



TECHNOLOGY

Detailed Information

CAPACITOR TECHNOLOGY

SuperBias – Electron Beam Induced Bias

SuperBias – key technology for productivity and quality

In the plastic film capacitor industry, there is a continuous strive for flexible, high-end metalizing equipment running with maximum productivity and constantly increasing requirements of quality. At the same time, there is the demand for continuously decreasing film thicknesses. In order to metalize thin plastic films with higher speeds, or with lower peak temperatures, the essential challenge is to improve the efficiency of cooling of the substrates during the metalizing process.

SuperBias – extends your portfolio and margins

In 2004, Leybold Optics developed and implemented in CAP-M systems the so-called SuperBias – a revolutionary technology, consisting of electron beam gun and two plasma sources, as replacement for conventional bias, which are limited in various aspects. The EB-gun generates static electric charge on the plastic film, thus achieving maximum adhesion of the substrates to a cooled surface and, hence, an optimum heat transfer coefficient for efficiently leading off the thermal load.

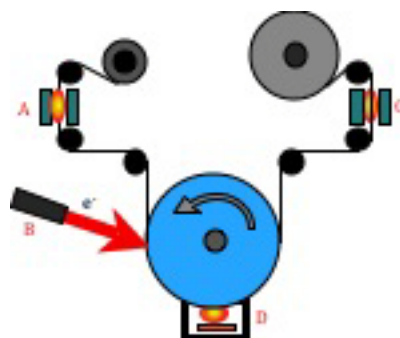


Fig 1: Schematic of system with electron beam induced bias.
A – plasma source, B – electron beam gun, C – plasma source, D – evaporator





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An electron beam induced bias allows a higher charge of the film compared to conventional bias due to the immobile, static charge. The pressure of the film to the cooled surface and accordingly the heat transfer coefficient can be increased by one order of magnitude during the time before the substrates are exposed to the heat load, i.e., when the metalizing takes place. In addition, the cooling of electron beam bias is effective during the whole time the plastic film is in contact to the cooled surface.



Fig 2: Electron beam induced bias – electron beam while metalizing PET.

Advantages and benefits

- Flexibility.
 - Extensive range of products.
 - Even marginal applications can be produced.
 - Two biasing systems¹.
- Improved product quality.
 - Cooling is effective all the time, when the substrate is in contact with the cooled surface.
 - Higher efficiency of cooling by increased pressure between substrate and cooled surface.
 - Reduced peak temperature of the substrate during metalizing².
 - Highly innovative and efficient plasma sources.

¹ If option SuperBias is selected. Conventional bias is standard equipment in all systems.

² Using electron beam induced bias a higher BDV (up to 50 %) has been observed for thin films (PET 2.0, OPP 4.0) metalized with high conductivity layers (pure aluminium 1.5 to 2.0 Ω/\square) in comparison to conventional bias.





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- In case of pinholes, the substrate never loses the contact to the cooled surface.
- Further processing of the metalized material is positively affected.
- Higher productivity.
 - Higher process speed (up to 30 %) at a peak temperature comparable to conventional bias.
 - In case of pinholes, the winding behaviour remains intact, no slipping or jumping or even web tears.
- Ease of operation.
 - Operator convenience due to simplified control.

