

## *Multilayer Injection Blow Molding*



Presentation of

## **Multilayer**

Injection Blow Molding

by

Steve Lee & Wolfgang Eihusen

**Unifyer**  
MULTILAYERTECHNOLOGY

*State September 08th 2009*

## Multilayer Injection Blow Molding

**Unifyer** is the logical consequence of a global relationship between specialists from the injection blow market.

**Unifyer** is based on Swiss, German and Korean minds.

**Unifyer** is pushing for satisfying the old market demand of having multilayer injection blown bottles.

Lead by the global esprit, the first results are available, today.



**Unifyer**  
MULTILAYERTECHNOLOGY

*Philosophie*

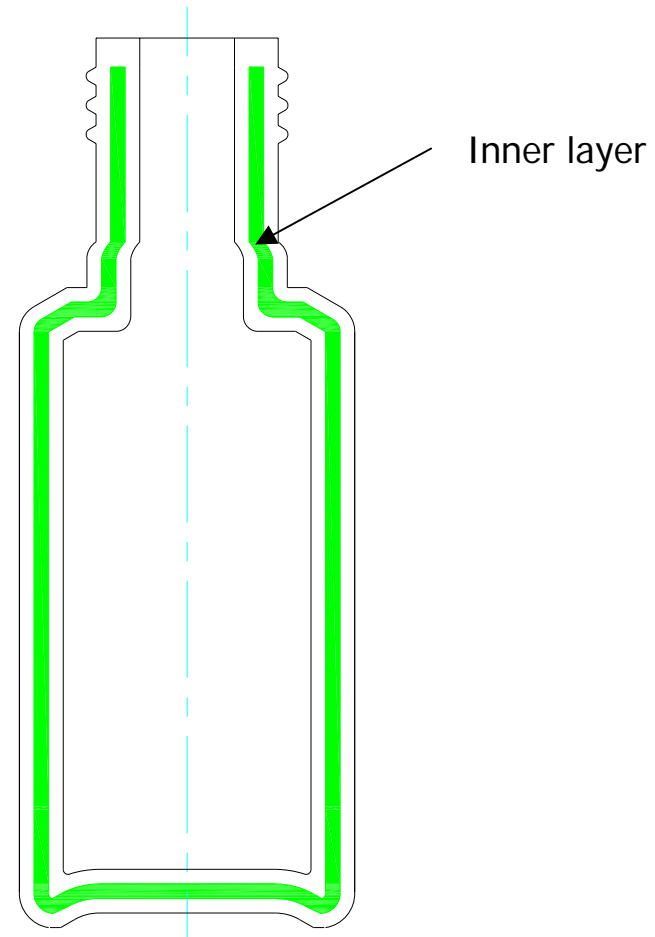
## Multilayer Injection Blow Molding

### *How the bottles are made?*

On a co-injection blow molding machine two resins are injected into a pre-form mold.

After injecting, the preform is transferred into the blow station. There the pre-form is blown up into its final bottle shape.

The general bottle structure is shown at the right hand side.



## Multilayer Injection Blow Molding

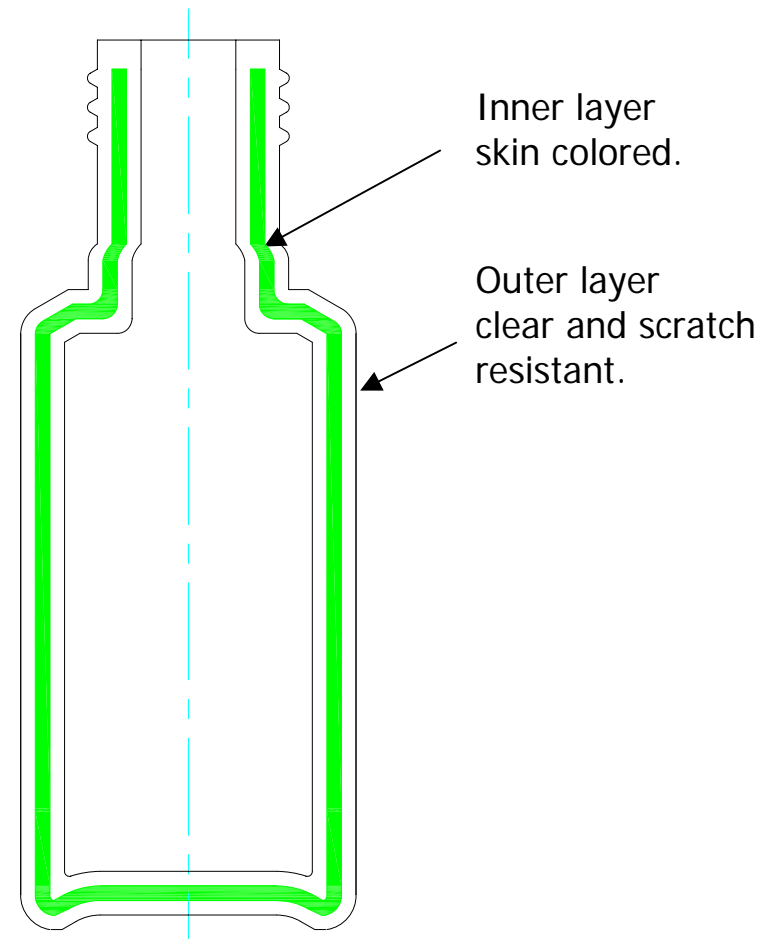
### *No spray coating*

Spray coating for decoration or surface protection the bottle is not required with multilayer bottles.

For this application the outer layer is clear and scratch resistant, e.g Nylon, protecting the inner layer.

The inner layer can be colored and thus a spray coating as secondary and expensive operation is obsolete.

Multilayer technology is environment friendly.



## Multilayer Injection Blow Molding

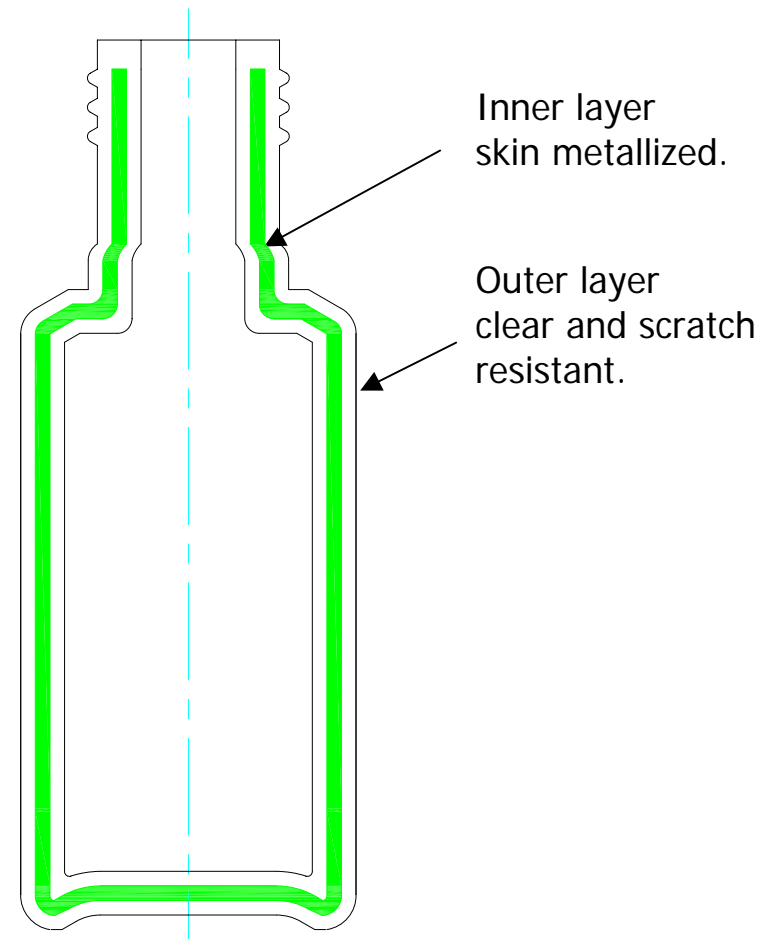
### ***No metallizing***

Metallizing is not required for multi-layer bottles.

For this application the outer layer is clear and scratch resistant, e.g Nylon, protecting the inner layer

The inner layer can be ad with a metallizing masterbatch and thus a secondary operation using metallizing is obsolete.

Again, multilayer technology is cost saving and environment friendly.



## *Multilayer Injection Blow Molding*

### *Random-Fill*

Clear outer layer and a colored inner layer.

Every bottle is filled individual. Each Random-Fill is a unique „one and only“ bottle.



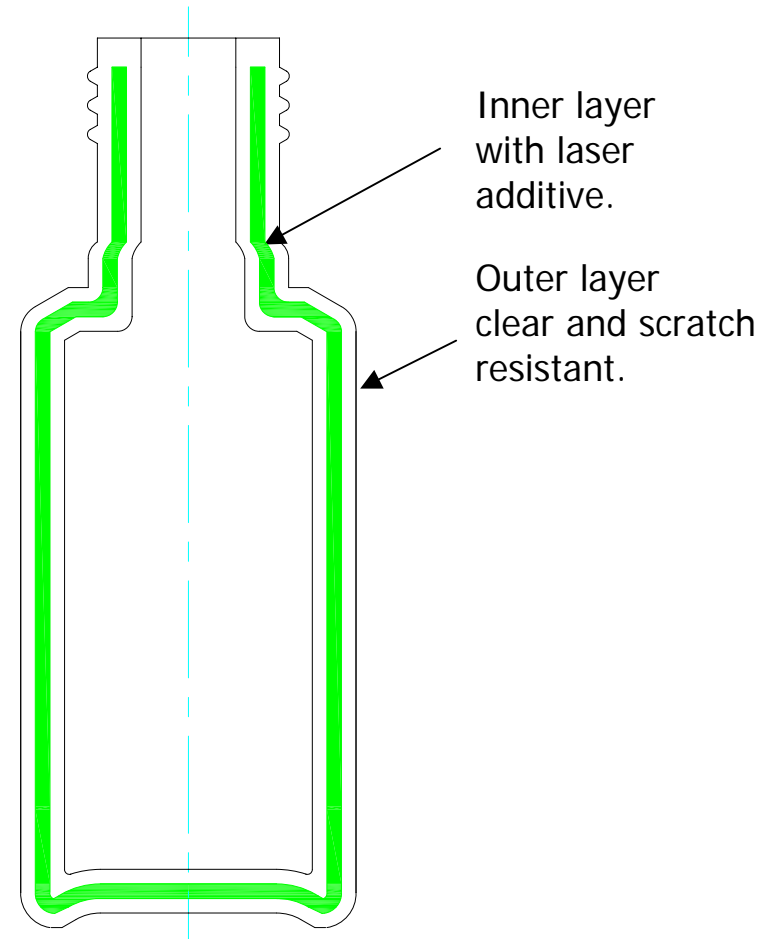
## Multilayer Injection Blow Molding

### *Laser marking*

Multilayer bottles are opening a new world of laser decoration.

A laser additive is mixed to the inner layer.

Typically Nd-YAG are used for this application.



## *Multilayer Injection Blow Molding*

### *Laser marking - details*

Laser markings are light or dark. Light markings are like dirty white and dark markings are medium grey.

Using a Nd-YAG laser with 1064 nm is creating markings darker due to karbonating. UV lasers with 355 nm creating a lighter marking.

Laser additives can be used for clear layers, but reducing the clarity of the resin a little bit.





## Multilayer Injection Blow Molding

### *Laser marking*

Laser marking results on solid filled and random fill.



**Unifyer**  
MULTILAYERTECHNOLOGY

*Laser decorating*

## *Multilayer Injection Blow Molding*

### *Laser foaming - details*

By use of a laser, a logo can be foamed into the surface of the bottle. These unique markings are lying grey shiny on the surface of the bottle.



## *Multilayer Injection Blow Molding*

### *Laser foaming*

Laser marking foaming results.

Foamed UNIFYER logo



**Unifyer**  
MULTILAYERTECHNOLOGY

*Laser decorating*

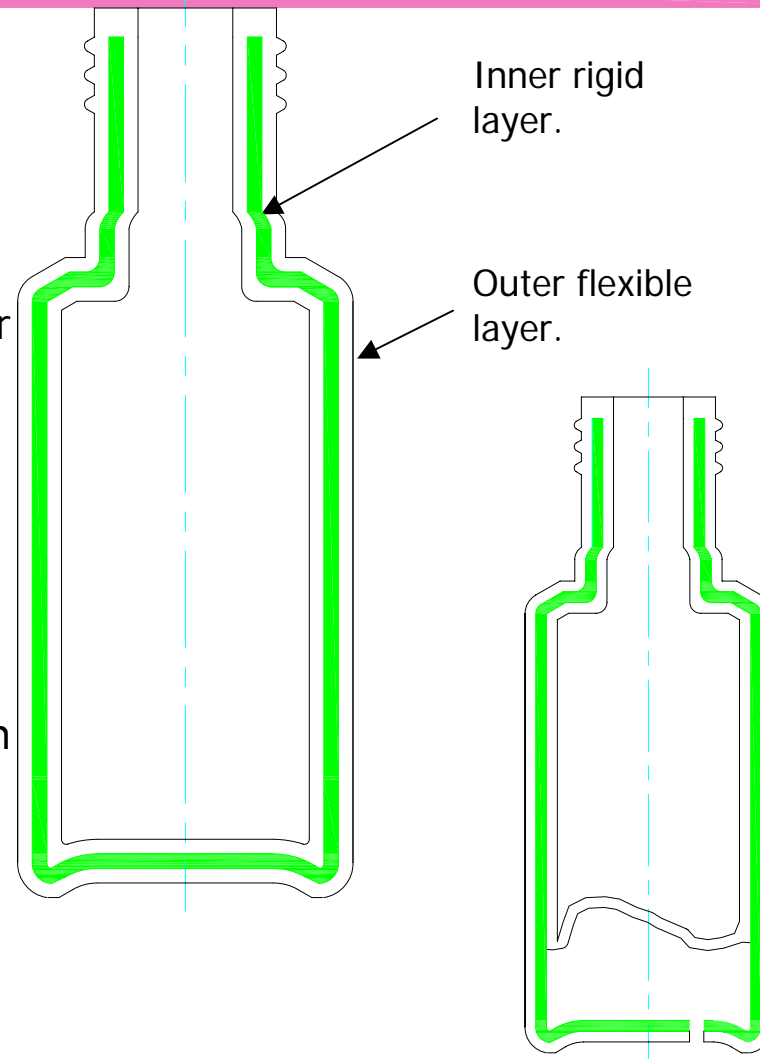
## Multilayer Injection Blow Molding

### *Pouch bottles*

Pouch bottles can be done by multilayer injection blow molding.

For this application a rigid inner layer such as PET is used. The outer layer is from a very flexible resin such as Surlyn.

The hole is done during the process. All bottles are 100% function tested, which is giving safety for the filler and the cosmetic company.



Filed for patent in August 2008.

Korean submit number 10-2008-86179

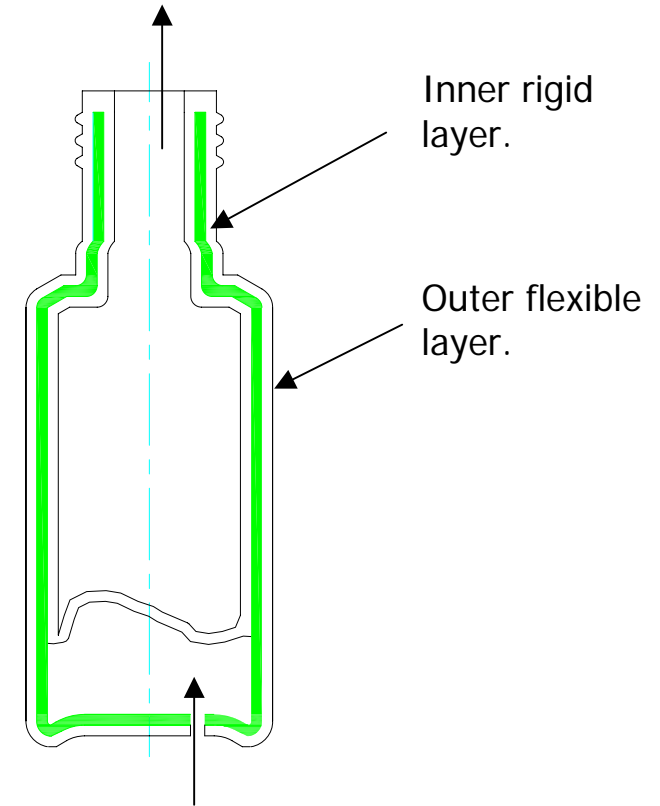
## Multilayer Injection Blow Molding

### *Pouch bottles - application*

Pouch bottles are used with airless pumps.

The airless pump is sucking the content. Parallel the bag is collapsing. Through a hole in the bottle bottom air is flowing in-between the bag and the rigid layer.

Content removal by means of an airless pump.



Inner rigid layer.

Outer flexible layer.

Air filling the area caused by collapsing inner bag through a hole in the bottle bottom.

## *Multilayer Injection Blow Molding*

### *Pouch bottles*



Filled bottle



Half empty bottle

**Unifyer**  
MULTILAYERTECHNOLOGY

*Pouch - Airless*

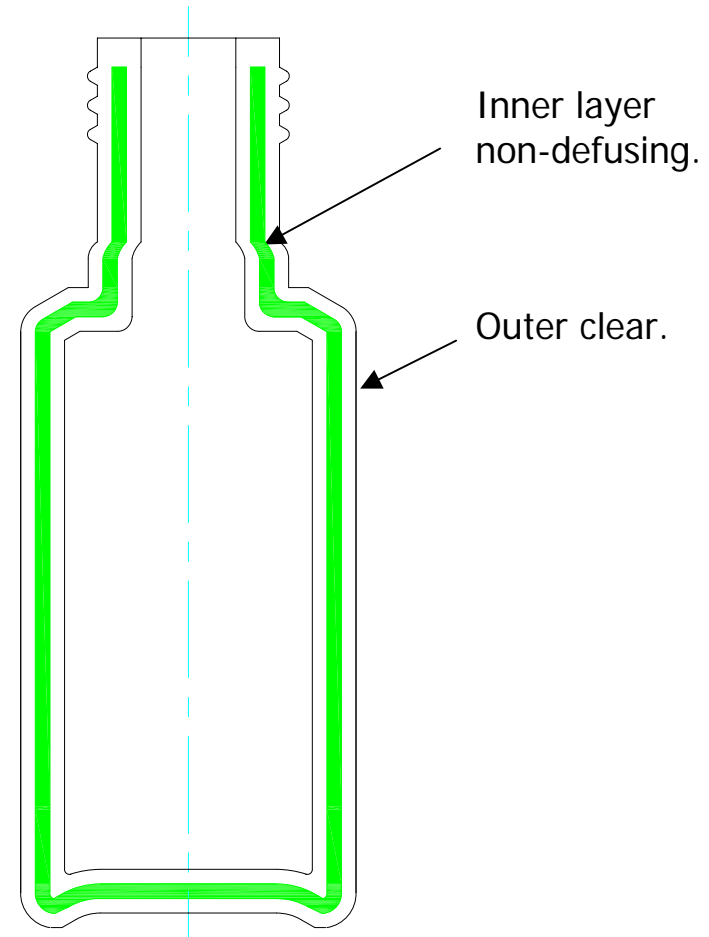
## Multilayer Injection Blow Molding

### **Barrier**

For this application a non-defusing inner layer is used. The outer layer is a cheap resin such as PE or PP.

This application can replace glass containers. The advantage is a non-breakable container, which is cheaper than a container made from 100% non-breakable clear resin.

Also a combination of PP and EVOH can reduce PVC. EVOH gas barrier is used for Airtight-systems.



## *Multilayer Injection Blow Molding*

### ***Contact***

#### Asia and America

Steve Lee

Tel.: +82 103 405 3146

E-Mail: [sle@unifyer.ch](mailto:sle@unifyer.ch)

#### Europe and America

Wolfgang Eihusen

Tel.: +49 171 833 200

E-Mail: [wei@unifyer.ch](mailto:wei@unifyer.ch)

Web: [www.unifyer.ch](http://www.unifyer.ch)

