

In Almelo, a small city of 72,000 inhabitants in the eastern part of the Netherlands, the Cirex company makes small, precision castings that are mainly used in the automotive industry, which means that they need to be produced in volume and to a consistent quality.

# Bake it to make it



> Precision parts are what Cirex is all about. The company's cast iron foundry is used to make the actual castings, but the 14-step process starts with injection moulding, which creates a wax model of the product and an extension that allows them to be placed on a tree. An IRB 2400 robot removes the moulds and creates the tree, each of which can carry up to about 80 moulds. These trees allow other robots to transport the moulds to the various parts of the manufacturing process, the first of which is to clean the wax patterns.

Finished trees are dipped into a bath of molten ceramic, they are rotated in order to allow the excess liquid to fall back into the bath, and then the same robot takes them to a rainfall sander. The trees are then left to dry, which takes around two hours. Heating cannot be used to accelerate drying since at this stage the ceramic shell is very thin and it could crack. This is the most critical part of a manufacturing process that requires tight quality control and an IRB 60 robot that has been in operation for over 100,000 hours handles it.

**Dipping and sanding** is repeated seven more times, but now the process is less critical since a hard shell is in place so heating can be employed. The final result

is a thick, protective covering that can withstand the 1000° C temperature of the furnace. However, before casting the wax has to be removed: this is done using high-pressure steam.

After casting there are various machining operations. The first involves degating, which is followed by a vibration process that removes the coating. We now have metallic castings that are: sand blasted, machined, visually inspected, ground, heat-treated and then they receive a final inspection. The whole process, from wax mould through to finished products takes around two weeks and it involves seven robots. Throughput is a thousand castings a week.

The furnace and other parts of the plant are around 20 years old. They are not being replaced: Instead, the company will implement a new production line in a brand-new building that is being built alongside the current plant. Two new IRB 7600 robots having a lifting capacity of 500 kg will be used, one for picking and placing the trees and the other for pouring the molten material.

Says Jeroen Spoelder, Director: "The new production line will be state-of-the art, but we only need to replace the casting part of the plant. Right now it is the production bottleneck. The new 750 kW furnace will increase capacity by 50 percent and at the same time the use of heat exchangers means that it is environmentally friendly." ☉

This IRB 60 robot has logged up 100,000 hours, which means that it has been in operation for around 18 years - since before the merger of Asea and Brown Boveri that created ABB - hence the ASEA logo. It will be replaced next year, but only because spare parts are no longer available.

## > FACTS

### About Cirex

- Established in 1963 as an in-house manufacturing facility for Philips
- 60 percent of the castings are for the automotive industry
- Products sold throughout most of Europe
- 110 employees in the Netherlands and 170 in the Czech Republic

### Why robots?

Cirex has found a number of advantages with using its ABB robots for production:

- Durability of the old IRB 60 robot means it has worked 100,000 hours over 18 years
- New production line will increase production by 50 percent