



MEGAshell® technology

MEGAshell® technology enables the production of huge ceramic shell moulds to deliver the benefits of Replicast® for one-off and low volume castings of a size and weight much greater than most casting manufacturers would have thought possible.

This is achieved by replacing the polystyrene pattern produced in a die with one machined from polystyrene using 5-axis machinery. This enables the production of low volume, precision high integrity castings – customised with respect to design, alloy, contractions relevant to specific alloys, etc.

To date, ceramic moulds have been produced on numerous machined patterns up to a nominal maximum size of 2 x 2 x 2m, with a target of 2.5 x 2.5 x 2.5m within Cti's sights. The point has been reached where just 10 coats of ceramic are used on even the largest of shell moulds, and these have proved capable of enduring the thermal and mechanical stresses associated with pouring up to 2½ tonnes of molten steel (the limit of Cti's melting capacity).

Developments are underway that are likely to reduce the number of coats to 8, resulting in lower costs, higher productivity and lighter moulds. Indeed, a measure of the challenges faced in this development is the weight of such a shell mould, the largest so far being more than 300kg.

Cti has had to overcome handling and other issues in order to bring this technology to a level of functionality and cost competitiveness that will ensure its adoption. The measure of progress towards this objective is the success in licensing the technology, registered as MEGAshell®, to 5 companies (one of which is using it for the production of very large titanium castings), with discussions underway with a further 5 companies.

More than 3500 ceramic moulds have been manufactured by the MEGAshell® technology to date, demonstrating its capability to meet the market demand for large, near net shape castings, particularly in costly alloys of steel and nickel.

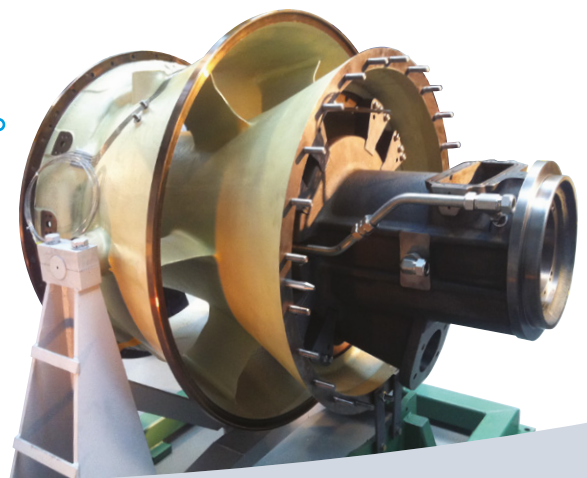
Case study: Siemens – manufacturer of Industrial Gas Turbines

The application of the MEGAshell® technology to production castings is enabling Siemens to verify and quantify the benefits, and to evaluate its competitiveness.

The headline points at this stage are that a considerable reduction in machining allowances can be achieved and that wall section thickness can be reduced, which together can lead to weight reductions of 30% or more. In addition, in components where gas flow is critical to the performance of the end product, the improved surface finish and precision of form compared with sand cast parts can provide an uplift in operational performance.

Further substantiation of the opportunities afforded by MEGAshell® will result in proven products and the MEGAshell® technology migrating into wider supply chains at minimised risk and cost.

Cti believes that similar gains could be realised in the manufacture of 'specials' in the valve sector. Collaboration with a valve producer similar to that with Siemens could reduce end product and lifecycle costs, achieve enhanced product performance and reliability, and reduce environmental impact.



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