

SHAPING YOUR | PREFORM

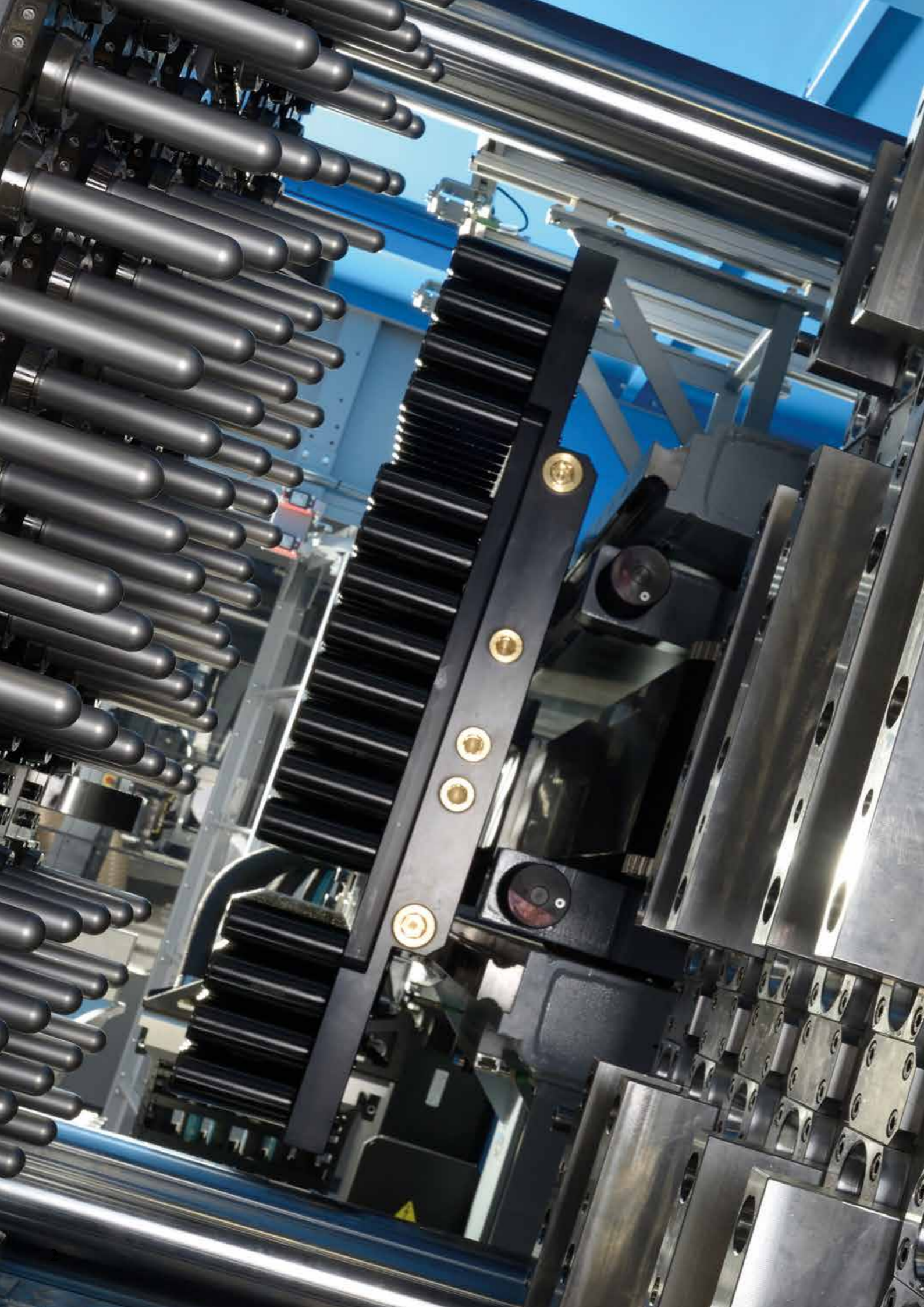
SIPAMAGAZINE

2019

SIPA BRINGS THE
X FACTOR TO PREFORM
LIGHTWEIGHTING,
WITH XMOULD

NO MAINTENANCE
NEEDED
FOR 11 MILLION
CYCLES

INDUSTRY-LEADING
EXPERTISE IN
LARGE-CAVITATION
MOLDS



ENERGY SAVING LOW MAINTENANCE HIGH PERFORMANCE
preform lightweighting
high performance
Energy saving
Low maintenance
energy saving
PREFORM
LIGHTWEIGHTING
HIGH PERFORMANCE
Preform lightweighting
High performance

SHAPING YOUR | PREFORM

2019

Welcome to SHAPING YOUR PREFORM! We want to tell you about SIPA's competence in designing, engineering, manufacturing and refurbishing molds and hot runner systems for the production of PET preforms. SIPA is of course one of the world's top producers of preform injection molding machines, but it is also a leader in the tooling that goes onto those machines – and in fact any leading preform machine, whatever the brand. SIPA stands out for its world-class technology and supporting customer services. As you will see over the following pages, SIPA tooling can make your preform production operation more energy-efficient, it can further cut your conversion cost with long maintenance intervals, and it can enable production of preforms that not only perform at the highest level, but are among the lightest on the planet. Read on!

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TOOLMAKING IS A SIPA STRENGTH

SIPA

SIPA is the second largest producer of PET preform injection molds in the world, with a tooling department that accounts for more than a quarter of total company sales.

At the company's headquarters in Vittorio Veneto, Italy, the tooling department extends over an area of 4480m², with plans to expand it to 5400m² during the year.

In that space are more than 100 CNC machines - lathes, milling, grinding, EDM and deep hole drilling equipment - hard at work making molds and hot runners.

Each year, SIPA produces around 15,000 stacks. Not only new molds are made there though: SIPA also has an extensive refurbishment operation. All told, the total number of people involved in one way or



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of state-of-the-art technology to make what it believes are the best molds and hot runners in the world. Now, SIPA toolmaking is embracing **Industry 4.0**. Across its entire operation, the company is connecting all its various systems to have a total control of orders and to provide an even higher level of automation than it has had in the past - all the way from feasibility testing through to on-site trials.



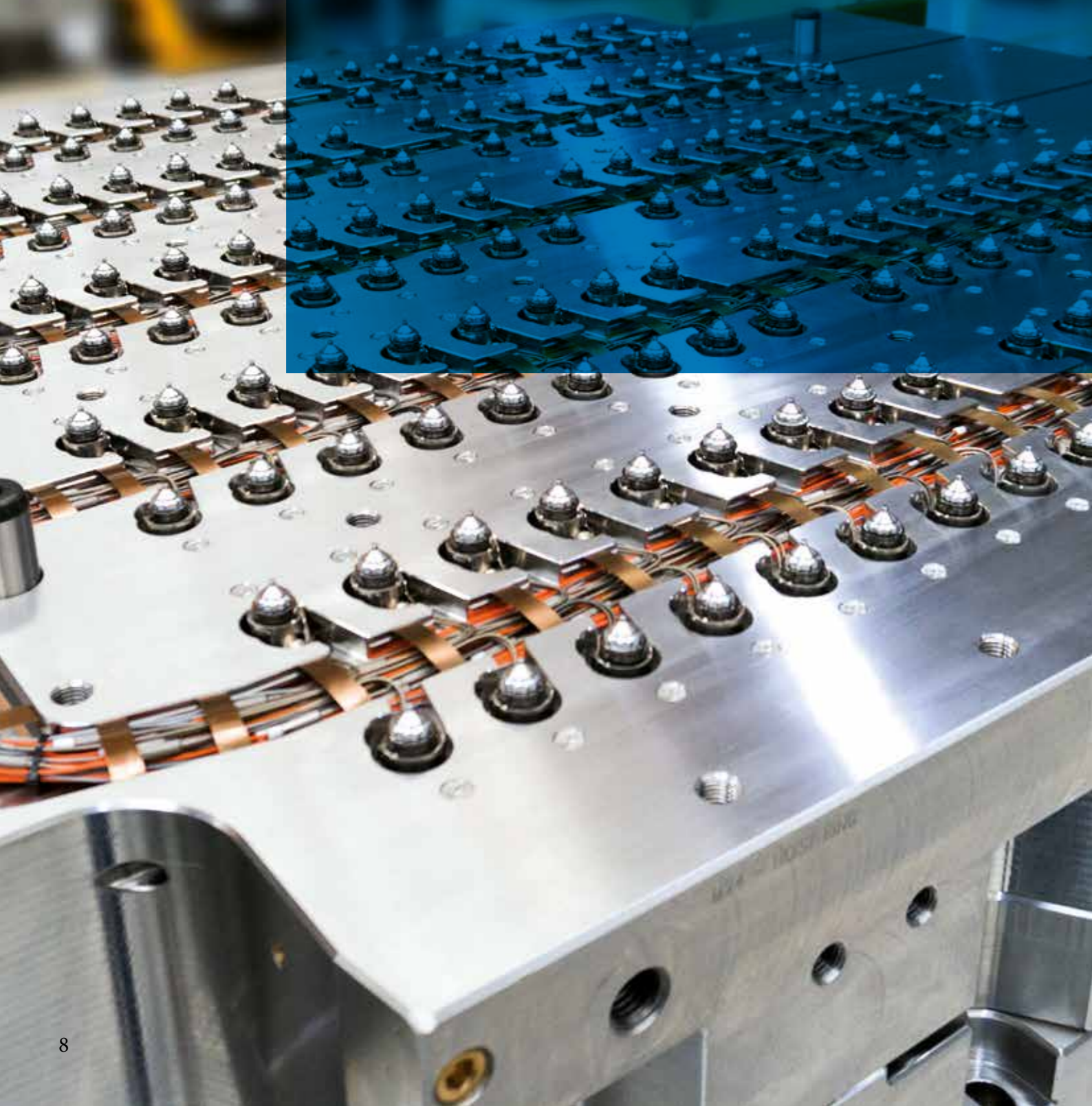
4480m²
15,000
stacks
per year

another in preform tooling in Vittorio Veneto - designers, planners, workshop employees among them - comes to some 300. The operation continues to grow. SIPA has an on-going program of investment in layout and new machine tools that will allow it to increase production by at least 50% in the coming years. While the tooling department is an integral part of the total set-up for producing

SIPA injection molding systems, it is also very important to note that SIPA makes molds that will enhance any PET preform injection molding operation, whatever the brand of machine the preforms are made on. The physical extent of the operation is certainly impressive, but size is not everything. What distinguishes SIPA more than anything when it comes to toolmaking is its application



INDUSTRY-LEADING EXPERTISE IN LARGE-CAVITATION MOLDS



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SIPA has conceived, designed, built and delivered an hot runner system for preform mold with **192** cavities for one of the world's leading PET container makers, based in North America. Creating an hot runner system that consistently and reliably enables so many cavities to be filled identically, at high speed, without excessive force, is a task that extremely few companies are capable of handling. SIPA can do it, thanks largely to its **Xflow** melt distribution system.



Much improved melt distribution

Xflow incorporates an innovative hot runner manifold design that provides the best balance of melt distribution and the lowest pressure drop in the industry.

That is one reason why the maintenance interval - 5 million cycles - is so long, since wear and tear is considerably reduced. This technology, unique to SIPA, allows the company to create very high-cavitation systems without having to compromise on balance, pressure losses, and the formation of acetaldehyde due to polymer degradation. **Xflow** can also be applied to molds with more modest levels of cavitation with equally impressive results.

2 Advanced concepts in polymer rheology

The **Xflow** solution applies the most advanced concepts of polymer fluid dynamics to hot runner engineering. By taking melt rheology aspects into account, it is possible to obtain balancing results quite beyond those of traditional systems. When it came onto the market, **Xflow** halved the imbalance in melt flow compared with SIPA's first generation of hot runners as well as in comparison with competitor's systems.

"**Xflow** is without doubt the best solution in this respect," says Andrea Cavalet - Global Engineering Manager Injection Molds & Hot Runners. "Use of rheological balancing translates into minimum energy demand and a very low pressure drop.

Xflow can be applied to any application to provide the best solution for high-speed injection of critical preforms."

3 Breaking down mold design barriers

Xflow is also incorporated in SIPA's GEN4 hot runner design concept which overcomes traditional limitations on cavity lay-outs. Most PET preform molds have standard configurations, with 72, 96, 128 or 144 cavities. But now, preform producers can use molds with non-standard cavity lay-outs to substantially raise output of their machines without putting extra stress on them.

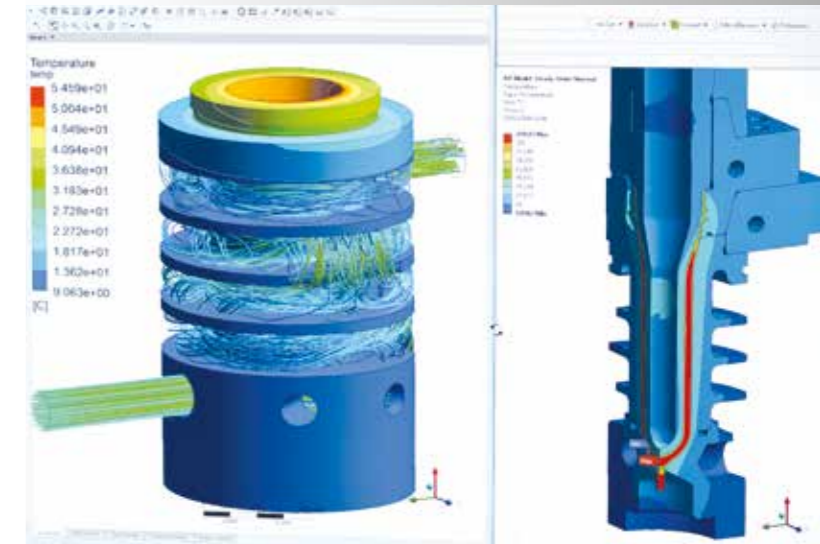
4 World's first 180 - cavity preform mold

The concept allowed SIPA to engineer and manufacture the first 180-cavity preform tooling in the world. "It's not the biggest preform mold in the world, but the filling characteristics are excellent, so the customer isn't gaining quantity at the price of quality," says Cavalet. "There are no penalties to pay in terms of cycle time and weight distribution."

5 Maximizing machine potential

No compromises on mold robustness: thanks to features like the **SmartLock™** stack design (which delivers excellent component life), **XGuidance™** (which guarantees perfect mold alignment) and its superior **LongLife™** treatment, the expected life of this mold exceeds industry standards.

"We are using open and available technology that can be mounted not only on SIPA XFORM GEN4 500, 350 and 250-tonne production systems, but also on other compatible platforms on the market, as long as they do not incorporate special protective software", says Cavalet.



UP TO 192 CAVITIES

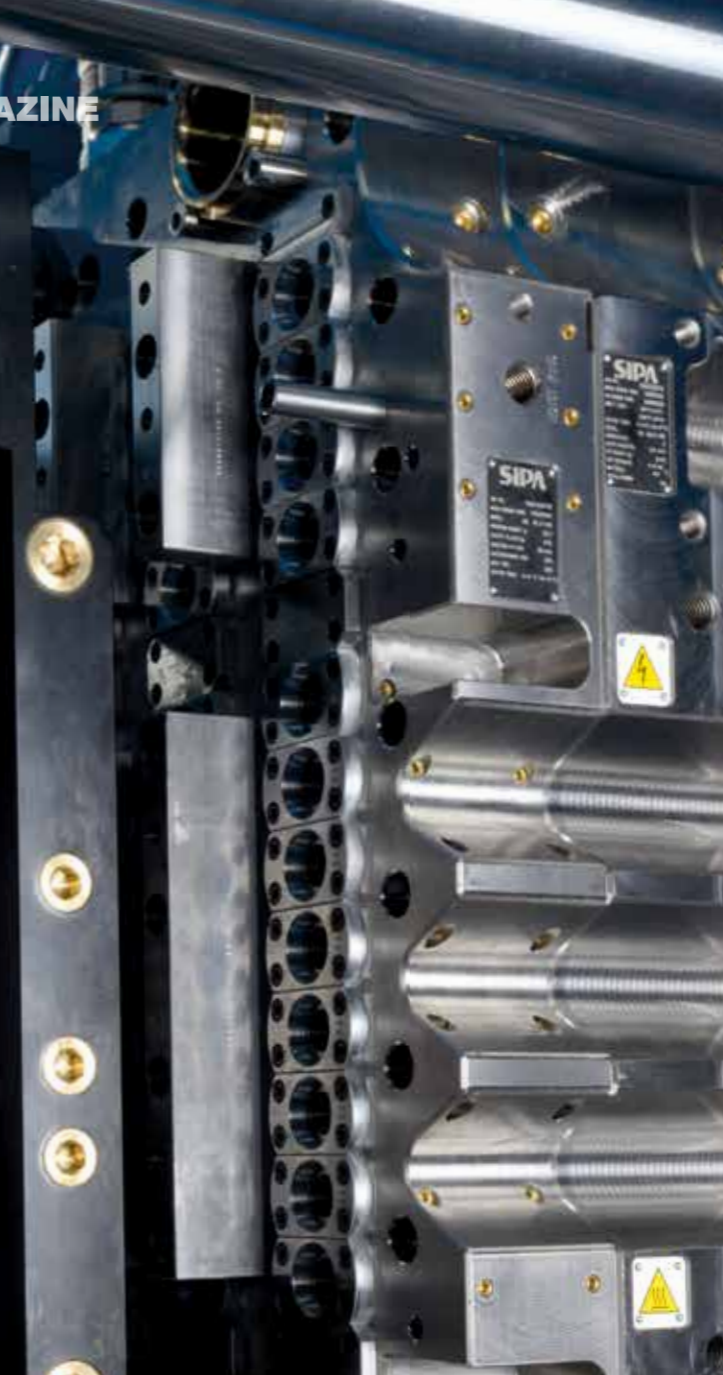
NO MAINTENANCE NEEDED FOR 11 MILLION CYCLES

Latest PET preform mold cold halves made by SIPA running in SIPA XFORM production systems now have maintenance intervals of **11 million cycles**. That's three million more than before. The XFORM stands out for its speed, its precision, its versatility (it accepts any generation of legacy tooling from any major mold maker), its energy efficiency - consumption can be as low as 200 Watts for every kilo of PET consumed - and its reliability.

Until recently, cold halves running on XFORM equipment were guaranteed to run for eight million cycles before maintenance was recommended to ensure that there was never any flash over 0.2 mm. But SIPA has now considerably extended the guarantee period for cold halves - by close to **40%** - when they incorporate the company's **LongLife** surface treatment technology and **Xguide**, and as long as they run on XFORM GEN4 systems.

Customers get more up time, they save more money, and they get extra overall satisfaction. SIPA can produce preform molds holding up to 192 cavities.

This means that between one refurbishment and the next, a production system may be able to produce up to over two billion preforms when the mold is equipped with LongLife.



XFORM



SIPA BRINGS THE X FACTOR TO PREFORM LIGHTWEIGHTING, WITH XMOULD

XMOULD gives designers the power to create preforms that are longer or wider, for the creation of containers with more suitable stretch ratios.

Low weight, high performance

XMOULD technology now makes it possible to produce preforms with ratios of length to wall thickness (L/t) close to 60, while applying injection pressure similar to that normally used for preforms with 45 L/t ratios. This means that the stretch ratio in the final 7.2 g bottle is between 10.5 and 13.6, depending on its design—highly manageable for modern stretch-blow moulding equipment. Plus, the performance of the bottle, on the filling line and in use, meets all relevant requirements.

Pushing back the boundaries

“With XMOULD technology, we are pushing back the boundaries in PET preform injection moulding,” says Laurent Sigler, SIPA’s Innovation Director. “When it comes to L/t limits, 50 has been the magic number for more than 20 years, so taking it up to close to 60 in one step is a major achievement.”

XMOULD is making new preform design opportunities available, and our customers can lightweight their preforms even more and/or further improve their bottle performance.

Technology is available to all

The advantages of XMOULD technology are being made available across the market. Injection moulding of the new preform designs can be carried out, not only on SIPA’s XFORM new generation of processing equipment, but also on most existing preform injection moulding machines, regardless of their brand.



STANDARD PREFORM

XMOULD PREFORM

REFURBISHMENT CENTERS: STRONG SUPPORT FOR CUSTOMERS AROUND THE WORLD

SIPA operates mold refurbishing centers in Vittorio Veneto, Atlanta, Los Angeles, São Paulo, and San Luis Potosi, Mexico. In the next few months, the company will open its next refurbishing centers in Bangkok and in Seoul, its most recent subsidiary in Korea.

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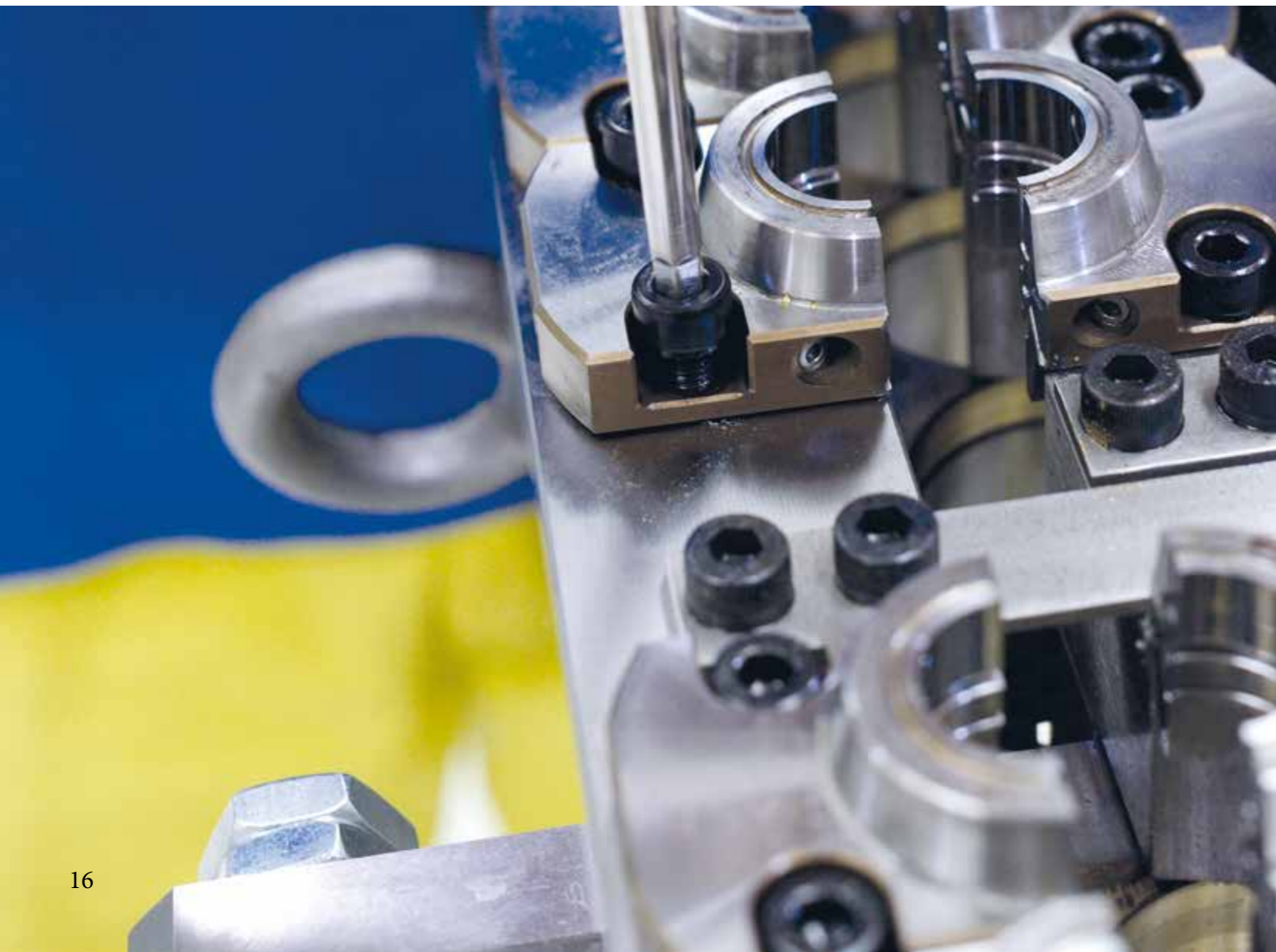
Stay competitive, cost-effectively

"Our customers want a partner who can provide them with a highly cost-effective way of upgrading production without having to make a major investment in completely new tooling," says Manfred Lausenhammer, Global Key Account Manager. "That's what we aim to provide. SIPA can refurbish hot halves and cold halves made by any major mold manufacturer, not just SIPA itself". The biggest call comes from users of large molds, typically with 96 or 144 cavities.



Everything is planned

"No customer wants an important mold out of service for any time at all, so we move fast - but with great skill," says Lausenhammer. "When we are done, the mold is just about as good as new as you can get."





**NEVER
FAR
AWAY**

Emphasis on energy conservation

The range of solutions benefits from SIPA's special focus on reducing energy consumption. With better distribution flow and a higher water temperature (14-15°C instead of 8°C), water consumption is minimized and performance in terms of condensation reduction is improved. Mold systems also exhibit enhanced cooling performance, resulting in high quality preforms, maximum productivity and reduced production costs.

Major overhauls

Lausenhammer cites the case of a 192-cavity hot runner system that SIPA handled a short while ago. "At first, it looked like it was going to be a relatively straightforward wear item exchange program," he says, "but a close inspection revealed that a complete HR refurbishment was in order." Signs of melt leakage due to damage in the manifolds were found. "The manifolds were repaired and upgraded to a more reliable engineering solution. The full scope of the work was plotted out by our engineers together with the customer and, thanks to our troubleshooting capabilities and the expertise to determine which parts could be reused and which replace, we arrived at a successful and highly cost-effective conclusion".

Two-week turnaround

"Not so long ago, we also took on a project for complete cold-half refurbishment on a 144-cavity mold. It took us less than two weeks to have the mold back up and running, performing as if it were brand new." Wherever they are, customers benefit from SIPA's LCS Life Cycle Service for PET preform molds. This is a comprehensive package of services aimed at increasing the overall effectiveness of their operations, through such activities as improving the reliability and availability of equipment, analyzing productivity and part quality, improving personnel performance, and collaborating on planning.





SIPA and Retal, from PREFORM design to TOOLING

Global packaging solutions provider RETAL has been investing in PET preform tooling from SIPA in recent months. Just last year, it has invested on injection tooling now running at operations in several countries worldwide.



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RETAL has expressed satisfaction, not only with the GEN3 technology used in the molds, but also with the cooperation SIPA has provided on designing preforms for bottles used by some major brand owners. "The designs were not simple, but we rose to the task!" says SIPA's Leonid Nim, Key account manager for Retal.

RETAL produces a wide range of PET preforms in various standard and special sizes. The preforms are for containers up to 25 liters in volume, for food & beverage and also non-food segments. Headquartered in Cyprus, RETAL has more than 20 production operations producing packaging of various types, rigid and flexible, in 12 countries - virtually all in Europe and the CIS, although one of its most recent investments was in the USA. The company has customers in some 60 countries.



SIPA SHOWING NEW TECHNOLOGIES AT K 2019

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The world's biggest plastics industry exhibition is not far off, and SIPA is getting ready to show the world two of its latest offerings in PET preform injection molding and in injection-stretch-blow.

New XFORM 250 GEN 4

K 2019 in Düsseldorf, Germany, takes place from October 16 to 23 and SIPA will be on Stand B11 in Hall 13. Pride of place will be taken by the world debut of the smallest addition to the company's XFORM family of injection molding systems. **The 250-tonne XFORM 250 GEN4** will handle preform molds with up to 96 cavities. As with other XFORM systems with 350 and 500 tonne clamps, it will be fast, flexible, highly energy-efficient (consuming **under 200W of electricity for every kilo of PET** it processes), and fully compatible with legacy tooling.

SBM machine for hot-fill

Also on the SIPA stand will be **single-stage injection-stretch-blow molding (ISBM)** unit making hot-fillable bottles, the **ECS SP 80 HF**. This machine, with an 80-tonne injection clamp force, is the largest in the range of compact and very energy-efficient ECS SP units for making bottles with contents as small as 10mL. On this occasion, it will be producing oval/shaped ketchup containers, with a volume of 450-500 mL, capable of withstanding filling temperatures up to 89°C. Hot-fill capability can be retrofitted on existing SP80 machines as well as supplied on new ones.

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SIPA S.p.A.

via Caduti del Lavoro, 3

31029 Vittorio Veneto - Italy

+39 0438 911511

www.sipa.it

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Bia Network