

# Ingenia Flexible Packaging Brief

## Antistat

Plastics products made from polyolefins like polyethylene and polypropylene are natural insulators. This means they easily build up static electricity during handling or processing. This static can lead to the attraction of dust and dirt, problems feeding material into machines, or electric sparks that may damage electronics or cause fires.

Antistatic Masterbatches (MBs) are added to plastics to help control static electricity. They work by moving to the surface of the film and attracting moisture from the air. This moisture forms a thin layer of water that allows the static charge to dissipate.

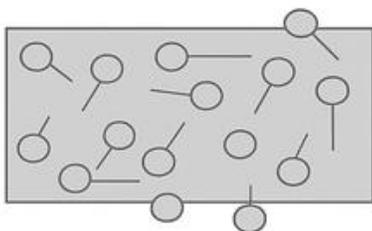
There are two main types of antistatic agents:

- External: Sprayed or wiped onto the surface of the finished part.
- Internal: Mixed into the plastic during production (focus of this brief).

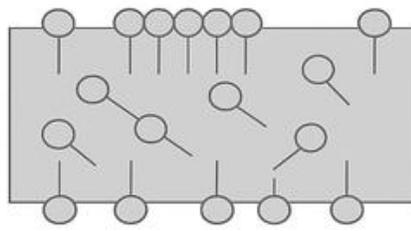
Common chemical types include: Glyceryl monostearate (GMS), ethoxylated amines, diethanolamides, and ethoxylated amine esters.

## How Internal Antistatic Agents Work

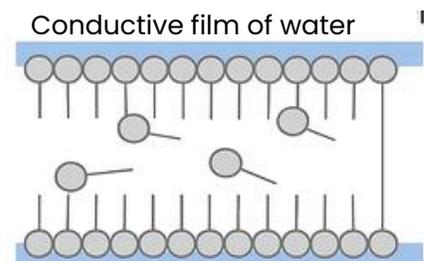
1. The antistat is mixed into the plastic during film production.
2. After cooling, the antistat moves to the film surface over time.
3. Its water-attracting moiety pulls in moisture from the air.
4. A thin, invisible water layer forms.
5. This layer helps carry away the static charge from the surface.



Antistat dispersed in polymer immediately after film or part production.



Antistat migrates to the surface of the film. Hydrophilic heads line up to outer surface.



Hydrophilic heads of antistat molecules attract moisture, creating a thin layer of water on the surface.

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## What Affects Performance:

- Polymer type - Affects how well the antistat spreads to the surface.
- Polymer crystallinity - Antistats move more slowly in plastics with high crystallinity like HDPE. This is because the molecules are packed more tightly, which blocks the antistat from migrating to the surface as quickly.
- Usage Level - Too little may result in poor antifog performance, too much antistat can cause problems like poor sealing or impart haze on film.
- Compatibility with other additives - Due to the migratory nature of the antistat additive, migration could be affected by other additives.
- Moisture in the air - Higher humidity results in more water molecules available for attraction to the surface of the part.
- Temperature - Warmer conditions help the antistat move faster, but very high heat may cause antistats to break down.
- Film structure - Antistat loadings can be varied based on thickness and layers in the film structure.
- Winding tension - Tight winding can slow down the migration of the antistat to the surface.

## Troubleshooting Tips

- Dust still sticks to the film - Optimize antistat type and loading.
- Film doesn't seal properly - Too much antistat may be interfering.
- Ink or coating doesn't adhere well - Apply ink or coating immediately after treatment.
- Inadequate performance window - May require blends of antistats.

## Summary

Antistatic Masterbatches are important for keeping products clean, safe, protected, and easy to handle. Whether for food, electronics, or general packaging, the right antistat improves quality and safety.