avanzare

*inventing the future*

# PERMANENT COLOURLESS ANTISTATIC ESD ADDITIVES


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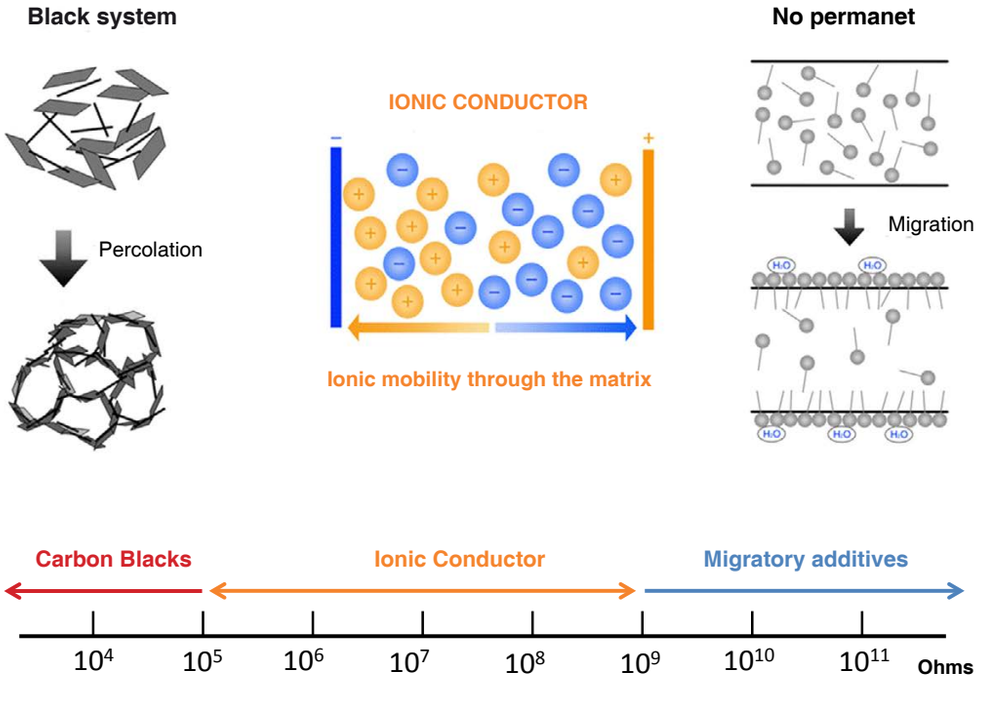
# Antistatic/ESD additives Electrostatic dissipation & discharge protection

# Electrostatic dissipation

Resins and plastic materials are intrinsically insulating materials; nevertheless, materials with conductive and/or antistatic performance features are increasingly demanded both for production and protection purposes. Some of their common applications are; safety footwear, flooring, rolls, caster wheels, conveyor belts, handrails, gloves, etc.

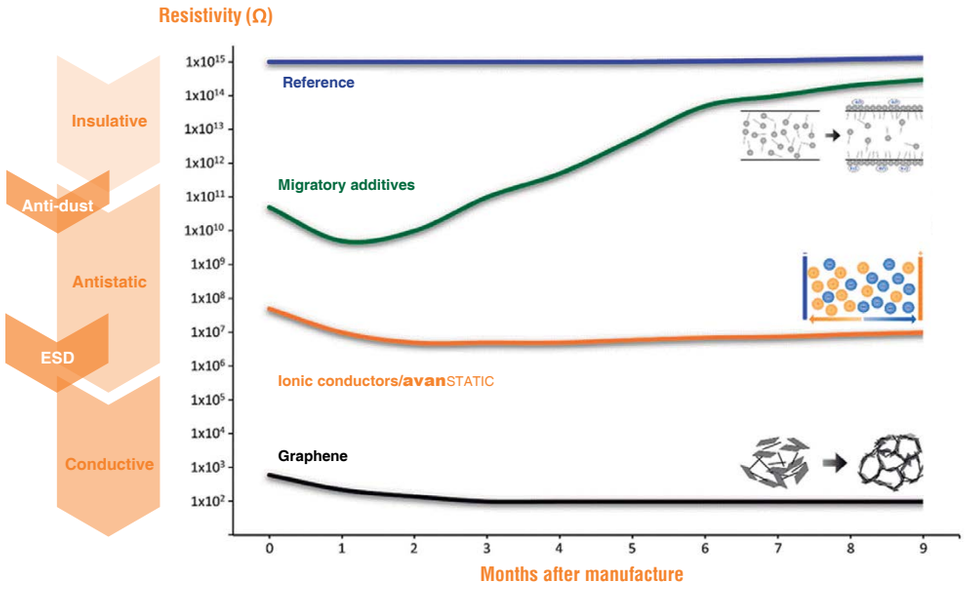
Our antistatic/ESD additives impart certain conductivity in host materials so that they can release static electricity effectively in a controlled way and thus prevent problems caused by static electricity and uncontrolled electrostatic discharges, such as electric shocks, destruction of electronic circuits, sparks, appliance malfunctions, dust adhesion, etc.

## Mechanism to generate antistatic

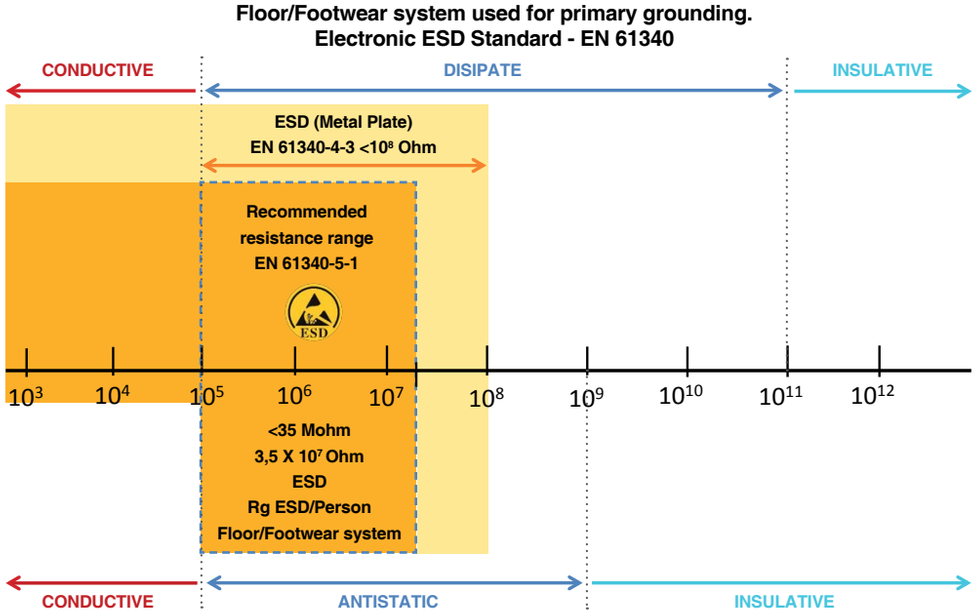



| | Avanzare Graphene percolation | Avanzare Ionic Conductor | Migratory Additives |
|---|---|---|---|
| **Colourable** | NO/PARCIALLY | YES | YES |
| **Permanent** | YES | YES | NO |
| **Humidity Dependent** | NO | NO | YES |
| **Resistance level Range** | $<10^6$ ohms | $10^5$ to $10^{10}$ Ohms | $10^9$-$10^{12}$ Ohms |

## Evolution of conductivity with the time




## Ranges of conductivity




Occupational and safety shoes standard - EN ISO 20344 to 20347



## Main characteristics of avanzare´s antistatic additives.

- Static dissipative and ESD levels **permanent performance**
- **Colorless** and colourable
- Low dosage required
- Cost-effective
- Minimal effect to host material properties
- **Non-migratory**
- Solid, liquid, pellet MB forms available depending on the product.
- Food grade in some applications

**Product and agents specifically developed to ensure compatibility with the host matrix and according to the requested performance.**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# Antistatic/ESD additives for rubber

Rubber is a very diverse material, with many different applications and formulas, so the additive and the amount needed vary greatly depending on the type of rubber, formula, Polarity of the mixture, etc...

## Different grades of antistatic additives for rubber.

| | Type of rubber | Format | Dosage phr | Characteristic | Impact price |
|---|---|---|---|---|---|
| **avan**STATIC Rubber | NBR | Solid | 2-6 | Only UE | $ |
| **avan**STATIC Plast | NBR, SBR, CR, BR, CSM | Liquid | 5-15 | Plasticizer | $ $ $ |
| **avan**STATIC Plast Rub | NBR | Liquid | 4-8 | Plasticizer | $ $ |
| **avan**STATIC NBR 535 | NBR | Liquid | 4-8 | Plasticizer | $ |
| **avan**STATIC SBR/EPDM | SBR, EPDM | Solid | 7-14 | | $ |
| **avan**STATIC Rubber MB | NBR, SBR, NR,EPDM, etc… | MB in NBR | 10-25 | | $ $ |



# Antistatic/ESD additives for EVA

## avanNATUR EVA applications:

The production of EVA plates as well as the micro-expanded granulated EVA are two of the most used EVA applications today. Thus, its use in orthopaedic plants, templates, construction plates, as well as in any injected piece are gaining ground against other competing products due to their low weight, ease of work and properties.

EVA, by itself, has an extremely low electrical conductivity, together with its use in the form of foam, which increases the problem even more. In order to have EVA in the form of foam and at the same time high electrical conductivity, **avanzare**'s experts have developed **avan**NATUR.

**avan**NATUR, a series of additives developed and commercialized by **avanzare**, offer the best solution to this problem, allowing its use in a wide range of applications that until now were not feasible.

| | EVA production | Format | Dosage range phr | Impact price |
|---|---|---|---|---|
| **avan**NATUR EVASTAT (S) | Sheet (banbury) | Solid | 10-30 | $ |
| **avan**NATUR EVASTAT 850 | Bouth | Liquid | 10-15 | $ |
| **avan**STATIC 747 | Injection | MB | 30-35 | $ $ |

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# Antistatic/ESD additive for TPU

During the last years the boom in the use of TPU is causing a multitude of thermoplastics with completely different characteristics to be found under this denomination.

Given this versatility and variety of TPUs in the market, **avanzare** has developed a wide variety of additives in various formats to respond to each of the requests shown by the market.

| | TPU | Format | Dosage | Use | Impact price |
|---|---|---|---|---|---|
| **avan**STATIC TPU (L) | - | Liquid | 0.5-4% | Transparent TPU, | $ |
| **avan**STATIC TPU MB | Polyester | MB | 4-10% | Extrusion, injection | $ |
| **avan**STATIC TPU.2 MB | NBR/TPU Polyester | MB | 4-10 % | Extrusion, injection | $ |
| **avan**STATIC TPU 77LMB | Polyester | MB | 5-15 % | Film, extrusion, injection | $ $ $ |
| **avan**STATIC TPU-B255 | - | Solid | 7-14 | Extrusion, injection | $ |
| **avan**NATUR TPU STAT (FC) | TPU (polyester) … | MB | 10-25 | EU-USA Food grade | $ $ $ |



# Antistatic/ESD additives for PU

Polyurethane is a material widely used in industry in both rigid and foamed applications. The final density obtained as well as the type of polyol play a crucial factor in the antistatic characteristics of the system.

**avanzare** has developed a variety of products that, depending on the type of application and foam structure, can be used as the main and unique antistatic agent or as synergistic with other products on the market.

For polyester applications, **avanzare** has evaluated its products against the hydrolysis of polyester polyurethane itself, not observing any changes with respect to the untreated product.

| | PU | Format | Dosage Range (1) | OH-Value (mg KOH/g) | Max dosage without adjust (1) | Impact price |
|---|---|---|---|---|---|---|
| **avan**ION- 35 | Ester/ether | Liquid | 0.5-4 | 1050 | 2.5 | $ |
| **avan**ION- 39 | Ester/ether | Liquid | 0.5-5 | 790 | 3.75 | $ |
| **avan**ION-5 | Ester/ether | Liquid | 1-7 | - | 5 | $ |
| **avan**ION-13 | Ester/ether | Liquid | 1-7 | - | 5 | $ $ |
| **avan**ION-510 | Ester/ether | Liquid | 1-7 | - | 5 | $ $ $ |

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# Antistatic/ESD additives for PVC

The variety of existing thermoplastics and the inclusion of each of new grades and materials means that every day it is necessary to develop new additives tailored to the needs of our customers.

We produce these additives in accordance with the criteria set by our clients, increasing their catalogue and performance in all areas.

Other products formulated for specific industrial applications are reflected here.

| | Material | Format | Dosage range (1) | Impact price |
|---|---|---|---|---|
| **avan**NATUR Nylonstat | PA6 | Liquid | 3-7 | $ |
| **avan**NATUR Nylonstat -5 MB | PA6 | MB | 6-15 | $ $ $ |
| **avan**STATIC PVC A-033 | PVC | Solid | 3-6 | $ $ |
| **avan**STATIC PVC A-03 | PVC | Solid | 3-6 | $ |
| **avan**ION 11 | Plastisol | Liquid | 1-4 | $ |
| **avan**STATIC PVC B-255 | PVC | Solid | 3-8 | $ $ |
| **avan**STATIC 1050 | PVC or PVC/NBR | Liquid | 1-5 | $ |



# Antistatic additives for polyolefins

**avan**DISS is a line of polymeric masterbatches based on polyester resins, capable of producing permanent and colourable antistatic systems.

The generation of permanent antistatic systems is produced due the generation of percolation networks of third polymers inside the polymer to be treated. **avanzare** has designed its product line **avan**DISS, MB polymer products specially designed to generate three-dimensional structures in base polymers.

| | Additive for | Format | Dosage range (%) | Impact price |
|---|---|---|---|---|
| **avan**DISS-232 | HIPS, PS | MB | 10-22 | $ |
| **avan**DISS-378 | General use, PP, PE, ABS, POM, PET, etc. | MB | 10-20 | $ $ $ |
| **avan**DISS-450 | PE-PP (food contact ) | MB | 10-22 | $ $ |

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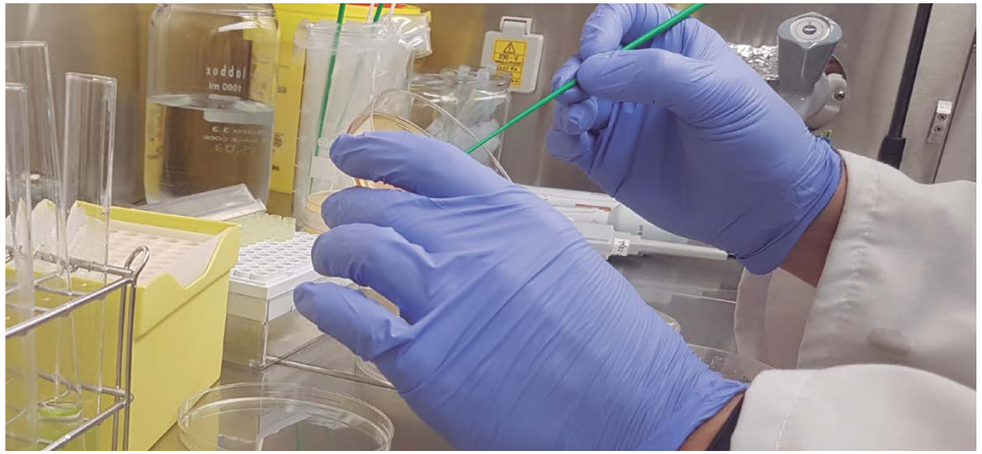
# avanSTATIC aditives for Latex

The use of latex gloves is no longer an exclusive matter of hospitals and health centres: Thus, the emergence of electronics and its use in clean rooms has modified the final characteristics required by these customers, increasingly promoting the use of anti-static gloves for Do not damage these electronic circuits.

**avanzare** has developed a series of additives that, depending on the use and the final need, can provide antistatic behaviour in the glove. The products developed will be differentiated according to their final application single-use or multi-use glove, Type of rubber, NBR, SBR, etc.



| | Type of rubber | Format | Dosage phr | Characte-ristic | Uses | Impact price |
|---|---|---|---|---|---|---|
| **avanSTATIC 75 B** | SBR, NR | Solid | 2-6 | Full glove | Multipur-pose | $ |
| **avanSTATIC NBR 535** | NBR, | Liquid | 2-6 | Full glove | Multipur-pose | $ |
| **avanSTATIC Glove 62** | NBR | Liquid | 1-4 | Superficial | Disposable | $ $ |
| **avanSTATIC Glove 300** | NBR | Liquid | 1-4 | Superficial | Disposable | $ $ |



# Antistatic additives for coating and paints

| | Colourable | Format | Use | Dosage | Area | Type of resin | Impact price |
|---|---|---|---|---|---|---|---|
| **avanSTATIC Coat 323** | YES | Solid | Water-base | 2-5 | Antidust Antistatic | General | $ |
| **avanION 100** | YES | Liquid | Water-base | 1-5 | Antidust Antistatic | General use | $ |
| **avanNATUR 133** | YES | Liquid | Solvent/ water base | 0.5-4 | Antidust Antistatic | General use | $ $ $ |
| **avanNATUR Antidust** | YES | Solid | Solvent/ water base | 2-5 | Antidust | Polyester or acrylic | $ |
| **avanCON-DUCTIVE 212** | No (black) | Solid | Water-base | 2-6 | ATEX | General | $ |
| **avanCON-DUCTIVE 334** | No (black) | Solid | Solvent base | 2-6 | ATEX | General | $ |

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graphene

## Graphene materials
## Conductive and heat dissipative systems

**avanzare** is a well-known graphene materials and graphene/ graphite nanoplatelets producer.

These laminar materials exhibit an incomparably lower percolation threshold to other materials, and therefore lower dosages are required to achieve conductivity in the host polymer matrix.

Thanks to their low-dosage requirements they have a minimal effect on the host resin properties.

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**ATEX tank produced with unsaturated Polyester resin and graphene.**

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