

IN - MOLD LABELING IMPROVED WITH UV/EB

UV (ultraviolet) and (EB (electron Beam) inks and protective top coatings are producing better IML labels. The benefits of these energy-curing processes lend themselves to the rigorous requirements of IML. Both have the capability of providing excellent label durability, a range of finish from high gloss to matte, and high productivity.

In-mold labeling (IML) is a one step innovative concept where in a printed finished label is joined in the molding process to either blow molded or injection molded plastic products.



Photo courtesy IP

The IML process was introduced in North America in the 1970's. Since then it has become dominant in a market-defined by long run, blow molded branded bottles.



Photo courtesy CCL

The IML market is said to be growing at the rate of 3-5%, and is stimulated by the continuous introduction of new consumer items. In North America, the blow molding process commands about 95% of all IML production. Blow molding produces bottles packaging liquids, such as laundry products, juices, and personal care products.

In Europe, injection molded containers dominate, utilizing about 80% of IML production. The container variety is characterized as open top tubs.



Photo courtesy Dairy Foods Magazine

European consumers have been experiencing quality, IML labeled food packaging for the past two decades, especially in dairy products.

Currently, IML is redefining itself through the introduction of improved transparent films, papers, inks, coatings and adhesives to make itself more attractive to the market represented by smaller containers and shorter runs. IML continues to offer important advantages in lower cost, a no label - no edge label look and feel. Uniquely, an IML label not only contributes decorative value, but also structural value light weighting the container by 10-15%, yet adding sidewall strength.

Astonishingly, it is estimated that 85-95% of food packaging applications feature IML labeling in Europe. What a number! If only a small fraction of these applications can be commercialized in North America, up from a currently estimate 5%, what growth we'd see.

It's coming. We're seeing more and more injection molded packages. IML decoration can be seen on the sidewalls and lids of these new style functional containers.

Traditional means of decorating injection-molded products have been pad and offset printing, heat transfer foils and decals, shrink sleeves, pressure sensitive and glue-on labels. These methods all involve secondary off-line operations (read cost), and often limitations in decorative quality.

Make no mistake IML is quality. The vision is striking in offering the consumer the perception of pre-purchase quality. This quality can be further enhanced by the incorporation of photos, 3-D images and lenticular-film motion images.



Photo courtesy Hellman Assoc.

North American packagers and injection molders are now focusing on the development of IML injection molded packaging for such popular products as; ice cream, butter, popcorn, baby wipes, salads, yogurt, laundry and garden items etc. While there have been some industrial type products IML injection molded in North America (consumer products), there will soon be many more.



Photo Courtesy Fusion Graphics

Significant to IML injection molding is what can be accomplished. IML capability includes flat lids in all shapes and sizes, 360° wrap around labels and IML's that cover 3, 4, 5 and up to 8 sides of a container that can be square, rectangular, round, oval, have wavy sides or rounded corners. A plus is that a square container utilizes shelf space better because a round wastes 45% of valuable shelf space.



Photo courtesy Spies

There are many benefits to IML decorated containers.

- Quality graphics with a premium perception
- Elimination of secondary deco processes
- Fully decorated odd shaped containers
- Minimized container handling/storing
- Minimal handling equals cleanliness
- Containers are fully recyclable
- IML labels are tamper proof

IML is compatible with a wide variety of printing processes. Larger volume IML is printed gravure and web offset litho while flexo, sheetfed offset litho, screen and digital are shorter run oriented. Each one of these has it's own set of quality, cost, prep, durability, longevity and finishing qualities. Regardless of the printing method employed, precise die cutting is a given. An IML label must be die cut exact to fit label handling automation and mold cavities.

European regional markets have allowed a smaller scale IML injection molded business model to unfold. The USA market is larger and requires a larger investment in tooling to enter. Nevertheless the market is develop-ing with

suppliers showing high volume, fast cycling, thin-wall molding machinery.

In-mold label substrates, paper, synthetic paper and films must be capable of the higher temperature rigors of injection molding. Synthetic paper (plastic) is unique because it has been developed to accept commercial printing inks. It can offer higher quality graphics than straight film, be more water and blistering resistant, and more durable than paper. Papers continue to be used even though they present recycling issues and require protective top coatings to overcome abrasion and moisture deterioration. Metallized papers are also in use. A variety of plastic films are used and generally have the benefit of being fully recyclable providing they match the containers plastic. They can be more difficult to handle and print on. Surface print protection is required and can be provided by top coatings. A clear film label on a similar clear bottle can yield a "no-label look". Another development has seen reverse printed film commercialized, with graphics sandwiched between the label film and the container sidewall, offering total protection.

Inks must be mold heat tolerant and color shift must be avoided. Both inks and top coatings must avoid shrinkage to eliminate "orange peel" appearance defects or curling.

Blow molding requires a heat seal adhesive on the label back. It may be a liquid, converter applied solvent or water based material, or a co-extruded sealable film layer. It is a layer that has the requirement of fusing with the blown bottles surface during blow molding.

Injection molding is typically utilizing polypropylene and mates it with polypropylene film as a label substrate. The label fuses to the container in the injection molding process as a result exposure to high heat and pressure.

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