

# ROUNDTABLE ON EXTRUSION EQUIPMENT

**Q:** What's new and/or notable with your company? Have you released anything new recently? Do you have any new releases planned to coincide with NPE or any of the other industry shows?

**Nunes:** Our customers demand that we are constantly improving and developing new technologies to provide them the tools they require to grow the flexible packaging industry. These include barrier films up to 11 layers, maximum throughput lines for targeted applications and brand new technologies like nano and hybrid dies.

**Caprioli:** Since 2015, Macchi has decided to enter the strategic, fast-growing market of wide web filming applications for agricultural uses. In spite of its long experience in the agrifilm business, including such innovative applications as silo bags, Macchi has traditionally not served the wide web market for greenhouses, mainly because of the lack of internal capacity for the production of the wide dies necessary for such applications. It has always been a clear Macchi decision to deliver only die heads machined in house, so the first prerequisite to allow Macchi to compete in the wide web film market was to equip the workshop with a new fully automatic milling-turning center which, having the capacity of machining pieces up to a 2800-mm diameter, has allowed us to offer die heads fully made in house.

The investment has been rewarded in a short time: two orders for wide web film lines (each one featuring dies over 1800 mm in diameter) have been received in a short time, and more are

expected to come, thus confirming Macchi's leading role in this specific industry. At the same time, Macchi has been busy getting ready for the new Industry 4.0 standard to make sure that all lines comply with requirements, integrating with proven results, IT, automation and mechanics. Macchi 4.0 plants represent a new level of organization and control of the line for the entire product lifecycle and are able to meet different customer needs by applying them to a vast array of working circumstances and conditions. The company has therefore oriented its choices towards digitalization, with the aim to improve efficiency whilst maintaining flexibility.

**Shankar:** During the PLASTINDIA 2018 show in India, we exhibited all PE recyclable films, which will replace composites and laminates like PET and PE in many cases. This film was surface printed with lacquer coating to match the glossy appearance as seen in PET/PE laminates. The film was run on our pouch maker without any supporting substrates like PET/BOPP/aluminum foil/paper, etc. Such pouches were further used on our PFS (Pick Fill & Seal) machines. Hence we could show end-to-end solutions that deal with Solid Waste Management Rule 2016 of India to stop using non-recyclable films in near future. As similar legislation is expected to follow in Europe and rest of the world, it was the talk of the show during PLASTINDIA 2018.

At NPE 2018, we will be launching our 7-layer line series. For this, we have shortlisted about 11 structures both symmetric and asymmetric using PA, EVOH and both, as well as 7 PE. All of these 11 structures can be produced on a single line, which makes it extremely flexible.



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**Mellen:** Process solutions and new product development are a significant part of Pearl's business. At any given

time during the year we have several new products and materials in the works for both blown film extrusion and film converting markets. Pearl will be showcasing its next-generation retrofit bubble cages and bubble guides for the blown film extrusion industry at NPE 2018 in Orlando.

For decades, customers worldwide have enjoyed Pearl's scratch-free bubble control as a direct result of using Pearl bubble cages and bubble guides. The key to better film in these units is Pearl's SM24 rollerless cage arms, which possess both the lowest COF material and hardest surface finish available in the industry. This ensures high-quality film production without scratches, tracks or blemishes like those seen from cage arms with Teflon rollers. Our newest cage designs introduce a state-of-the-art touchscreen actuation control system with digital positioning feedback and recipe storage/retrieval. This new system makes film processing repeatability a matter of just pushing a button and it is installed as a standard feature on all Pearl bubble cages and bubble guides going forward.

**Huennefeld:** W&H introduced two substantial and unique technologies at the K Show in October 2016, including an automated resin purging and job changeover system that significantly reduces recipe and format changes to just a few minutes. The reduction of energy, resin consumption and changeover time equates to reduced waste, lower costs and increased productivity. This technology has just been introduced as a retrofit on W&H VAREX and VAREX II lines built in or after 2010. The "plug and play" upgrade can be completed with minimal downtime. We're excited about the efficiencies this will provide our customers.

The other technology we introduced and will be discussing extensively at NPE 2018 is our Film Performance Monitor (FPM) that is currently available on our FILMEX II cast film lines. The FPM continuously scans the entire film web, monitoring key process parameters that relate to the physical properties of the film. From a film manufacturer's perspective, this is beneficial because it ensures that the physical properties of the film they are providing to downstream converters are consistent.

**Q:** With blown film extrusion equipment as one of the more expensive investments a company will make, how do you communicate the value proposition of such purchases to your customers?

**Mellen:** We think it is necessary to have discussions with the customer about market limitations due to poor film quality and limited output, pointing out that investment in the proper extrusion line upgrades typically results in significant improvements in both. Beyond the initial immediate savings related to reduced maintenance and increased output, Pearl customers find that these advantages open the door for new product sales, new markets and new customer opportuni-



Macchi's POD 5-layer coextrusion line.

ties. All of those facilitate revenue growth, ultimately gaining return on their initial investment.

**Huennefeld:** Our equipment is designed with an extensive array of processing technologies, functions and efficiencies that will maximize the return on investment relative to the vast quantity of material that will be processed during the lifetime of the machine. The extrusion systems that are provided are backed by an extensive global support network for parts, service and training, as well as process testing and development facilities to keep your investment performing at the highest level.

**Shankar:** To respond to value proposition, we have already established globally that complete lines with automation always crosses the \$1 million USD mark irrespective of its size, output and performance. Hence, it is always a dream for many processors to acquire a good line. Fortunately, we have proven world-class technology, and being in India, we score far ahead on value proposition. With recent development of 1+3 component (Multi Component) gravimetric in-house, we can offer world-class lines with proven technology.

**Caprioli:** The figures involved in the purchase of a new blown film extrusion line are always very important. (But), this is one of those cases where if you buy cheaply, you pay dearly. In fact, plastic film today tends to behave like a commodity, so the only way to make some money from plastic film extrusion lies in the quantity of high quality production your line is able to guarantee you at the end of the day. In such cases, the cost of the line becomes a minor worry, as its incidence on the overall cost of the product is quite limited. At the same time, a line using the Macchi POD (5-layer PolyOlefin Dedicated) technology can provide a number of advantages that allow the converter to stand out of the blood-soaked battlefield of price-sensitive commodity film by offering to the market a better film that is at the same time thinner, more performing, easily convertible and printable.



Mamata's Mex Flex extrusion system.

**Nunes:** Blown film equipment is actually the least costly component of producers' total costs. Resin, labor, utilities and overhead costs are the most expensive. Our customers offset those costs with the highly efficient, productive and profitable blown film equipment we supply. You literally cannot afford to manufacture with less than the most efficient equipment, even if it is free.

**Q:** We've heard that blown film is likely to replace many cast film applications. First, is this something that you're seeing? If so, why do you think this is?

**Huennefeld:** This has happened, particularly in breathable back sheet film production, with Asian and European companies using blown film production for a long time. North American companies have started to do the same. The biaxial orientation of the film as well as resins with higher melt strength in the blown film process lead to improvements in the physical properties of the film than can facilitate downgauging. The further development and application of in-line MDO technologies allows the processor additional control and optimization of the micro-voiding process that is important for moisture vapor transmission rate (MVTR) requirements for this application.

**Nunes:** Blown film is more flexible (no pun intended) and offers significant improvement in film properties. Properties

can also be customized due to the element of blow-up-ratio in blown film production. Blown film also produces less waste (and in some cases almost zero waste) during normal production conditions. Very large roll diameters can be made, which is a significant advantage in subsequent converting steps.

**Mellen:** We believe that there are probably three main reasons for this: cost, flexibility and film durability. From strictly an equipment cost standpoint, blown film extrusion equipment is about half the cost of equipment for a cast line. Further, cast lines typically require longer setups and production runs while producing significantly more scrap than blown film lines. This will have a significant cost impact when running expensive coextrusion films. Two, any one die on a blown film line can run several different widths and sizes without significant trimming, giving blown film processing much higher product flexibility. Cast lines offer higher film output and can hold tighter thickness tolerances, however they are typically limited by die size and require longer setups and production runs. This makes them difficult to manage in a multi-product environment. Blown film extrusion is capable of shorter runs, allowing more frequent changeovers and less scrap. Finally, blown film extrusion offers more balanced mechanical and structural film properties as a function of the process itself. The film is drawn in both the machine and transverse directions, so multi-directional thinning and stretching already inherent in the process results in a much more durable film.

Pearl's history of understanding industry trends and innovative product design positions us very well to react to changing market dynamics. New challenges for extruders who are trying to change a certain product to a new process create opportunities for Pearl to partner with them and create value.

**Shankar:** It's very true - blown films are going to replace many cast film applications. Our customers produce 10 microns PP+PE-based films, which are used for replacing BOPP cast films for laminating raffia woven fabrics.

**Caprioli:** One of the sectors of the industry where blown film is starting to replace some cast film applications is the production of stretch film. The reasons are both economic and technical: The stretch film market is very price sensitive, so the lower investment required by a blown film line, together with the lower energy costs to run the line, are getting more and more critical in the pursuit of some improvements of the margins. Moreover, the process imparts a much better TD orientation of the molecular chains of the film, thus improving the mechanical characteristics of the end product. This can sometimes allow for a better selling price, while at the same time raising the bar for the competing cast products.

**Q:** Is there anything that concerns you about the state of blown film extrusion equipment? What can be done to alleviate these concerns?



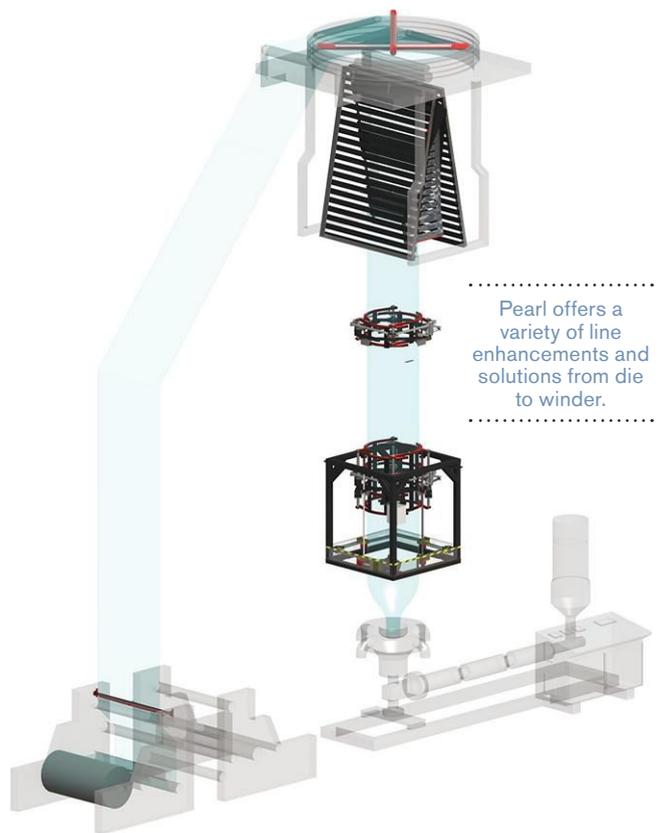
Existing W&H VAREX II and VAREX I lines built in or after 2010 can be retrofitted with the TURBOCLEAN module.

**Caprioli:** Nowadays, the main concern about the state and the future of blown film equipment is connected with the increasing requests for the reduction of plastic wastes and higher sustainability of the packaging materials. In this respect, we are convinced that our 5-layer PolyOlefin Dedicated technology (POD) represents a correct and all-encompassing answer to such requests, while at the same time offering the industry a powerful tool to increase the margins and to stand out from the competition.

The possibility to use 5 layers instead of the typical 3 in blown film extrusion, by allowing for the use of pure resins in thinner, definite layers, provides higher levels of flexibility in designing the most suitable structure to guarantee the performances of the film. At the same time, it allows for a (sometimes) dramatic downgauging of the film itself, without reducing the properties required. So, for example, the switch to 5-layer POD technology has reduced the standard thickness of the collation shrink film for beverages from the old 50–60  $\mu$  to the current 35, a move which is clearly saving resources, energy costs and transportation costs.

Another even more striking example is the substitution of glass bottles by standup pouches. A comparison between 0.2 liter standup pouch versus 0.2 liter glass bottle shows that the same quantity of pouches can be transported from the packaging supplier to the filling location by one truck versus 26 trucks – and that’s only the benefits in terms of weight/space occupancy. POD technology, together with the resins designed and developed by Dow Chemical, enables film downgauging. The new formulation also allows for the use of pure PE, which makes for much easier recovery and recycling of the used package.

**Mellen:** We think the biggest concern with blown film extrusion equipment is the ability to upgrade the line in order



to meet the performance requirements put forth by new film types and new packaging schemes. It has been our experience that many extrusion lines were developed and installed long before many of today’s film requirements were even conceived and therefore are not configured to run many new products without some sort of retrofit upgrade. In many cases, there is just not enough space available to make the required upgrade. Despite the fact that Pearl has a significant arsenal of materials and equipment solutions, we seem to always be working on another new solution for a new process requirement. If extrusion line manufacturers could have the foresight to offer more free space in and around the core equipment to allow for upgrades, it would save a lot of expense and headaches downstream.

**Nunes:** The only concern is how quickly aging assets can be upgraded to the current state-of-the-art equipment available today. It is very difficult to do all at once, but it is imperative to begin to change and adapt to the new technologies.

**Shankar:** The biggest concern of blown film to date is the reduced thickness and limitation of post-extrusion equipment design to handle such films at high speeds without distortion. To run a 10-micron, 3-layer film up to 100 m/min is manageable, but beyond that it becomes difficult for the operator. The solution is to design and produce post-extrusion equipment. **FP**

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