



Safety in ESD and ATEX environments

Your trusted compounding partner in innovating new material solutions for the most demanding material needs. Our mission is to improve safety in ESD and ATEX environments.

PREMIX

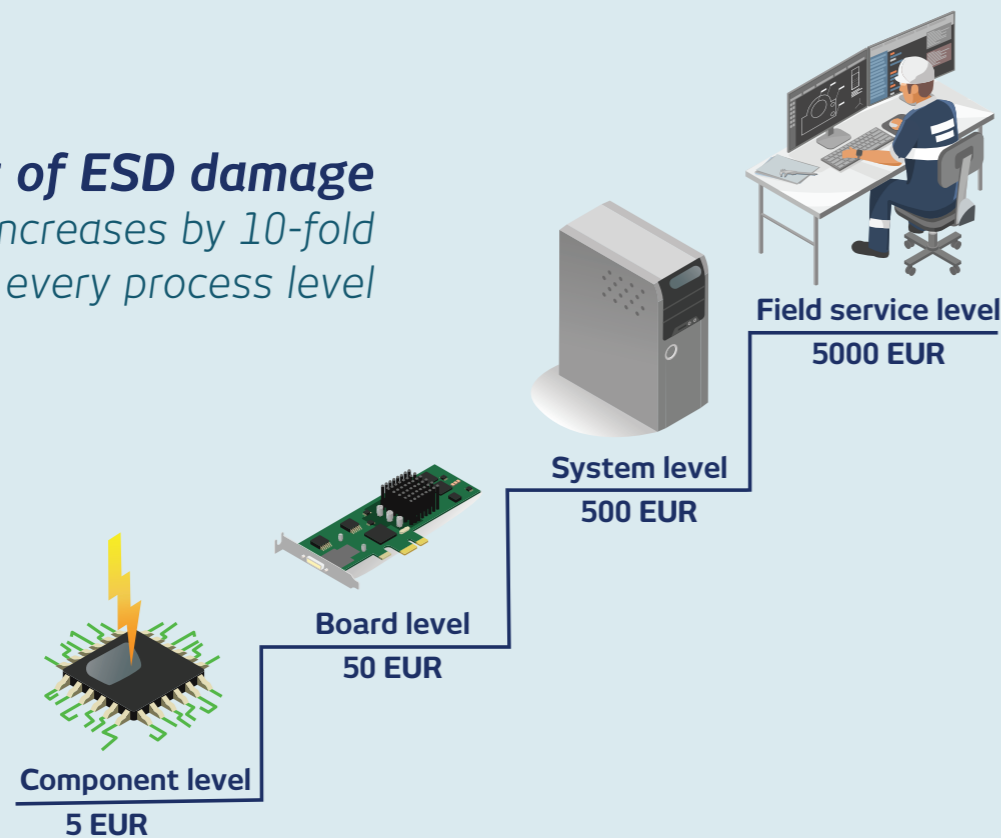
Protection against uncontrolled electric discharge (ESD)



Uncontrolled electric discharge (ESD) appears when a person or object is charged because of static electricity e.g. from rubber shoe soles on a carpet.

In electronics industry, ESD is a recognized problem, as even very mild electric shocks that a person might not even notice, can cause breakages. Electronics have become smaller over time, and the small parts are even more sensitive to ESD. Fragile electronics can break in manufacturing, transportation, or storage, causing enormous losses. To prevent breakage, components can be packaged in ESD-compatible packaging.

Cost of ESD damage
increases by 10-fold
at every process level



Protection in explosive environments (EX/ATEX)

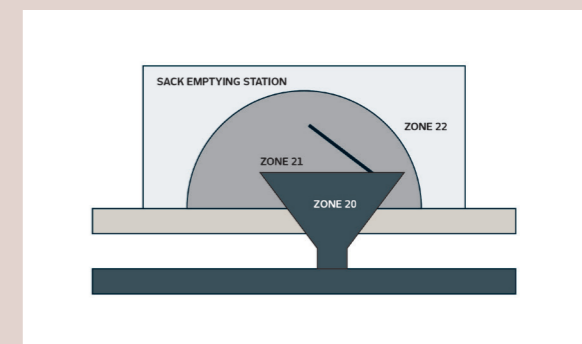
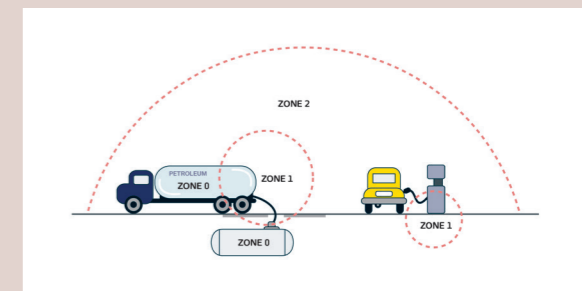
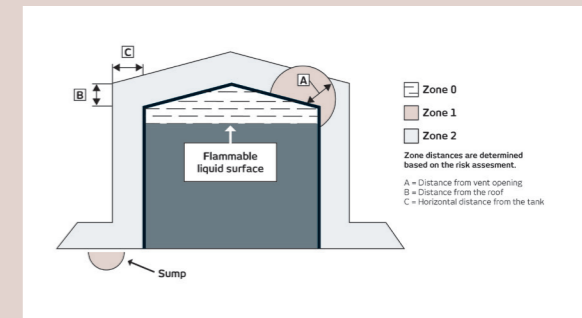


In explosive (Ex) environments, electric sparks are especially dangerous. Explosions can occur when these factors combine:

- Dry air
- Explosive substances in the air, such as
 - Oil fumes, gasses
 - Dust from agricultural products, such as flour, sugar, cereals, soybeans, rice, etc.
 - Eliminate the effect of static electricity
- Ignition source (e.g., ESD)

European Union's ATEX Directive (2014/34/EU) covers equipment and protective systems intended for use in potentially explosive atmospheres. For raw materials, there's no specific directive, but the materials need to be compatible with the requirements for the whole equipment.

Plastics can be a source of electric discharge if the resistance of the material is over 10^9 – 10^{12} ohms. Using that kind of plastics in equipment might cause dangerous explosions in ATEX environments.



Atex Zone: a place in which an explosive atmosphere is	Gas	Dust
Continually present	0	20
Likely to occur in normal operation occasionally	1	21
Not likely to occur in normal operation and only for very short durations	2	22

ATEX zones
for gases
and dusts

ESD and ATEX application examples



PRE-ELEC® sheet materials
for protecting electric components with ESD packaging

The high material requirements of the transport and packaging industry inspire us to continuously develop new sustainable and functional materials to meet the needs of our customers.

PRE-ELEC® film materials
for controlling static electricity with conductive films

The film compounds have high and durable conductivity and excellent dispersion. We have ensured they are compatible with ATEX regulations and are easy to process. They are also recyclable and resist wear and tear very well.



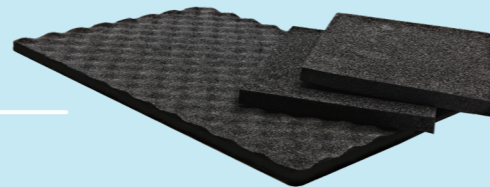
PRE-ELEC® materials for ESD boxes & pallets
used during assembly and transportation

The conductive thermoplastics can be used to eliminate static charging and reduce the risks of explosions in hazardous environments and damaging expensive equipment.



PRE-ELEC® foam materials

Polyethylene continuous and block foams made of PRE-ELEC® compounds and concentrates, chemically and physically crosslinked, can be CNC-cut and used for heavy automotive and defense industry electronics packaging for transportation. Additionally, high-density EVA foam can be cut into gaskets and sealings.



PRE-ELEC® elastomers

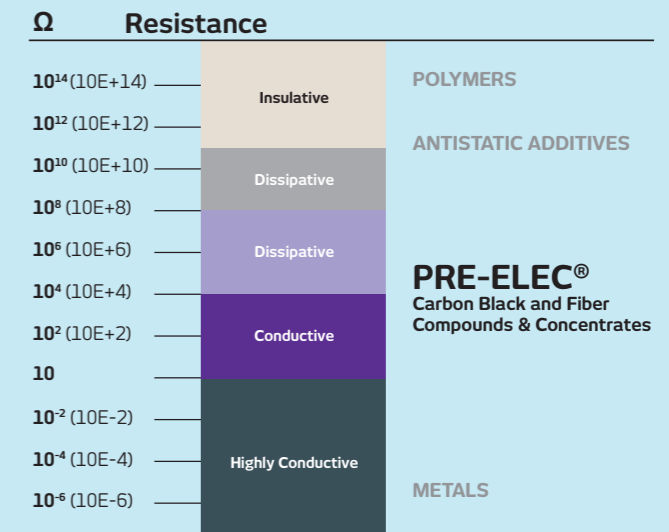
Tubes made of PRE-ELEC® compounds are solid and flexible. They can be used in multi-component structures. Using our conductive compounds, you guarantee conductivity, high abrasion resistance, high flex-life, durability, easy processability, and flexibility even at low temperatures.



PRE-ELEC® electrically conductive plastics

Premix's electrically conductive PRE-ELEC® plastics typically have much lower resistance than typical plastics, and they can be customized to fulfill the customer's specifications. Compared to metals, plastics are cheaper, lighter, and corrosion-resistant. The plastics can even be made flame-retardant.

Carbon black has established its position as the most widely used electrically conductive filler. Carbon black offers a superior price-performance ratio and stable properties over time. Typically carbon black compounds' surface resistance range settles between $10^2 \Omega$ and $10^5 \Omega$. Premix's comprehensive product portfolio covers the conductive plastics spectrum.



*Precision, purity,
and consistency
– the cornerstones of
PRE-ELEC® compounds.*

Polymer types & processing

	Base polymers	Processing type	Post-processing	Other information
Compounds	PE, PP, PS, ABS, PC, PC/ABS, PA6, PBT, TPU, TPE *	<ul style="list-style-type: none"> Extrusion Injection moulding Blow moulding 	<ul style="list-style-type: none"> Foaming Thermoforming 	No dilution
Concentrates	PE-HD, PE-LLD, EVA, PP, PS, PA6	<ul style="list-style-type: none"> Extrusion Injection moulding Blow moulding 	<ul style="list-style-type: none"> Foaming Thermofoaming 	Dilution ratio starting from 70% to 40% depending on SR target

*North Carolina manufacturing plant: PE, PP

Properties of PRE-ELEC® grades with compounds (typical values)

Polymer Base	Product name	Applications	Compound	Concentrate	Extrusion	Injection moulding	Volume resistivity (Ωcm)	Surface resistance (Ω)	Melt flow rate (g/10min)	Density (g/cm3)	Flexural modulus (MPa)	Hardness (Sh D)
EVA	PRE-ELEC® CP 1515	Foams	•	•	•	•	250	5E+3	190°C / 5.0 kg: 1.2	1.06	110	47
PE-LD	PRE-ELEC® PE 1271	Films, FIBC	•	•	•	•	70	5E+3	190°C / 5.0 kg: 1.7	1.02	-	56
PE-HD	PRE-ELEC® PE 1291	Sheets, Pipes, Cans & Bins	•	•	•	•	50	9E+2	190°C / 21.6 kg: 6.0	1.04	1,200	71
PE-HD	PRE-ELEC® PE 1296	Sheets, Cans & Bins, Pipes	•	•	•	○	1 (c)	3E+2 (c)	190°C / 21.6 kg: 0.6	1.12	1,200 (c)	65 (c)
PE-HD	PRE-ELEC® PE 1312	Cans & Bins	•	•	•	•	100	4E+3	190°C / 21.6 kg: 1.0	1.03	1,200	67
PE-HD	PRE-ELEC® PE 16006	Cans & Bins	•	•	•	•	< 1E+7	< 1E+7	190°C / 21.6 kg: 2.0	1.02	1,000	-
PE-LD	PRE-ELEC® PE 17800	Foams	•	•	•	•	2	3E+2	190°C / 10.0 kg: 1.0	1.15	-	-
PE-LLD	PRE-ELEC® PE 17840	Films, Filaments, FIBC, Sheets	•	•	•	•	0.7	out of range	230°C / 21.6 kg: 4.5	1.20	-	-
PE-LD	PRE-ELEC® PE 18381	Films	•	•	•	•	14	9E+2	190°C / 5.0 kg: 0.5	1.05	170	45
POE	PRE-ELEC® PE 18480	Flexible Tubes and Profiles	•	•	•	•	8	4E+2	190°C / 10.0 kg: 2.2	1.05	200	47
PE-HD	PRE-ELEC® PE 18594	Sheets, Boxes & Pallets, Cans & Bins	•	•	•	•	1 (d)	1.2E+6 (d)	190°C / 21.6 kg: 3.1	1.14	1,375 (d)	67 (d)
PP-H	PRE-ELEC® PP 1353	Filaments, FIBC	•	•	•	○	180 (e)	1E+3 (e)	230°C / 10.0 kg: 9.0	1.11	1,300 (e)	75 (e)
PP-C	PRE-ELEC® PP 1375	Boxes & Pallets	•	•	•	•	80	4E+3	230°C / 2.16 kg: 20.0	0.98	1,300	65
PP-C	PRE-ELEC® PP 1380	Technical parts, ECG & EEG electrodes	•	•	•	•	3	6E+2	230°C / 5.0 kg: 1.5	1.06	1,900	72
PP-C	PRE-ELEC® PP 1393	Sheets	•	•	•	○	4 (f)	6E+2 (f)	230°C / 5.0 kg: 0.5	1.06	1,500 (f)	71 (f)
PP-C	PRE-ELEC® PP 1397	Sheets	•	•	•	○	60	3E+3	230°C / 2.16 kg: 1.2	0.98	1,400	74
PP-H	PRE-ELEC® PP 15392	Sheets	•	•	•	○	150 (g)	8E+3 (g)	230°C / 10.0 kg: 8	1.11	1,265 (g)	70 (g)
PP-C	PRE-ELEC® PP 18999	Boxes & Pallets	•	•	•	•	15	6E+2	230°C / 10.0 kg: 2.7	1.03	200	51
PP-C	PRE-ELEC® PP 19136	Boxes, Crates, Technical parts	•	•	•	•	> 5,000	7E+6	230°C / 5.0 kg: 34	1.00	1,054	65
PP-C	PRE-ELEC® PP 19161	Boxes, Crates, Technical parts	•	•	•	•	90	4E+3	230°C / 2.16 kg: 3.4	1.02	1,200	65
PP-C	PRE-ELEC® PP 19599	Boxes, Crates, Technical parts	•	•	•	•	< 200	2E+3	230°C / 5.0 kg: 52	1.01	1,500	-
PP-C	PRE-ELEC® PP 19625	Sheets	•	•	•	•	> 5000	1E+5 (j)	230°C / 5.0 kg: 7	1.09	-	-
TPE-S	PRE-ELEC® TPE 18416	Flexible Tubes and Profiles	•	•	•	•	3.5	4E+2	190°C / 21.6 kg: 9.8	1.20	-	87
TPU-Es	PRE-ELEC® TPU 1512	Flexible Tubes and Profiles, Sheets, Technical Parts	•	•	•	○	10	8E+2	190°C / 10.0 kg: 11.0	1.27	-	87

Manufactured and shipped from Finland 2024 (warehoused in our North Carolina plant for JIT requirements, Q4/2024).

Premix's manufacturing plant in the U.S. fully operational during Q2/2025
Compounds manufactured in North Carolina.

More information in **Premix Data Center:**
www.premixgroup.com/data-center

- Primary processing method
- Secondary processing method

Notes

- (c) dilution 40% HDPE MFI 9 (190°C / 21.6 kg)
- (d) dilution 50% HDPE MFI 9 (190°C / 21.6 kg)
- (e) dilution 50% PP-H MFI 35 (230°C / 2.16 kg)
- (f) dilution 30% PP-C MFI 13 (230°C / 2.16 kg)
- (g) dilution 50% PP-C MFI 3.5 (230°C / 2.16 kg)
- (j) 50% PP-C, MFI 3.5 (230°C / 2.16 kg)

Surface resistance - how to read: for example, 2E+6 Ω = 2,000,000 Ω

1/2024

Our new plant in North Carolina, USA will double Premix's manufacturing capacity once completed.



ABOUT PREMIX

With more than 40 years of industry experience, Premix's expertise lies in formulating and producing functional plastic materials. Premix's materials are more than just traditional plastics – they play an active role in the product or process they are integrated into. Premix was one of the first companies to enter the market for electrically conductive plastics in the early stages, and it is now the world's leading specialist in the area.

The headquarters and modern manufacturing facilities are located in Rajamäki, Finland. With our plant being built at Apple Creek Corporate Center in Gastonia, North Carolina, in 2025, we will double our production capacity and offer our customers better global supply. Once our manufacturing plant is fully operational, our customers will benefit from our ability to deliver high-quality materials from two continents. As a Premix customer in the U.S., you will enjoy local production and services, ensuring short lead times and high supply reliability. The new plant will manufacture an electrically conductive and dissipative range of plastic compounds for various applications.

PRE-ELEC® is a registered trademark of Premix Oy.

We are ready
to create a new
success story
with you!

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