



## Anton reduces unit costs thanks to tie-bar-less technology

### Free space fully exploited

**Anton Kft., which is based in Zalaegerszeg, Hungary, can now place four injection units at once on an ENGEL victory injection moulding machine with a clamping force of just 400 tonnes, while at the same time combining multi-component injection moulding with insert technology. Thanks to tie-bar-less technology, the plastics processor, which specialises in technical parts, has been able to cut down its production costs and also reduce the amount of floor space its manufacturing cells take up.**

Highly complex multi-component parts are one of Anton's specialities. As it makes its own moulds, the company, which was founded in 1990, is able to offer a complete range of services, from the design stage to the process development stage to mass production. "We have always focused on multi-component technology and are now one of Hungary's leading providers in this area," stresses László Kendli, the production manager at Anton. "Our international customers in particular appreciate the fact that we are able to provide them with a mould construction service and injection moulding from the same place." The car industry accounts for about 40 % of Anton's regular mould construction and injection moulding customers, while the remaining 60 % are split between the household appliance and electronics industries.

Bosch is one of the company's biggest customers. Anton has worked with the global technology giant for more than ten years and, among other things, makes power tool casings for it, such as the casings for the jigsaws in the PST series. As products aimed at DIY enthusiasts which are faced with tough competition in home improvement stores on a daily basis, the tools have to be both highly functional and attractive in appearance. The casing therefore plays a key role. Different colours and materials are combined using a



very economical, integrated process. After all, the price of an item also has a significant effect on how competitive it will be when it appears on the shelves.

#### **Four injection units positioned compactly**

The jigsaw casings are produced using four-component injection moulding and insert technology, and the mould is accordingly large. It measures, 1250 mm x 910 mm x 900 mm and weighs, 3000 kg. Although the required clamping force is only 350 tonnes, plans for injection moulding machines with a clamping force of over 600 tonnes were initially drawn up. ENGEL, however, tried using a 400-tonne machine for the production process, and was rewarded with the order for the injection moulding system involved here. The key to achieving this? As the clamping units on the ENGEL victory injection moulding machines don't have tie bars, mould fixing platens can use all the space right up to the edge of the machines. This means that large moulds fit on relatively small machines. András Borszéki, the sales manager at ENGEL Hungaria, says: "It's no longer the mould dimensions which dictate the size of the injection moulding machine, but the clamping force that's actually required. This is especially advantageous in the case of multi-cavity and multi-component applications, as large moulds are generally needed and some of the core pulls have to be bulky, but a relatively low clamping force is sufficient because the part surfaces projected are quite small.

Another advantage of the barrier-free clamping unit is the fact that the four injection units can be positioned compactly. Two are vertical, one is horizontal, and one is placed in a piggyback position. Equipped with an integrated ENGEL viper 20 linear robot, the ENGEL victory 1050H/330W/200V/400 combi injection moulding machine produces a left half and a right half of a casing per cycle in a 2+2-cavity rotary table mould. The viper robot inserts a metal sleeve into each cavity at the beginning, which is later used to attach the saw blade at the assembly stage. Once the mould has closed, the basic forms are injected in the



lower half of the mould. These are green polypropylene and contain 30 % glass fibres. The mould then opens and transfers the pre-moulded parts to the top half, where core pull technology is used to add the three other components: the red Bosch logo, which is also polypropylene reinforced with glass fibres, and TPE S in black and grey on the handles. After a total cycle time of 36.8 seconds, the ENGEL viper 20 robot removes the two halves of the casing while putting a new set of inserts in place so that the process can start from the beginning again. The writing "PowerLight", which points out the light on Bosch jigsaws, is applied using pad printing as soon as the injection moulding is complete. The printing system, which sits directly next to the injection moulding machine, is loaded by a machine operator, who also carries out a visual quality check of the casing at the same time.

"Quality is the most important thing, and our customers' requirements have become considerably more demanding in the last few years," stresses Anton's quality manager, Norbert Farkas. "The surface quality is just as important as the dimensional accuracy of the parts." While high-quality surfaces are mainly achieved through optimising the mould, the precision of the injection moulding machine and the way parts are handled are what count when it comes to attaining dimensional accuracy. Norbert Farkas adds: "By investing in a new manufacturing cell, we've been able to reduce our proportion of rejects to less than 5 %. With our old systems, this figure was 12 to 16 %. This improvement is primarily down to the way the new system handles parts."

### **Positioning accuracy reduces cycle times**

By acquiring an ENGEL viper 20 robot, Anton has switched to ENGEL's latest generation of linear devices. The trademark of this generation is maximum stability combined with outstanding dynamics. New software features such as vibration control, which reduces the natural oscillation of the robots and increases tracking and positioning accuracy in doing so, are responsible for this. Zoltán Vincze, Anton's technical manager, says: "The viper 20



does remain stable while working for a long period of time, without us having to readjust it. This is not the case with other linear robots." It's not just putting in the insert parts that demands high precision levels; it is actually the removal of the metal sleeves from the feed rails, which are manually loaded, that requires these most. Zoltán Vincze says, "At our site it is more convenient to use such a robot than a vibrating conveyor."

András Borszéki adds, "The ENGEL viper robots also offer new ways to optimise the interaction between injection moulding machines and robots to make systems more efficient." As the robots' control unit is completely integrated in the CC 200 control unit of ENGEL injection moulding machines, a robot can access the machine's parameters directly and start the insertion and removal process before the mould has fully opened. From his calculations, Arnold Farkas, Anton's production team manager, is able to say: "This cuts our cycle times by about 3 %. If a large number of units is being produced, this alone will have an effect on the unit cost."

### **No compromises thanks to tie-bar-less technology**

In addition to the jigsaw casings, four other products are now being produced on the new ENGEL victory 400 injection moulding machine. The mould is changed twice a week, and Anton benefits from the tie-bar-less technology here as well. The fact that there are no bars to get in the way means the moulds can be inserted and removed more quickly. Even the smallest injection unit positioned at the side simply has to be pushed to the side without being dismantled for the mould to be changed.

Having a modern set of machines will be important to Anton if they are to be very competitive going forward, as customers are expecting more and more flexibility from their injection moulding service provider. To remain flexible in spite of just-in-time production, thorough and long-term production planning is needed, as well as the aforementioned short set-up times.



"Thanks to tie-bar-less technology we don't have to make any compromises," stresses Norbert Farkas. "When designing a mould we can concentrate completely on the product requirements and on creating an efficient production process. Even when thinking about where to put coolant and hydraulic connection points we don't have to take machine-specific factors into consideration.

Anton processes up to 2,000 tonnes of plastic granules every year, with 30 different materials being split between 20 injection moulding machines with clamping forces between 80 and 400 tonnes. At the moment, the 4,400 m<sup>2</sup> production hall is still not particularly crowded. However, Anton do want to continue to grow. László Kendli says, "To save space, when it comes to large clamping forces, we only buy tie-bar-less machines."

Another decision factor which is quickly gaining importance with regard to investing in new injection moulding machines is their energy consumption levels. In view of rapidly rising energy costs (Hungary has been affected just like everywhere else), Anton ordered the victory 400 with ENGEL's energy saving option, ecodrive. Instead of an asynchronous motor which is permanently running with a variable capacity pump, a servomotor with a fixed displacement pump is used. This saves the energy which is lost by traditional hydraulic injection moulding machines. Zoltán Vincze says, "Our initial measurements indicate that our new machine consumes between 30 and 50 % less energy than our older systems. The car industry has been using servomotors for more than 20 years, and they have also worked well for us in our metal-processing machines. It made logical sense to us to starting using them in our injection moulding machines too." Anton has also been able to save more energy by using its machines' standby mode. So that new orders can be taken on at short notice, the machines are purposely not run at full capacity, while the operating temperature of the machines remains at 180 °C when they are idle. Arnold Farkas says, "This allows us to put the machines into operation again quickly at any time, and overall we don't have to use as much energy as we would if we were to heat them up from room temperature every time."



## HL Award

The high efficiency levels which Anton achieves when making jigsaw casings on a tie-bar-less ENGEL victory injection moulding machine with a clamping force of 400 tonnes impressed the jury of the 2012 HL Awards. The Hungarian plastics processor won the bronze HL Award. The HL Awards are ENGEL's acknowledgement of excellent applications with ENGEL tie-bar-less injection moulding machines. The award ceremony took place during the 2012 ENGEL Symposium in Austria.

## At a glance

Anton Kft., which is based in Zalaegerszeg, Hungary, houses three business areas under one roof: mould construction, plastic injection moulding, and the manufacture and processing of turbine parts for the energy and aircraft industries. When the company was first founded in 1990, it focused solely on mould construction. Today it is one of Hungary's leading providers of multi-component injection moulds. Anton's workforce is growing all the time. The company currently has more than 320 employees. Its customers include many large international companies in the electronics, household appliance, energy, and car industries.



Thanks to tie-bar-less technology, Anton can now place four injection units compactly on an ENGEL victory injection moulding machine with a clamping force of just 400 tonnes



Design and function: Customer Bosch has high demands.





Developing efficient and economical production solutions together: Franz Pressl and András Borszéki of ENGEL, and László Kendli, Andrea Lendvai, Arnold Farkas, and Norbert Farkas of Anton (from left to right).

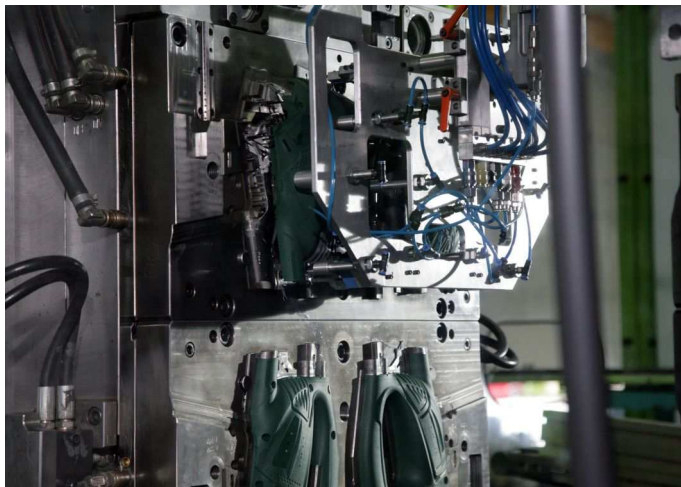


As mould fixing platens on the tie-bar-less ENGEL victory injection moulding machines can use all the space right up to the edge of the machines, large moulds fit on relatively small machines.





The precise movements of the ENGEL viper robot make it possible to feed in the metal sleeves on rails.



The ENGEL viper robot removes the two casing halves and inserts a metal sleeve into each cavity of the mould for the next cycle.



Mould construction is a separate business area, which allows Anton to offer a complete range of services, from the design stage to the process development stage to mass production.



Thanks to tie-bar-less technology, more machines now fit in Anton's production hall. When it comes to large clamping forces, the company only buys tie-bar-less machines.



Quality control after the injection moulding process. By investing in state-of-the-art technology, Anton has been able to reduce its proportion of rejects significantly.

Photos: ENGEL