



**FOCUS ON:**  
systems integration

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SIPA has demonstrated its consummate skills in integrating diverse technologies into a single system on many occasions. Today, there are numerous production lines in operation that begin with a SIPA PET preform injection molding machine and end with SIPA palletizing and stretch-wrapping equipment. In between, you may find units from SIPA for blowing the preforms into bottles, for filling those bottles, for capping those filled bottles, and for labelling those formed, filled, and sealed bottles. Everything works together - works well together. Just about every line is different, so SIPA designers, engineers and technicians are constantly on their toes. And, of course, once each line is successfully installed and running, there comes the challenge for them to do something else different, something else better. The state of the art in systems integration (better to think of it as the state of the technology) is

always in a state of flux. Individual pieces of equipment continue to improve and change, and at the same time, the demands customers are in constant evolution. For example, SIPA XFORM preform injection molding machines have progressed through four generations in fewer than eight years. In that time, market demands for higher performance, lower weight, greater sustainability in packaging have increased inexorably. How is SIPA continuing to rise to the challenge? Let's look at one recent in-house development, together with coverage of two new projects for customers who want to push the boundaries of what is possible in rigid packaging. We can't give you the names of the customers, and we can't go into a lot of detail, because the projects are commercially sensitive. But we hope to provide an idea of where SIPA is heading in technology development and systems integration.

# MASTERING COMPLEX SYSTEMS INTEGRATION



# Integrated Preform Production / Rotary Blowing / Filling

First, a prime example of system integration. The XTREME Sincro Cube system is the ultimate in process integration, combining ultra-lightweight preform production, extremely energy-efficient bottle blowing, and filling and capping. It can be configured for all kinds of products: still and carbonated, cold-fill and hot-fill, with and without pulp, sensitive products (including CSDs without preservatives) and value products such as edible oil, milk and derivatives, premium clear juices, home, and personal care products. The solution is compact - everything fits into a space of about 200 square meters - and cost-saving. And it produces a better result. The XTREME injection-compression molding system creates preforms that are up to 10% lighter than even the lightest preform produced by conventional injection molding. XTREME feeds XTRA, SIPA'S latest rotary blower platform designed to achieve top performance levels with the highest energy saving at the highest speed in the market. Finally, there is Flextronic, an innovative modular range of electronic, volumetric filling monoblocs. By choosing the most suitable filling valve, it is possible to create bespoke solutions for a wide range of bottling needs.



## Multiple-use bottles

The first customer project to highlight shows how SIPA technology can push boundaries in the Circular Economy. The customer came to SIPA for a system to produce bottles that could be used many times over for filling with carbonated drinks. The system SIPA developed starts with an XFORM 350/48 Gen4. It can produce several different types of preform: for 0.5-liter bottles, preforms in PET, but there is also a version in a high-performance copolyester, which weighs just 60g (this copolyester has a glass transition temperature of around 95°C - close to 30°C higher than PET - which means that bottles made in the material can be put in a dishwasher). The customer also wanted to produce 1 liter bottles, so the XFORM can mold PET preforms for such bottles too in PET or weighting a bit less in copolyester. So that's four molds, all made by SIPA as well. The preforms are automatically taken out of the mold by a "cool pick plate" on a robot arm and transferred to a stabilization station, where they remain for several cycles. Once stabilized, they are picked up by a six-axis anthropomorphic robot, which has special end-of-arm tooling equipped with vacuum suction, and transferred to a SIPA SFL 6/6 EVO stretch-blow molding machine. Here, the bottles are formed (the necks are also oriented) and then transferred using star wheels for 100% in-line scanning with a camera to ensure their quality. All of this happens in an uninterrupted process, running at a rate of 3000 bottles/h.





# Blowing polystyrene

The second customer had an even more unusual request. They wanted to produce special containers - not in PET, not even in copolyester, but in polystyrene. The customer wanted to make them using injection-stretch-blow molding. Why ISBM? These containers are not, as you might have been thinking at the beginning, like petri dishes, flat and wide, but rather narrow and quite tall. The largest in fact is 500mm tall. Virtually nobody uses polystyrene for ISBM. The literature is almost void of any discussion of the process. It is not rare (not common either, though) for polystyrene to be used to make biaxially oriented film, but bottles? That is what the customer wanted, and SIPA was up for it. The main challenge for SIPA was in finding optimum stretch ratios, and defining optimum process conditions - melt temperature, preform demoulding temperature, conditioning process... everything. Not surprisingly, the prototyping phase was extensive. In the end, a line was created based around a specially-developed single-stage ISBM system, an ECS SP80 H. The H signifies that the machine is much higher than a standard ECS SP80 configuration. But the main difference is in the mold opening capability, which is much wider on the special version, to accommodate the very long preforms: these range up to 425mm, whereas a standard unit can make preforms up to 175mm long. In addition, the ECS SP80 H can run with taller blow molds (the ECS SP80 can blow containers up to 340mm in height). A special screw diameter (70mm diameter) was also created in order to provide a large enough shot size (600g, for production of four 150-g preforms at a time). Once the bottles are blown, a multi-axis robot carries them to a plasma chamber for sterilization, and then to a line conveyor. This takes them through capping and labelling stations, and then onto a bagging machine. Once bagged, automation finally yields to manpower, as the bags are placed in a carton box by an operator at the end of the line.

# More ideas?

So there you have it: three totally different, totally ground-breaking integrated production systems - systems that will help users save money in a sustainable way. SIPA wants to continue in this highly innovative spirit. So, if you have a crazy idea that might just work, we could be interested.

