Metal adhesion promoter for vacuum metallized CPP films

PRODUCT APPLICATION NOTES

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Metal Adhesion Promoter for Vacuum

Metallized CPP Films

Packaging industry has been propelled to astonishing heights since the creation of flexible films. Continual innovations in the utilization of these films through manufacturing practices progressed the need of a broad spectrum of products best suited to further enhance their desirable characteristics.

While there are many polymers utilized in the flexible packaging industry, the most common are polypropylene (PP), polyethylene (PE), polyvinyl chloride (PVC), polyethylene terephthalate (PET). One of the most popular innovations that has taken place in the recent past is the introduction of metalized films in the flexible packaging industry. With the application of a layer of aluminum to a polymer's surface, the finished product proves to be more resistant to both water and oxygen transmission as well as providing a metallic and glossy appearance—much like that of aluminum foil. The ability to provide some of the key properties possessed by aluminum foil, for a considerably lower cost and tare weight makes metalized films a popular choice in the food and confectionary fields.

Polyester and PP are commonly used base substrate for producing these high barrier packaging films- Metallized Films. The most widely used type of metallized films are metallized cast PP films. A cast PP film when coated with a thin layer of metal, usually aluminium by Vacuum metallization is termed to be as VMCPP or simply MCPP/MCPP films. Areas of applications are Food Stuff Packaging, Cling Packaging, Cosmetic Packaging, Tobacco & Liquor Packaging etc.

The extended adhesion of the metal on the surface of the CPP film is important to safeguard the quality of the film and hence the shelf life of the product packed. Nowadays either Plasma metallization or use of additives like metal adhesion improvers is done for ensuring extended metal adhesion. Plasma metallization is an inline web treatment prior to metallizing to promote surface cleanliness and chemical modification, encouraging metal adhesion and improvements in barrier functionality. Whereas metal adhesion improvers are speciality additives which impart polarity to the otherwise non polar polymers and chemically bind with metal particles for enhanced metal retention.

The formulations, where metal adhesion improvers are added in the CPP film during production and then plasma or corona treated to form metallized CPP films are known to have the best metal retention in their entire life cycle ensuring the highest degree of quality to the film.

Sensing the demand of Metal Adhesion Improvers from flexible packaging industry, PLUSS Polymers has developed a speciality additive marketed under the brand name BindEX™ E-181, which is used for metal adhesion improvement.

CHARACTERISTICS OF BindEX™ E-181

BindEX™ E-181 is a maleic anhydride modified very low density polyethylene adhesive resin. It is used as a metal adhesion improver in vacuum metalized cast polypropylene films. It also acts as an adhesion promoter between polyethylene or most of ethylene copolymers and polyamides and EVOH.

Adhesion of the metal and the barrier properties of MCPP films are related to:

1. The film surface energy.
2. The interaction of the metal with the surface.
3. The way the metal builds structure beyond the surface.
4. The thickness of the metal deposited.

Maleic Anhydride groups present in BindEX™ E-181 chemically react with Aluminum which chemically binds aluminum to the polymer chain. Aluminum particles also get embedded into the softer LLDPE layer matrix after corona treatment which results in the continuous lustier of the metalized film.

BindEX™ E-181 is used along with other ingredients of the VMCPP film like HomoPP, TerPP, CoPP, Antiblock etc.

Suggested Formulation is as under:

Layer Type	Layer Ratio	Suggested Formulation*
Sealing Layer	20%	TerPP (92%) + Antiblock (8%)
Core Layer	60%	HomoPP (100%)
Treated Layer	20%	CoPP (67-70%) + BindEX™ E-181 (25-30%) + Antiblock (3-5%)

BindEX™ E-181 is reported to produce a far superior product at marginal cost increments. BindEX™ treated metallized film gives advantage of non repition of corona treatment before printing over non-treated films. It can be processed on most of the standard extrusion equipments designed to process conventional polyolefins. Maximum processing temperature should not generally exceed 290 ^{0}C. It should be stored in a dry, cool and well-ventilated area protected from UV-light. Improper storage conditions may cause degradation and thus can adversely affect the physical properties of the product.