APPLICATION NOTE

FILM AND SHEET PRODUCTION

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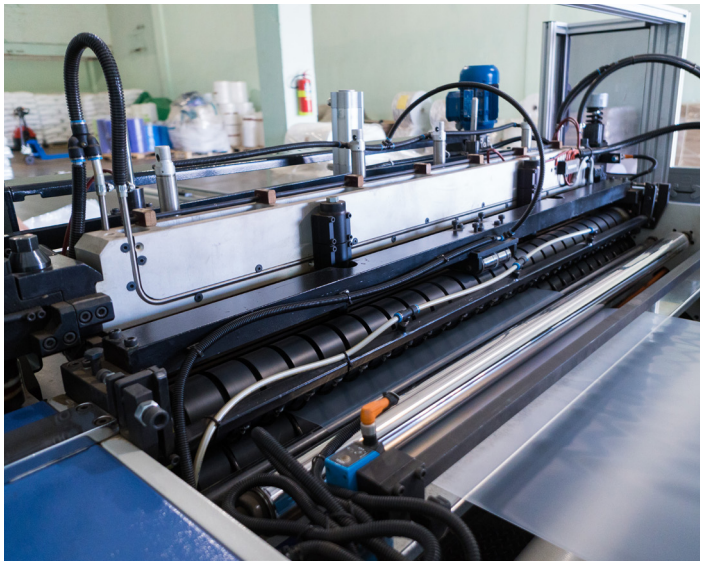
FILM & SHEET PRODUCTION

Plastic films are used for food and textiles packaging as coating substrates in extrusion coating processes, or laminated to other materials to form complex films, among others.

Film & sheet production



Film & sheet production

Typically, the cast film process involves coextrusion, which is a simultaneous extrusion of two or more materials from a single die to form a multi-layered film. This is because, in many cases the final application of the plastic film demands a performance that cannot be achieved with a film composed of only one material.

For example, food packaging applications generally require films with oxygen barrier capabilities. A high oxygen barrier material like EVOH is combined with polyolefin materials in a multi-layered structure.

Coextruded films typically contain up to seven layers; however, the number of layers, their individual thickness and the required vacuum levels (between 5–200 mbar) depend on the particular application of the film.

The process starts with the feeding of plastic resins to the extruder where they are melted and mixed. The polymer melt is degassed using vacuum pumps to remove air bubbles – which otherwise would create fish eyes in the film – and fed to the die system.

It is critical to ensure that the flow exiting the extruder is well controlled and constant as a failure can cause periodic changes in film thickness. A vacuum is commonly employed on the flat die box to produce a consistent flow regardless of the discharge pressure of the extruder.

As the polymer exits the die, the point where the top two rollers meet, the sheet is pulled in by the motion of the rollers and passed through a cooling unit which comprises of the rolls in a vacuum box for a more efficient cooling. PP materials, if not cooled aggressively, tend to form crystals that ultimately give rise to hazy films.

The vacuum box removes entrained air between the roll surface and the film to minimize the air barrier between the hot web and the roll. This air barrier, if not reduced, acts as a thermal insulation cushion that impedes the film cooling process. The box also reduces the amount of necking in the film and the air gap and allows higher line speeds to be utilised.

FILM AND SHEET PRODUCTION

1. CHALLENGE

- Chances of liquid carryover during degassing is high and the vacuum system need to be capable of handling solids and liquids.
- Vacuum cooling can be dusty and ingested dust combined with vapours may cause pump seizures.

2. SOLUTION

- Edwards offer standard combinations with inbuilt self cleaning modes making them highly tolerant to dusty applications with liquid carry over. Our modular pumps can be easily systematized to protect the pump from condensates and polymer dust.
- GXS - In-built control and self-clean mode

3. MAIN BENEFITS

- Standard booster combinations available for GXS.
- Easy systemisation for EDS with accessories available.
- Global service footprint, large scale production capability, competitive pricing with reliable systems.
- Reliable products with essential application expertise.

EDS - Built for challenging installations

GXS - Control and automation capabilities

SUCCESS STORIES

5x GXS250/2600 MD+, German Film manufacturing OEM

2X EDS300/EH2600, Largest Film & Sheet producer, Austria

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