



### According to

EN 50618/ IEC 62930 / UTE C 32-502



### Standards and approvals

TÜV Rheinland (from 2.5 to 25mm<sup>2</sup> in Black and Red) / RETIE / AENOR/ RoHS / CE



### CPR (Construction Products Regulation)

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







**E<sub>ca</sub>**



## APPLICATION

TOPSOLAR® PV DC Feeder Aluminium cable is suitable for all types of underground and open air solar installations. This cable is recommended for connections between string boxes and photovoltaic inverters in large scale rooftops or ground farms.

- Solar PV installations.
- Heavy impact and armoured versions also available.

## CONSTRUCTION

### Conductor

Aluminium class 2 according to EN 60228 and IEC 60228.

### Insulation

Cross-linked polyethylene, type XLPE according to IEC 60502-1. The standard identification of insulated conductors according to HD 308 is the following:

|           |   |
|-----------|---|
| 1 x       | Natural   |
| 2 x       | Blue + Brown  |
| 3 x       | Brown + Black + Grey                                |
| 3 x + 1 x | Brown + Black + Grey + Blue (reduced cross-section) |
| 4 x       | Brown + Black + Grey + Blue                         |

### Outer sheath

Special UV resistant PVC, type ST2 according to IEC 60502-1. Black colour.

## CHARACTERISTICS



### Electrical performance

Low voltage: 1,5/1,5 (1,8) kV DC according to EN 50618.  
1,8/3 (3,6) kV AC according to IEC 60502-1.



### Thermal performance

Maximum conductor temperature: 90°C.  
Maximum short-circuit temperature: 250°C (max. 5 s).  
Minimum service temperature: -40°C (fixed and protected installations).  
Minimum installation and handling temperature: 0°C (on cable surface).



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.  
Reaction to fire CPR: E<sub>ca</sub> according to EN 50575.  
Reduced halogen emission. Chlorine < 15%.



### Mechanical performance

Minimum bending radius: 5x cable diameter.  
Impact resistance: AG3 High severity.



### Environmental performance

Chemical resistance: Good.  
Grease & mineral oils resistance: Good.  
UV Resistant according to EN 50618 and HD 605/A1.  
Water resistance: AD8 Submersion.



### Installation conditions

Open Air.  
Buried.  
In conduit.

## STANDARDS / COMPLIANCE



According to  
IEC 60502-1



Standards and approvals  
RETIE / RoHS / CE



CPR (Construction Products Regulation)  
E<sub>ca</sub>





## APPLICATION

TOPSOLAR® PV AWA/SWA DC Feeder Aluminium cable is suitable for all types of underground and open air solar installations.

This cable is recommended for connections between string boxes and photovoltaic inverters in large scale rooftops or ground farms. Suitable for transport and distribution of electric power where there is the possibility of mechanical aggressions.

- Solar PV installations.

## CONSTRUCTION

### Conductor

Aluminium class 2 according to EN 60228 and IEC 60228.

### Insulation

Cross-linked polyethylene, type XLPE according to IEC 60502-1.

The standard identification of insulated conductors according to HD 308, is the following:

|     |                                     |
|-----|-------------------------------------|
| 1 x | Natural                             |
| 2 x | Blue + Brown                        |
| 3 x | Grey + Brown + Black                |
| 4 G | Brown + Black + Grey + Green/Yellow |
| 4 x | Brown + Black + Grey + Blue         |

### Inner covering

Extruded PVC.

### Armour

Aluminium wire armour (AWA) is used in single-core cables to avoid parasite currents that may overheat the cable.

Galvanized steel wire armour (SWA) is used in multicores cables.

### Outer sheath

Special UV resistant PVC, type ST2 according to IEC 60502-1.

Black colour.

## CHARACTERISTICS



### Electrical performance

Low voltage: 1,5/1,5 (1,8) kV DC according to EN 50618.  
1,8/3 (3,6) kV AC according to IEC 60502-1.



### Thermal performance

Maximum conductor temperature: 90°C.  
Maximum short-circuit temperature: 250°C (max. 5 s).  
Minimum service temperature: -40°C (fixed and protected installations).  
Minimum installation and handling temperature: 0°C (on cable surface).



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.  
Reduced halogen emission. Chlorine < 15%.



### Mechanical performance

Minimum bending radius: 10x cable diameter.  
Impact resistance: AG4 High severity.



### Environmental performance

Chemical resistance: Good.  
Grease & mineral oils resistance: Good.  
UV Resistant according to EN 50618 and HD 605/A1.

## STANDARDS / COMPLIANCE



According to  
IEC 60502-1



Standards and approvals  
CE / RoHS



# TOPSOLAR® PV LSZH AI 1500 V HEAVY DUTY

Aluminium cable for buried photovoltaic installations.

ACCORDING TO: IEC 60502-1



## APPLICATION

The TOPSOLAR® PV LSZH HEAVY DUTY cable can be directly buried in most soils. They can be installed in smaller trenches as no sand or external backfill is required.

The special outer sheath compounds make this cable highly resistant to possible shocks and friction during its installation (impact and tearing). In addition, the cable is AD8 water resistant (submersible). Finally, this cable resists degradation caused by ultraviolet (UV) rays as it is tested for UV protection according to the solar standard EN 50618.

## CONSTRUCTION

### Conductor

Aluminium class 2 according to EN 60228 and IEC 60228.

### Insulation

Cross-linked polyethylene type XLPE according to IEC 60502-1. Natural colour.

### Outer sheath

Polyethylene halogen free and UV resistant, type ST7 according to IEC 60502-1 with extra thickness as protection for direct buried cables.

Black colour.

## CHARACTERISTICS



### Electrical performance

Low voltage: 1,5/1,5 (1,8) kV DC according to EN 50618.  
1,8/3 (3,6) kV AC according to IEC 60502-1.



### Thermal performance

Maximum conductor temperature: 90°C.  
Maximum short-circuit temperature: 250°C (max. 5 s).  
Minimum service temperature: -40°C (fixed and protected installations).  
Minimum installation and handling temperature: 0°C (on cable surface).



### Fire performance

Halogen free according to EN 60754-1 / IEC 60754-1.  
Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.



### Mechanical performance

Minimum bending radius: 5x cable diameter.  
Impact resistance: AG4 (≤ 40 J) Extra high severity according to NF C 33-226.  
Abrasion according to NF C 33-226.



### Environmental performance

UV Resistant according to EN 50618.  
Water resistance: AD8 Submersion.



### Installation conditions

Open Air.  
Buried.  
In conduit.

## STANDARDS / COMPLIANCE



According to  
IEC 60502-1



Standards and approvals  
CE / RoHS





# TOXFREE® ZH OUTDOOR H07Z1-K (AS) type 2 CuSn

grounding cable, with tinned copper conductor.

ACCORDING TO: EN 50525-3-31 / UNE 211002



**B2<sub>ca</sub>**

## APPLICATION

Toxfree® ZH Outdoor H07Z1-K (AS) CuSn is a cable specially designed for ground connections in outdoor installations. The tinned copper conductor and special outer sheath compounds make this cable highly resistant to corrosion and ultraviolet (UV) degradation and prevent galvanic pair when connecting metals of different normal potential.

It is a halogen-free cable with the highest CPR classification (B2ca-s1a, d1, a1) and UV protection according to solar standard EN 50618.

## CONSTRUCTION

### Conductor

Electrolytic annealed tinned copper, class 5 (flexible) according to IEC 60228 and EN 60228.

### Insulation

UV resistant polyolefin, type T17 according to EN 50363-7.

The standard identification of insulated conductors is the following:

Green/Yellow RAL 6018/1021

Other colours available on request.

## CHARACTERISTICS



### Electrical performance

Low voltage: 450/750 V.



### Thermal performance

Maximum conductor temperature: 70°C.

Maximum short-circuit temperature: 160°C (max. 5 s).

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



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.

Fire non-propagation according to EN 60332-3-24 / IEC 60332-3-24 and EN 50399.

Reaction to fire CPR: B2ca-s1a, d1, a1, according to EN 50575.

Low smoke halogen free according to EN 60754-1 / IEC 60754-1.

Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.

Low smoke emission according to EN 61034 / IEC 61034:

Light transmittance > 80%.



### Mechanical performance

Minimum bending radius: 5x cable diameter.



### Environmental performance

Chemical & Oil resistance: Excellent.

Grease & mineral oils resistance: Excellent.

UV Resistant according to EN 50618.

Ozone resistant according to EN 50618.

## STANDARDS / COMPLIANCE



### According to

EN 50525-3-31 / UNE 211002



### Standards and approvals

HAR / AENOR / BUREAU VERITAS / RoHS / CE



### CPR (Construction Products Regulation)

B2ca-s1a, d1, a1





LOW  
VOLTAGE  
**SPECIAL  
CABLES**

---



## APPLICATION

The Topflat® H05VVH6-F & H07VVH6-F is a flat cable specially designed for cranes, lifts, hoists, drum reeling and conveyor systems.

The hanging length of the cable can reach up to 35 m and its pull out speed can reach up to 1,6 m/s (overlying cables is not recommended when installing).

- Industrial use.
- Mobile services.
- Bridge cranes.
- Lifts, elevators.
- Conveyors.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible) according to EN 60228 and IEC 60228.

### Insulation

Flexible PVC, type T12, according to EN 50363-3.

The standard identification of insulated conductors according to HD 308 and EN 50334, is the following:

|           |                                     |
|-----------|-------------------------------------|
| 4 G       | Brown + Black + Grey + Green/yellow |
| 6 or more | Black numbered + Green/yellow       |

### Lay-up

Insulated conductors are placed side by side in parallel arrangement forming a flat cable.

### Outer sheath

Flexible PVC, type TM2 according to EN 50363-4-1.

Black colour.

The ripcord allows you to gently tear the outer sheath.

## CHARACTERISTICS

### ⚡ Electrical performance

Low voltage: 300/500 V - 450/750 V

Nominal voltage:

H05VVH6-F (up to 1 mm<sup>2</sup>): 300/500 V.

H07VVH6-F (from 1,5 mm<sup>2</sup>): 450/750 V.

### 🔥 Thermal performance

Maximum conductor temperature: 70°C.

Maximum short circuit temperature: 160°C (maximum 5 s).

Minimum operating temperature: 0°C (mobile service).

### 🔥 Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.

Low halogen emission. Chlorine < 15%.

### 📏 Mechanical performance

Minimum bending radius on pulleys (to 20 ± 10°C):

Festooned as in gantry cranes: 10x smaller dimension

Deflected by pulleys: 10x smaller dimension

Free movement: 5x smaller dimension

Impact resistance: AG2 Medium severity.

### 🌍 Environmental performance

Chemical & Oil resistance: Acceptable.

Water resistance: AD5 Jets.

## STANDARDS / COMPLIANCE



According to:  
EN 50214 / IEC 60227-6



Standards and approvals  
HAR / AENOR / CE/ RoHS







## APPLICATION

The cable X-PUR® H07BQ-F is a flexible cable for mobile service. Suitable for installations where the cable must withstand medium mechanical stress, for machines in industrial and agricultural workshops, for motors and transportable machines on construction sites, for windmills and for agricultural exploitations.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible), according to EN 60228 and IEC 60228.

### Insulation

Cross-linked elastomeric, type EI6 according to EN 50363-1. The standard identification, according to HD 308 is the following:

|           |  |
|-----------|--|
| 1 x       | Natural                                    |
| 2 x       | Blue + Brown                               |
| 3 G       | Blue + Brown + Green/Yellow                |
| 4 G       | Brown + Black + Grey + Green/Yellow        |
| 5 G       | Brown + Black + Grey + Blue + Green/Yellow |
| 6 or more | Black numbered + Green/Yellow              |

### Lay - up

The cores are twisted together.

### Outer sheath

Thermoplastic polyurethane, type TPU according to EN 50363-10-2. Orange color.

## CHARACTERISTICS



### Electrical performance

Low voltage: 450/750 V.



### Thermal performance

Maximum conductor temperature: 90°C.  
Maximum short-circuit temperature: 250°C (max. 5 s).  
Minimum service temperature: -40°C (static with protection).



### Fire performance

Flame non propagation according to EN 60332-1 (not <HAR> requirement).



### Mechanical performance

Minimum bending radius:  
3x cable diameter (cable <12 mm)  
4x cable diameter (cable ≥12 mm)  
Impact resistance: AG2 Medium severity.



### Environmental performance

Chemical & Oil resistance: Excellent.



### Installation conditions

Open air.

## STANDARDS / COMPLIANCE



According to  
EN 50525-2-21



Standards and approvals  
AENOR <HAR> / CE / RoHS



# PARALLEL AUDIO CABLE

Cable for connecting music equipment speakers

ACCORDING TO: UNE 211030



## APPLICATION

Cable specially indicated in domestic installations for connecting music equipment speakers and for broadcasting music signals throughout the home.

- Speaker connection.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible) according to EN 60228 and IEC 60228 (bicolour) or oxygen free electrolytic copper conductor (OFC).

### Insulation

PVC type T12 according to EN 50363-3.

The standard identification of insulated conductors is the following:

- |                        |                           |
|------------------------|---------------------------|
| - Bicolour audio cable | Red + Black               |
| - OFC audio cable      | Transparent + Transparent |

## CHARACTERISTICS



### Electrical performance

These cables have no assigned voltage and can't be used in electric power transport circuits.



### Thermal performance

Maximum conductor temperature: 70°C.

Maximum short-circuit temperature: 160°C (max. 5 s).

Minimum service temperature: -15°C (static, with protection).



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.



### Mechanical performance

Minimum bending radius: 5x cable diameter.

## STANDARDS / COMPLIANCE



According to:  
UNE 211030



Standards and approvals  
AENOR / RoHS



# COAXIAL SATELLITE 17 VATC

Coaxial cable for television signals.

ACCORDING TO: EN 50117-1



**D<sub>ca</sub>**

## APPLICATION

Coaxial cable for the reception and distribution of digital terrestrial, analogue and digital satellite television signals. These cables do not have a rated voltage and cannot be used in electric power transmission circuits.

- Digital terrestrial television.
- Analogical satellite.
- Digital.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper conductor, class 1, according to EN 60228 and IEC 60228.

### Insulation

Polyethylene HDPE according to EN 50290-2-23.

### Screen

Copper screen and aluminum-polyester tape with overlapping copper braid, ensuring 100% screening coverage.

### Outer sheath

PVC, white colour.

## CHARACTERISTICS

### ⚡ Electrical performance

These cables do not have a rated voltage and cannot be used in electric power transmission circuits.

### 🌡 Thermal performance

Maximum conductor temperature: 70°C.

Minimum service temperature: -15°C (mobile service).

### ☀ Installation conditions

Open air.

In conduit.

On tray.

## TECHNICAL DATA

| Outer sheath colour | Diameter (mm <sup>2</sup> ) | Weight (kg/km) | Impedance |
|---------------------|-----------------------------|----------------|-----------|
| white               | 7                           | 27,0           | 75 +- 3 Ω |

## STANDARDS / COMPLIANCE



**According to:**  
EN 50117-1.



**Standards and approvals**  
CE / RoHS.



**CPR (Construction Products Regulation)**  
D<sub>ca</sub> -s1a,d1,a1.





# COAXIAL SATELLITE 21 VATC

Coaxial cable for television signals.

ACCORDING TO: EN 50117-1



E<sub>ca</sub>



## APPLICATION

Coaxial cable for the reception and distribution of digital terrestrial, analogue and digital satellite television signals with enhanced screen.

- Digital terrestrial television.
- Analogical satellite.
- Digital.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper conductor, class 1, according to EN 60228 and IEC 60228.

### Insulation

Polyethylene HDPE according to EN 50290-2-23.

### Screen

Copper or aluminum screen and aluminum-polyester tape with overlapping copper braid, ensuring 100% screening coverage.

### Outer sheath

PVC, white colour.

## CHARACTERISTICS



### Electrical performance

These cables do not have a rated voltage and cannot be used in electric power transmission circuits.



### Thermal performance

Maximum conductor temperature: 70°C.

Minimum service temperature: -15°C (mobile service).



### Installation conditions

Open air.

In conduit.

On tray.

## TECHNICAL DATA

| Outer sheath colour | Diameter (mm <sup>2</sup> ) | Weight (kg/km) | Impedance |
|---------------------|-----------------------------|----------------|-----------|
| white               | 7                           | 27,0           | 75 +- 3 Ω |

## STANDARDS / COMPLIANCE



According to:

EN 50117-1



Standards and approvals

CE / RoHS



CPR (Construction Products Regulation)

E<sub>ca</sub>.



# TOXFREE® ZH ALARMS Z1OZ1-K (AS)

Cable for alarm systems

BASED TO: EN 50525



C<sub>ca</sub>



## APPLICATION

The TOXFREE® ZH ALARMS Z1OZ1-K (AS) cable is designed to comply with the regulations of Fire Detection and Alarm systems. It is recommended to be used in public places. It should not be used for direct connection to the power supply network or other low impedance sources.

- Fire detection.
- Fire alarms.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible) according to EN 60228 and IEC 60228.

### Insulation

Special polyolefin, type T17 according to EN 50363-7, with low smoke emission and halogen-free.

Conductor identification: Red - Black

### Screen

Overlapping aluminium-polyester tape screen with 100% coverage + tinned copper drain wire.

### Outer sheath

Fire-retardant polyolefin, type DMZ-E according to UNE 21123-4, with low smoke emission and halogen-free fumes in case of fire. Red colour.

## CHARACTERISTICS

### Electrical performance

Low voltage: 300/500 V.

### Thermal performance

Maximum conductor temperature: 70°C.

Maximum short-circuit temperature: 160°C (max. 5 s).

Minimum service temperature: -40°C (static, with protection).

### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.

Fire non-propagation according to EN 50399.

Reaction to fire CPR: C<sub>ca</sub>-s1a, d1, a1 according to EN 50575.

Low smoke halogen free according to EN 60754-1 / IEC 60754-1.

Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.

Smoke density according to EN 61034 / IEC 61034:

Light transmittance > 80%.

### Mechanical performance

Minimum bending radius: 10x cable diameter.

### Environmental performance

Chemical & Oil: Acceptable.

Water resistance: AD3 Sprays.

### Installation conditions

Open air.

In conduit.

On tray.

## STANDARDS / COMPLIANCE



Based to:  
EN 50525



Standards and approvals  
AENOR / RoHS



CPR (Construction Products Regulation)  
C<sub>ca</sub>-s1a, d1, a1



# TOXFREE® ZH

## ALARMS Z1OZ1-K (AS+)

Fire resistant cable for alarm systems

ACCORDING TO: UNE 211025



C<sub>ca</sub>



### APPLICATION

The TOXFREE® ZH ALARMS Z1OZ1-K (AS +) fire resistant cable is designed to comply with the regulations of Fire Detection and Alarm systems.

It is recommended to be used in public places. It should not be used for direct connection to the power supply network or other low impedance sources.

- Fire detection.
- Fire alarms.

### CONSTRUCTION

#### Conductor

Electrolytic annealed copper, class 5 (flexible) according to EN 60228 and IEC 60228.

#### Insulation

Mica tape + Special polyolefin, type TI7 according to EN 50363-7, with low smoke emission and halogen-free.

Core identification: Red - Black.

#### Assembly of cores

The cores are twisted together.

#### Screen

Overlapping aluminium-polyester tape screen with 100% coverage + tinned copper drain wire.

#### Outer sheath

Fire-retardant polyolefin, type DMZ-E according to UNE 21123-4, with low smoke emission and halogen-free fumes in case of fire.

Red colour.

### CHARACTERISTICS

#### Electrical performance

Low voltage: 300/500 V.

#### Thermal performance

Maximum conductor temperature: 70°C.

Maximum short circuit temperature: 160°C (maximum 5 s).

Minimum operating temperature: -40°C (static, with protection).

#### Fire performance

Flame non-propagation according to EN 60332-1/ IEC 60332-1.

Fire non-propagation according to EN 50399.

Reaction to fire CPR: C<sub>ca</sub>-s1a, d1, a1 according to EN 50575.

Fire resistant (PH120) minimum 120 minutes at 840 °C according to IEC 60331-2 / EN 50200.

Low smoke halogen free according to EN 60754-1 / IEC 60754-1.

Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.

Smoke density according to EN 61034 / IEC 61034:

Light transmittance > 80%.

#### Mechanical performance

Minimum bending radius: 10x cable diameter.

#### Environmental performance

Chemical & Oil: Acceptable.

Water resistance: AD3 Sprays.

#### Installation conditions

Open air.

In conduit.

On tray.

### STANDARDS / COMPLIANCE



**According to:**  
UNE 211025



**Standards and approvals**  
CE / RoHS



**CPR (Construction Products Regulation)**  
C<sub>ca</sub>-s1a, d1, a1







## APPLICATION

Flexitel® H05RNH2-F is a flexible cable for mobile service. Suitable for temporary installations, both indoor and outdoor. The rectangular outer sheath with calibrated dimension makes it especially suitable for special lamp holders adapted to this type of cable.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible), according to EN 60228 and IEC 60228.

### Insulation

Thermosetting rubber insulation, type EI4 according to EN 50363-1. The standard identification of insulated conductors is the following:

2 x Blue + Brown

### Outer sheath

Thermosetting rubber, type EM2 according to EN 50363-2-1. White colour. Other colours available under request.

## CHARACTERISTICS



### Electrical performance

Low voltage: 300/500 V.



### Thermal performance

Maximum conductor temperature: 60°C.  
Maximum short-circuit temperature: 200°C (max. 5 s).  
Minimum service temperature: -40 °C (static with protection).



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.  
Low halogen emission. Chlorine < 15%.



### Mechanical performance

Minimum bending radius: 10 x cable diameter.  
Impact resistance: AG2 Medium severity.



### Environmental performance

Chemical & Oil resistance: Good.

## TECHNICAL DATA

| Cross-section (mm²) | Dimension (mm) | Weight (kg/km) |
|---------------------|----------------|----------------|
| 2 x 1,5             | 13,5 x 5,5     | 125            |

## STANDARDS / COMPLIANCE



According to:  
EN 50525-2-82 / IEC 60245.



Standards and approvals  
CE / RoHS





# MARINE **CABLES**

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## APPLICATION

The Toxfree® Marine XZ1-K (AS) cable with halogen free is a safety cable. In case of fire, it does not emit toxic or corrosive gases, thereby protecting public health and avoiding any possible damage to electronic equipment. For this reason, its use is recommended in marine applications.

- Marine use.
- Public use.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible), according to IEC 60228.

### Insulation

Cross-linked polyethylene type HF XLPE-90 °C according to IEC 60092-360.

The standard identification of insulated conductors is the following:

|                      |                                     |
|----------------------|-------------------------------------|
| 1 x                  | Natural                             |
| 2 x                  | Blue + Brown                        |
| 3 x                  | Brown + Black + Grey                |
| 3 G                  | Blue + Brown + Green/Yellow         |
| 4 x                  | Brown + Black + Grey + Blue         |
| 4 G                  | Brown + Black + Grey + Green/Yellow |
| 5 or more conductors | Black numbered                      |

Other colours available on request.

### Outer sheath

Low smoke halogen free polyolefin, type SHF1 according to IEC 60092-360.

Black colour.

## CHARACTERISTICS



### Electrical performance

Low voltage: 0,6/1 kV.



### Thermal performance

Maximum conductor temperature: 90°C.

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

Lowest installation temperature: -15°C

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



### Fire performance

Flame non-propagation according to IEC 60332-1.

Fire non-propagation according to IEC 60332-3-22.

Low smoke halogen free according to IEC 60754-1.

Low corrosive gases emission according to IEC 60754-2.

Low smoke emission according to IEC 61034:

light transmittance > 60%.



### Mechanical performance

Minimum bending radius:

Ø ≤ 25mm 4x cable diameter.

Ø > 25mm 6x cable diameter.

Impact resistance: AG2 medium severity.



### Environmental performance

Chemical & Oil resistance: Good.

UV Resistant according to EN 50618.

Water resistance: AD6 waves.



### Installation conditions

Open Air.

In conduit on a bulkhead.

On a bulkhead.

## STANDARDS / COMPLIANCE



According to  
IEC 60092-353



Standards and approvals  
ABS / DNV-GL / BUREAU VERITAS / LLOYD'S  
REGISTER / CE / RoHS







## APPLICATION

The Toxfree<sup>®</sup> Marine Plus XZ1-K (AS+) is specially designed to transmit electric power in the presence of fire, assuring electric supply to emergency circuits, like signalling lights, smoke extractors, acoustic alarms, water pumps, etc. In case of fire, it does not emit toxic or corrosive gases, thereby protecting public health and avoiding any possible damage to electronic equipment. For this reason, its use is recommended in public places and marine applications.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible) according to IEC 60228.

### Insulation

Mica Tape + Cross linked polyethylene type HF XLPE 90°C according to IEC 60092-360.

The standard identification is the following:

|                      |                             |
|----------------------|-----------------------------|
| 1 x                  | Natural                     |
| 2 x                  | Blue + Brown                |
| 3 x                  | Brown + Black + Grey        |
| 4 x                  | Brown + Black + Grey + Blue |
| 5 or more conductors | Black numbered              |

Other colours available on request.

### Outer sheath

Low smoke halogen free thermoplastic polyolefin, type SHFI according to IEC 60092-360.

Orange colour.

Non-toxic, fire retardant and fire resistant.

## CHARACTERISTICS



### Electrical performance

Low voltage: 0,6/1 kV.



### Thermal performance

Maximum conductor temperature: 90°C.

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

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

Lowest installation temperature: -15°C



### Fire performance

Flame non-propagation according to IEC 60332-1.

Fire non-propagation according to IEC 60332-3-22.

Fire resistant according to IEC 60331-2 (overall diameter ≤ 20 mm) and IEC 60331-1 (overall diameter > 20 mm).

Low smoke halogen free according to IEC 60754-1.

Low corrosive gases emission according to IEC 60754-2.

Low smoke emission according to IEC 61034:

light transmittance > 60%.



### Mechanical performance

Minimum bending radius:

≤ 25mm 4x cable diameter.

> 25mm 6x cable diameter.

Impact resistance: AG2 medium severity.



### Environmental performance

Chemical & Oil resistance: Good.

UV Resistant according to EN 50618.

Water resistance: AD6 waves.



### Installation conditions

Open Air.

In conduit on a bulkhead.

On a bulkhead.

## STANDARDS / COMPLIANCE



According to  
IEC 60092-353



### Standards and approvals

ABS / DNV-GL / BUREAU VERITAS / LLOYD'S  
REGISTER / CE / RoHS





## APPLICATION

The Toxfree® Marine XTCuZ1-K (AS) cable with halogen free is a safety cable. In case of fire, it does not emit toxic or corrosive gases, thereby protecting public health and avoiding any possible damage to electronic equipment. For this reason, its use is recommended in marine applications.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible), according to IEC 60228.

### Insulation

Cross-linked polyethylene type HF XLPE-90 °C according to IEC 60092-360.

The standard identification of insulated conductors is the following:

|                      |                             |
|----------------------|-----------------------------|
| 1 x                  | Natural                     |
| 2 x                  | Blue + Brown                |
| 3 x                  | Brown + Black + Grey        |
| 4 x                  | Brown + Black + Grey + Blue |
| 5 or more conductors | Black numbered              |

Other colours available on request.

### Bedding

Thermoplastic polyolefin, natural colour, with low smoke and halogen free under fire conditions (single-cores and multi-cores from 25 mm²).

### Screen

Aluminium polyester tape screen with overlapping tinned copper braid armour, ensuring 100% screening coverage.

### Outer sheath

Low smoke halogen free thermoplastic polyolefin, type SHF1 according to IEC 60092-360.

Black colour.

## CHARACTERISTICS



### Electrical performance

Low voltage: 0,6/1 kV.



### Thermal performance

Maximum conductor temperature: 90°C.

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

Lowest installation temperature: -15°C

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



### Fire performance

Flame non-propagation according to IEC 60332-1.

Fire non-propagation according to IEC 60332-3-22.

Low smoke halogen free according to IEC 60754-1.

Low corrosive gases emission according to IEC 60754-2.

Low smoke emission according to IEC 61034:

light transmittance > 60%.



### Mechanical performance

Minimum bending radius: 6x cable diameter.

Impact resistance: AG3 High severity.



### Environmental performance

Chemical & Oil resistance: Acceptable.

UV Resistant according to EN 50618.

Water resistance: AD6 waves.



### Installation conditions

Open Air.

In conduit on a bulkhead.

On a bulkhead.

## STANDARDS / COMPLIANCE



According to  
IEC 60092-353



### Standards and approvals

ABS / DNV-GL / BUREAU VERITAS / LLOYD'S REGISTER /  
CE / RoHS





## APPLICATION

The Toxfree<sup>®</sup> Marine Plus XTCuZ1-K (AS+) is specially designed to transmit electric power in the presence of fire, assuring electric supply to emergency circuits, like signalling lights, smoke extractors, acoustic alarms, water pumps, etc. In case of fire, it does not emit toxic or corrosive gases, thereby protecting public health and avoiding any possible damage to electronic equipment. For this reason, its use is recommended in public places and marine applications.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible) according to IEC 60228.

### Insulation

Mica Tape + Cross linked polyethylene type HF XLPE 90°C according to IEC 60092-360.

The standard identification is the following:

|                      |                             |
|----------------------|-----------------------------|
| 1 x                  | Natural                     |
| 2 x                  | Blue + Brown                |
| 3 x                  | Brown + Black + Grey        |
| 4 x                  | Brown + Black + Grey + Blue |
| 5 or more conductors | Black numbered              |

Other colours available on request.

### Bedding

Thermoplastic polyolefin, natural colour, with low smoke and halogen free under fire conditions (single-cores and multi-cores from 25 mm<sup>2</sup>).

### Screen

Aluminium polyester tape screen with overlapping tinned copper braid armour, ensuring 100% screening coverage.

### Outer sheath

Low smoke halogen free thermoplastic polyolefin, type SHF1 according to IEC 60092-360.

Orange colour.

Non-toxic, fire retardant and fire resistant.

## CHARACTERISTICS

### Electrical performance

Low voltage: 0,6/1 kV.

### Thermal performance

Maximum conductor temperature: 90°C.

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

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

Lowest installation temperature: -15°C

### Fire performance

Flame non-propagation according to IEC 60332-1.

Fire non-propagation according to IEC 60332-3-22.

Fire resistant according to IEC 60331-21 (90 minutes at 750°C).

Low smoke halogen free according to IEC 60754-1.

Low corrosive gases emission according to IEC 60754-2.

Low smoke emission according to IEC 61034:

light transmittance > 60%.

### Mechanical performance

Minimum bending radius: 6x cable diameter.

Impact resistance: AG3 High severity.

### Environmental performance

Chemical & Oil resistance: Acceptable.

UV Resistant according to EN 50618.

Water resistance: AD6 waves.

### Installation conditions

Open Air.

In conduit on a bulkhead.

On a bulkhead.

## STANDARDS / COMPLIANCE

According to  
IEC 60092-353

Standards and approvals  
ABS / DNV-GL / BUREAU VERITAS / LLOYD'S  
REGISTER / CE / RoHS





# TOXFREE® MARINE XOxZ1-K (AS) XOxTCuZ1-K (AS)

The marine armoured instrumentation cable.

ACCORDING TO: IEC 60092-376



## APPLICATION

The Toxfree Marine XOxZ1-K (AS) and XOxTCuZ1-K (AS) cable with halogen free is a safety instrumentation and telecommunication cable. In case of fire, it does not emit toxic or corrosive gases, thereby protecting public health and avoiding any possible damage to electronic equipment. For this reason, its use is recommended in marine applications.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 5 (flexible) according to IEC 60228 (conductor resistance according to IEC 60092-376, Table 1).

### Insulation

Cross-linked polyethylene type HF XLPE 90°C according to IEC 60092-360.

The standard identification of insulated conductors is the following:

Pair White + Blue (each core numbered with the pair number)

Other colours available on request.

### Assembly of cores

Stranded conductors in pairs.

### Individual screen (XO3Z1-K and XO3TCuZ1-K)

Aluminium + polyester tape with 100% coverage + tinned copper drain wire applied over the assembled cores.

### Assembly of pairs

Cabled in concentric layers.

### Collective screen

Aluminium + polyester tape with 100% coverage + tinned copper drain wire applied over the assembled pairs

Only for XO2TCuZ1-K (AS) cables, the tinned copper drain wire will be removed, and the aluminium side of the tape will put in contact with the braid armour.

### Braid armour (XO2TCuZ1-K and XO3TCuZ1-K)

Tinned copper wire braid armour over the collective screen.

### Outer sheath

Low smoke halogen free thermoplastic polyolefin, type SHF1 according to IEC 60092-360.

Grey colour.

## CHARACTERISTICS



### Electrical performance

Instrumentation: 150/250 V.



### Thermal performance

Maximum conductor temperature: 90°C.

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

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

Lowest installation temperature: -15°C



### Fire performance

Flame non-propagation according to IEC 60332-1.

Fire non-propagation according to IEC 60332-3-22.

Low smoke halogen free according to IEC 60754-1.

Low corrosive gases emission according to IEC 60754-2.

Low smoke emission according to IEC 61034:

light transmittance > 60%.



### Mechanical performance

Minimum bending radius:

Ø ≤ 25mm 4x cable diameter.

Ø > 25mm 6x cable diameter.

Impact resistance: AG3 high severity.



### Environmental performance

Chemical & Oil resistance: Acceptable.

UV Resistant according to EN 50618.

Water resistance: AD6 waves.



### Installation conditions

Open Air.

In conduit on a bulkhead.

On a bulkhead.

## STANDARDS / COMPLIANCE



### According to

IEC 60092-376



### Standards and approvals

ABS / DNV-GL / BUREAU VERITAS / CE / RoHS



# TOXFREE® MARINE PLUS

## XOxZ1-K (AS+)

## XOxTCuZ1-K (AS+)



The marine armoured instrumentation cable.

ACCORDING TO: IEC 60092-376



### APPLICATION

The Toxfree Marine Plus XOxZ1-K (AS+) and XOxTCuZ1-K (AS+) cable with halogen free is a safety instrumentation and telecommunication cable.

It is fire resistant and specially designed to continue transmitting information/data in case of fire. For this reason, it is recommended for use in public places and marine applications.

### CONSTRUCTION

#### Conductor

Electrolytic annealed copper, class 5 (flexible) according to IEC 60228 (conductor resistance according to IEC 60092-376, Table 1).

#### Insulation

Mica Tape + Cross-linked polyethylene type HF XLPE 90°C according to IEC 60092-360.

The standard identification of insulated conductors is the following:  
Pair White + Blue (each core numbered with the pair number)  
Other colours available on request.

#### Assembly of cores

Stranded conductors in pairs.

#### Individual screen (XO3Z1-K and XO3TCuZ1-K)

Aluminium + polyester tape with 100% coverage + tinned copper drain wire applied over the assembled cores.

#### Assembly of pairs

Cabled in concentric layers.

#### Collective screen

Aluminium + polyester tape with 100% coverage + tinned copper drain wire applied over the assembled pairs.

Only for XO2TCuZ1-K (AS+) cables, the tinned copper drain wire will be removed, and the aluminium side of the tape will put in contact with the braid armour.

#### Braid armour (XO2TCuZ1-K and XO3TCuZ1-K)

Tinned copper wire braid armour over the collective screen.

#### Outer sheath

Low smoke halogen free thermoplastic polyolefin, type SHF1 according to IEC 60092-360.

Orange colour, non-toxic, fire retardant and fire resistant.

### CHARACTERISTICS



#### Electrical performance

Instrumentation: 150/250 V.



#### Thermal performance

Maximum conductor temperature: 90°C.

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

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

Lowest installation temperature: -15°C



#### Fire performance

Flame non-propagation according to IEC 60332-1.

Fire non-propagation according to IEC 60332-3-22.

Fire resistant according to IEC 60331-21 (90 minutes at 750°C).

Low smoke halogen free according to IEC 60754-1.

Low corrosive gases emission according to IEC 60754-2.

Low smoke emission according to IEC 61034:  
light transmittance > 60%.



#### Mechanical performance

Minimum bending radius:

$\varnothing \leq 25\text{mm}$  4x cable diameter.

$\varnothing > 25\text{mm}$  6x cable diameter.

Impact resistance: AG3 high severity.



#### Environmental performance

Chemical & Oil resistance: Acceptable.

UV Resistant according to EN 50618.

Water resistance: AD6 waves.



#### Installation conditions

Open Air.

In conduit on a bulkhead.

On a bulkhead.

### STANDARDS / COMPLIANCE



According to  
IEC 60092-376



Standards and approvals  
ABS / DNV-GL / BUREAU VERITAS / CE / RoHS





# MEDIUM VOLTAGE **CABLES**

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**F<sub>ca</sub>**



## APPLICATION

X-VOLT® RHZ1 is a Medium Voltage aluminium cable halogen-free for fixed installations.  
Suitable for transport and distribution of electric power in medium voltage networks.

## CONSTRUCTION

### Conductor

Aluminium class 2 according to EN 60228 and IEC 60228.  
Optionally, with longitudinal water tightness (cable type -2OL).

### Conductor screen

Screen over the conductor, made of thermosetting semiconductor material.

### Insulation

Cross-linked polyethylene type XLPE according to IEC 60502-2, natural colour.

Cross linked in catenary line with nitrogen atmosphere through a triple layer extrusion process.

### Insulation screen

Screen over the insulation, made of thermosetting and strippable semiconductor material.

### Metallic screen

Copper wires and copper tape screen, with a minimum cross-section of 16mm<sup>2</sup>.

### Longitudinal water tightness

Hygroscopic tape completely covering the screen (cable type – OL and -2OL).

### Outer sheath

Polyethylene type ST7 according to IEC 60502-2.  
Red colour.

## CHARACTERISTICS



### Electrical performance

Medium Voltage: 3,6/6 (7,2) kV  
6/10 (12) kV  
8,7/15 (17,5) kV  
12/20 (24) kV  
18/30 (36) kV



### Thermal performance

Maximum conductor temperature: 90°C.  
Maximum short-circuit temperature: 250°C (max 5 s).  
Minimum service temperature: -15°C.



### Fire performance

Reaction to fire CPR: F<sub>ca</sub> according to EN 50575.  
Halogen free according to EN 60754-1 / IEC 60754-1.  
Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.



### Mechanical performance

Minimum bending radius: 15x cable diameter.  
Abrasion resistant.  
Tear resistant.



### Environmental performance

UV Resistant according to UNE 211605.



### Installation conditions

Open Air.  
Buried.  
In conduit.

## STANDARDS / COMPLIANCE



According to  
IEC 60502-2



Standards and approvals  
AENOR (except 3,6/6 (7,2) kV) / RETIE (18/30 (36) kV)



CPR (Construction Products Regulation)  
F<sub>ca</sub>





**E<sub>ca</sub>**

## APPLICATION

X-VOLT® RHZ1 (S) is a Medium Voltage aluminium cable halogen-free and no flame propagation for fixed installations. Suitable for transport and distribution of electric power in medium voltage networks.

## CONSTRUCTION

### Conductor

Aluminium class 2 according to EN 60228 and IEC 60228. Optionally, with longitudinal water tightness (cable type -2OL).

### Conductor screen

Screen over the conductor, made of thermosetting semiconductor material.

### Insulation

Cross-linked polyethylene type XLPE according to IEC 60502-2 and type DIX3 according to HD 620-1, natural colour. Cross linked in catenary line with nitrogen atmosphere through a triple layer extrusion process.

### Insulation screen

Screen over the insulation, made of thermosetting and strippable semiconductor material.

### Metallic screen

Copper wires and copper tape screen, with a minimum cross-section of 16mm<sup>2</sup>.

### Longitudinal water tightness

Hygroscopic tape completely covering the screen (cable type -OL and -2OL).

### Outer sheath

Polyolefin type ST7 according to IEC 60502-2 and type DMZ2 according to HD 620-1. Red colour with two grey stripes. Other colours under request.

## CHARACTERISTICS



### Electrical performance

Medium Voltage: 6/10 (12) kV  
8,7/15 (17,5) kV  
12/20 (24) kV  
18/30 (36) kV



### Thermal performance

Maximum conductor temperature: 90°C.  
Maximum short-circuit temperature: 250°C (max 5 s).  
Minimum service temperature: -15°C.



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.  
Reaction to fire CPR: Eca according to EN 50575.  
Halogen free according to EN 60754-1 / IEC 60754-1.  
Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.



### Mechanical performance

Minimum bending radius: 15x cable diameter.  
Abrasion resistant.  
Tear resistant.



### Environmental performance

UV Resistant according to UNE 211605.



### Installation conditions

Open Air.  
Buried.  
In conduit.

## STANDARDS / COMPLIANCE



According to  
IEC 60502-2 / UNE-HD 620-10E (type 10E-4)

# X-VOLT® AL (-OL/-2OL) RHZ1 (AS)

Medium Voltage aluminium cable, XLPE insulation.

ACCORDING TO: IEC 60502-2 / UNE-HD 620-10E (type 10E-5)



C<sub>ca</sub>



## APPLICATION

X-VOLT® RHZ1 (AS) is a Medium Voltage aluminium cable halogen-free with low smoke emission and no fire propagation properties for fixed installations.

Suitable for transport and distribution of electric power in medium voltage networks.

## CONSTRUCTION

### Conductor

Aluminium class 2 according to EN 60228 and IEC 60228.

Optionally, with longitudinal water tightness (cable type -2OL).

### Conductor screen

Screen over the conductor, made of thermosetting semiconductor material.

### Insulation

Cross-linked polyethylene type XLPE according to IEC 60502-2 and type DIX3 according to HD 620-1, natural colour.

Cross linked in catenary line with nitrogen atmosphere through a triple layer extrusion process.

### Insulation screen

Screen over the insulation, made of thermosetting and strippable semiconductor material.

### Metallic screen

Copper wires and copper tape screen, with a minimum cross-section of 16mm<sup>2</sup>.

### Longitudinal water tightness

Hygroscopic tape completely covering the screen (cable type – OL and -2OL).

### Filler

Additional fireproof polyolefin layer, halogen free.

### Outer sheath

Polyolefin type ST7 according to IEC 60502-2 and type DMZ2 according to HD 620-1.

Red colour with two green stripes.

Other colours under request.

## CHARACTERISTICS

### Electrical performance

Medium Voltage: 6/10 (12) kV  
12/20 (24) kV  
18/30 (36) kV

### Thermal performance

Maximum conductor temperature: 90°C.  
Maximum short-circuit temperature: 250°C (max 5 s)  
Minimum service temperature: -15°C.

### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.  
Fire non-propagation according to EN 50399.  
Reaction to fire CPR: C<sub>ca</sub>-s1b,d2,a1 according to EN 50575  
Halogen free according to EN 60754-1 / IEC 60754-1.  
Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.

Low smoke emission according to EN 61034 / IEC 61034:  
Light transmittance > 60%.

### Mechanical performance

Minimum bending radius: 15x cable diameter.  
Abrasion resistant.  
Tear resistant.

### Environmental performance

UV Resistant according to UNE 211605.

### Installation conditions

Open Air.  
Buried.  
In conduit.

## STANDARDS / COMPLIANCE



According to  
IEC 60502-2 / UNE-HD 620-10E (type 10E-5)



Standards and approvals  
AENOR



CPR (Construction Products Regulation)  
C<sub>ca</sub>-s1b,d2,a1





# X-VOLT® CU (-OL/-2OL) RHZ1

Medium Voltage copper cable, XLPE insulation.

ACCORDING TO: IEC 60502-2



**F<sub>ca</sub>**

## APPLICATION

X-VOLT® RHZ1 is a Medium Voltage copper cable halogen-free for fixed installations.

Suitable for transport and distribution of electric power in medium voltage networks.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 2 according to EN 60228 and IEC 60228.

Optionally, with longitudinal water tightness (cable type -2OL).

### Conductor screen

Screen over the conductor, made of thermosetting semiconductor material.

### Insulation

Cross-linked polyethylene type XLPE according to IEC 60502-2, natural colour.

Cross linked in catenary line with nitrogen atmosphere through a triple layer extrusion process.

### Insulation screen

Screen over the insulation, made of thermosetting and strippable semiconductor material.

### Metallic screen

Copper wires and copper tape screen, with a minimum cross-section of 16mm².

### Longitudinal water tightness

Hygroscopic tape completely covering the screen (cable type -OL and -2OL).

### Outer sheath

Polyethylene type ST7 according to IEC 60502-2.

Red colour.

## CHARACTERISTICS



### Electrical performance

Medium Voltage: 6/10 (12) kV  
8,7/15 (17,5) kV  
12/20 (24) kV  
18/30 (36) kV



### Thermal performance

Maximum conductor temperature: 90°C.  
Maximum short-circuit temperature: 250°C (max 5 s)  
Minimum service temperature: -15°C.



### Fire performance

Reaction to fire CPR: F<sub>ca</sub> according to EN 50575.  
Halogen free according to EN 60754-1 / IEC 60754-1.  
Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.



### Mechanical performance

Minimum bending radius: 15x cable diameter.  
Abrasion resistant.  
Tear resistant.



### Environmental performance

UV Resistant according to UNE 211605.



### Installation conditions

Open Air.  
Buried.  
In conduit.

## STANDARDS / COMPLIANCE



According to  
IEC 60502-2



Standards and approvals  
AENOR



CPR (Construction Products Regulation)  
F<sub>ca</sub>



# X-VOLT® CU (-OL/-2OL) RHZ1 (S)

Medium Voltage copper cable, XLPE insulation.

ACCORDING TO: IEC 60502-2 / UNE-HD 620-10E (type 10E-4)



E<sub>ca</sub>



## APPLICATION

X-VOLT® RHZ1 (S) is a Medium Voltage copper cable halogen-free and no flame propagation properties for fixed installations. Suitable for transport and distribution of electric power in medium voltage networks.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 2 according to EN 60228 and IEC 60228.

Optionally, with longitudinal water tightness (cable type -2OL).

### Conductor screen

Screen over the conductor, made of thermosetting semiconductor material.

### Insulation

Cross-linked polyethylene type XLPE according to IEC 60502-2 and type DIX3 according to HD 620-1, natural colour.

Cross linked in catenary line with nitrogen atmosphere through a triple layer extrusion process.

### Insulation screen

Screen over the insulation, made of thermosetting and strippable semiconductor material.

### Metallic screen

Copper wires and copper tape screen, with a minimum cross-section of 16mm<sup>2</sup>.

### Longitudinal water tightness

Hygroscopic tape completely covering the screen (cable type -OL and -2OL).

### Filling

Additional fireproof polyolefin layer, halogen free.

### Outer sheath

Polyolefin type ST7 according to IEC 60502-2 and type DMZ2 according to HD 620-1.

Red colour with two grey stripes.

Other colours under request.

## CHARACTERISTICS



### Electrical performance

Medium Voltage: 6/10 (12) kV  
8,7/15 (17,5) kV  
12/20 (24) kV  
18/30 (36) kV



### Thermal performance

Maximum conductor temperature: 90°C.  
Maximum short-circuit temperature: 250°C (max 5 s)  
Minimum service temperature: -15°C.



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.  
Reaction to fire CPR: E<sub>ca</sub> according to EN 50575  
Halogen free according to EN 60754-1 / IEC 60754-1.  
Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.



### Mechanical performance

Minimum bending radius: 15x cable diameter.  
Abrasion resistant.  
Tear resistant.



### Environmental performance

UV Resistant according to UNE 211605.



### Installation conditions

Open Air.  
Buried.  
In conduit.

## STANDARDS / COMPLIANCE



### According to

IEC 60502-2 / UNE-HD 620-10E (type 10E-4)



### Standards and approvals

AENOR



### CPR (Construction Products Regulation)

E<sub>ca</sub>



# X-VOLT® CU (-OL/-2OL) RHZ1 (AS)

Medium Voltage copper cable, XLPE insulation.

ACCORDING TO: IEC 60502-2



C<sub>ca</sub>



## APPLICATION

X-VOLT® RHZ1 (AS) is a Medium Voltage copper cable halogen-free with low smoke emission and no fire propagation properties for fixed installations.

Suitable for transport and distribution of electric power in medium voltage networks.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 2 according to EN 60228 and IEC 60228.

Optionally, with longitudinal water tightness (cable type -2OL).

### Conductor screen

Screen over the conductor, made of thermosetting semiconductor material.

### Insulation

Cross-linked polyethylene type XLPE according to IEC 60502-2, natural colour.

Cross linked in catenary line with nitrogen atmosphere through a triple layer extrusion process.

### Insulation screen

Screen over the insulation, made of thermosetting and strippable semiconductor material.

### Metallic screen

Copper wires and copper tape screen, with a minimum cross-section of 16mm<sup>2</sup>.

### Longitudinal water tightness

Hygroscopic tape completely covering the screen (cable type -OL and -2OL).

### Filling

Additional fireproof polyolefin layer, halogen free.

### Outer sheath

Polyolefin type ST7 according to IEC 60502-2.

Red colour with two green stripes.

Other colours under request.

## CHARACTERISTICS



### Electrical performance

Medium Voltage: 6/10 (12) kV  
8,7/15 (17,5) kV  
12/20 (24) kV  
18/30 (36) kV



### Thermal performance

Maximum conductor temperature: 90°C.  
Maximum short-circuit temperature: 250°C (max 5 s).  
Minimum service temperature: -15°C.



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.  
Fire non-propagation according to EN 50399.  
Reaction to fire CPR: C<sub>ca</sub>-s1b, d2, a1 according to EN 50575.  
Halogen free according to EN 60754-1 / IEC 60754-1.  
Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.  
Low smoke emission according to EN 61034 / IEC 61034:  
Light transmittance > 60%.



### Mechanical performance

Minimum bending radius: 15x cable diameter.  
Abrasion resistant.  
Tear resistant.



### Environmental performance

UV Resistant according to UNE 211605.



### Installation conditions

Open Air.  
Buried.  
In conduit.

## STANDARDS / COMPLIANCE



According to  
IEC 60502-2



Standards and approvals  
AENOR



CPR (Construction Products Regulation)  
C<sub>ca</sub>-s1b, d2, a1





# X-VOLT® AL RHZ1-OL

Medium Voltage aluminium cable, XLPE insulation,  
halogen free, in triplex formation.

ACCORDING TO: BS 7870-4.10 / IEC 60502-2



## APPLICATION

X-VOLT® RHZ1-OL is a Medium Voltage aluminium cables for transmission and distribution of electricity. Halogen free.

- Distribution networks.

## CONSTRUCTION

### Conductor

Aluminium class 2 according to EN 60228 and IEC 60228.

### Conductor screen

Screen over the conductor, made of thermosetting semiconductor material.

### Insulation

Cross-linked polyethylene type DIX3 according to BS 7870-4.10 and type XLPE according to IEC 60502-2, natural colour.

Cross linked in catenary line with nitrogen atmosphere through a triple layer extrusion process.

### Insulation screen

Screen over the insulation, made of thermosetting non-strippable semiconductor material.

### Metallic screen

Screen of copper wires and copper tape, applied over the outer semiconducting layer, with a minimum cross-section of 16 mm<sup>2</sup>.

### Water blocking

Hygroscopic tape applied over the metallic screen.

### Outer sheath

Polyolefin type DMP5 according to BS 74870-4.10 and type ST7 according to IEC 60502-2.

Red colour.

### Assembly of single-core cables

Three stranded single-core cables in triplex formation.

## CHARACTERISTICS



### Electrical performance

Medium voltage: 6,35/11 (12) kV.  
19,33 (36) kV.



### Thermal performance

Maximum conductor temperature: 90°C.  
Maximum short-circuit temperature: 250°C (max 5 s).  
Minimum service temperature: -15°C.



### Fire performance

Halogen free: according to EN 60754-1 / IEC 60754-1.  
Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.



### Mechanical performance

Minimum bending radius: 15x cable diameter.  
Abrasion resistant.  
Tear resistant.



### Installation conditions

Open Air.  
Buried.  
In conduit.

## STANDARDS / COMPLIANCE



According to  
BS 7870-4.10 / IEC 60502-2

# X-VOLT® AL RH5Z1-OL/-2OL

Medium voltage aluminium cable, XLPE insulation,  
halogen free with longitudinal aluminium strip screen.

ACCORDING TO: UNE 211620 / ENEL Global Standard GSC 001



## APPLICATION

Aluminium cable for fixed installations. Halogen free.  
Suitable for transport and distribution of electric power in medium voltage networks.

This cable is suitable for indoor, outdoor and buried installations.

## CONSTRUCTION

### Conductor

Aluminium class 2 according to EN 60228 and IEC 60228.  
Optionally, with longitudinal water tightness (cable type -2OL).

### Conductor screen

Screen over the conductor, made of thermosetting semiconductor material.

### Insulation

Cross-linked polyethylene, type DIX-3 according to HD 620-1, natural colour.

Cross-linked in catenary line with nitrogen atmosphere.

### Insulation screen

Screen over the insulation, made of thermosetting semiconductor material. Strippable.

### Water blocking

Semi-conducting swellable tape under metallic screen.

### Metallic screen

Aluminium tape of thickness 0,3 mm longitudinally applied on the water-blocking. The tape is overlapped and bonded 5 mm minimum. The screen is longitudinally and continually fixed in the outer sheath.

### Outer sheath

- Polyethylene halogen free, type DMZ1 according to HD 620-1. Red colour.

## CHARACTERISTICS



### Electrical performance

Medium voltage: 12/20 (24) kV  
18/30 (36) kV



### Thermal performance

Maximum conductor temperature: 90°C.  
Minimum service temperature: -15°C.  
Minimum installation temperature: 0 °C.  
Maximum short-circuit temperature: 250°C (max 5 s).



### Fire performance

Halogen free according to EN 60754-1 / IEC 60754-1.  
Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.



### Mechanical performance

Minimum bending radius permanently installed: 15x cable diameter.  
Minimum bending radius while installation: 20x cable diameter.  
Abrasion resistant.



### Environmental performance

UV Resistant according to UNE 211605.  
Water resistance: AD8 Submersion.



### Installation conditions

Open Air.  
Buried.  
In conduit.

## STANDARDS / COMPLIANCE



### According to

UNE 211620 / ENEL Global Standard GSC001



### Standards and approvals

AENOR / RETIE (18/30 (36) kV)





**F<sub>ca</sub>**



## APPLICATION

X-VOLT® HEPRZ1 AL is a Medium Voltage aluminium cable for the transmission and distribution of electricity.

## CONSTRUCTION

### Conductor

Aluminium class 2 according to EN 60228 and IEC 60228.

### Conductor screen

Screen over the conductor, made of thermosetting semiconductor material.

### Insulation

High module ethylene propylene rubber (HEPR) type DIH-2 according to HD 620-1, in dry atmosphere catenary tube, through a triple layer extrusion process.

### Insulation screen

Screen over the insulation, made of thermosetting and strippable semiconductor material.

### Metallic screen

Screen of copper wires and copper tape, with a minimum cross-section of 16mm<sup>2</sup>.

### Separator

Polyester tape completely covering the screen to facilitate the stripping of the outer sheath.

Optionally, substituted by hygroscopic tape (cables with longitudinal water tightness, type -OL).

### Outer sheath

Polyolefin, type DMZ1 according to HD 620-1.

Red colour.

## CHARACTERISTICS



### Electrical performance

Medium Voltage: 12/20 (24) kV  
18/30 (36) kV



### Thermal performance

Maximum conductor temperature: 105°C.  
Maximum short-circuit temperature: 250°C (max 5 s).  
Minimum service temperature: -15°C.



### Fire performance

Reaction to fire CPR: F<sub>ca</sub> according to EN 50575.  
Halogen free according to EN 60754-1 / IEC 60754-1.  
Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.



### Mechanical performance

Minimum bending radius: 15x cable diameter.  
Abrasion resistant.  
Tear resistant.



### Environmental performance

UV Resistant according to UNE 211605.



### Installation conditions

Open Air.  
Buried.  
In conduit.

## STANDARDS / COMPLIANCE



### According to

UNE-HD 620-9E (type 9E-1) / NI 56.43.01



### Standards and approvals

AENOR



### CPR (Construction Products Regulation)

F<sub>ca</sub>





# X-VOLT® AI

## HEPRZ1 (S)

Medium Voltage aluminium cable, HEPR insulation.

ACCORDING TO: UNE-HD 620-9E (type 9E-1)/ IEC 60502-2.



### APPLICATION

X-VOLT® HEPRZ1 Cu/Al is a Medium Voltage aluminium cable for the transmission and distribution of electricity.

X-VOLT HEPRZ1 Cu/Al (S) configuration is halogen free with low smoke emission and no flame propagation properties. X-VOLT HEPRZ1 Al (AS) configuration is halogen-free with low smoke emission and no fire propagation properties.

### CONSTRUCTION

#### Conductor

Aluminium electrolytic annealed conductor, class 2, according to EN 60228 and IEC 60228.

#### Internal semiconductor

Screen over the conductor, made of thermosetting semiconductor material.

#### Insulation

High module ethylene propylene rubber (HEPR) type DIH-2 according to HD 620-1, in dry atmosphere catenary tube, through a triple layer extrusion process. Lead-Free version available on request.

#### External semiconductor

Screen over the insulation, made of thermosetting and strippable semiconductor material.

#### Metallic screen

Screen of copper wires and copper tape, with a minimum cross-section of 16mm<sup>2</sup>.

#### Separator

Polyester tape completely covering the screen to facilitate the stripping of the outer sheath. Optionally, substituted by hygroscopic tape (cables with longitudinal sealing, type -OL and -ZOL).

#### Outer sheath

Fire-retardant and halogen-free polyolefin outer sheath, red colour with two grey bands, type DMZ2 according to HD 620-1.

### CHARACTERISTICS



#### Electrical performance

Medium Voltage 12/20 kV and 18/30 kV.



#### Thermal performance

Maximum service temperature: 105°C.

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

Minimum service temperature: -30°C.



#### Fire performance

Flame non-propagation according to EN 60332-1.

Halogen free: according to EN 50267, EN 60754 and IEC 60754.

Low smoke emission according to EN 61034, EN 60754-2 and IEC 60754-2.

Reaction to fire CPR: E<sub>ca</sub>, according to EN 50575.



#### Mechanical performance

Minimum bending radius: 15 x cable diameter.

Abrasion resistant.

Tear resistant.



#### Environmental performance

UV Resistant according to UNE 211605.

### STANDARDS / COMPLIANCE



#### Based on

UNE-HD 620-9E (type 9E-1)/ IEC 60502-2.



#### Standards and approvals

AENOR



#### CPR (Construction Products Regulation)

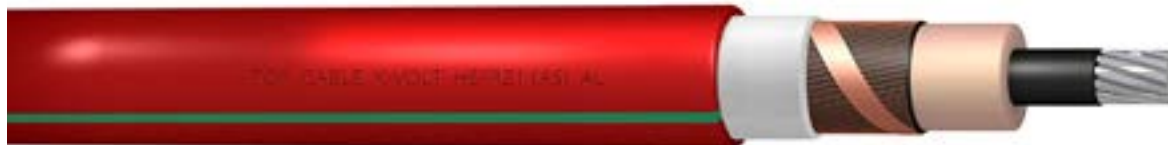
E<sub>ca</sub>



# X-VOLT® AL (-OL) HEPRZ1 (AS)

Medium Voltage aluminium cable, HEPR insulation.

ACCORDING TO: UNE-HD 620-9E (type 9E-5) / NI 56.43.01



C<sub>ca</sub>

## APPLICATION

X-VOLT® HEPRZ1 (AS) AL is a Medium Voltage aluminium cable halogen-free with low smoke emission and no fire propagation properties for the transmission and distribution of electricity.

## CONSTRUCTION

### Conductor

Aluminium class 2 according to EN 60228 and IEC 60228.

### Conductor screen

Screen over the conductor, made of thermosetting semiconductor material.

### Insulation

High module ethylene propylene rubber (HEPR) type DIH-2 according to HD 620-1, in dry atmosphere catenary tube, through a triple layer extrusion process.

### Insulation screen

Screen over the insulation, made of thermosetting and strippable semiconductor material.

### Metallic screen

Screen of copper wires and copper tape, with a minimum cross-section of 16mm<sup>2</sup>.

### Separator

Polyester tape completely covering the screen to facilitate the stripping of the outer sheath.

Optionally, substituted by hygroscopic tape (cables with longitudinal sealing, type -OL).

### Filling

Additional fireproof polyolefin layer, halogen free.

### Outer sheath

Polyolefin, halogen free type DMZ2 according to HD 620-1.

Red colour with two green stripes.

## CHARACTERISTICS



### Electrical performance

Medium Voltage: 12/20 (24) kV  
18/30 (36) kV



### Thermal performance

Maximum conductor temperature: 105°C.  
Maximum short-circuit temperature: 250°C (max 5 s).  
Minimum service temperature: -15°C.



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.  
Fire non propagation: according to EN 50399.  
Reaction to fire CPR: C<sub>ca</sub>-s1b, d2, a1 according to EN 50575.  
Halogen free according to EN 60754-1 / IEC 60754-1.  
Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.  
Low smoke emission according to EN 61034 / IEC 61034:  
Light transmittance > 60%.



### Mechanical performance

Minimum bending radius: 15x cable diameter.  
Abrasion resistant.  
Tear resistant.



### Environmental performance

UV Resistant according to UNE 211605.

## STANDARDS / COMPLIANCE



According to  
UNE-HD 620-9E (type 9E-5) / NI 56.43.01



Standards and approvals  
AENOR



CPR (Construction Products Regulation)  
C<sub>ca</sub>-s1b, d2, a1



# X-VOLT® RHVhMVh 3x Cu +H1

Medium Voltage copper cable, XLPE insulation  
and hydrocarbon resistant.

ACCORDING TO: IEC 60502-2. / Repsol ED-P-10.01-01



## APPLICATION

Medium Voltage copper cable for the transmission and distribution of electricity. This cable is recommended for installations where there may be a risk of oils and/or hydrocarbon type chemical agents coming into contact with the cable.

- Distribution networks.

## CONSTRUCTION

### Conductor

Electrolytic annealed copper, class 2 according to EN 60228 and IEC 60228.

### Conductor screen

Screen over the conductor, made of thermosetting semiconductor material.

### Insulation

Cross-linked polyethylene type XLPE according to IEC 60502-2, in dry atmosphere catenary tube, through a triple layer extrusion process.

### Insulation screen

Screen over the insulation, made of thermosetting and strippable semiconductor material.

### Cores identification

The cores are identified with a tape placed along the cable between the external semiconductor and the metallic screen.

Colours are brown, green and yellow.

### Metallic screen

Metallic screen made of copper tape. It consists in two copper tapes of 0,1 mm of thickness placed helicoidally and overlapped (H1 screen) over the outer semi-conducting screen.

### Assembly of cores

The three cores are assembled helicoidally with the metallic screens in touch.

### Separation sheath

PVC type ST2 according to IEC 60502-2.

The special compound gives a high level of resistance to hydrocarbons and mineral oils.

### Armour

Galvanized steel wire wrapped helicoidally around the cable and fixed with a counter-wound metal tape.

### Outer sheath

PVC type ST2 according to IEC 60502-2.

The special compound gives a high level of resistance to hydrocarbons and mineral oils.

Red colour.

## CHARACTERISTICS



### Electrical performance

Medium voltage: 3,6/6 (7,2) kV

6/10 (12) kV

8,7/15 (17,5) kV

12/20 (24) kV

18/30 (36) kV



### Thermal performance

Maximum conductor temperature: 90°C.

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

Minimum service temperature: -15°C.



### Fire performance

Flame non-propagation according to EN 60332-1 / IEC 60332-1.

Fire non-propagation according to EN 60332-3 / IEC 60332-3.

Reduced halogen emission. Chlorine < 15%.



### Mechanical performance

Minimum bending radius: 15x cable diameter.

Abrasion resistant.

Tear resistant.



### Environmental performance

Chemical resistance: Excellent.

Oil resistant: according to UIC 895 OR.

Hydrocarbon resistant: according to UIC 895 OR.



### Installation conditions

Open Air.

Buried.

In conduit.

## STANDARDS / COMPLIANCE



According to

IEC 60502-2 / Repsol ED-P-10.01-01





E<sub>ca</sub>



## APPLICATION

X-VOLT® FR-N20XA8E-AR Medium Voltage aluminium cables for the electricity transmission and distribution. Halogen free.

- Distribution networks.

## CONSTRUCTION

### Conductor

Aluminium, class 2, according to NF-EN 60228 and IEC 60228.

### Conductor screen

Screen over the conductor, made of thermosetting semiconductor material.

### Insulation

Cross-linked polyethylene (XLPE).

### Insulation screen

Screen over the insulation, made of thermosetting and strippable semiconductor material.

### Longitudinal sealing

Swelling powder.

### Metallic screen

Longitudinal aluminium foil with polymer laminate bonded to the outer sheath.

### Outer sheath

Polyolefin.

Black colour.

## CHARACTERISTICS



### Electrical performance

Medium Voltage: 12/20 (24) kV  
18/30 (36) kV



### Thermal performance

Maximum conductor temperature: 90°C.  
Maximum short-circuit temperature: 250°C (max 5 s)  
Minimum service temperature: -15°C.



### Fire performance

Flame non-propagation according to NF C 32-070 C2.  
Reaction to fire CPR: E<sub>ca</sub> according to EN 50575.



### Mechanical performance

Minimum bending radius: 13x cable diameter.  
Impact resistance: AG4 Extra High Severity (≤ 20J).



### Environmental performance

UV Resistant according to NF EN 50483.  
Water resistance: AD8 Submersion.



### Installation conditions

Open Air.  
Buried.  
In conduit.

## STANDARDS / COMPLIANCE



According to  
NF C 33-226



Standards and approvals  
CE / RoHS / EDF



CPR (Construction Products Regulation)  
E<sub>ca</sub>





**E<sub>ca</sub>**

## APPLICATION

X-VOLT® TSLF is a halogen free cable for fixed installations. Suitable for transport and distribution of electric power in medium voltage networks.

This cable is suitable for indoor, outdoor and buried installations.

## CONSTRUCTION

### Conductor

Aluminium, class 2 according to EN 60228 and IEC 60228.

Hygroscopic tapes applied to achieve longitudinal watertightness on the conductor.

### Conductor screen

Cross-linked semiconductor screen applied over conductor in a triple-extrusion process.

### Insulation

Cross-linked polyethylene insulation type DIX8 according to HD 620-1; natural colour.

Cross-linked in catenary line with nitrogen atmosphere.

### Insulation screen

Cross-linked semiconductor screen applied over insulation in a triple-extrusion process. Bonded to the insulation layer.

### Longitudinal water-blocking

Hygroscopic tape completely covering the screen.

### Metallic screen

Metallic screen with copper wires, applied over the semi-conducting swellable tape.

### Radial water-blocking barrier

Made up of an aluminium foil/polymer laminate bonded to the outer sheath.

### Outer sheath

Polyethylene type DMP 17 according to HD 620-1 (with conductive covering).

Black colour.

## CHARACTERISTICS



### Electrical performance

Maximum voltage: 12kV, 24kV and 36kV.



### Thermal performance

Maximum conductor temperature: 90°C.

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

Minimum service temperature: -15°C.



### Fire performance

Reaction to fire CPR: E<sub>ca</sub> according to EN 50575.

Halogen free according to EN 60754-1 / IEC 60754-1.

Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.



### Mechanical performance

Minimum bending radius: 15x cable diameter.

Abrasion resistant.

Tear resistant.



### Environmental performance

Water resistance: AD8 Submersion.



### Installation conditions

Open Air.

Buried.

In conduit.

## STANDARDS / COMPLIANCE



**Based on**  
HD 620-10K



**CPR (Construction Products Regulation)**  
E<sub>ca</sub>

















78%















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