

The heart  
of Robotics

# Robotized Investment Casting

Forging | Die casting | Sand casting | Precision casting

## Case study: *Investment Casting at TPC Components*

Situated in Hallstahammar, Sweden, TPC Components Manufacture of high quality components.



## High quality means steady growth

*The foundry industry enjoys steady growth. Investment casting companies are no exception. Growth reaches a healthy 6-10% per year, and customers in the automobile, aerospace, gas turbine, food, medical and process industries keep increasing component volume produced with the lost wax method. Why?*

Complex parts are possible to manufacture very close to their final shape. This means that the need for time-consuming and costly post processing is reduced to a minimum. The part can also be produced in a wide variety of materials, which means that designers can optimize part characteristics. Finally, the high precision of the lost wax method means that you get a very high quality casting result with an excellent surface finish.

The conclusion is that the high part quality, combined with a large degree of freedom regarding

design and material choice, put investment casters in a favourable position.

### Automation trend

Investment casting is still a labor intensive industry. Manufacturing series are often short, and even large batches require the flexibility and precision of skilled workers to achieve the high quality castings that customers demand. But, there is a definite automation trend in the industry. Shell making, where you dip the wax trees in an alcohol or water based slurry and continually build the ceramic shell using special sand, is often robotized. Robots are also used for post processing applications, such as grinding and polishing of the cast part. And progressive companies are now looking at automating the wax tree mounting area of the shop floor.

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### IRB 7600 helps increase output

TPC Components produces some 1,000 different articles every year – some in very small, prototype series and others in series of up to 250,000 parts per year. Practically all ceramic shell making is automated.

Until now they used an Unimate robot. Because of its outstanding reach and large handling capacity it was kept in production for ages. It was only recently possible to replace it with ABB's new IRB 7600 long-arm version, which features a reach of 3.5 m and a handling capacity of 150 kg. Due to these facts, it was possible to introduce the new robot into the existing production line without making any changes to the

machinery. The new robot reduces the cycle time, which allows for more parts to be handled in the robot cell. The final output has increased from 1400 trees to 1800. After the optimization of the cycle it will be up to 2300 per day.

### Quick pay-back

ABB's IRB 7600 was chosen for this long reach and high payload. Further ABB's unique Foundry Plus protection, including its IP 67 tightness was needed to ensure that the explosive, alcohol-based slurry does not enter the machine.

Both technically and economically, the IRB 7600 is a success. The investment in the new automation was basically limited to the robot itself, since they could introduce it without rebuilding the production line. Pay-back time will be a year and a half.

### Foundry Plus

- Protects robots in harsh environments
- Virtually completely sealed against fluids and solids
- The whole robot and track motion is IP67 compliant
- Highly corrosion-proof
- Rust-primer under two-component epoxy paint coating
- Withstands high-pressure steam washing
- Rapid payback time due to increased uptime and lifetime
- Wide range of ABB robots available in Foundry Plus version