



## PHARMA CHALLENGE

### How to produce annually 240 million pharmaceutical stoppers using automation processes ?

That's the challenge REP took up for a leading company in the field of injectable drug packaging.

#### The customer's demand

The challenge consisted in providing a turnkey solution for the production of pharmaceutical stoppers on injection molding machines in a controlled atmosphere. The goal of the fully automated solution with integrated robot for the stripping of the parts was to produce 240 million stoppers of a diameter of 13 mm per year.

#### Major difficulties and challenges to cover with regard to the injection of these parts

These parts must absolutely be cut to exclude any risk of flashes and allow for fast stripping. No gate marks are allowed in the centre of the part. The compound formulations used require multiple degassing even during the beginning of the curing phase.

The injection molding process leads to shrinkage giving the parts an oval shape, as the process consists in molding a mat and compound feeding is circular.

Moreover, problems such as air encapsulation, marks and burned spots are very critical on the bottom of the cavities where compacting sometimes is difficult. Pharmaceutical stoppers are generally molded on compression molding presses with big platens and several stages for improved productivity. However, compression molding requires the calibration of the compound plates (blank) for constant thickness, which is an expensive operation.

#### The solution proposed by REP

The injection-compression molding solution proposed by REP consists in producing the stoppers on 2 fully-automated multistation CMS-type machines equipped with 8 molds. Please note that the CMS machine, an exclusivity by REP, is an injection press with 4 rotating stations: injection, curing and stripping are synchronized for optimized productivity.

Thanks to the ergonomic design, CMS machines are flexible and easy to automate.

Automation has the advantage that any risk of human contamination is eliminated on all stations (compound preparing, part stripping and transfer to the cutting tool).



The part: pharmastopper



3D-view of the injection-compression mold, 413 cavities

Please note that the unit is operated in a controlled atmosphere where production constraints are particularly stringent.

#### A turnkey project thanks to REP's partner network

Regardless of the customer's requirements, we endeavour to define the best solutions for each application by involving - if necessary - our partners located in the close vicinity of the customer for optimized responsiveness and dependable customer care. Whatever the application, we work with the expert in the field.

In this special case, an injection-compression mold prototype of 420 cavities has been performed to approve both the injection molding process with the customer and the CMS kinematics. Once the prototype has been approved, 8 molds of 413 cavities have been performed. Injection takes place inside a vacuum bell.

Concurrently, a complete automated unit of reduced space (4.9 m x 7.9 m) has been performed. It includes among others a robot allowing for the pick-up of the injection-compression molding mat at the discharge end of the mold, the atomization of a stripping agent on the 2 bottom and top parting lines, the cutting of the feed sprue and the deposit of the mat on a conveyor, in order to take it to the cutting station for the separation of the parts and the mat in compliance with the customer's specifications.

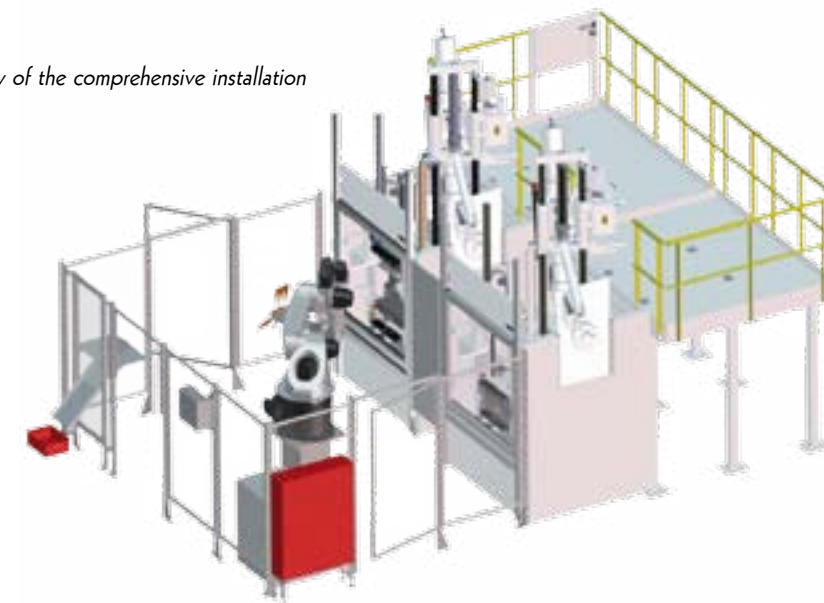
#### Convincing results

Thanks to the injection-compression molding on the 2 CMS machines, the customer can now produce 41,880 parts/hour with a



View of the robot during the stripping phase

3D view of the comprehensive installation



#### An exemplary collaboration

The development of this unit has been advantaged by a very good understanding and collaboration between the customer, REP Corporation (REP's subsidiary in the USA) and REP international. In association with the mold manufacturer and integrator, this team work was one of the keys to success.

machine cycle of 71". Considering that the first test phase was successful, they could expand this new process, as beside the fact that there is no human contamination, there is no doubt that REP's automated CMS solution is proven to be profitable. In fact, it eliminates the blank preparation process, thus reducing the costs and waste-generating variations.

#### A positive balance

Thanks to the automatic unit:

- Reduced labor costs
- Regular process

Thanks to the elimination of the blank preparation process:

- Reduced waste
- Reduction in cost



Robot for stripping

#### THEY WORKED ON THE PROJECT

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Automation Engineer,  
Manager of the Application Lab  
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