



CASE STUDY

VFX, THE SHELL TYPE MILLING CUTTER
DESIGNED FOR AEROSPACE APPLICATIONS

A success story for technology

MECAPREC



MMC Metal France S.A.R.L.
A Group Company of **MITSUBISHI MATERIALS CORPORATION**

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Mécaprec, a French aerospace machining specialist, has tested Mitsubishi Materials' VFX shell type roughing cutter with the aim of improving the company's performance

The result: Machining time for components made from Inconel 718 was cut by 75%.

ABOUT VFX SERIES

Diameter	Ø40 – Ø100
Corner Radius	0.8 – 4.0
Length	short & standard
Grades	MP9030, MP9130
Breaker	LS, MS, HS

Metal removal rate up to 400cm³/min
For difficult to cut materials.

„A product will only be sent to a customer once it meets precise QA requirements. This success will enable us to stake a position in other areas of manufacturing.“

JEAN-MARC GOMEZ
PRESIDENT MECAPREC



(From right to left) Jean-Marc Gomez - President MECAPREC, Paul Bermes - Technical Manager MECAPREC, Christian Gil - Production Leader MECAPREC, Laurent Le Meteil - Regional Manager MMC Metal France

"STRIVING FOR EXCELLENCE"

Excellence is at the very heart of what, Mécaprec, a French SME (small and medium sized enterprise) does. They specialise in precision machining and display the words „striving for excellence“ in large capital letters on a board in the middle of the factory. So central is this concept to the company's mission that a set of magnetic badges in the shape of smiley faces in different colours can also be seen here too, placed next to indicators such as „on-time delivery“ or „non-compliance rate“. These reflect the factory's performance during the current week and for the past month, highlighting upcoming trends. „The smiley system means everybody can see our ongoing performance at a glance“, explains Jean-Marc Gomez, Chairman of Mécaprec.

„It's much simpler than using graphs.“ Next to the customer feedback indicator, all smiley badges are currently green. „A product will only be sent to a customer once it meets precise quality assurance (QA) requirements,“ stresses Gomez.

This perfectionism is evident in Jean-Marc Gomez's ceaseless efforts to meet the strenuous requirements of the aerospace industry. This is doubly important considering aerospace component manufacturing represents 98% of the company's turnover. A process of continuously analysing the company's approach, increasing the size of the premises, improving production methods or investing in automation maintains the edge needed by the company in today's highly competitive market place. The company's current poly articulated robot equipped with 21 pallets is fully integrated into the CAPM system and will be supplemented in July by another with the ability to load 58 pallets. A third machine of this kind will be added to the factory's assets within the next 10 months. „In the future, these robots will form an autonomous manufacturing unit,“ adds Jean-Marc.



MP9030
[XNMU190912R]



The VFX Series has been developed for titanium machining - Mitsubishi Materials

EN 9100 CERTIFICATION WITHIN 13 MONTHS

Mécaprec is based in a town called Lavelanet, located in an area of south western France that is formerly known for its textile industry expertise. When Jean-Marc Gomez took over the company in 2008, the business only had 12 employees and was generating a turnover of around €800,000. Seven years on and the workforce is now 50 strong with a turnover increased by more than six fold – a success that was hard won in the face of a tough start. The effects of the crisis which hit the entire global economy were making themselves felt just three months after the company was purchased. „Fortunately, we were able to make the business a success thanks to the trust that a company called Aubert et Duval, placed in us,” recalls Gomez. Within thirteen months, Mécaprec obtained EN 9100 certification, a standard specific to the aerospace industry. As a result, nearly everything that passes through the workshop is destined to be part of popular aircraft such as the A320, A350 and even the A400M or ATR.




At the end of 2014, Jean-Marc Gomez and his team were concerned when they saw that around eight

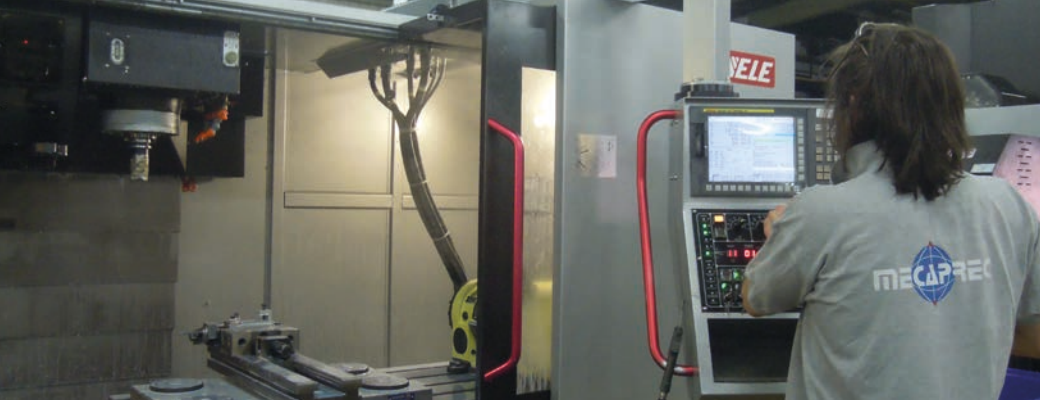
hours were needed to machine a component in Inconel 718 for the A320 Neo. „This meant it would take a whole week of manufacturing time to produce a series of just four or five components. We just weren’t where we needed to be,” recounts Gomez. „In addition to this, the inserts in the existing indexable milling cutters needed to be constantly monitored as their lifecycle was only 2 hours on one edge,” he continues. The only answer was to investigate new tools. „At first we were sceptical about using a shell type roughing cutter to machine Inconel,” admits Paul Bermes, a young engineer and graduate who joined Mécaprec 18 months ago from the Incam School in Toulouse. However, the shell type VFX from Mitsubishi Materials’ was the tool the team eventually decided on. The decision was made following an intriguing presentation given a few months earlier by Laurent Le Méteil, Regional Manager of MMC Metal France; the French subsidiary of Mitsubishi Materials cutting tools division. His proactive and regular dialogue with Mécaprec since taking over France’s south west region in May 2014 was to prove beneficial for all parties when this situation arose.

„At first we were sceptical about using a shell type roughing cutter to machine Inconel. I was pleasantly surprised when I looked at the spindle power monitor during the first pass... It was working brilliantly.”

PAUL BERMES
TECHNICAL MANAGER MECAPREC



		<i>HS</i> Breaker	<i>MS</i> Breaker	<i>LS</i> Breaker		
	Grade	Width of cut: ae				
<i>LS</i>	<i>MP9130</i>					
<i>MS</i>	<i>MP9030</i>					
<i>HS</i>	<i>MP9030</i>					
		0.1D	0.3D	0.5D	0.7D	0.9D



8 HOURS MACHINING TIME SLASHED TO 2 THANKS TO THE VFX5 CUTTER

„I visited the company regularly from January onwards so that we could optimise the cutting conditions during testing,” reports Laurent Le Méteil. The first tests on an actual component were run at the beginning of February. Paul Bermes recalls: „I was pleasantly surprised that during the first pass I looked at the spindle power monitor, which had not risen to anywhere near the levels I expected when the cutter was fully engaged. It was working brilliantly.” It took just two hours to machine the first workpiece. „That day I ordered a large quantity of the new MP9000 series inserts,” enthused the engineer. The additional tests which followed were all conclusive. „The VFX cutter was specifically designed for general machining of heat resistant alloys,” explains Laurent Le Méteil. „But it has also proved to be perfect for milling difficult-to-cut materials used in the aerospace sector, such as titanium or Inconel.”



With a convex curve cutting edge and a V-shaped seating face, Mitsubishi's VFX shell type cutter end mill is the perfect tool for reliable, high-performance machining. In addition, arranging the inserts vertically absorbs the principal cutting force through the thickness of the insert to provide high rigidity. The through coolant holes ensure that chips are removed efficiently. The coolant is supplied through adjustable diameter nozzles that are positioned slightly above the rake face of the cutting edge so that it is aimed directly at the chip. This forcibly ejects the chips and prevents edge welding, thereby enabling higher efficiency machining.

Inconel currently makes up only 3 to 4% of the alloys that Mecaprec machines, but

Jean-Marc Gomez is looking to the future. „This success will enable us to stake a position in other areas of manufacturing,” he adds. Indeed, as a result of this success, the company decided to try another Mitsubishi tool, the brand new WSX445 general purpose milling cutter. Laurent Le Méteil explains its benefits: „The double-sided Z geometry of the inserts coupled with the negatively mounted but positive rake edge design leads to low cutting resistance.” In addition, Jean-Marc Gomez is delighted with the eight cutting edges which mean that „in comparison with our current setup, and for the same performance, the cost of the insert is practically halved.”

The Chairman of Mecaprec is not stopping there. On the lookout for future repeats of this success story, Mr Gomez is developing a host of ideas to ensure his company continues to prosper. Potential projects include automating chip recovery and diversifying the company's competence skills so it is able to adjust to different demands and applications in the market place. This is just the beginning for Mecaprec and a promising future cooperation with MMC Metal France.



WSX445 - Double sided Z geometry Inserts
- Mitsubishi Materials

ABOUT MECAPREC

Mécaprec is a French machining company, specialising in the development of tooling solutions for the machining of prototypes and mass produced components (small, mid-sized and large) for various industry sectors such as aerospace, mold and die, energy and general machining.

The company was founded in 1986 in Lavelanet, in the Midi-Pyrénées region of France, as an initiative of five industry partners. After commencing operations, Mécaprec received the RAQ-Aircraft Qualification, establishing itself in the French aerospace market for machining components and equipment for aircraft. In 2008, Jean-Marc Gomez acquired the company and became President and sole Managing Director. In-line with the growth of operations the company added a further 3500 m2 space, expanding its premises in both the manufacturing and office areas. The integration of additional machine tools such as 4 and 5-axes CNC milling machines has resulted in the doubling of the company's production capacity. In 2009, Mécaprec obtained the EN9100 certification. The company is continuously growing, increasing its manpower, machine and property assets to match new business requirements and industrial demands.

www.mecaprec.fr

ABOUT

MMC METAL FRANCE S.A.R.L.

MMC Metal France is one of the 7 European subsidiaries of the Japanese Mitsubishi Materials Corporation cutting tools division based in Orsay, France. Founded in 1992 the company delivers over the last 22 years precision tools and integrated cutting tool solutions for the automotive, aerospace and medical as well as the general machine building and mould & die industries. MMC Metal France is a member of the European Group, reporting to the European Headquarters in Germany. Together with a great number of local distributors and associates the company offers customised solutions and a wide variety of precision tools for turning, milling and drilling to the French metal working industry.

Mitsubishi Materials Corporation employs more than 23,000 people in 77 countries, operating Head Offices in Europe, India, Brazil, China, USA, Japan and Thailand, a modern R&D Centre in Japan as well as several production facilities throughout the world.

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