

KEEPING AP RACING ON TRACK

Objet Geometries



Coventry-based AP Racing, one of the world's leading manufacturers of brake and clutch systems for motorsport and specialist road-going vehicles, is achieving significant time and cost savings in its design processes, with the Objet QuadraTempo™ 3D PolyJet™ printing system.

Achieving Results

The Objet QuadraTempo™ enables AP Racing to produce high resolution 3D output for design verification and customer form, fit and function testing prior to production, as well as to demonstrate components to subcontract suppliers prior to commitment to tooling. Since the installation of the Objet QuadraTempo AP Racing is benefiting from significant savings in design times, through increased confidence earlier in the design cycle.

Key benefits of the Objet QuadraTempo at AP Racing:

- reduced design to manufacture lead times
- the elimination of costs associated with tooling errors
- increased customer confidence – designs can be ratified by the customer prior to manufacture.

«The reaction to the introduction of the Objet technology has been tremendous»,

says Nick Mennell, Director of Engineering at AP Racing.

«We produced our first part on the Objet QuadraTempo in April 2002 for a customer involved in rallying. The order for the part was placed on Thursday and on the very next day we were able to give the customer an accurate 3D output from the printer for him to take away to check for fit. In fact, the customer was so excited he took the part away before we even had the chance to clean it up.»

Technology in Action

Based on the principles of inkjet printing technology, the Objet QuadraTempo operates in a fashion similar to any other networked printer, accepting STL file input from all popular 3D CAD packages, with AP Racing using Solidworks. The print head of the Objet QuadraTempo features 1,536 nozzles, half of which deposit the photopolymer material and half of which lay down the support

material. The printer uses Objet's highly durable and flexible proprietary FullCure™ photopolymer resin, which is UV cured as it is deposited, enabling the rapid production of fully hardened and functional components.

Design to Track

With 95% of the racecars on the F1 grid using AP Racing's clutches and over 50% using its braking systems, the company is particularly busy during the F1 season. A team of 24 fulltime designers are employed by the company, some of whom are dedicated to F1 development. «Clutches for every customer in the F1 line-up are different and subject to continuous change throughout the season, literally this can be from race to race,» Nick explains. «It is in this area that the QuadraTempo





«You cannot beat the feeling of holding a physical design in your hand, it gives us and our partners ultimate confidence in the design.»

3D inkjet printer provides particular benefits, as we can adapt a product one day, leave the model printing overnight and have a new prototype ready for the customer the next day. In addition, the photopolymer material is particularly easy to paint, enabling us to supply parts that, until you pick them up, are virtually indistinguishable from the real thing.»

AP Racing actually started looking at rapid prototyping systems in 1997, but was unable to find a solution suited to their requirements, especially in terms of performance - with particular regard to speed, material suitability and budget.

«At the time, there was only one other 3D printer on the market, but it was unable to offer us a big enough build platform. The wax based material it used was too weak for our purposes and it was not dimensionally accurate enough. Furthermore, the supports generated by the system required significant time to «clean up» so, all in all, we decided it was not for us and that we would wait until something more suited to our needs came along,» says Nick. «We have now found our solution with the Objet QuadraTempo 3D printer. The combination of a good sized print platform and an excellent print resolution, coupled with the highly functional and durable resin meets the full requirements of our application.»

Furthermore, as the Objet QuadraTempo constructs support structures from a gel-

based material, components are easily cleaned by the application of a simple water jet, resulting in high clarity, fully hardened parts.

Until the installation of the Objet QuadraTempo, AP Racing had subcontracted its rapid prototyping requirements to a nearby bureau that supplied it with SLA models. «Bringing the process in-house and under our own control not only saves us costs on subcontract services, it also enables us to provide far quicker turnarounds to our customer base. Since the installation of the 3D printer we have not outsourced a single model,» Nick says.

AP Racing estimates that the average product cycle of any of the components it produces is two and a half years and, with more than 20,000 live products at any one time in its database, the company is very design focussed. As Nick comments: «Anything we can do that is both time and cost effective to speed the design to manufacture cycle is key to helping us maintain and grow our market position in what is a very competitive environment. Investment in technology, such as the Objet printer is key to our development in this area.»

Nick continues, «The system is very user friendly. It sits in its own room next to the design office and is looked after by the design and IT teams. Typically, the designers set the machine building overnight, so those components are ready for review next day. The accuracy of the machine is excellent. Recently, for example, we built two halves of a component on the Objet QuadraTempo in two different latitudes. When we took them off the machine and cleaned them up, they fitted together perfectly.»

«We waited five years to find a technology that suited our needs in terms of speed, accuracy and material properties. We are confident that we have made the right choice with the Objet QuadraTempo.»



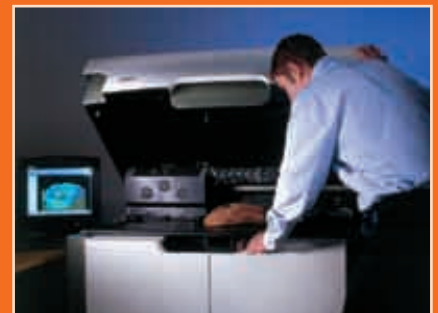
FEATURES & FACTS

Features:

- High quality, high resolution results at affordable cost
- Easy to clean, gel-like support material
- Fast build speeds
- Smooth curves and fine detail for exceptional surface finishes
- Large material cartridges for lengthy unattended operation (optional)

Facts:

- Build size (mm): 270 (w), 300 (l), 200 (h)
- Print resolution (dpi): 600 (X), 300 (Y), 1270 (Z)
- Build/Support material: photopolymer (FullCure™)
- Input: STL file
- Communication: LAN - TCP/IP



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