



*Courtesy: Rajoo Engineers Ltd*

Plastics' versatility allows it to be used in everything from car parts to zip lock bags. This flexibility is influencing blown film extrusion technology leading to a number of advancements and innovations. One of the latest developments is that of 5 layers for polyolefin-based lamination grade films instead of 3 layers. Blown film extrusion is further seeing improvements in barrier films, where 9 layers are being used instead of 5 or 7 layers. Beverley Lewis takes a closer look at the advances being made in the blown film industry.

Blown film technology can be used in a variety of applications ranging from simple mono-layer films for grocery & shopping bags, to complex and enhanced multi-layer structures for food packaging. In addition, it can process a variety of polymer types, although the majority uses grades of PE, LDPE, LLDPE and HDPE. The blown film industry has also seen rapid advances in production technology resulting in significant improvements in quality and increased outputs. Furthermore, the evolution of equipment and technology for blown film extrusion is particularly notable in the areas of product uniformity & consistency and process control.

### Trends in the industry

Mostly, it is the packaging industry, which is influencing the developments taking place in blown film extrusion technology. Manufacturers are working with gauge variation, design changes in the die system and automatic control systems to expand their capabilities.

Flexible packaging is currently the fastest growing industry in India

and consumers are demanding better packaging. Says Uday Shah, Director, Star Technocrats Pvt Ltd, "Consumers want to know what it means when a package is sustainable. Consumers are increasingly interested in their personal impact on the environment and are demanding more from manufacturers. Also, the economy is a big driver of how consumers make their choices."

Current market trends show that flexible packaging composite film is gradually replacing packing cans and bottles, which were produced using PP film tape technology. Now, a new generation of PP using full blown film materials is being used in the extrusion process of PP film. Arvind Mehta, Chairman, Welset Plast Extrusions Pvt Ltd, states, "Other latest trends include standard machines with the latest technology, with higher output per hour that down gauge the polymer without affecting the property of the product. As there is a shortage of technical manpower, automation is now welcomed by entrepreneurs who have the resources to invest in it."

Raw material has also influenced the quality, properties and output of



While consumers are also more educated about the products they buy, they are still seeking and positively responding to innovations in products, packaging, advertising and branding.

### Uday Shah

Director, Star Technocrats Pvt Ltd

the film. Currently, polymer producers are also engaged in developing new materials, eg high molecular HDPE (HM - HDPE) and LLDPE, from LDPE some years ago. S N Kabra, Vice Chairman & Managing Director, Kabra Extrusiontechnik Ltd, observes, "In recent years, metallocene LLDPE (mLLDPE) has been introduced. This material used in blends improves clarity, has high tensile strength, and good sealability. Due to its better properties, such blend offers benefits of superior film, down gauging and economy in formulation cost of PP grades, barrier materials like EVOH, polyamide and PVDC."

According to Sunil Jain, President, Rajoo Engineers Ltd, "One of the latest developments are 5 layers for polyolefin-based lamination grade films instead of 3 layers with the objective of down gauging and reducing costs. In barrier films, new investments are now witnessed in 9 layers instead of 5 or 7 layers."

In terms of machine design, the ability to increase film output per mm die diameter is an innovation, which is a combination of die design and cooling efficiency. For



Courtesy: Rajoo Engineers Ltd



There are several applications in packaging sector where blown film is preferred. Even in developed countries like Europe and America, blown film is being produced and used in massive quantities.

### SN Kabra

Vice Chairman & Managing Director,  
Kabra Extrusiontechnik Ltd

inner bubble cooling (IBC) systems based lines, generally 1 kg of film is produced from 1 mm of diameter and the latest trend is to increase the same to 1.8 kg level to cater to increasing customer demands. Another challenge faced by the industry is that there are a wide range of polymers with different physical properties required by end-users for flexible packaging. The blown film industry faces constant fluctuation in prices of various raw materials. Fluctuations in prices vary the cost of the end film substantially, because the polymer contributes as high as 80 per cent in input costs.

Fragmented ordering by blown film customers is also a bottleneck faced by manufacturers. According to Kabra, "Every order for blown film, in printed or unprinted form is important to a blown film manufacturer. However, small runs for a particular job may increase downtime of a blown film machine and may generate wastage. The scenario is, however, changing due to increased consumption of blown film for various applications."

Additionally, the availability of skilled manpower in flexible packaging has still not been resolved. The training of manpower requires a large amount of time and resources. Since the demand is increasing, more manpower needs to be trained for new production facilities to meet the needs of customers.

### Growing demands

Customers are demanding changes in technology, which will drive innovation. "The consumer is also more educated and aware of what he wants. He seeks constant innovation, which we have to provide through our machines. We fully understand that unless we provide our customers with an extra edge, they are not likely to come back to us in the future. Furthermore, quality and support are by-products now, which one does not talk about; it is already part of the package," feels Shah.

Earlier, manufacturers used to provide packaging materials as per their respective product design and availability. However, things have changed. Customers have become more demanding and manufacturers are required to pay close attention to the designing of products, which can prove to be a tough task. The frequent change in polymer prices also poses problems.

The plastics & polymers industry in India has been growing at a healthy rate. Despite this significant growth in demand of petrochemicals, the per capita consumption in India is still far below the world average. This means there are immense opportunities for growth and investment (including FDI), going forward. Moreover, to fill the needs for higher levels of processing machinery, the plastics sector will require a large number of injection and blown film extrusion machines. Besides, blown film offers environmentally sustainable solutions compared to other packaging materials.

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Lower thickness films reduce the weight of the pack, and thereby decrease overall consumption of plastics. Polymers available today are bio-degradable and produced from non-petroleum sources.

### Sunil Jain

President, Rajoo Engineers Ltd



Blown film can offer an environmentally sustainable solution, since the plastic waste is used to develop new materials such as in road construction.

### Arvind Mehta

Chairman, Welset Plast Extrusions Pvt Ltd

### Challenges faced

Blown film producers are challenged by the continual search for high value-added products to add to their portfolios. Often, these products are in small market segments that do not have enough volume to justify a complete new system.

Another issue faced by blown film producers is resolving the varying extrusion needs and proposing a system with performance standards at a level consistent with dedicated, purpose-built machinery.

"This is forcing brand owners to reformulate, rebrand and reprice products to avoid competing strictly on price. It is also increasing the importance of the package as a differentiator," says Shah.

### Sustainable solutions

Majority of plastics are recyclable. The important issue is collection of plastic waste and recycling. As such, environment-friendly & bio-degradable polymers have also been developed. Normal polymers can also be made bio-degradable or oxo-degradable by addition of some percentage of specialised masterbatches. "These masterbatches have also been developed by some indigenous masterbatch manufacturers. These materials are processed on similar machinery used for other commonly used polymers. Bio-degradable polymers, however, are not popular in India because of their high cost," informs Kabra.

Bio-degradable polymers with hydrolyzable chemical bonds are researched extensively for biomedical, pharmaceutical, agricultural and packaging applications. The chemical nature of the degradation products, rather than that of the polymer itself, often critically influences biocompatibility. Bio-degradable polymers must also meet other criteria to be qualified as biomaterial-processable, sterilisable, capable of controlled stability or degradation

in response to biological conditions. According to Jain, "Lower thickness films can be used, thus reducing the weight of the pack, and thereby, decreasing overall consumption of plastics. Polymers available today are bio-degradable and produced from non-petroleum sources."

Mehta opines, "Blown film can offer an environmentally sustainable solution, since the plastic waste is used to develop new materials, such as in road construction."

### Future of blown film technology

Last year the plastics industry grew by an average of 20 per cent. The packaging industry grew by 20 to 25 per cent. "The future is growth-oriented. Due to globalisation, every citizen wants plastic packaging products, as it adds to the hygiene, cleanliness and assurance of product. Hence, the future of blown film technology appears bright," feels Mehta.

Blown film also gives flexibility to the processor to enter into film production as well as provides a tool to develop customised solutions for different applications with lower wastage and investment levels. Says Jain, "Venturing into exotic film structures even going up to 9 layers involves lower investment as compared to similar products in cast film. The use of blown film technology in the packaging of products such as *pan masala* (mouth fresheners), milk and edible oil is growing significantly. Due to its enormous benefits, it is likely to gain wide acceptance, going forward." In addition, film produced by the blown process has more balanced physical properties, in terms of machines. "There are several applications in the packaging sector where blown film is preferred. Even in Europe and America, blown film is being used in massive quantities," adds Kabra. ■