

EUROPEAN TOOL & MOULD MAKING

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Vogel Business Media

After the sky falls, EDM helps find the beauty at the core

Electro-discharge machining can be used for cutting a wide range of materials, but one UK shop was in for quite a surprise when it was asked to machine something that had only recently arrived on this world.

Precision subcontractor North Devon Precision Products (NDPP) has been conducting business since 1973, so the shop has seen plenty. But the Barnstaple, UK, company was confronted with an out-of-this-world manufacturing proposition: machining high-precision parts from a meteorite.

Shop MD Nick Squire said his company was approached by an agent for Richard Dinan, entrepreneur and co-owner of Armour Surveillance Security Equipment and Technology. The company was looking for local precision manufacturing to make high-quality, high-accuracy components for a limited range of stylish and sophisticated micro-keyless entry system bracelets.

A true blast from the past

"What was particularly exciting about the project," Squire noted, "was that the raw material used to machine the com-

ponents was to be a four-billion-year-old meteorite!"

The meteorite (known as a Gibeon meteorite) is composed of an iron-nickel alloy with significant amounts of cobalt and phosphorus. The crystal structure provides a classic example of fine octahedrite and the Widmanstätten pattern exhibited after machining, chemical etching and polishing the material is renowned for its beauty, the reason for its use in high-value jewellery.

Owing to the non-contact and stress-free characteristics of EDM, the shop determined it was the best process. However, NDPP was aware that this method could create a potential problem down the line. Because the composition of the meteorite was unknown, EDM could have failed.

"We were machining blind and didn't know if we would hit a pocket of non-conductive material, which would render the EDM process redundant," Squire

noted. The shop created sophisticated jigs and fixtures to hold the meteorite with the hope operators could index the meteorite around if they hit a non-conductive area.

Finding the right wire was key

The shop selected a GF Machining Solutions wire EDM machine. Initially, the company attempted to slice the meteorite with 0.25mm diameter brass wire, but the hard exterior of the rock caused deflection and the wire to break. Better results (albeit slower) were achieved with 0.25mm zinc-coated wire.

In two weeks, the shop had cut the meteorite into 4 slices, and then used the machine to cut the profiles of the prototype bracelet.

The next job involved using spark erosion machines to create intricate cavities and the delicate interlocking mechanism of the bracelet. A total of eight different graphite electrodes (for roughing and finishing) were machined on a GF HSM 300 high-speed milling machine, and the parts were then spark-eroded on a GF die-sink machine.

"After our initial trepidation the machining operations all went well," Squire said, noting that after making the first bracelet, he decided to invest in further EDM and milling machine tools in order to make the bracelet manufacturing process more robust and reliable. The shop purchased three machines from GF Machining, a new Cut 300ms wire machine, a Form 20 die-sinker and a VCE 800 Pro VMC.

The units, installed at the shop last year, are being put through their paces machining the meteorite.

GF Machining Solutions,
Losone, Switzerland.
gfms.com



Source: GF Machining

The beauty of the meteorite is much further down than skin deep, so EDM technology was needed to cut the space rock.