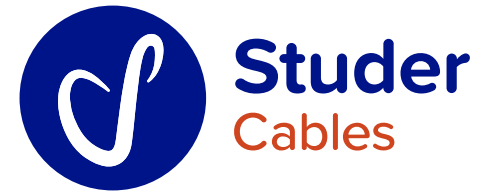




SALES TRAINING
SOLAR AND DC SOLUTIONS
Customer, Date, Location

PRODUCT PRESENTATION SOLAR AND DC SOLUTIONS

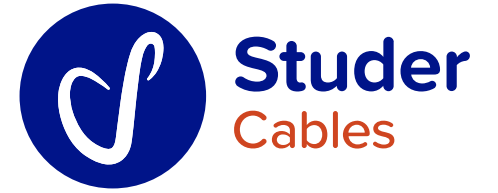
Agenda



- **Overview Market Segment**
- **Overview Product Families**
- **Overview Family BETAflam**
- **Application**
- **Properties**
- **Advantages**
- **Overview Family SOLARpower**
- **Application**
- **Properties**
- **Advantages**
- **TRAFO-FLEX & ROFLEX**
- **Summary**

MARKET SEGMENT

Rooftop systems & Module connection cables



Market

Small systems for house roofs to larger systems on industrial and logistics buildings

Distribution

Small quantities via dealers, larger quantities via installers with Packaging units and direct delivery, module connection cable for cable harnessing and module manufacturers.

Solar dealers usually sell cables from several cable manufacturers, Studer as a premium manufacturer in direct price competition. Small solar installers pay more attention to quality also because of direct product liability.

Products

BETAflam Solar 125 flex 1500V DC and BETAflam Solar 125 RV flex 1500V DC (installation cable)
BETAflam Solar 125 flex UL/EN, BETAflam Solar 125 S flex UL/EN (connection cable for PV modules)



MARKET SEGMENT

Ground-mounted PV Systems



Market

Medium 50MVA to large ground-mounted systems 300MVA
Focus on Europe and Asia

Distribution

Direct sales and delivery to the construction site
or seaport worldwide to EPC (creator of the plant)

Sale partly with advice and planning support, calculation
of the current carrying capacity, installation method etc.



Products

BETAflam Solar 125 RV flex 1500V DC, SOLARpower Alu-ATA XS, SOLARpower Outdoor XS

MARKET SEGMENT

Floating PV Systems (FPV) & High Alpine Locations



Market

Small to medium floating PV systems (inland waters) & close to the coast in connection with wind turbines), PV systems in the Alps at dam walls, on reservoirs or infrastructure facilities.
Focus on European market

Distribution

Direct sales and delivery to the construction site or seaport worldwide to EPC (creator of the plant)

High quality is important due to the harsh environmental conditions and often hard-to-reach locations.
Partial delivery with pre-assembled cable harnesses.

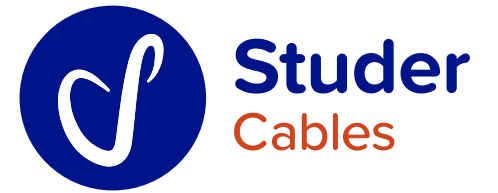
Products

BETAflam Solar 125 flex WR 1500, SOLARpower Alu-ATA XS, SOLARpower Outdoor XS, Roflex including services for consulting and cable laying, current carrying capacity, connection technology



MARKET SEGMENT

Large EV Charging Infrastructure, Battery storage



Market

Fast charging infrastructure for cars, trucks and buses, often in conjunction with battery storage and medium-voltage connection. So far, the focus has been on the Swiss and UK markets.

Distribution

Direct sales and delivery to the construction site. High consulting competence especially in this new application with high requirements regarding installation with high energy density and electrical currents in a confined space.

Products

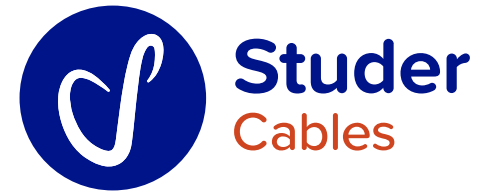
BETAflam Solar 125 flex WR 1500, Roflex, BETAflam TRAF0-FLEX for the flexible and SOLARpower Alu-ATA XS, SOLARpower Outdoor XS for fixed installation and large radii.

Further services and advice as a subcontractor for the general contractor.

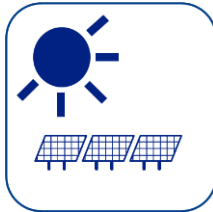


OVERVIEW OF PRODUCT FAMILIES

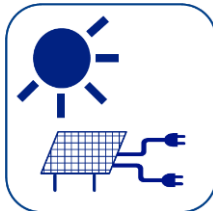
SOLAR and DC Solutions



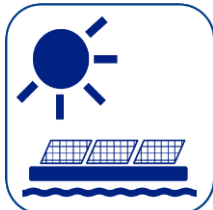
BETAflam Solar



BETAflam Solar 125 flex 1500V DC
BETAflam Solar 125 RV flex 1500V DC

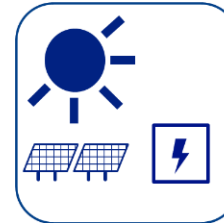


BETAflam Solar 125 flex UL/EN
BETAflam Solar 125 S flex UL/EN

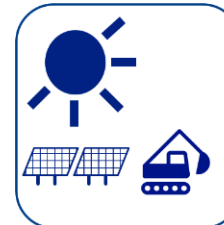


BETAflam Solar 125 flex WR 1500

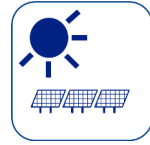
SOLARpower



SOLARpower Outdoor Alu XS



SOLARpower Alu-ATA XS
SOLARpower Accessories

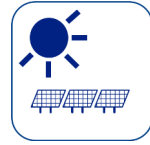


BETAflam Solar 125 flex 1500V DC

- Connection between the PV modules and from the PV modules to the generator junction box or inverter
- For indoor and outdoor use, fixed or free hanging, installation in tubes or electrical appliances.
- Approval: EN 50618
- Market: CH and Europe
- Focus on rooftop systems

BETAflam Solar 125 RV flex 1500V DC

- Connection between the PV modules and from the PV modules to the generator junction box or inverter
- For indoor and outdoor use, fixed or free hanging, installation in tubes or electrical appliances.
- Approval: EN 50618, IEC 62930
- Market: worldwide except the USA
- Large rooftop and ground-mounted systems

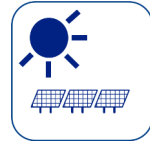


BETAflam Solar 125 flex 1500V DC

- Two-layer structure for protection class II
- Conductor with tinned strand class 5
- Voltage: 1000V/1000V AC 1500V DC max. 1800V DC
- short and earth fault proof
- UV resistant, black jacket with white stripe & labeling: - pole
or
red stripe & labeling: + pole
- More robust version with larger wall thicknesses than the BETAflam Solar 125 RV flex 1500V DC

BETAflam Solar 125 RV flex 1500V DC

- Two-layer structure for protection class II
- Ladder structure with tinned strand class 5
- Voltage: 1000V/1000V AC 1500V DC max. 1800V DC
- short and earth fault proof
- UV resistant, black jacket with white stripe & labeling: - pole
or
red stripe & labeling: + pole
- Cost-optimized design for large PV ground-mounted systems

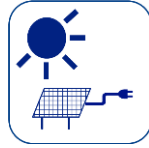


BETAflam Solar 125 flex 1500V DC

- Best possible UV protection = > solar cable exclusively with black sheath
- Consistently high product quality for more than 16 years without damage
- Continuous manufacturing process with extensive quality monitoring and tracking process.
- Own compound formulations and production
- More robust version with larger wall thicknesses than the BETAflam Solar 125 RV flex 1500V DC

BETAflam Solar 125 RV flex 1500V DC

- Best possible UV protection = > solar cable exclusively with black sheath
- Consistently high product quality for more than 16 years without damage
- Continuous manufacturing process with extensive quality monitoring and tracking process.
- Own compound formulations and production
- Cost-optimized design for large PV ground-mounted systems

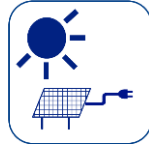


BETAflam Solar 125 flex UL/EN

- Module connection cable for the connection between the junction boxes of the photovoltaic modules
- For indoor and outdoor use, fixed or free-hanging, installation in tubes, as well as in devices with EU and US approval.
- Approval: EN 50618, UL 4703
- Market: worldwide to module and inverter manufacturers or their assemblers

BETAflam Solar 125 S flex UL/EN

- Module connection cable for the connection between the junction boxes of the photovoltaic modules
- For indoor and outdoor use, fixed or free-hanging, installation in tubes, as well as devices with EU and US approval.
- Approval: EN 50618, UL 4703, IEC 62930
- Market: worldwide to module and inverter manufacturers or their assemblers, as well as for battery storage with rated voltage of 1500V DC (EN), 2000V (UL)

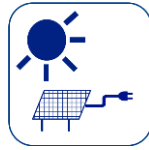


BETAflam Solar 125 flex UL/EN

- Three-layer structure for protection class II
- Voltage: 1000V/1000V AC
1500V DC max. 1800V DC
2000V AC (UL 4703)
- short and earth fault proof
- Halogen-free
- UV resistant, black sheath
- More robust design with larger wall thicknesses than the BETAflam Solar 125 S flex UL/EN

BETAflam Solar 125 S flex UL/EN

- Three-layer structure for protection class II
- Voltage: 1000V/1000V AC
1500V DC max. 1800V DC
2000V AC (UL 4703)
- short and earth fault proof
- Halogen-free
- UV stable, black coat color
- Cost-optimized design with reduced wall thicknesses

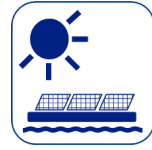


BETAflam Solar 125 flex UL/EN

- Approval for the EU and US market particularly interesting for European device manufacturers who export to the USA
- Best possible UV protection = > solar cable exclusively with black sheath
- Consistently high quality for more than 16 years without damage
- Own compound formulations and production
- Continuous manufacturing process with extensive quality monitoring and tracking process.

BETAflam Solar 125 S flex UL/EN

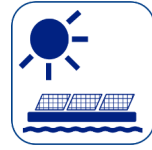
- Approval for the global market.
- particularly interesting for European device manufacturers who export worldwide
- Best possible UV protection = > solar cable exclusively with black sheath
- Consistently high quality for more than 16 years without damage
- Own compound formulations and production
- Continuous manufacturing process with extensive quality monitoring and tracking process.



BETAflam Solar 125 WR 1500

- Connection between the PV modules and combiner box or inverter of floating solar systems (FPV).
- Flexible connection for EV charging stations, battery storage
- Particularly robust design for indoor and outdoor use, direct underground installation.
- Market:
Worldwide with a focus on Europe for FPV systems and for particularly harsh environmental conditions such as in the Alps or offshore

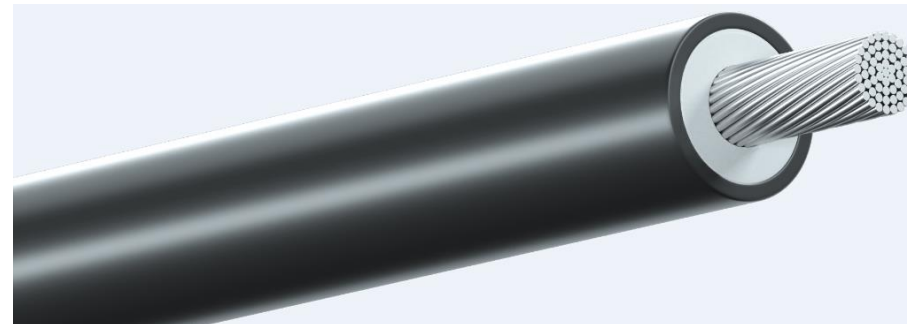
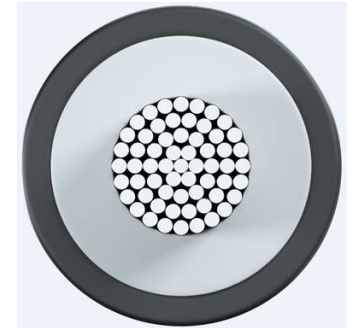




BETAflam Solar 125 WR 1500

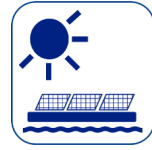
- Three-layer structure for protection class II
- Conductor with tinned strand class 5
- Voltage: 1000V/1000V AC 1500V DC max. 1800V DC

- Approval: EN 50618, IEC 62930, 2PfG 2740
- Water resistant, even at high temperatures
- For direct burial installation
- UV resistant, black sheath
-



BETAFLAM SOLAR

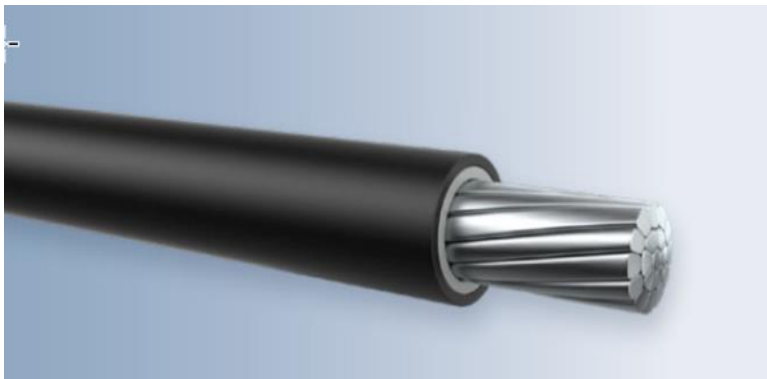
Advantages



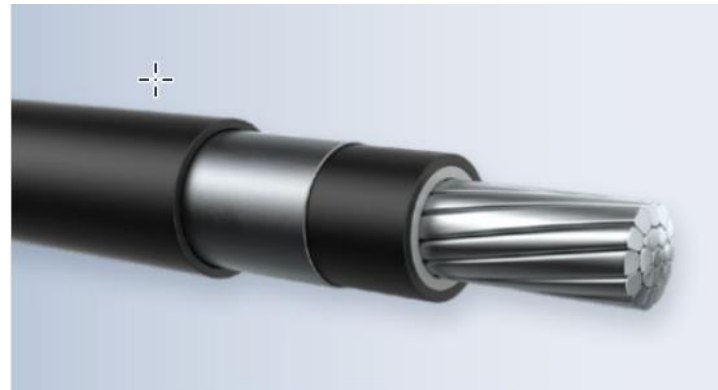
BETAflam Solar 125 flex WR 1500

- First solar cable with TÜV approval according to the new TÜV 2PFG 2740 09/20 "Requirements for cables with improved water resistance for installation in photovoltaic systems"
- Tightened IEC tests in salt water for 12 weeks at 90°C and test voltage 3.6kV
- UL Test of Capacitive Change in water bath
- Best possible UV protection = > solar cable exclusively with black sheath
- Consistently high quality for more than 16 years without damage
- Continuous manufacturing process with extensive quality monitoring and tracking process.

SOLARpower Outdoor Alu XS

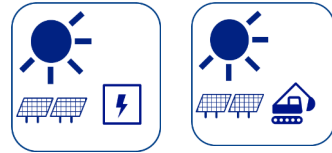


SOLARpower Alu-ATA XS



SOLARpower Accessories





SOLARpower Outdoor Alu XS

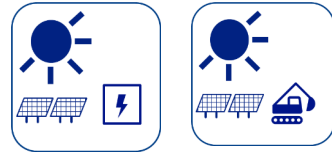
- Connection between combiner box and inverter
- Large battery storage systems and inverters
- DC connection for DC railways
- protected installation in outdoor areas

SOLARpower Alu-ATA XS

- Connection between combiner box and inverter
- Large battery storage systems (containers) and inverters
- DC connection for DC railways
- direct underground installation

SOLARpower Zubehör

- Connection and grounding set for the SOLARpower Alu-ATA XS



SOLARpower Outdoor Alu XS

- TÜV Rheinland certification according to 2 PfG 2642 11.17 Requirements for aluminium cables for fixed installation in soil for photovoltaic systems
- Aluminium conductor class 2
- 1500V DC, 1000V/ 1000V AC

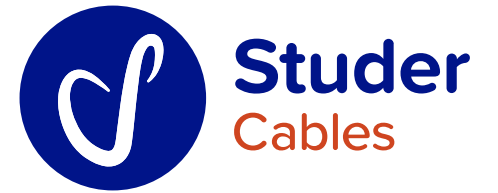
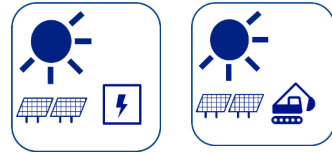
SOLARpower Alu-ATA XS

- TÜV Rheinland certification according to 2 PfG 2642 11.17 «Requirements for aluminium cables for fixed underground installation in photovoltaic systems»
- 1500V DC, 1000V/1000V AC
- Aluminum tube armoring
- Robust, high-tough outer jacket made of termigon
- Also suitable for fixed installation under water.
- Anti-rodent and anti-termites

SOLARpower Accessories

- Connection and grounding set for the SOLARpower Alu-ATA XS
- Optimally matched set for dense, reliable and durable connection
- Quick and easy installation with screw cable lugs especially suitable for aluminum conductors

SOLARPOWER Advantages



SOLARpower Outdoor Alu XS

- TÜV Rheinland certification according to 2 PfG 2642 11.17
- Cost advantage for large cross-sections and protected installation
- 1500V DC, 1000V/ 1000V AC

SOLARpower Alu-ATA XS

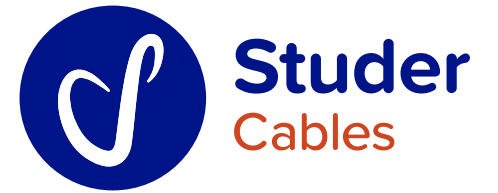
- TÜV Rheinland certification according to 2 PfG 2642 11.17
- for direct burial installation
- Radial water resistant
- Also suitable for fixed installation under water with 20 years of practical experience
- Rodents and termites protected
- 1500V DC, 1000V/1000V AC

SOLARpower Accessories

- Cables and accessories => everything from a single source.
- All required parts optimally matched to each other and available as a set.
- Simple and fast on-site assembly no small parts procurement and search
- Screw cable lugs with constant contact force, compensates the creeping of aluminum conductors
- No pressing tool required

BETAFLAM TRAF0-FLEX

Overview



Application:

- Flexible low-voltage connection between transformer and e.B switchgear inside buildings, transformer stations in humid environments but no permanent water storage, e.B. in tube systems

Properties:

- Bare fine copper strands Cl. 5
- CPR declaration of performance: $D_{ca}-s1,d2,a1$

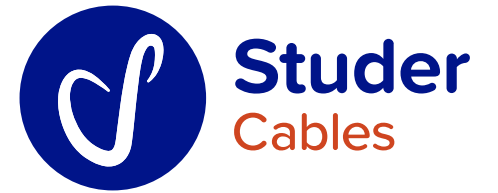
Advantages:

- Halogen-free and flame-retardant
- Compact strand construction suitable for standard and DIN cable lugs
- Cross-linked EPR insulation
- EMC standard according to NISV for the stranded version



ROFLEX

Overview



Application:

- Highly flexible low-voltage connection under extreme environmental conditions. Approval: ESTI CH-N1BQ-F (not VDE H05BQ-F and H07BQ-F)

Properties:

- Highly tough outer jacket for strong mechanical stress, UV, ozone and mineral oil resistant, very good cold flexibility (down to -40°C).
- Bare fine copper strands Cl. 5, cross-linked EPR insulation.
- CPR declaration of performance F_{ca} (no permanent installation in buildings)

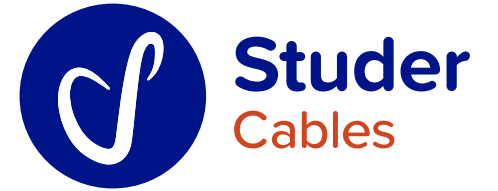
Advantages:

- Very wide range of applications, food, chemical industry, electrical trade Laying in water (fresh and salt water)
- Shielded version or customer-specific printing on request



SUMMARY

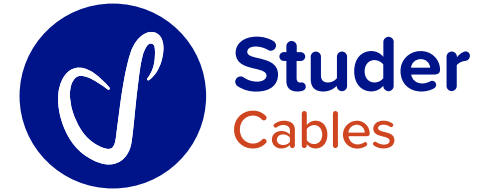
Market Segment SOLAR UND DC SOLUTIONS



- **With the new market developments in the field of e-mobility and battery storage, in addition to the previous PV market, there are other very interesting applications for our DC cables.**
- **Depending on the project and application, the requirements for the cable connections are very different.**
- **With our cable range, we are very well positioned and can offer a solution whether for flexible or fixed applications, inside or outside buildings or another type of installation.**
- **In e-mobility and battery storage, high electrical currents are often installed in a confined space. Therefore, a correct cable design and calculation of the current load values is very important. Studer Cables is happy to offer the necessary support.**

REFERENCES

Ground-mounted PV Systems



Large PV installations

with Studer cable worldwide:

Marriott & Sheraton Hotel 11MW (JOR)

Bidor Solar Parc, Perak 30MW (MY)

Liberose 71 MW (GER),

Waldpolenz 52 MW (GER),

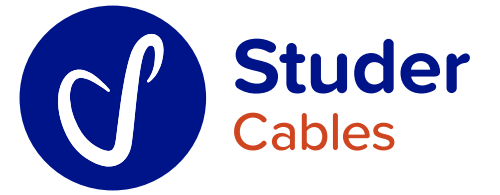
Shotwick Solar Parc 72 MW (UK)

Limondale Balranald, 349 NSW, (AUS)



REFERENCES

Floating PV plants (FPV) & high alpine locations



Albigna Dam, 410kWp plant, Switzerland

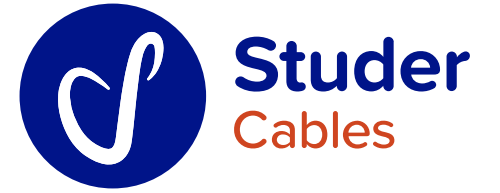


Muttsee dam, 2.2MWp plant, Switzerland



REFERENCES

Large EV charging infrastructure, battery storage



Braintree EV 350kW Super Chargers & Batterie Storage, UK



Thanks for your attention

We are happy to answer any questions you may have.