

Fresh Ideas for the Packaging Industry

To many consumers, food packaging is seen as little more than an attractive array of bags, stand up pouches, plastic trays and cartons, designed to entice them to purchase the product. For the manufacturers and retailers however, today's packaging is the result of extensive research and is a high technology product, designed to extend shelf life and freshness whilst providing unprecedented levels of functionality for the user. Many of the features incorporated in modern packaging, which consumers now take for granted, would not be feasible were it not for the processing capabilities of lasers.

Keeping produce fresher for longer

Modified Atmosphere packaging (MAP) increases the shelf life of fresh and refrigerated food products. For perishable food in particular, shelf-life has a great influence on its value. The growth in markets such as healthy foods and snacks, has driven the requirement for not only attractive presentation, but extended shelf life for products such as organic fruit, vegetables, nuts, dried fruit and cereals. The freshness of these products is largely determined by air-ventilation and the preservation of humidity within the packaging. To achieve this requires a series of precise and consistent perforations which are produced using a laser (see figure 1). An additional requirement has also arisen for multi-chamber trays used for multi-component snacks. For these products each chamber requires perforating differently, to optimise the storage life of the ingredients within that particular chamber.

These perforations need to be generated "on the fly" as the packaging material moves at high speed. When a laser pulse hits fast moving material (web speeds can reach 500 m/min), the resultant quality of the hole may not be as required; depending on pulse duration and web speed the holes can



Fig.1: Precise perforations for easy ventilation; designed for longer shelf life of fresh food



Fig.2: StarPerfo Advanced with web movement compensation - WMC for identical hole size and shape

become visibly oval. Historically, in many cases, material that had been produced at high speed may not have been of the accuracy required to allow the specified air exchange and may therefore have been deemed inefficient at best and at worst, unusable.

Fortunately, the problem of a changing perforation hole shape at high speed can be eliminated. For example, the Rofin StarPerfo Advanced (see figure 2) incorporates a Web Movement Compensation System (WMC) which allows control of the perforation hole dimensions. In this way, the shelf life of fresh food products can be maximised. This means less waste, lower costs and ultimately more attractive pricing for the customer.

Lasers let off steam for microwave food



Fig.3: NeoSteam® packaging contains a pressure regulation valve generated by laser perforation using a Rofin StarShape Laser

In today's fast moving world, snack foods, ready meals and convenience foods continue to grow in popularity. Many of these foods are prepared in the microwave and prior to cooking, consumers are usually required to puncture the covering film to allow steam to escape.

NeoSteam® packaging, developed by Mondi Consumer Flexibles, ensures that microwave food retains its vitamins and minerals and is also very easy to prepare (see figure 3). This leading edge packaging concept incorporates a pressure regulation valve generated by laser perforation, which eliminates the need to manually puncture the film before cooking. In addition, the precise nature of laser processing enables the valve to be configured to match the individual

steam properties of the particular product (see figure 3).

Making light work of opening

The consumer's product experience can be adversely influenced if the packaging is difficult to open. If the opening process requires too much initial force, this can result in spillages or even minor injuries. Manufacturers must also consider the needs of the ever increasing elderly population where ease and consistency of opening are essential attributes. Difficult to open packaging is often the result of poor or inconsistent quality of mechanically created opening lines. Lasers on the other hand, offer a reliable and consistent non-contact solution to a wide range of scribing and perforation applications.

Also known as selective weakening, (see figure 4) the laser in this example is set to "select" a particular film layer or layers, generating the easy open tear lines whilst leaving the other layers, which are required to protect the product from light and humidity, intact. Almost all packaging foils are so-called multilayered structures consisting of several layers. Different layers usually have different functions. PET for example makes for stiffness and aroma conservation, PE for sealing and tear resistance, PP for water vapour tightness and aluminium for the general light protection. With easy opening, the supporting layer is selectively weakened without affecting other functionality.



Fig.4: Easy opening features generated using a Rofin StarPerfo-Advanced Laser

With today's consumers expecting continuous improvements on freshness, quality and greater convenience, packaging manufacturers will seek to develop new packaging materials and concepts to meet these demands.

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