

IN-MOLD LABELING TODAY

If we look back historically at the IML market it has been basically a high volume, low cost, paper substrate driven market. It has served high volume packaging markets such as automotive, food, beverage and detergent. In-mold labels by definition are labels that are applied to blown bottles or containers as they are formed in extrusion blow molding equipment. This is in contrast to post container forming labeling which is usually done at the time and place of container product filling. Earlier blow molding equipment, which accepted IML, was based on a 12-14 cavity rotary wheel concept which allowed for high volume, 40-50 million container, per machine, per year output. Container size ranged from 7 oz. to 1 gal.

Since the early 1990's IML has been expanded into blow molding equipment based on a 2 mold shuttle concept that cycles in a horizontal plane. This move is responsible for IML being able to fit smaller volume applications without a cost penalty. The process cycles as follows:

1. *Plastic parison ejected*
2. *IML labels inserted*
3. *Mold shuttles to pick up parison*
4. *Mold closes and shuttles*
5. *Air injector pin is inserted*
6. *Bottle is blown against mold and label*
7. *Mold opens and releases labeled bottle*
8. *Mold shuttles to start cycle over*

Traditional IML markets have been volume label markets but now shuttle equipment is able to handle and expand IML into short run, low volume container label markets. IML label printing is moving to shorter run equipment so that sheetfed offset is now growing at a high rate. Future growth is expected to take place in the following product markets:

- *Personal care*
- *Beverage*
- *Household cleaners*
- *Food*
- *Detergents*
- *Automotive*
- *Pharmaceutical*

IML applications will not only continue to be developed for

blow molded containers but they will also be developed for injection molded and thermoformed containers.

IML has been a paper substrate market but now film is advancing as the substrate of choice. Like all IML, in addition to eliminating post container forming labeling, IML film labeling offers the following advantages:

- *Recyclability (pre and post consumer)*
- *Clear film transparency on container*
- *Better moisture and stain resistance*
- *Less container bulging around label*
- *Improved container squeezability*
- *Difficult to counterfeit*

IML is also said to have a number of disadvantages, which are:

- *The need for stacked labels*
- *Retro-fit costs to enable use*
- *Inflexibility to change label graphics after container forming/labeling*

Large important blow molders who have a use for IML are:

- *Continental Plastics*
- *Owens-Brockway*
- *Silgan Plastics*
- *Plastipak Packaging*
- *Graham Packaging*
- *Liquid Container*

Blow molders require that IML film labels be received that are:

- *In a clean edged, non-blocked stack*
- *Easy to handle loading a magazine*
- *Regrindable/recyclable*
- *Bondable without blisters*
- *Blow mold die heat resistant*
- *Free of static cling*
- *Low in COF print to seal side*

OVER

The IML labeled container purchaser also has performance requirements that must be met, as follows:

- *Package must be visually appealing*
- *IML accurately bonded without blisters*
- *Competitive total Package cost*
- *High quality IML print/gloss/satin finish compatible with the package finish*
- *IML clarity or opacity as required*

IML printer converters consist of a mix of narrow-web flexo and letterpress printers, wide-web gravure printers and sheetfed offset printers. Typically, printers require the following performance from substrates to be converted to IML labels:

- *Exacting print-to-print and print-to-die cutting registration*
- *Flatness that allows accurate label stacking formation*
- *Acceptable print surface energy dyne level above 40*
- *Hot stamping capability*
- *Tight caliper control across the web*
- *Non-curling properties*
- *Heat seal and top coatings and/or sealable films that do not block in rewind, in sheetfed loads or in die cutting*

In addition, sheetfed offset printer/converters require:

- *A sheet that is stiff enough to handle*

The IML label market is moving more and more to plastic film substrates instead of paper. There are already a variety of these materials available to the printer. Typically, they are offered in opaque white or clear. IML films may be constructed of multiple co-extruded layers, be cast (extruded from a flat die), or be blown (extruded from a round die into a large diameter tube and slit). The film may be oriented for strength and, because the backside layer is heat sealable in some cases, require no adhesive or clay coating as paper does. Suppliers of IML films are:

Avery Dennison - Primax white and Fasclear
Arjobex - Polyart
Dow - Optimal
International Paper - Polyweave
Kimberly Clark - Kimdura
Owens-Illinois - Dura Core

In-mold film labels now represent 40% to 50% of the total annual USA IML labeling market, which is estimated to be between 350 and 400 billion square inches. Responsible for this growth is a narrowing of the price between film and paper, overall economics, technical advancements, improved graphics, and film recyclability.

Strong market growth is forecast through this decade. Growth will be driven by technological developments from film manufacturers, converters and molders of packaging.

Aqueous and UV print top coatings will find application in the various print processes that will be utilized to produce IML film labels. In addition some of the film substrates require backside heat sealable coatings. IML continues to grow for all of the reasons presented here. Look for a good part of future growth to come from the sheetfed offset segment of the graphics arts market.

Again..... **LOOK TO CORK!** for your coating needs, for both aqueous and UV IML top coatings and backside adhesives too.