



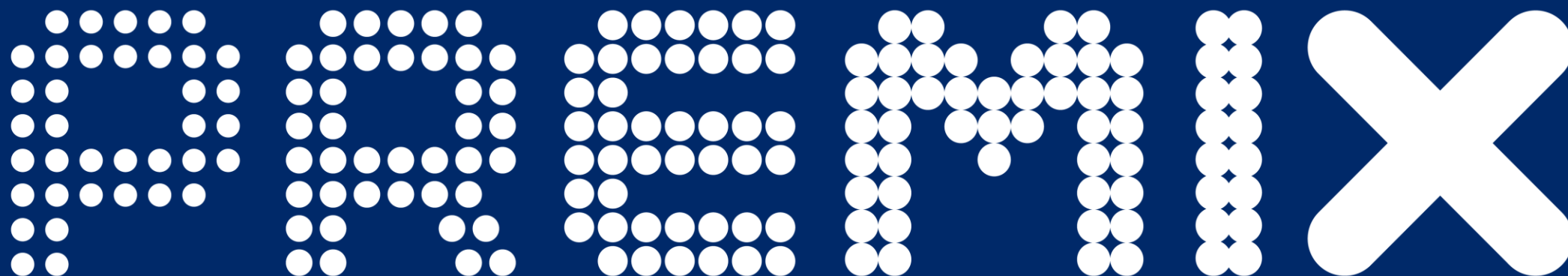
Premix

40 years of Black Magic

ORIGINALLY DELIVERED AT THE **FESTIVAL OF POLYMER INNOVATION 2024**
VISIT [HTTPS://WWW.POLYMERFESTIVAL.COM](https://www.polymerfestival.com) FOR MORE INFORMATION

A HUGE THANK YOU TO PLASTIKCITY FOR SPONSORING OUR MAINSTAGE





40 years of black magic!

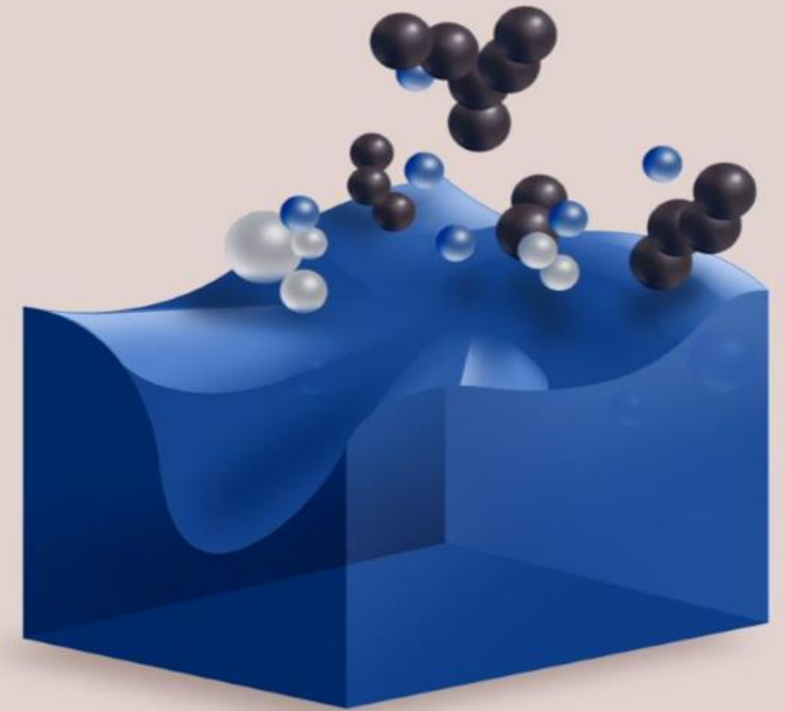
PRE-ELEC[®] electrically conductive compounds

Festival of Polymer Innovation

September 4th, 2024

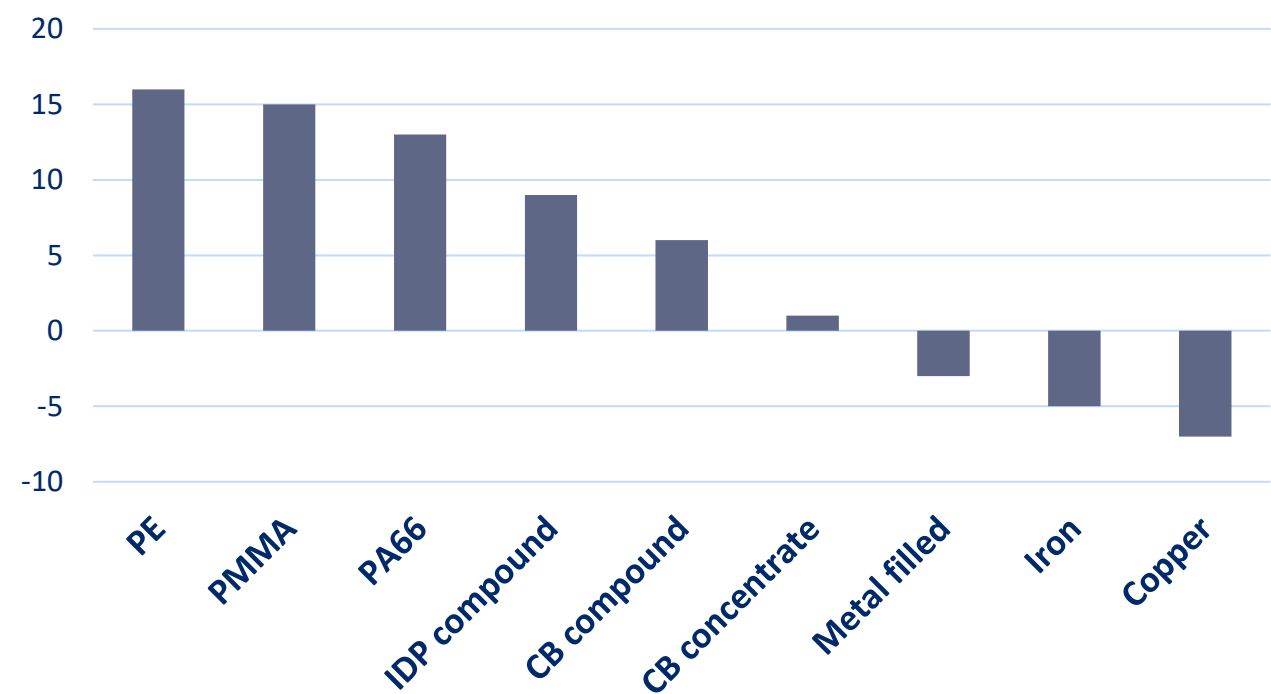
We mix materials and create innovative formulations for functional plastics

Electrically conductive compounds and concentrates

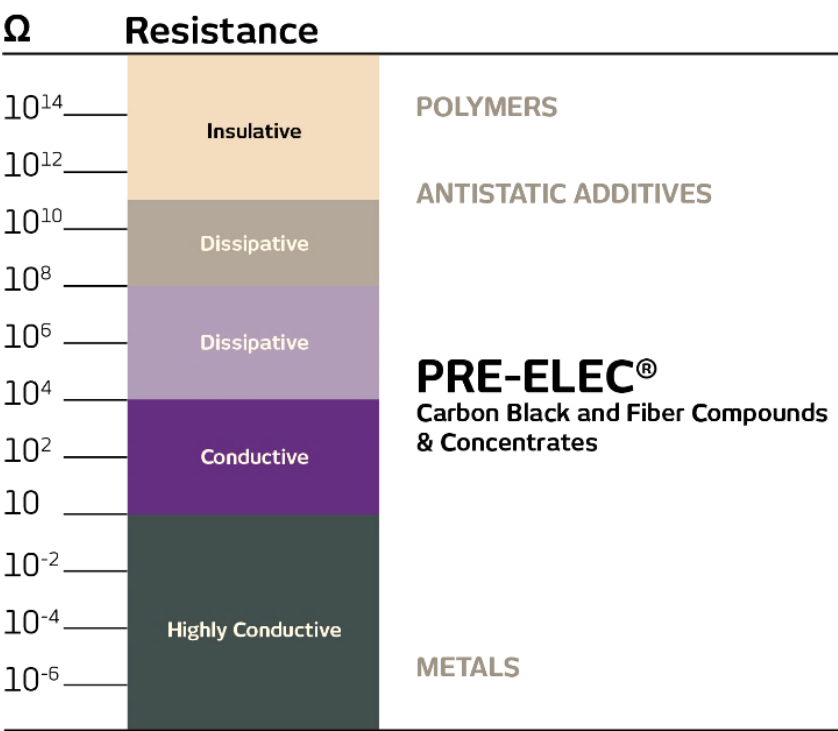


Conductivity

Volumetric resistivity of various materials, Ohm



Premix's resistance spectrum



Conductive fillers

Filler	PRE-ELEC [®]
Carbon black	X
Carbon fiber	X
Graphite	X
Carbon nanotubes and graphene	
Metal particles and fibers	
Inherently dissipative polymers	

Legal drivers to use electrically conductive plastics in Europe



ESD: Protecting from unintentional ElectroStatic Discharges

Protecting the components from failures caused by static electricity during electronics production and transportation.

[ESD International](https://www.premixgroup.com/where-to-use/esd-protection/)

<https://www.premixgroup.com/where-to-use/esd-protection/>

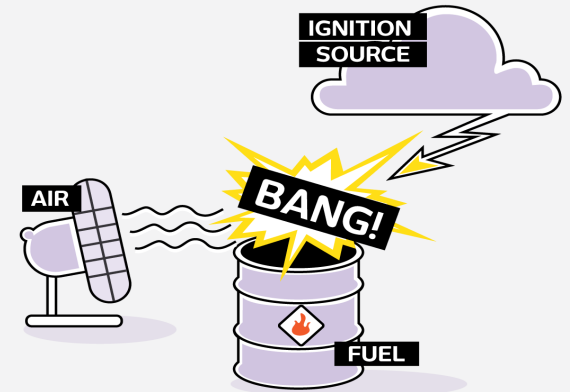


Protecting from accidents in explosive environments

Eliminating the static discharges which can cause explosion and fire risks in, e.g., automotive, mining, and process industry.

[ATEX for Europe](https://www.premixgroup.com/where-to-use/atex-ex-environments/)

<https://www.premixgroup.com/where-to-use/atex-ex-environments/>



ESD control in healthcare facilities

IEC TS 61340-6-2 ED1 Electrostatics - Part 6-2

- Electrostatic control in healthcare, commercial and public facilities - Public spaces and office areas
- This part of IEC 61340 applies to the interior design of public places and office areas. The document 120 includes guidelines for architects, interior designers and facility managers. 121 Hazards, nuisances and other problems associated with electrostatic phenomena and principles of 122 their control are outlined.

This document includes requirements and recommendations for materials, 123 and products used to control static electricity.

IEC 61340-6-1:2018

- Electrostatic control for healthcare - General requirements for facilities
- Technical requirements and recommendations for controlling electrostatic phenomena in healthcare facilities, which includes requirements for equipment, materials, and products used to control static electricity.

The requirements of this document do not apply to medical electrical equipment specified in IEC 60601-1 and in vitro diagnostic (IVD) medical equipment specified in IEC 61010-2-101.

- 2018 edition focuses on operating rooms: static control, floors, clothing, fabrics etc...
- Amendment under preparation, estimated publishing date 12/2024. This document will expand the static control requirements from operating rooms to all medical facilities.

Static electricity in hospital environments

Technical paper: *"Electrostatic Threats in Hospital Environment"* *

Key ESD risks in hospital environments:

1. ESD/EMI to electrical equipment (static/electromagnetic disturbances)
2. Electrostatic attraction and repulsion (contamination control)
3. Shock to people
4. Ignition of flammable substances

Solutions:

1. Material selections
2. Groundings
3. Standardization
4. Information sharing (healthcare professionals, medical device designers, architects, construction engineers....)



*Technical paper preceded the first ESD standard for hospital environments.

IEC 61340-6-1: "Standard for electrostatic control in healthcare facilities" was released on July 13th, 2018.

The amendment is under preparation, with an estimated publication date of 12/2024.

The new document will expand the static control requirements from operating rooms to all medical facilities.

Examples of PRE-ELEC[®] functions

- Electronics protection from uncontrolled static discharge for EPA zones with ESD packaging
- Ignition control with flammable chemicals for ATEX areas
- Electrostatic painting
- Detection for surface or damage
- Metal replacement for ECG electrodes
- Dosage accuracy
- EMI shielding

PRE-ELEC[®] is available as

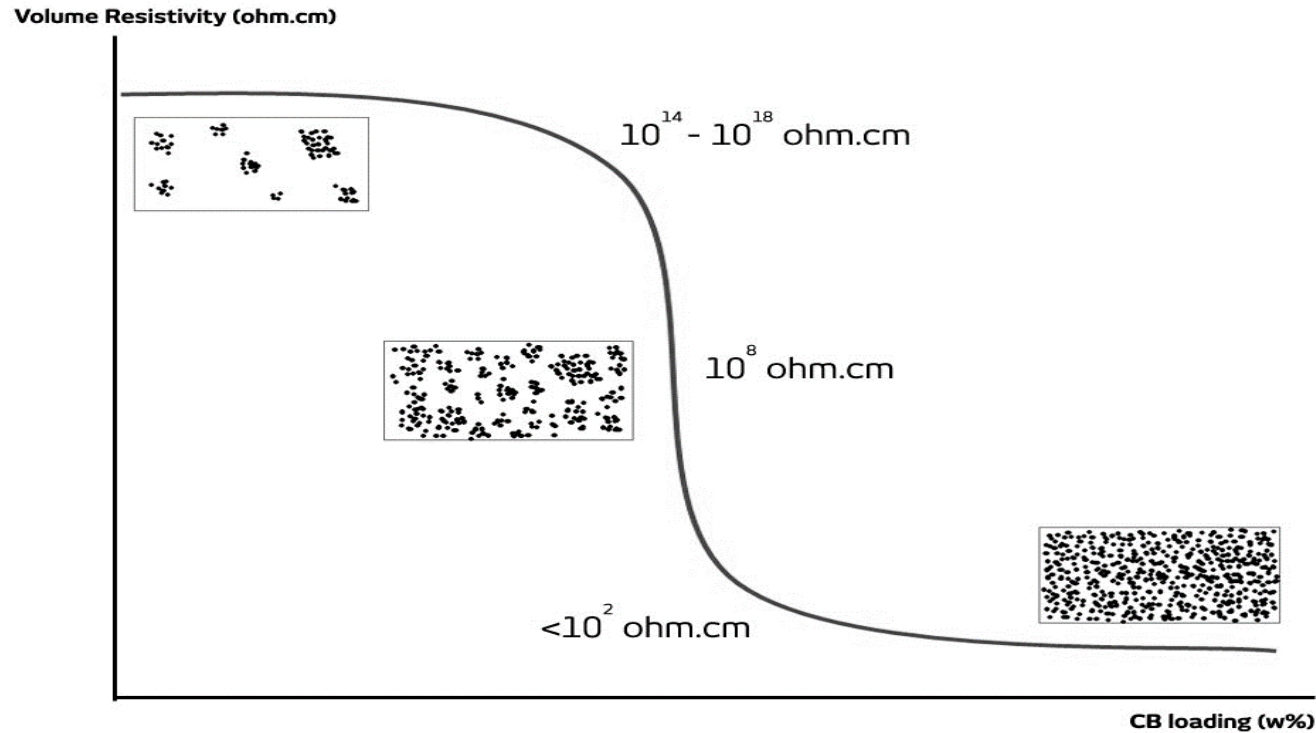
Filler	Base polymers	Processing type	After processing	Other comments
COMPOUNDS	PE, PP, PS, ABS, PC, PC/ABS, PBT, PA6, TPU, TPE	• Extrusion • Injection moulding • Blow moulding	• Foaming • Thermoforming	
CONCENTRATES	PE-HD, PE-LLD, EVA, PP, PS, PA6	• Extrusion • Injection moulding • Blow moulding	• Foaming • Thermoforming	Dilution ratio starting from 60% to 40% depending on SR target.



Carbon black effect on conductivity

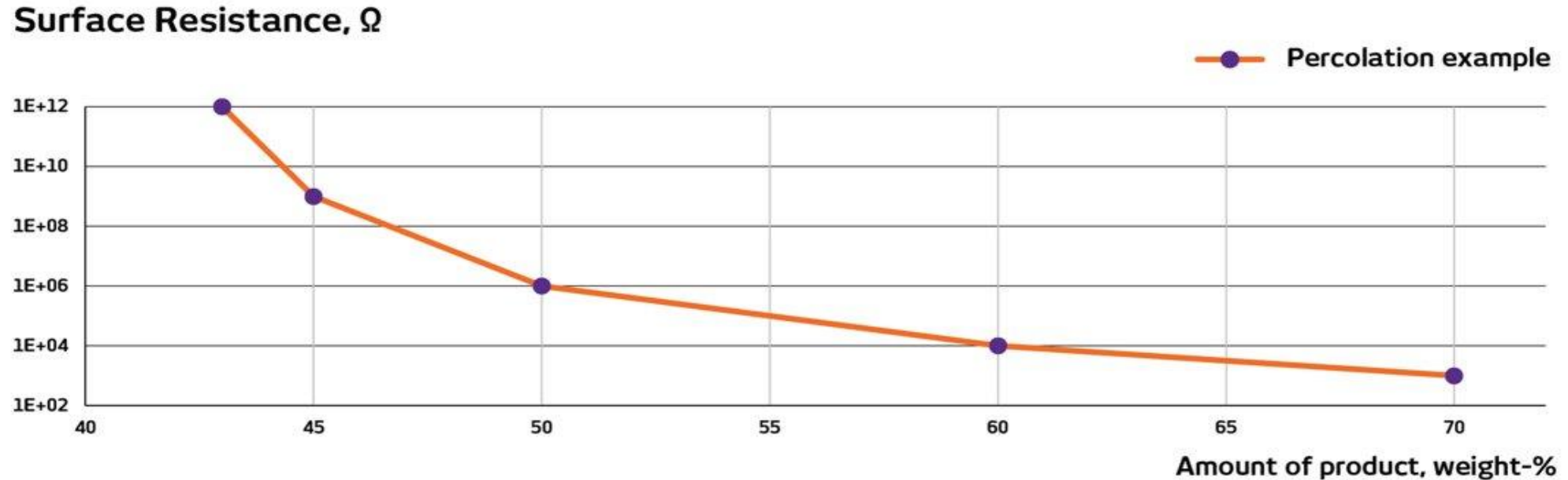
Percolation:

making conductive paths across the volume of the material along carbon black particles touching.



PRE-ELEC[®] concentrates

Dilution graph example



The product and its processability are a combination of:

- 1) concentrate amount
- 2) dilution polymers
- 3) dilution polymer MFR range

The percolation graphics are always product-specific and provided in the technical datasheets of our concentrates.

PRE-ELEC[®] applications

ESD applications



ATEX applications



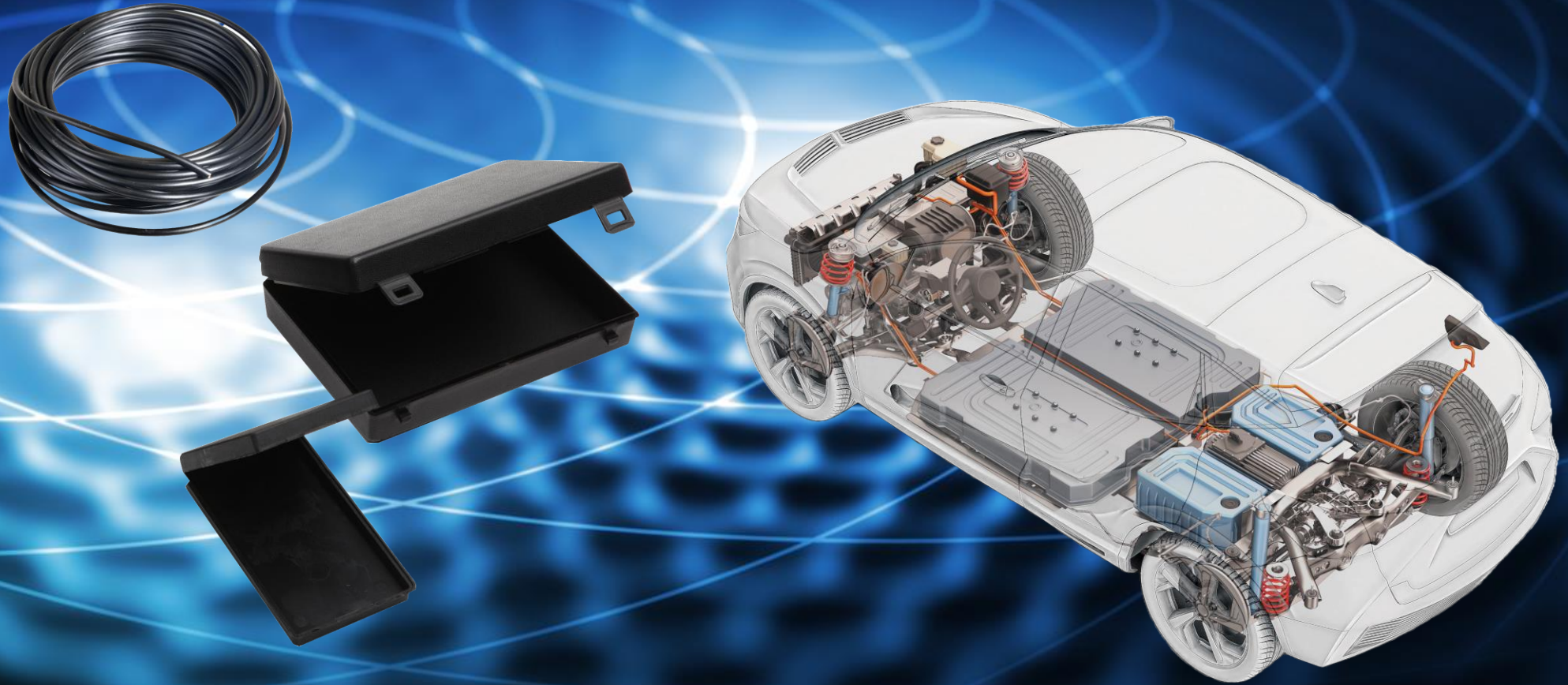
Electrostatic painting



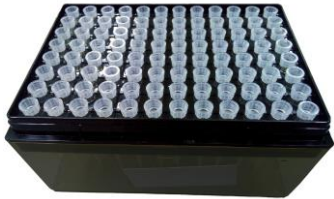
Detection and sensors



EMI shielding solutions



Applications for the medical industry



Summary

1. Conductive and dissipative products can be manufactured in standard lines without major investments.
2. However the procedures in materials handling, process optimization and production scheduling may require changes.
3. Concentrates are worth of considering as an alternative for straigh compounds in larger volume production.

Becoming truly international

Premix today

- A leading expert in polymer modification and a pioneer in electrically conductive compounds since 1980
- 2023 turnover: 35 Mln Eur
- Headquarter and R&D located in South Finland Rajamäki
- Exports from Finland to customers in over 40 countries.
- Local teams supporting our customers in Finland, the U.S., and China.



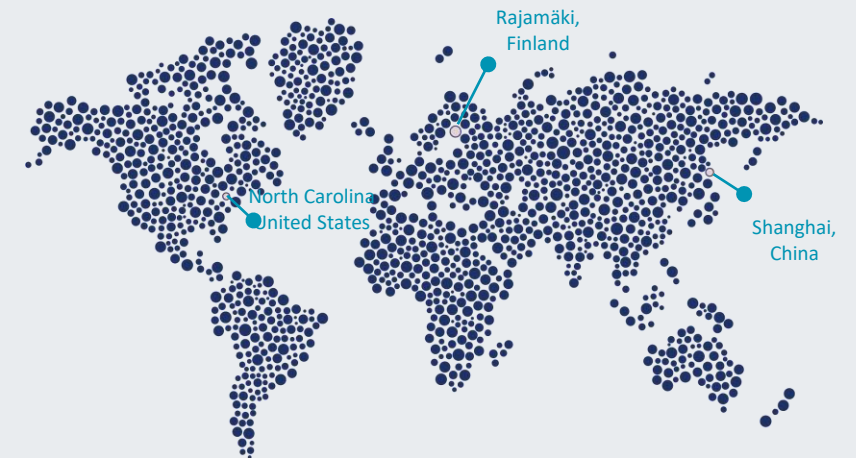
Premix Oy, Rajamäki, Finland
Plastic compound manufacturing plant & HQ
Opened in 1985, expanded and modernized in 2010's

Premix in 2025

- Modern plastic compound manufacturing plants on two continents
 - To cater the most demanding needs of our customers in Healthcare, Energy and Material and component handling markets
 - Toll compounding services for high-quality requirement materials
 - Improved global supply capability
- Higher ability to serve our customers locally on two continents
- Doubling production capacity



Premix Inc., Gastonia, North Carolina
Plastic compound manufacturing plant
Opening in 2025



LET'S MAKE
A GOOD MIX

www.premixgroup.com