



New Processes and Products Expand the Shrink-Film Market

DEKORIEREN MIT MD-FOLIEN AUS SBC

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Regardless of whether glass, plastic or metal - many food items such as dairy products, soft drinks and alcoholic beverages can be found decorated with shrink film on store shelves today.

Furthermore, a growing percentage of non-food packaging in the household, cosmetics and pharmaceutical sectors is being decorated with shrink film. Reasons for the success of shrink film in such applications include, for instance, appealing, high-quality printed images, the improved shelf life of sleeve-covered articles, no migration of ink or solvents and easy removal of the sleeve from the bottle.



The newest bottle to use shrink film made from Styrolux® has an especially eye-catching design and will be decorated at the Sidel stand during the Interpack 2011.

Quelle: Styrolution GmbH

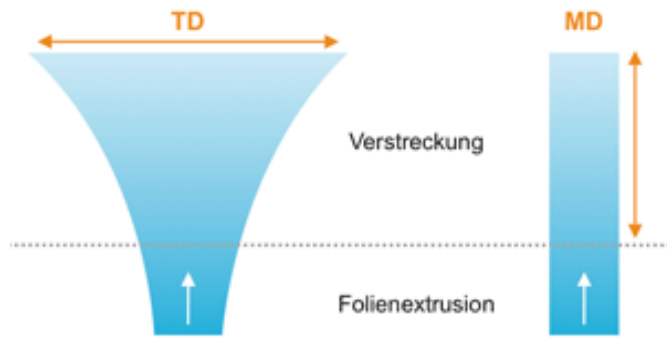
temperature. In the stretching zone, the now-heated film is stretched the desired amount by the increasing speed of each successive roll.

Plus, the market for these decorative films is continuing to expand. The driving forces behind this are a growing demand for product differentiation, brand image and the amount of consumer information required as well as the desire for ever higher-quality presentation of products at the point of sale.

Competition for TD film

Until now, the market for decorative shrink film was dominated by transversely stretched, so-called TD film (TD = transverse direction). The technology of transverse stretching is well-established, but requires significant investment as well as a great deal of floor space for production.

Stretching in the direction of extrusion (MD = machine direction) is simpler in terms of machinery technology and thus more cost-effective. In this approach, stretching occurs over a series of up to 13 rolls. On the first set of rolls, the heating zone, the film is brought to the required



Shrink film can be stretched in either the machine direction (MD) or the transverse direction (TD)

Quelle: BASF

sleeves made from MD film to be slipped over the container directly from the roll. Initially, however, the possible uses for the economically very interesting MD technology were rather restricted. The reason: the limited shrink of max. 20 percent achievable with the PP film that was used exclusively.

ROSO technology developed further



Mit Hilfe dieser MD- Anlagen sind abhängig vom Folienmaterial verschiedene Reckverhältnisse und damit auch unterschiedliche Schrumpfraten erzielbar.

Quelle: Brückner

To expand the market for the cost-effective MD film, the three large machinery manufacturers Krones (Neutraubling), Sacmi (Imola, Italy) and Sidel (Hünenberg, Switzerland) have developed the ROSO process further in recent years, making it possible to decorate containers with complex shapes as well. Materials suitable for producing film with higher shrink rates are available, for

Quelle: verpacken-aktuell.de

<http://verpacken-aktuell.de/berichte/fachartikel/2011/4/12/neue-verfahren-und-produkte-werten-den-schrumpffolienmarkt-auf/>

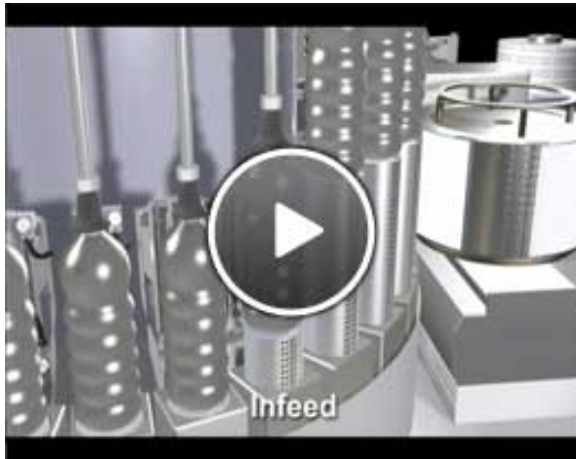
On such equipment, such as the one available from Brückner (Siegsdorf), various stretching ratios are possible, depending on the film stock, thus allowing different shrink rates. The investment needed for compact MD lines is considerably lower than that for the wider and larger TD lines.

In addition, MD film offers several benefits when it comes to processing: While a sleeve must be manufactured in a separate step in the case of TD film, the so-called ROSO process (roll on, shrink on) permits

instance, from Styrolution GmbH, a subsidiary of BASF in Ludwigshafen.

The starting point, and commonly encountered in the market, is a process in which the film is rolled directly onto the bottles, the ends of the film are held in place by a UV-curing adhesive and the film is then brushed to promote further attachment to the container. Adhesive bonding to the bottle and working with brush systems, however, imposes certain restrictions with regard to the bottle's shape. Extreme radius differences and shrink rates of over 60% cannot be achieved in this way.

In alternative processes, the film is first rolled onto a cylinder, held in place by means of vacuum and welded to form a sleeve. The cylinder is then lowered and the bottle slides into the sleeve.



Bei alternativen Verfahren wird die Folie zunächst auf einen Zylinder aufgerollt ...

Quelle: Sidel



... mit Vakuum fixiert und zu einer Folienhülse verschweißt.

Quelle: Sidel

Heating in the shrink tunnel then allows the film to conform to the shape of the bottle without creases. By welding the film on the cylinder and holding it in place by means of vacuum, the technological benefits of the new film materials can be used to their full potential for high-quality decoration of containers with even complex shapes.

These processes do not require the use of adhesives or solvents to hold the film in place, making them ideal for the food-processing sector and cleanroom production.

The heat-pulse welding technique (heat and cool bar) used by Sidel produces a very high-quality seam. Within just a few milliseconds, the seam is created through application of heat, welded under pressure and then cooled immediately.

The process step of shrinking the film is the same in all cases. The residence time in the shrink tunnel lasts about three seconds. On the one hand, it must be long enough for the film to shrink the necessary amount; on the other hand, it must be short enough to ensure that the sensitive content of the already-filled bottles does not suffer as the result of exposure to elevated temperatures.

New high-shrink film materials

The styrene-butadiene block copolymer-based (SBC) Styrolux®-shrink film products developed by BASF permit optimal utilization of the technological advances offered by the processes

described above. The highly transparent, easily printed film made from these materials can achieve shrink rates of up to 45 percent at temperatures up to 100 degrees Celsius and even up to 70 percent at temperatures above 100 degrees Celsius. (Fig. 3) It also does not matter whether blown film or

Quelle: verpacken-aktuell.de

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Danach senkt der Zylinder ab und die Flasche gleitet in die Hülse.

Quelle: Sidel



Im Schrumpftunnel schmiegt sich die Folie schließlich faltenfrei an die Flasche an.

Quelle: Sidel

good controllability of the shrink process, there are almost no limits on the container's shape.

The shrinkable wrap-around labels can be supplied in printed form (choice of solvent-based flexographic or intaglio printing) in widths from 20 to 1600 millimeters with a thickness of 50 micrometers (also thinner on request). They are easy to cut, easy to process even on high-speed machines and suitable for adhesive bonding, laser welding or welding by means of pulse heating.

Common presentation at the Interpack

The success story resulting from the cooperation between equipment manufacturer (Sidel), material supplier (BASF/Styrolution) and film producer (B+K) was presented at interpack 2011. A bottle with a new, more complex design was presented. While the bottle displayed at the K 2010 achieved shrink values of up to 50 %, the new bottle extends this figure to 60 %. The decoration process will be demonstrated "live" at the Sidel stand.

cast film was subjected to the MD stretching.

Depending on requirements, three different product grades are available: Stretch film made from Styrolux[®] 3G 46 (Link to Styrolux 3G46) achieves maximum shrink above 100 degrees Celsius and is thus ideally suited for hot-air tunnels. Film made from Styrolux[®] HS 70 (Link to K '07 press release) or the two-component grade Styrolux[®] T/S first presented at the K 2010 already undergoes maximum shrink at lower temperatures. They are thus ideal for use in conjunction with steam tunnels.

A special aspect of Styrolux[®] T/S is that the film manufacturer can adjust the desired film properties on his own within certain limits. Among other benefits, the two-component grade permits production of even thinner film - an interesting option not only from the standpoint of weight savings, but also one that can improve the economics of laser and heat-pulse welding.

High-shrink MD film already available

Using Styrolux[®] from Styrolution GmbH, Bischof + Klein (B+K, Lengerich) produces FlexAround[®] its wrap-around label film. The crystal-clear film with its brilliant appearance can be processed on all lines designed for polyolefins. Its high final shrinkage offers decoration opportunities that to date were possible only with TD film. Thanks to the outstanding shrink values of these special films, uniform shrink in the machine direction and



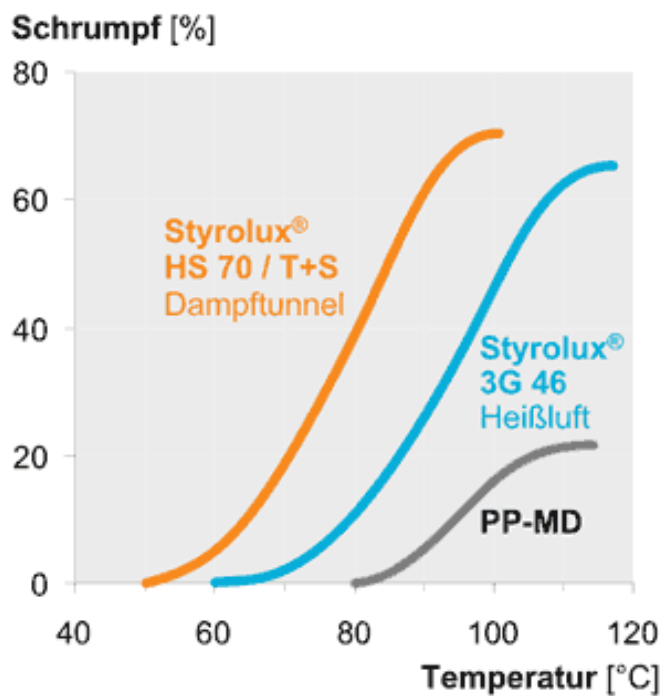
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[1] Further reading about Styrolux[®] HS 70

[2] New two-component concept for SB copolymers

Innerhalb von wenigen Millisekunden wird die Naht mit Wärme und Druck verschweißt und dann blitzartig abgekühlt.

Quelle: Sidel



The various Styrolux[®] grades in the SBS line from Styrolution already achieve a high degree of shrink at low temperatures.

Quelle: Styrolution GmbH

Quelle: verpacken-aktuell.de

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