IonPhasE IPE
The Static Dissipative Polymer

IonPhasE® IPE® Polymers

The next generation of zero halogen static control polyr

IonPhasE Company

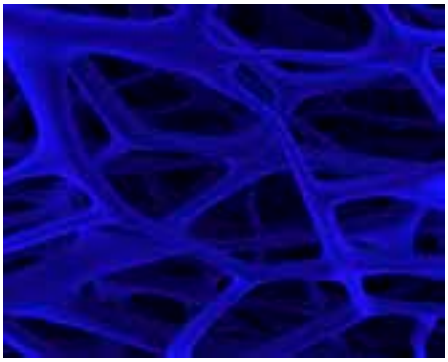
IonPhasE is an innovative solution provider of static dissipative polymers, that helps you to manage ESD and static electricity related problems in plastics materials.

- Established in 2001
- Head office, R&D and manufacturing in Finland
- Sales offices in France (Paris area), Finland (Espoo), Hong Kong and Guangzhou P.R. China
- Strong IPR portfolio
- Annual production capacity of 1200 tons of IonPhasE® IPE®

IonPhasE® IPE® Technology

IonPhasE® IPE® technology is based on a self organizing, co-continuous Ionomer PolyElectrolyte (IPE®) structure, where ions are able to neutralize charge inbalances.

Plastics products with IonPhasE® IPE® have immediate static dissipative properties which remain unchanged in time (permanent antistatic function) and have excellent functionality in low relative humidity (<12% RH). Due to the non-migratory, polymeric network structure, this functionality is maintained after washing and wiping.



Three dimensional Ionomer PolyElectrolyte network (illustration).

IonPhasE® IPE® Main Application Areas

Electronics Industry

ESD Protection and Manufacturing Yield Improvement

Electronics Packaging and Housings

- Sheets, trays
- Carrier Reels and Tapes
- Shielding and ESD Bags, Protection Tapes
- Covers and Housing Parts

Chemical, Medical and Food Industry

Dust Explosion Control, Processing and Yield Improvement

Industrial Film, Flexible and Rigid Packaging

- RIBCs, Drums
- FIBCs
- Liners, Bags

Automotive Industry

ESD Protection and Dust Prevention

Automotive Parts

- Panels, Frames, Covers
- Other components

IonPhasE® IPE® Features and Benefits

Features	Benefits
Static dissipative	Dissipates charges before damage occurs, prevents risk of explosion and dust build up. No need for grounding.
Permament	Maintains static dissipative properties throughout the life cycle of the end application.
Non-migratory	Improved processing, no sticky or greasy surfaces, no contamination of material and packaged goods.
Humidity independent	Static dissipative properties are maintained in low relative humidity and specific industrial environments.
Highly consistent, no hot spots	Static dissipative properties are maintained and stable even in very thin layers (e.g. co-extrusion blown film layers down to 3 microns).
No halogens, no heavy metals	RoHS approved, environmental friendly.
Clean	Low off-gassing, , no contamination of sensitive components, can be used in clean room applications.
Ready to use in conversion processes	Time & cost savings in production set-up and trials.
Natural colour	Transparent to white pellets colourable according to the specific needs.
Polymeric network forming	Immediate functionality. Minimal effect to mechanical properties of host polymer.
Recyclable, reusable	Cost savings through yield improvement and environmental friendly.
Widthstands high processing temperatures	Enables the use in wide range of engineering polymers.

IonPhasE® IPE® Properties and Static Control Performance

With IonPhasE® IPE® the desired static dissipative property of the product is achieved with minimum effect to the host material properties.

Static control properties are dependent on the loading of IonPhasE® IPE® as well as host polymer and processing method. With the same host polymer and processing method, static control properties can be adjusted to a requested level by changing the loading of IonPhasE® IPE®. Common loadings vary from 5% to 25%.

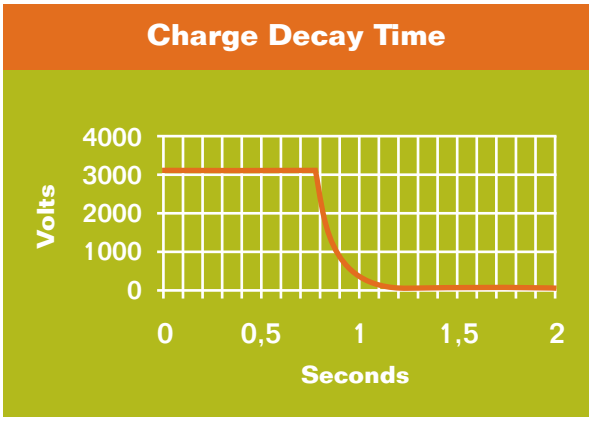
Surface Resistance

Common surface resistance of a plastic product with IonPhasE® IPE® ranges from $1x10^{7}$ to $1x10^{11}$ Ohms (IEC61340-2-3).

Charge Decay Time

Common charge decay time of a plastic product with IonPhasE® IPE® is from 0,2 to 2 seconds.

Example of charge decay curve measurement from multilayer PE film with IonPhasE® IPE® on surface layer.



Humidity Independence

IonPhasE® IPE® is humidity independent, and functions in low relative humidity (<12% RH). At over 50% relative humidity, the natural conductivity created by the ambient moisture may slightly influence electrical properties.

Permanent Properties

Due to the stable, non-migratory, polymeric network structure, electrical properties are maintained over the life cycle of the application.

Plastics and plastic products are part of our everyday life. However, almost all plastics are insulators. This physical property can create problems, losses and even disasters in use. Electrostatic "shocks" to people cause inconvenience and work hazards. Plastics products easily absorb dust and impurities as the static field acts as an electrostatic vacuum cleaner, creating manufacturing problems, yield losses and appearance defects. High energy sparks (ESDs) are causing explosions in chemical industry, mining industry and many more. According to several studies, annual losses in electronics sector due to static electricity alone exceeds tens of millions USD. Static electricity is like an invisible bomb which could explode anytime if its energy is not managed and controlled properly.

Traditional technologies based on migrating antistatic additives or conductive fillers (such as conductive carbon black) do not provide reliable solution for ESD protection. Migrating antistatic additives have limited shelf life, do not function in low humidity and will contaminate packaged goods as a result of the additive migration. Because of fast discharge behavior, conductive filler polymers require constant grounding. Contamination can be an issue through sloughing and loss of grounding can create dangerous scenarios in handling and use.

IonPhasE® IPE® polymers belong to the group of Inherently Dissipative Polymers (IDPs). These are the most reliable ESD protection solutions for plastics without the drawbacks of traditional technologies.

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Application Development Support

IonPhasE's professionals are able to tailor-make IonPhasE® IPE® products for your specific applications and requirements. We offer granulate masterbatches, semi – and even full compounds – so you can decide which better fits your specific needs and production equipment. We bring you the optimized processability, cost efficiency and performance. One of the great advantages of IonPhasE® IPE® is the excellent processability directly with host polymers. We have done the formulation easy for you.

IonPhasE® IPE® Processing and Use

IonPhasE® IPE® can be used in all common thermoplastics conversion methods. IonPhasE's unique approach to offer specific grades for different host polymers and processes ensures the most optimal performance, processability and cost efficiency for your benefit.

Great example of this are the IonPhasE® IPE® grades developed for multilayer PE blown films. These have excellent processability and superior static dissipative properties in low relative humidity conditions. These grades can be processed with up to 270˚C of melt temperature, have no 'fish eye' or 'gel' problems, providing uniform static dissipative performance with as low as 3um layer thicknesses – which no other grade in the market can match. We also manufacture highly transparent grades for the tightest optical requirements.

Other host materials which IonPhasE® IPE® prefers are POs, PS, PS-HI, ABS, PC/ABS, PC/ASA, ASA, PMMA, PA, PET-G, TPE, TPU, SBS and SEBS.

Products with IonPhasE® IPE® can meet the below standards, regulations and guidance:

- **ANSI S20.20 standard**
- **ANSI S541 standard**
- **IEC 61340-5-1 (2007)**
- **CEN/TR50404**
- **RoHS**
- **Zero halogen**
- **WEEE**

We at IonPhasE believe in continuous development of both our technology and services in order to be the best in class partner to our customers at present and in the future.

Contact us today and let's start creating "win-win" opportunities!
www.ionphase.fi