



**BETApower® Fireprotec**  
For a safe supply

**The Quality Connection**

**LEONI**

# Unique fire safety levels

MV cable with insulation integrity to a minimum of 180 minutes in the event of fire



**EXREMELY COMPACT  
CONSTRUCTION**

**FREE LAYING  
IN RACKS**

**USE IN PIPEWORK  
SYSTEMS**

### BETApower® Fireprotec sets new standards

Building and transport infrastructures have to meet extremely stringent requirements to provide protection against the consequences of faults and fire. LEONI's BETAflam® non-toxic, flame retardant products have set the standards in this area for the past 15 years. These cables are standard products in safety-relevant civil engineering installations. Now LEONI is carrying its expertise in safety cable systems over to voltage classes beyond 1000 V, by developing its TRI-DELTA XDME medium voltage cable further. The BETApower® Fireprotec 12/20 kV achieves a fire safety standard of 180 minutes, which makes it unique in this market.

### The new cable design meets stringent requirements and guarantees genuine benefits

- Low in weight and easy to install
- Shorter installation time
- Lower electrical losses, and lower energy costs
- Lower electromagnetic radiation
- Lower installation costs

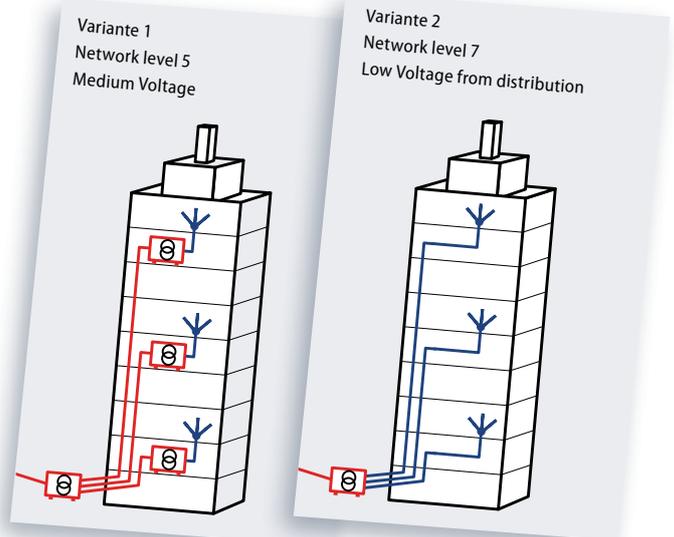
BETApower® Fireprotec is ideally suited to new buildings, opening new options for the design of energy supply and generation facilities. It also achieves astonishing results when used to replace conventional medium voltage cables. Compared to a conventional low voltage safety installation (in high-rise buildings, for example) the installation costs are reduced by up

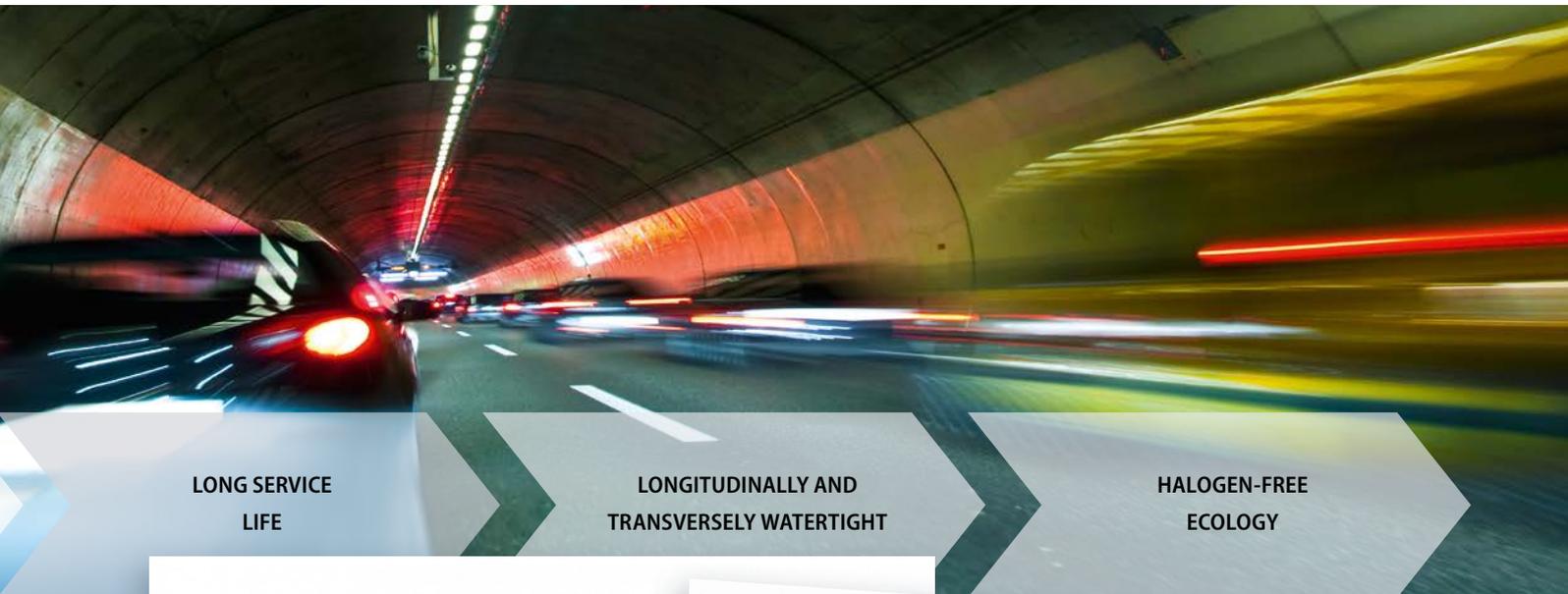
to 60 %. Thanks to a compact construction, the newly developed BETApower® Fireprotec can be included in conventional pipe-work systems or on riser tracks.

### BETApower® Fireprotec – the best solution for your applications.

#### Cost comparison in building development

Specification		Variante 1 BETApower® Fireprotec	Variante 2 LV Safety Cable
Maximum output	kVA	1000	1000
Transformers	kVA	3 x 1000	–
Feed at network levels	kV	5 (11) <span style="color: red;">—</span>	7 (0.4) <span style="color: blue;">—</span>
Investment costs	CHF	169'000	435'000





LONG SERVICE  
LIFE

LONGITUDINALLY AND  
TRANSVERSELY WATERTIGHT

HALOGEN-FREE  
ECOLOGY

SEV Verband für Elektro-, Energie- und Informationstechnik

### Expert's report / Expertise

Confirmation on preparation of an expert's report / Bescheinigung über die Durchführung einer Expertise  
CERTIFEL

Product Produkt	Polymer insulated medium voltage cable
Applicant Auftraggeber	LEONI Studer AG Herrenmattstrasse 20 CH-4658 Däniken SO
Manufacturer Hersteller	LEONI Studer AG Herrenmattstrasse 20 CH-4658 Däniken SO
Factory Fertigungsstätte	LEONI Studer AG Herrenmattstrasse 20 CH-4658 Däniken SO
Trade mark Handelsmarke	BETApower®
Type/Model Typ/Modell	BETApower® Fireprotac FE180 with cold shrink inline splice 3M QS 2000 in combination with flame protection 3M STFF 14W-HSB + 12 mm Cerar
Ratings, characteristics Nenndaten	20/12 KV; 1x50/27 ... 1x300/41 mm
Normative documents safety Normative Dokumente Sicherheit	BS 6387:1994 Performance requirements for cable fire conditions
Fire standard	BS 6387:1994 Annex D.2 Test C, Resistance to fire
Technical Features Technische Eigenschaften	The BETApower® Fireprotac FE180 module corresponding following fire

For the product an expert's report with regard to the aforementioned technical features has been issued.  
Für das Produkt wurde nach den Spezifikationen des Auftraggebers normative Dokumente, bzw. technischen Eigenschaften durchgeführt.

The results are given in the reports ref.no.: 13-IK-0111.  
Das Ergebnis ist zu entnehmen den Berichten Ref. Nr.:

**Electrosuisse**  
Swiss Certification Body

Erich Obrist  
Product Certification

SEV Verband für Elektro-, Energie- und Informationstechnik

### Expert's report / Expertise

Confirmation on preparation of an expert's report / Bescheinigung über die Durchführung einer Expertise  
CERTIFEL

Ref.Nr.: IK-1724  
page 1 of 1

Product Produkt	Polymer isoliertes Mittelspannungskabel
Applicant Auftraggeber	LEONI Studer AG Herrenmattstrasse 20, Postfach 63, CH-4658 Däniken SO
Manufacturer Hersteller	LEONI Studer AG Herrenmattstrasse 20, Postfach 63, CH-4658 Däniken SO
Factory Fertigungsstätte	LEONI Studer AG Herrenmattstrasse 20, Postfach 63, CH-4658 Däniken SO
Trade mark Handelsmarke	BETApower®
Type/Model Typ/Modell	BETApower® Fireprotac FE180
Ratings, characteristics Nenndaten	20/12KV; 1x50/27 ... 1x240/39mm²
Normative documents safety Normative Dokumente Sicherheit	EN 50267-2-1:98, EN 50267-2-3:98, EN 60332-1-2:04, EN 60332-3-24:09 IEC 60331-11(ed.1);am1, IEC 60331-21(ed.1), IEC 60332-1-2(ed.1), IEC 60332-3-24(ed.1);am1, IEC 60754-1(ed.3)
Normative documents EMC Normative Dokumente EMV	---
Technical Features Technische Eigenschaften	Die Kabel weisen entsprechend folgende technische Eigenschaften auf: - Geringe Brandfortleitung nach IEC/EN 60332-3-24 und IEC/EN 60332-1-2 - Isolationserhalt von 180 Minuten nach IEC 60331-21/-11 - Geringe Menge korrosiver Brandgase nach EN 50267-2-3 - Geringer Halogengehalt (halogenfrei) nach EN 50267-2-1 und IEC 60754-1

For the product an expert's report with regard to the aforementioned normative documents, respectively technical features has been issued.  
Für das Produkt wurde nach den Spezifikationen des Auftraggebers eine Expertise auf der Grundlage der normativen Dokumente, bzw. technischen Eigenschaften durchgeführt.

The results are given in the reports ref.no.: 11-IK-0573.01 + .02 + .03 + .04 + .05 + .06 + .07  
Das Ergebnis ist zu entnehmen den Berichten Ref. Nr.: + .08

**Electrosuisse**  
Swiss Certification Body

Martin Plüss  
Product Certification

Fehraltorf, 2011-12-01

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SQS Certification

# BETApower® Medium voltage cables

with circuit integrity



## Advantages

- Insulation integrity maintained for over 180 minutes
- Flame retardant, no fire propagation
- Longitudinally and transversely watertight
- Long service life
- Halogen-free / Ecology
- Reduced shielding losses
- Robust abrasion resistant sheath
- Compact / light / modular

## BETApower® Fireprotec 12 / 20 kV

### Applications

Medium voltage wiring with insulation integrity in the event of fire.

Use in safety-relevant construction designs in:

- public buildings
- tunnels
- underground train systems
- civil engineering works

### Construction

- |   |   |
|---|---|
| ■ Conductor   | Copper multi-compacted conductor according to VDE 0295 / IEC 60228, class 2 |
| ■ Internal semi-conductor layer / XLPE dielectric / External semi-conductor layer | Extruded in a single process, welded boundary layers                        |
| ■ Semi-conductor swelling tape  | Padded strip, longitudinally watertight                                     |
| ■ Aluminium shielding, tubular  | Aluminium tape, overlapped and glued, transversely watertight               |
| ■ Sheath  | Polyolefin-Copolymer, black   |
| ■ Thermal barrier   | Special intumescent intermediate layer                                      |
| ■ Outer sheath  | Polyolefin-Copolymer, double layer, black with red longitudinal stripes     |

### Electrical characteristics

Rated voltage	$U/U_0$ 20/12 kV (10/6 kV upon request) A voltage ( $U_m$ ) of 20 % more than the normal voltage is admissible at continuous operation.
Test voltage	$4 \times U_0$ at 50 Hz during 20 min
Partial discharge test	Test voltage $4 \times U_0$ level < 2 pC during 20 min

### Thermal characteristics

Continuous operation	+ 90 °C
Emergency operation	+130 °C (< 8 hrs/day; <100 hrs/annum)
Short-circuit	+250 °C (max. 5 s)

### Bending radius

during laying	> 15 × outer Ø
fixed	> 11 × outer Ø

### Pulling on conductors

Max. 60 N/mm<sup>2</sup> (1 × conductor cross section × 60 N/mm<sup>2</sup>)

### Standards / Material properties

- Construction: CENELEC HD 620 S1
- Halogen-free: IEC 60754-1, EN 50267-2-1
- No corrosive gases: EN 50267-2-3
- No toxic gases: NES 02-713
- Flame retardant: IEC 60332-1, EN 60332-1
- No flame propagation: IEC 60332-3-24, EN 60332-3-24
- Circuit integrity based on: IEC 60331-11 and 21; BS 6387 C

### Specialities

- Open tray laying as well as in tubes
- Special design with a copper tube screen upon request
- Compact construction
- **Recommendation:** For an optimized shield connection use end and connecting elements provided by LEONI
- Electrosuisse certified, SEV

Construction	Conductor		Weight	Tensile strength	Fire load	AC resistance	Capacity	Inductance		Order no.	
	insulation-Ø	Outer Ø						Ω/km, 60 °C	µF/km		mH/km
$n \times mm^2$	mm	mm	kg/km	max. kN	kWh/m	Ω/km, 60 °C	µF/km	mH/km	mH/km	Germany	Switzerland
1 × 50/27 Al	19.80	39.50	1997	3.0	7.42	0.448	0.182	0.446	0.631		306076
1 × 95/32 Al	23.40	43.10	2637	5.7	8.77	0.224	0.230	0.403	0.588		306077
1 × 150/34 Al	26.10	45.80	3254	9.0	9.72	0.144	0.265	0.379	0.564		306078
1 × 185/38 Al	27.90	47.60	3693	11.1	10.41	0.116	0.288	0.367	0.551		306079
1 × 240/39 Al	30.20	49.90	4335	14.4	11.21	0.089	0.318	0.353	0.538		306080
1 × 300/41 Al	available upon request										
1 × 400/45 Al	available upon request										

Current rating

Construction	Laying in tube in earth <sup>4</sup>					
	Current load <sup>1</sup> / Industrial load <sup>2</sup> 60 °C		90 °C		Emergency service <sup>3</sup> 130 °C	
$n \times mm^2$	A	A	A	A	A	A
1 × 50/27 Al	154 / 181	180 / 212	194 / 229	227 / 267	230	268
1 × 95/32 Al	225 / 265	263 / 310	283 / 333	332 / 391	335	393
1 × 150/34 Al	291 / 342	335 / 394	366 / 431	422 / 497	433	500
1 × 185/38 Al	328 / 386	379 / 446	414 / 487	478 / 562	490	565
1 × 240/39 Al	380 / 447	439 / 517	480 / 564	554 / 652	568	656

Construction	Laid in air					
	Current load <sup>1</sup> 60 °C		90 °C		Emergency service <sup>3</sup> 130 °C	
$n \times mm^2$	A	A	A	A	A	A
1 × 50/27 Al	185	207	263	292	332	367
1 × 95/32 Al	278	313	396	442	502	556
1 × 150/34 Al	360	406	514	575	652	725
1 × 185/38 Al	412	466	589	660	747	832
1 × 240/39 Al	484	549	692	779	880	983

<sup>1</sup> Load factor 24 h, 100% nominal current (main application: power plants)

<sup>2</sup> Load factor 10 h, 100% and 14 h, 60% nominal current (standard application)

<sup>3</sup> Maximum 8 h a day and maximum 100 h a year

<sup>4</sup> Inner diameter of tube at least 3 x overall diameter

<sup>5</sup> Inner diameter of tube at least 1.5 x cable diameter

Basis of calculation: Depth of laying 1 m, ground temperature 20 °C, air temperature 30 °C, shields connected to earth on both sides, specific thermal resistance 1K m/W, protected against direct sunlight, each cable system laid separately.



Accessories and connection elements

For our – BETApower® Fireprotec - product assortment, all common medium-voltage mountings and connecting elements are available. The installation of the mountings for BETApower® Fireprotec cables requires professional skilled precision work in order to guarantee the highest measure of safety for all operating conditions.

For the shield earthing of the cable terminations, we recommend the use of our earthing set developed by LEONI. These cable terminations provide connections, which are proven from decades of practical installation.



ZB – ME Earthing Set

Typ	Article no.	3 x 1 x ... 20 KV mm <sup>2</sup>
ZB – ME 20/25 – 95	218464	50 – 95
ZB – ME 20/120 – 240	218465	120 – 240



ZB1 – ME Earthing Set

Typ	Article no.	3 x 1 x ... 20 KV mm <sup>2</sup>
ZB1 – ME 1 – 3	224665	300 – 400

In order to guarantee the outstanding fire properties of BETApower® Fireprotec as well with regard to its connections along the line, we recommend using our tested fire prevention sleeves:

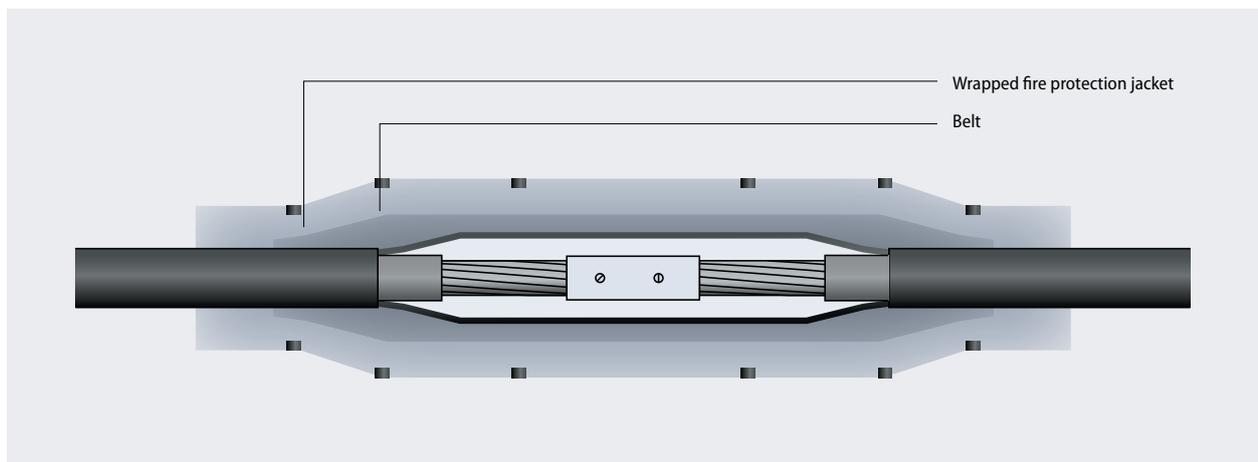
Sleeve type	Article no.	Cable construction n/mm <sup>2</sup>
93-AP611-1S, 050-070 Fireprotec Splice, 20 kV	308286	1x50/27 Al
	308147	1x95/32 Al
93-AP621-1S 095-240 Fireprotec Splice, 20 kV	308147	1x150/34 Al
	308147	1x185/38 Al
	308147	1x240/39 Al
93-AP631-1S 240-300 Fireprotec Splice, 20kV	308718	1x300/41 Al
	308718	1x400/45 Al

Additional accessory products are available on request.



# Fireprotec Splice

Tested by Electrosuisse certification body in cooperation with 3M company



Our splices for BETApower® Fireprotec were tested according to BS 6387 C in regard to their fire behaviour in our in-house fire laboratory at LEONI Studer AG, Däniken (Switzerland).



Find out more:

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