Semiconductive PRE-ELEC® Compounds
for Cable Applications


"Creating a safe society
with functional materials"

Legislation in the Nordic countries and Europe is pushing to increase **underground cable** infrastructure to minimize storm damage. Underground cabling has been an ongoing trend for several years now.

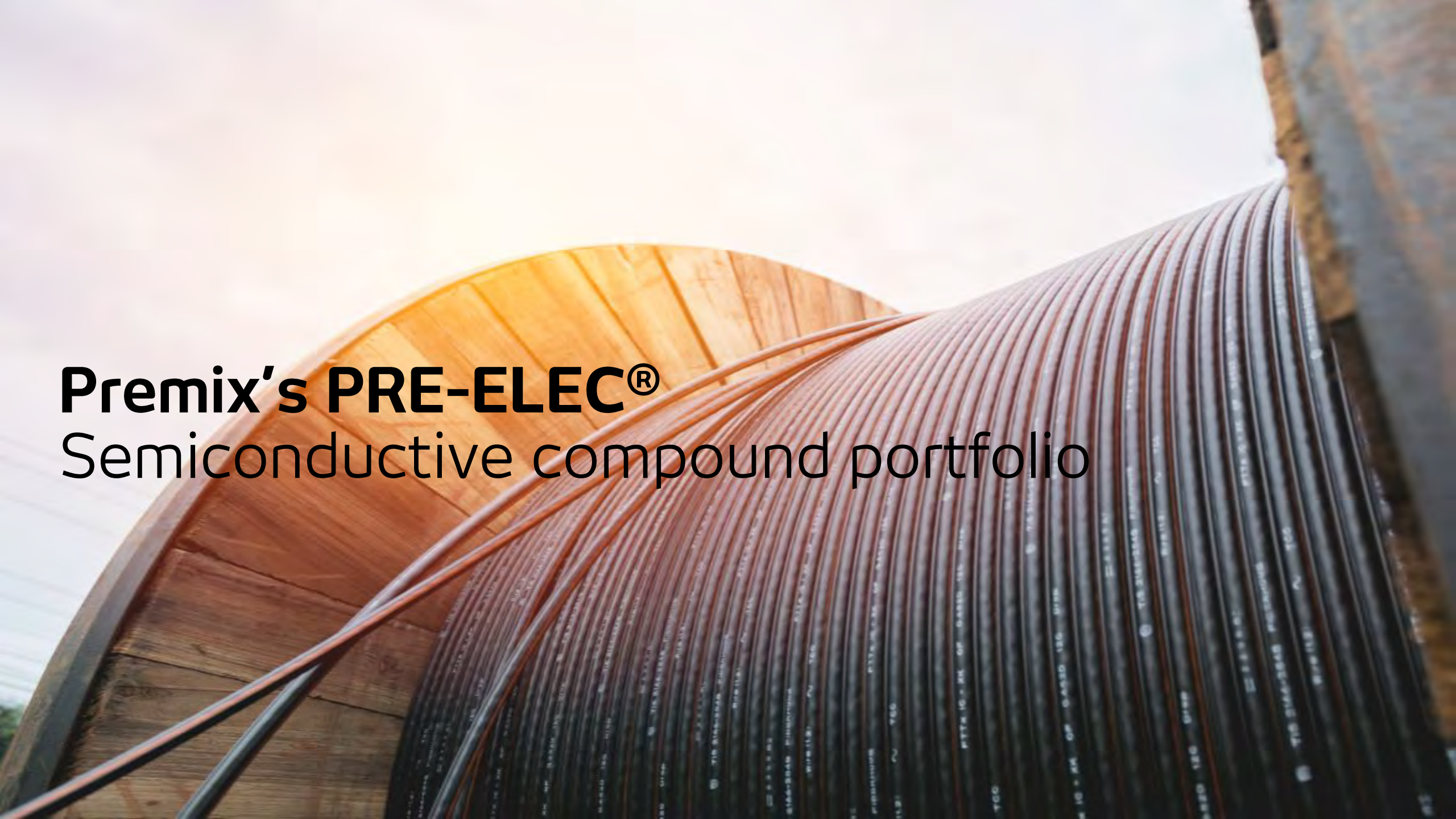
In warm climates like Australia and California, the trend is towards covered **overheadline cabling** to avoid ground fires.

Identified **global megatrends** impacting the cable markets and the demand:

Green energy solutions **to reduce CO2 emissions** generate investments in wind farms and solar farms; this requires power cabling—great demand and volumes identified.

The number of electric vehicles is increasing rapidly. As **Charging station infra** needs to be built, also high voltage power cables are needed to transfer the electricity. This creates a need for grid improvements.

PREMIX



Premix's PRE-ELEC®
Semiconductive compound portfolio

Solutions offered by PRE-ELEC® portfolio

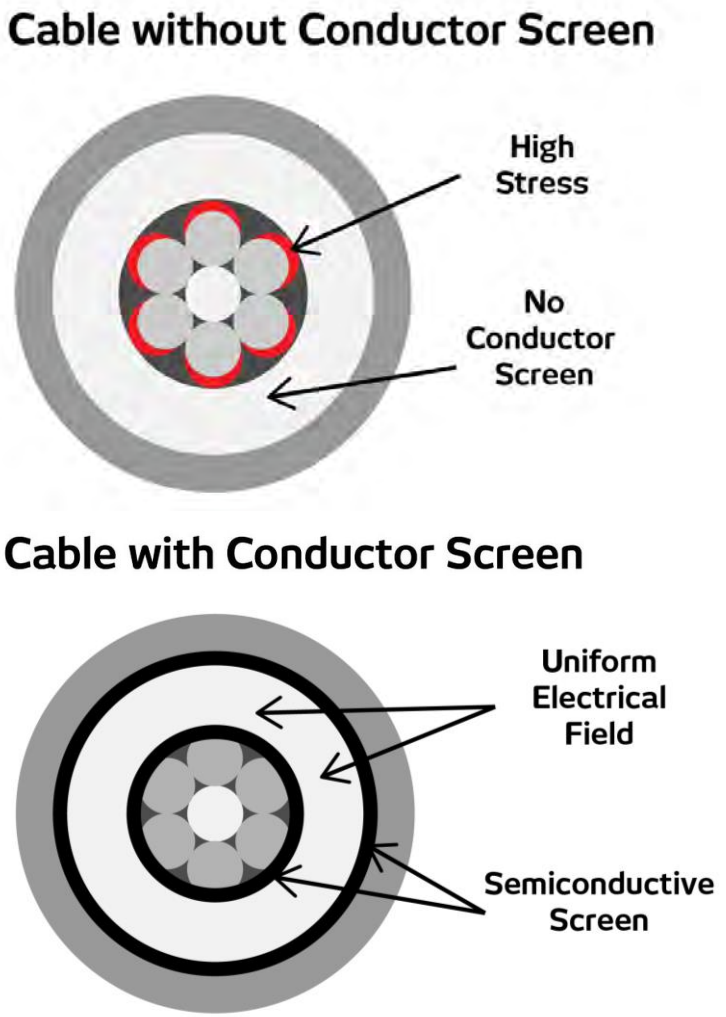
- PP semiconductive compound for conductor screen and insulation screen in MV cables to replace XLPE
- PE-HD based compound for conductive jacketing and conductive jacket skin
- PE-LD based semiconductive compound for MV cables, Monosil process
- Conductive adhesive compound with good adhesion to Cu and Al
- Thermoplastics for EMI shielding

Semiconductive screen for MV Cables

PRE-ELEC® for semiconductive screen

- Cables with high voltages (> 6 kV) need to have **conductor** (and insulation) **screen**, made of semi-conductive plastic.
- Without this semi-conductive layer, too high electrical stresses may be directed to the insulation and premature breaks can occur.

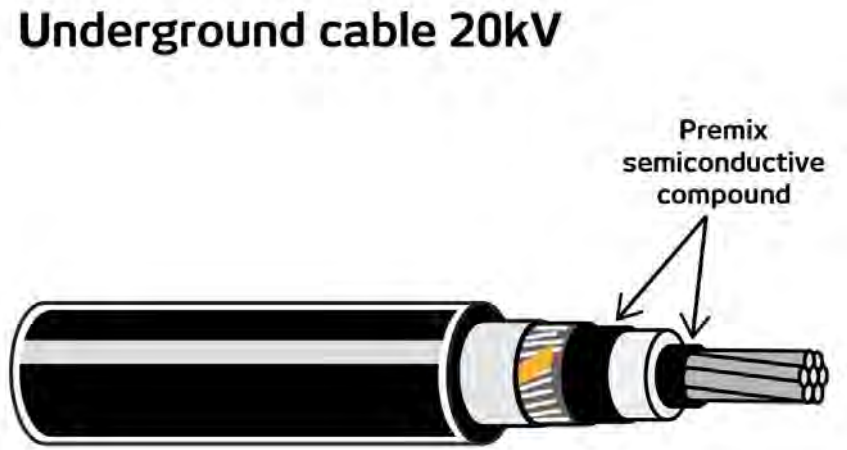
PRE-ELEC® PP18220 is a perfect match developed for PP semiconductive screen application. It matches the flexural modulus of XLPE, has excellent CB dispersion and conductivity while providing benefits of PP.



Medium voltage underground cables

PRE-ELEC® PP & PE compounds for underground cables

- Premix's portfolio covers high quality electrically conductive PP and PE compounds, with stable product properties and materials free of impurities.
- Premix has production equipment of the latest technology and decades of cumulated polymer know-how at your service.

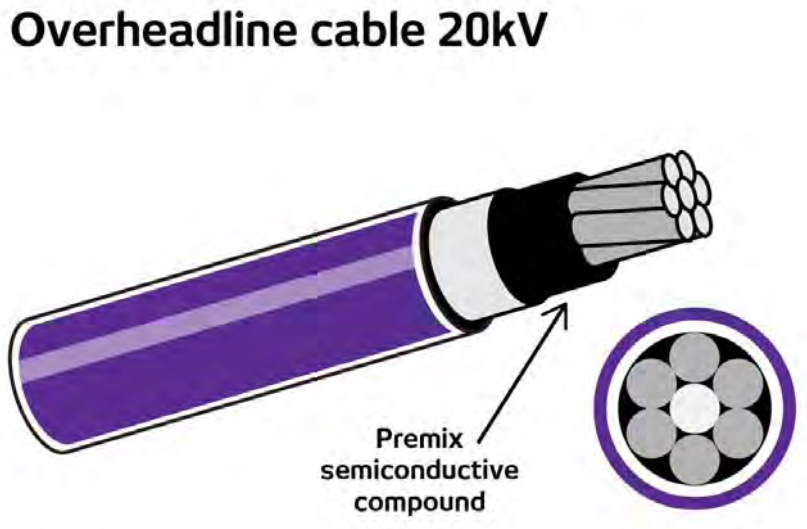


Underground cabling provides increased reliability for the transmission grid as it is not prone to extreme weather conditions.

Medium voltage covered overheadline cables

Semi-conductive PRE-ELEC® compounds for overheadline cabling

- Covered cables enable safety for the environment and installers.
- PRE-ELEC® compounds offer high service T, and an operating T even up from 90°C of XLPE.
- Premix's PP based solution is a perfect match for overheadline cabling requirements.



The continuous supply of electricity is a critical factor in today's society. However, electricity supply has become even more fragile due to extreme weather conditions. Breakages in power cabling cause risks for electricity supply but can also cause forest fires and endanger wildlife. These risks can be reduced with covered overhead line cables.

XLPE replacement in MV cables

Why to replace semi-conductive XLPE with semi-conductive PRE-ELEC® PP18220?

- Cable's plastic parts are recyclable
- Lower overall CO2 emissions (calculated as high as 40 %*)
- Processing costs become lower, as the energy-intensive crosslinking stage can be skipped in production
- Cable products reach higher service temperature

There is limited availability of products in the market to replace XLPE by PP based solution.

Premix can tailor and offer a comprehensive package of the PP-semiconductive, PP-insulator and jacketing material to meet your product requirements.

*source: EU-project Treasource, which aims at enhancing the recyclability of PP to PP-cables i.e. creating a closed loop.

Conductive jackets

Why semi-conductive HDPE for cable jacketing?

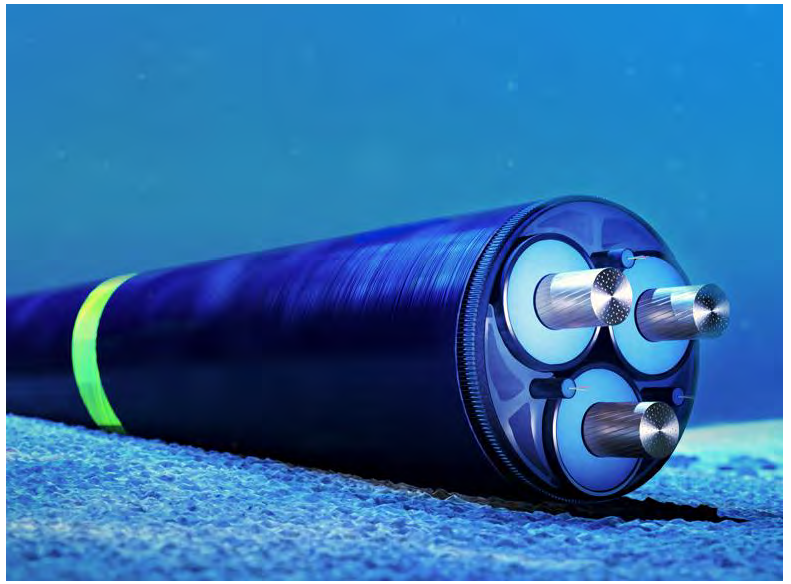
- HDPE provides the optimal balance of flexibility and abrasion resistance.
- PE 18664 has high environmental stress cracking resistance (ESCR), even if HDPE typically has poor ESCR values.
- HDPE is a recyclable thermoplastic, unlike PVC, which is widely used in jacketing.

PRE-ELEC® PE 18664 is optimized compound for conductive jacketing in HV and EHV cables with high ESCR.

The jacket protects the cable from mechanical damage during and after installation. While also being semi-conductive, the jacket removes the risk of charge build up due to capacitance. The cable jacket is the first line of moisture, mechanical, chemical, UV and ozone defense for a cable.

Conductive adhesive for sub-sea cabling

- Traditionally lead is applied as the water barrier in HV sub-sea cables.
- As lead, Pb, is heavy, expensive and poisonous metal, replacing solutions are under development.
- New cable designs are using Al- or CuNi-layer instead of lead.
- CuNi is not soft and can have nicks and buckling, when bended during reeling the cable.
- A reinforcing layer on top of CuNi is needed and a conductive adhesive layer in between.
- There is huge cost saving potential for a cable manufacturer, in case they get rid of lead. More cable can be placed into one reel, less joints needed and the cable weighs less.
- Additionally, as Pb is toxic, EU might ban its usage and the cable industry needs to have a solution for this scenario.



PRE-ELEC® PE 18500 is a PE based semi-conductive adhesive, developed particularly for this purpose, possessing good adhesion to Cu and Al.

EMI shielding

Why to use PRE-ELEC®PP18147 for EMI shielding applications?

- Protecting sensitive electronic components from electromagnetic interference (EMI).
- EMI or EMC prevention has traditionally been pursued with metals such as copper or zinc, novel material solutions include also EMI shields made of conductive plastics.
- Conductive plastics are lightweight and enable corrosion resistance.
- Premix's material solutions are isotropic semi-conductive.

Potential material solution for the aviation industry, the automotive sector, and many other industries.

PRE-ELEC® materials for cables
Grade selection

6 October 2021

Solutions for cable applications

Product	Base polymer	Special features	SR Ω / VR Ω*cm
PRE-ELEC® PE 1271	PE-LD/LLD	High class conductive film compound	< 1E+05
PRE-ELEC® PE 12841	PE-LLD compound	Flexible, good low T resistance	7E+02 / 19
PRE-ELEC® PE 18381	PE-LD compound	Flexible PE-compound, good processability and low resistivity	- / 13.5
PRE-ELEC® PE 18500	PE adhesive compound	Conductive adhesive compound, good adhesion to Cu and Al	9E+02 / 18
PRE-ELEC® PE 18664	PE-HD compound	Conductive HDPE jacket. Performance/cost optimized, good ESCR* performance	7E+02 / 29
PRE-ELEC® PP 18147	PP compound	Flexible EMI shielding product, very high conductivity	- / 0.6
PRE-ELEC® PP 18220	PP compound	Medium voltage PP-conductor & insulation screen. High flexibility, excellent low T resistance	- / 63
PRE-ELEC® PP 18920	PP compound	Medium voltage PP-conductor & insulation screen. High flexibility, excellent low T resistance	- / 63
PRE-ELEC® PP 1397	PP compound	Conductive compound for T3 automotive applications.	2E+03 / 80
PRE-ELEC® CP 1319	EVA compound	Soft conductive thermoplastic compound for flexible applications	3E+03 / 85

* Environmental stress cracking resistance

Elastomers for flexible cables

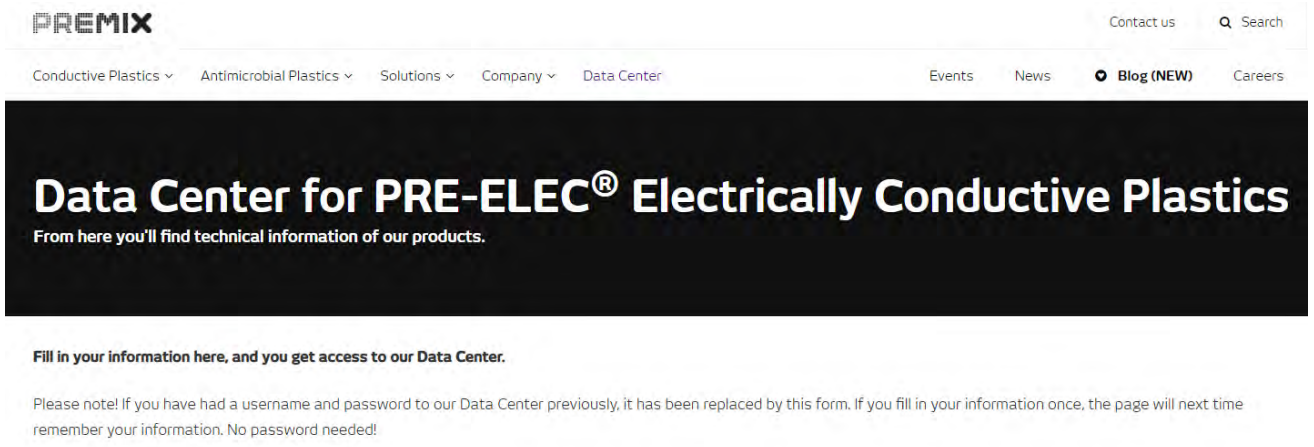
TPE and TPU

Product	Base polymer	Special features	SR Ω / VR Ω*cm
PRE-ELEC® TPE 1501	TPE compound	Excellent mechanical properties of the elastomer	< 1E+06 / < 1E+03
PRE-ELEC® TPE 1502	TPE compound	Excellent mechanical properties of the elastomer	< 1E+03 / < 1E+02
PRE-ELEC® TPE 1504	TPE compound	Excellent mechanical properties of the elastomer	2E+03 / 30
PRE-ELEC® TPE 18416	SEBS compound	Excellent balance of mechanical properties and easy to extrude	4E+02 / 3.5
PRE-ELEC® TPU 1512	Polyester based TPU	Excellent mechanical properties of the base elastomer	< 1E+04
PRE-ELEC® TPU 18025	Polyether based TPU	Excellent mechanical properties of the base elastomer	< 5E+02 / < 10
PRE-ELEC® TPU 18600	Polyester based TPU	Excellent mechanical properties of the base elastomer	6E+04 / 41

Premix Data Center
Technical datasheets

In our Data Center, we have collected **technical information** about our products for you, including **processing instructions** for PRE-ELEC® conductive compounds and concentrates.

https://premixgroup.com/data-center



Premix Oy

High expertise in semi-conductive PP- and PE compounds

Premix Oy – Your reliable material supplier

European market leader and global forerunner in **Electrically Conductive Plastics**.
Strong focus on developing future material solutions.

Agile & reliable supplier.

The newly invested state of the art machinery makes Premix **one of the strongest producer of semiconductive PP- and PE-compounds.**

High expertise in product development & technical support

- Tailored resistivity (SR/VR)
- Tailored mechanical performance
- Tailored temperature resistance

Wide distributor network, local representative in various countries.

Responsible Care
Our commitment to sustainability

QUALITY SYSTEM CERTIFICATION
DNV·GL
ISO 9001:2015

PREMIX

Family owned, independent company

Established 1980

110 employees

Sales revenue 46 M€ (2020)

Production capacity 70 kt/a

LET'S MAKE
A GOOD MIX

www.premixgroup.com