

The background of the page features three 3D rendered turbine components in a light blue color against a darker blue gradient. On the left is a long, curved blade with a perforated section. In the center is a large, flat, rectangular component with a grid of small holes. On the right is a smaller, curved component with a central protrusion and several small holes.

Case Study:

Morgan works with leading blade maker to meet surge in demand

The challenge

As a leading maker of gaspath components, primarily rotating blades and stationary nozzle guide vanes for the aerospace and gas turbine industries, AETC Ltd is more aware than most of the need for absolute precision and minimal waste in its manufacturing processes.

Having worked with Morgan Advanced Materials' Certech business for more than 20 years, it was natural for the two to collaborate when a surge of new products made exceptionally efficient production a key requirement for AETC.

Over the past two years, AETC (which is part of PCC Airfoils LLC) has initiated no fewer than nine new blade programmes, and for each has required Morgan to design and test prototype cores that can meet profile tolerances as tight as +/- 0.08mm, prior to manufacture.

How Morgan worked with AETC to develop a solution

Morgan has wide experience of designing and manufacturing casting products in a variety of materials, and in many sectors. Morgan's Certech business works with AETC to provide the ceramic inner cores which are used in the manufacture of blades. These determine the inner shape and geometry of the components, and so Morgan must design and test each core, to ensure they meet demanding profile tolerances. Furthermore, the cores must be made of a material that will perform well in extremely challenging casting conditions.

There is virtually no room for error in the blade manufacturing process. Not only does it involve highly demanding tolerances, but the price of the nickel- and titanium-based alloys used, the costs of reworking and the cost of a lost component if tolerances are not met, combine to make first-time success essential.

In this case, Morgan elected to make the AETC cores from its proprietary KI20 ceramic material. The solidified single crystal material shows excellent stability at high temperatures, and is therefore ideal for use with alloys that require high temperature pre-heats. Each core was designed and prototyped by Morgan, and rigorously tested to ensure that all profile tolerances had been met.

**With
expensive
materials and
reworking costs
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The result

Brenda Nichols, Group Purchasing Manager at AETC Ltd, is delighted with the outcome and explains: “Over the years we have worked with a number of core suppliers, but in recent years have made Morgan one of our key business partners. While their pricing is competitive, what has been far more important to the development of the partnership has been their technical capability, partnership-led approach and willingness to go the extra mile.

“Whenever we have introduced a new product - and there have been many recently - the Morgan team pull out all the stops to get the new cores designed and manufactured so we can begin casting. Currently we are manufacturing 30-40 different blade designs, each with their own discrete core design, and Morgan’s responsiveness and agility ensures there is minimal disruption to the casting process.”

Robert Park of Morgan added: “As a supplier to some of the biggest names in global industry, AETC cannot afford to miss a deadline when it comes to delivering blades. Our role is to ensure not only that they have the cores they need, when they need them, but that each core conforms to stringent design parameters. The extension of the relationship into additional projects is confirmation of our ability to deliver to the needs of this customer in terms of speed, quality and consistency.”

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Brenda Nichols, Group Purchasing Manager at AETC Ltd

ABOUT MORGAN ADVANCED MATERIALS



Morgan Advanced Materials is a global engineering company offering world-leading competencies in materials science, specialist manufacturing and applications engineering.

We focus our resources on the delivery of products that help our customers to solve technically challenging Problems, enabling them to address global trends such as energy demand, advances in healthcare and environmental sustainability.

What differentiates us?

- Advanced material science and processing capabilities
- Extensive applications engineering experience
- A strong history of innovation and reinvention
- Consistent and reliable performance
- A truly global footprint
- We find and invest in the best people

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