

Comparing Processes For Producing Coextrusion Barrier Film

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Coextruded barrier film is commonly used in a variety of food and non-food packaging applications. A typical structure contains a polyamide (nylon), EVOH or PVDC barrier layer, tie resins and a polyolefin or ethylene copolymer sealant. There are two primary processes for making these films: blown and cast. Each has its advantages and disadvantages. A general comparison of the two processes is given in Table 1.

- Benjamin Prinsen, Macro Engineering

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TABLE 1: Comparing Processes for Producing Coextruded Barrier Film

PROPERTY	BLOWN FILM	CAST FILM
Mechanical properties	Good. MD and TD orientation.	Not as good; splitty in TD. Uniaxial drawdown (MD), web neck-in.
Crystallization	High. Slow cooling promotes crystallization. Denser and stiffer film.	Low. Rapid cooling prevents crystallization. Less dense. Supple film.
Optical properties	Inferior. Less gloss and clarity. Higher haze.	Superior. Greater gloss and clarity. Little haze.
Thermoformability	Good. Film has some MD & TD orientation. Higher crystallinity.	Better. Film has MD orientation only. Less crystallinity.
Gauge uniformity	Not as good: +/- 7 to 10%. Automatic gauge control: +/- 3.5 to 5%	Very good: +/- 2.5% or better with automatic gauge control.
Film flatness	Nat as good as cast.	Very good.
Curling	Difficult to control curling in unbalanced structures. Slow cooling.	Easier to control curling in unbalanced structures. Fast cooling.
Resins	Lower melt index and higher melt strength.	Higher melt index and lower melt strength.
Processing	Lower temperatures	Higher temperatures

	(190 °C)	(245 °C)
Output rate	300-350 kg/hr on a 500mm die for structures with PA.	400-500 kg/hr on a 2m die depending on thickness & layer ratio.
Process versatility	Good, widths can vary greatly.	Poor, width changes limited to a narrow range.
Structure versatility	Layer rheology can vary to some extent.	Layer rheology must closely match.
Layer change versatility	Extruder resins have to be changed.	Layer changes made in the feedblock via a selector plug.
Trim and waste	Trim normally not required. Low waste.	Trim is required. Edges have beads and high percentage of one resin.
Short run flexibility	Good.	Not as good. Changeover waste is higher.
Additive loads	Allows high additive loads.	Amount of additive load is limited.
Investment & cost per kg produced	Lower investment. Higher cost/kg produced.	Higher investment: ~50%. Lower cost/kg produced.