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Technology and Costs

TECH 2022S10: Flexible Plastic Packaging

Flexible Plastic Packaging Technologies is one in a series of reports published as part of NexantECA's 2022 Technoeconomics – Energy & Chemicals (TECH) program.

Overview

For many years, developments for flexible plastic packaging were focused on making more sophisticated and complex designs to improve performance and allow increased usage in new applications. However, in many cases, the current trend is to simplify designs by reducing the number of polymers in a package to increase circularity, while keeping as many performance benefits as possible.

Flexible packaging manufacturers are now moving towards a more circular economy, due to their increasing commitment to sustainability driven mainly by legislation and commitments of consumer packaged goods companies.

This TECH report provides an updated overview of the conventional technological and economic aspects of producing several plastic films (e.g., blown, cast, BOPET, and BOPP). The following issues are addressed in this report:

- What are some of the strategic and business considerations surrounding the flexible plastic packaging industry?
- What are the main technologies to manufacture blown, cast, and biaxially oriented films?
- What are some of the recent technology trends and design developments for producing blown film, cast film, and bi-axially oriented film?
- How do the process economics for the films analyzed in this study compare across several different global locations? How do the production costs vary for a three-layer blown film when including 10 percent recycled LLDPE?

Commercial Technologies

There are two main film extrusion processes – blown film and cast film. Blown film extrusion is a relatively simple process used to produce a variety of plastic films. Even with major differences, blown and cast film methods are employed in similar applications.

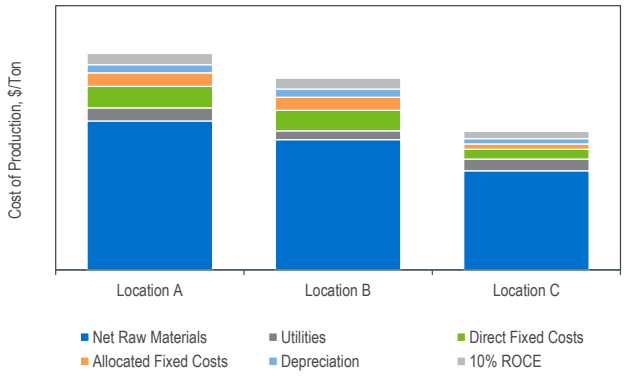
After a plastic film has been formed, it can be stretched in two different directions using equipment that varies depending on the process. Bi-axial orientation (combines machine and transverse direction orientation) is the process most widely used for all stretched film types in all types of packaging films, tapes, labels, and industrial films.

Polypropylene is the most common bi-axially oriented film material due to its properties. BOPP film is commonly used for applications that need moisture resistance, optical clarity, and high tensile strength. Additional bi-ax films include BOPET, BOPS, BOPA, and BOPE-HD.

Process Economics

Detailed cost of production estimates for blown film (single-layer, three-layer, and seven-layer), cast film (three-layer), BOPP film, and BOPET film are presented for the USGC, Western Europe, and China. A sensitivity analysis on feed pricing was conducted on the assumption that 10 percent of high quality recycled LLDPE was used in the center layer in the three-layer blown film product. The remaining 90 percent represented fossil-based virgin LLDPE material.

Blown Film (Three-layer) Production Costs



Commercial Overview

About 80 percent of the flexible packaging market is made from plastics. Flexible packaging has become one of the fastest growing packaging segments, with the market expected to grow at a CAGR of about 5 to 6 percent through 2030. Asia Pacific has been and will continue to be the main market driver of flexible packaging.

Global market overview for blown film and BOPP film are provided in this TECH report.

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- Regional supply and demand balances for product, including capacity tables of plants in each region
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Technology and Costs comprises the Technoeconomics – Energy & Chemicals (TECH) program, the Biorenewable Insights program (BI), and the new Cost Curve Analysis. These programs provide comparative economics of different process routes and technologies in various geographic regions.

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