

Technical Spotlight

Submitted by Tini Van Berkel

Company: ITB Precision in Metal and Thermoplastics;
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Machine: Charmilles Roboform 2000
Electrode: POCO EDM-3
Application: Housing for desktop video camera

A complete mould was needed for each half of the housing. Although the gracefully contoured housing is smooth outside, the inside has a series of thin ribs and clips that support the necessary circuit boards and the camera. Over 30 different electrodes were needed to produce two complete moulds. A rougher and finishing electrode was used for each burn.

The mould for the outside surface needed a VDI 27 finish and the mould for the inside surface needed a VDI 21 (1.10 Ra micro inch) finish. Very little hand polishing was necessary. To produce the 0.8mm thin ribs on the inside of the cavity, the electrode rib was 0.6mm. The rim where the two halves snap together is only .32mm wide. During the burn orbiting was used. The electrodes were fabricated by milling and grinding.

Machining Tip

Tooling

How can I get my tooling to last longer when machining graphite electrodes? The standard answer used to be solid carbide tooling; now there is another choice. Poly-crystalline diamond (PCD) tools can outlast conventional cutting tools.

Some of the advantages of PCD tooling are improved performance and longer tool life compared to carbide tooling. The extended life allows for less variation of parts caused by tool wear. These tools can produce fine surface finishes since they remain sharp longer. They tend to generate less heat and can run at speeds of 3,000 surface feet per minute. Even at slow speeds, PCD tooling takes longer to wear out.

There are two methods of producing PCD tools that are used for machining graphite. The first method is to produce a diamond thick film. This thick film can then be cut and brazed into the tip of cutter inserts for face mills and lathe turning tools. This type of tooling can be redressed with the proper equipment.

The second method of producing PCD tooling is to coat a carbide tool with a thin, diamond film. Although this type of tooling is highly abrasion resistant, it wears out faster than the thick film inserts. It is however, the most economical way to get diamond in complex geometries.

Expect continued improvement in PCD tooling since the industry is still advancing this technology.