

CASE STUDY AEROSPACE APPLICATION

INTRODUCTION

All companies producing high technology components make efficiency and productivity top priorities. SNECMA wanted to rationalise the operations and the large amount of different tooling required to produce turbine blade & vane cooling holes in civil engines. This applied in particular to the EDM machining of 'shaped' or 'diffuser' holes that have a 3D conical profile at the hole entrance tapering to a cylindrical through hole. Such holes provide more efficient cooling but their shapes are becoming increasingly complex. SARIX's Micro EDM Milling technology and fast hole EDM proved ideally suited to achieving these aims.

OBJECTIVE

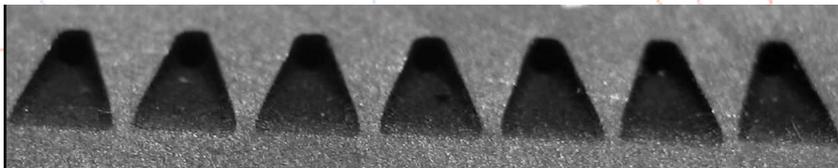
The objective was to reduce the number of 3D shape machining operations that require many different tools by using the recently developed SARIX technology of micromilling and micro-erosion and by using a single electrode diameter. Moreover, compared to present drilling techniques, Micro EDM Milling guarantees a more precise cooling flow by keeping the cylindrical hole in the axis of the conical hole without any significant steps.

SOLUTION IMPLEMENTED

The 7-axis version of the SARIX SX-200 machine has demonstrated both the feasibility and stability of the complete micro EDM process as applied to shaped, conical holes. The choice was confirmed from the very first test that showed it met SNECMA requirements for geometrical shapes, surface quality and above all, airflow. The stability and repeatability of micro-milling is now integrated into production, and has now also been extended to the drilling of all holes of different diameters in a single component using a single diameter electrode.

SPECIFICATIONS

The diameter of the electrode used for the cylindrical holes can vary from 0.20 mm to 0.80 mm. The conical shape is obtained using the same electrode in micro-milling mode with a continuous in process check on its wear and tear. The different conical hole geometries required for improved cooling flow diffusion are controlled by the SX- μ EDM-CAM-AERO Micro-Milling application programme.



PRODUCTIVITY

To ensure efficient continuous operation the SX machine uses an integrated electrode changer. The use of only one electrode diameter for all holes was key to the reduction of direct and indirect costs.

The efficiency of this Micro Machining, of which the results meet the productivity targets for the production of this blade, has already put in place the complete drilling of the HP blade of this engine.

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THE ECONOMICS OF μ EDM

SARIX offers automated industrial turn-key μ EDM equipment, that compete with traditional process, while having all the advantages of the Micro EDM Machining.

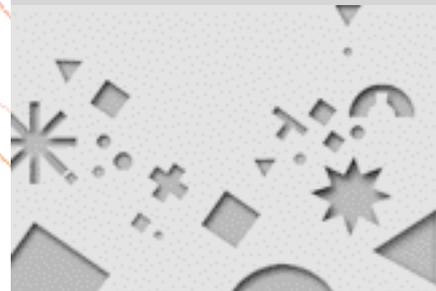
SARIX MICRO EDM machines demand that the operator define the work piece material, electrode material and hole depth. Once it has been set up the machine controls and optimises the process automatically the permanent presence of an operator is not needed and the machine can work as an autonomous production cell.

Parts machined through the μ EDM process can be immediately used with no additional finishing.

ABOUT SARIX SA

SARIX designs, manufactures and markets highly efficient Micro-EDM Equipment typically used in many industries such as: die-making, microelectronics, medical, watchmaking, automotive and aerospace as well as research centres and universities.

The SARIX SX-100 and SX-200 product line is designed for use in various Micro EDM Machining modes offering users the highest level of flexibility including Micro-Drilling, Micro-Milling and Micro-Sinking.



THE BEST MICRO EROSION
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SARIX
3D Micro - Milling

For additional product information
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