

Green Point (Suzhou) Technology Co., Ltd.

A forward looking company that is a leader in precision molds and plastic products focusing on wireless communications devices.

Strategic Partner

Three years ago, Green Point's mold shop used copper electrodes in their EDM machines for the production of molds. When management decided to make changes in their production methods to expand for the future, copper electrodes was one area of concern. Their research found that mold shops in the United States primarily use graphite electrodes and European mold shops had been transitioning to graphite electrodes for some time. Also in Europe, the introduction of high-speed graphite machining centers shortened the transition process. Green Point realized the importance of using graphite electrodes to reduce time and cost of their mold cavities.

With a growing international customer base, Green Point was in a position to take advantage of the European EDM trends and decided to transition to graphite electrodes in order to be more competitive in the global marketplace.

Since the company only had experience making and using copper electrodes, it was important to select a strategic partner to help them make the transition to graphite electrodes successfully. Not only did they need quality graphite materials; they also needed training and technical assistance to learn how to use graphite in the EDM machine to achieve the desired performance characteristics.

Poco Graphite was the strategic partner they chose to work with during this transition from copper to graphite electrodes. POCO was chosen because of the availability of their materials with local distribution, along with the classroom training and shop floor technical assistance needed to increase productivity. The right material selection could be made from a full range of quality graphite grades needed for their high-precision cavities.

POCO application engineers from the Singapore office provided in-plant seminars and technical support at all three mold shops that support Green Point's plastics operations. Graphite electrode fabrication on a high-speed machining center proved to be much faster and eliminated hand operations and remaking of electrodes that was required with copper

electrodes. Electrode design is simplified since all graphite roughing and finishing electrodes can have the same amount of undersize, unlike copper electrodes. EDMing with graphite electrodes can produce precision cavities in less time than with copper electrodes once graphite technology is understood. Graphite electrode wear rate is lower than with copper electrodes, which is important when producing multiple cavities. Using graphite allows the production of some electrodes that would have been impossible to make in copper. POCO's training and technical support were a key factor in increasing their productivity and making a successful transition.

Suzhou Mold Shop

The Suzhou mold shop is the newest of three mold shops in the Green Point group. In operation since 2001, they obtained ISO 9001 certification. Mold development currently averages 28 working days. New mold development is 50% of the operation and mold maintenance is the balance of the operation. This shop is producing molds for high tech mobile phones and car engine parts. The primary electrode material in this shop is also graphite. The Suzhou facility has the advantage of ongoing technical support for the nearby POCO Shanghai Training Center.

Advantages of Graphite Electrodes vs. Copper Electrodes

An increasing number of mould shops are abandoning copper electrodes for the advantages of graphite electrodes, which can include easier fabrication of electrodes, faster metal removal rates, and less electrode wear. Some electrode shapes that would have been impossible to produce out of copper can be easily machined in graphite. The weight of a copper electrode can also be a factor with very large electrodes.

As shops transition to graphite electrodes, it is important to understand how to use the graphite materials and there are a number of factors to consider. Since graphite is available in so many grades, to achieve the best results it is important that the appropriate grade and machine parameters are used for a particular application. If the operator uses the same settings that were used with copper electrodes when using graphite electrodes, the results will be disappointing. Because copper has a low melting point, 1083 degrees C compared to 3,550 degrees C for sublimation

of graphite, the graphite electrodes can handle more aggressive machine settings. The selection of these settings will determine the speed of metal removal and the amount of electrode wear. If conservation of the electrode is important, it is possible to put the graphite electrode in a no-wear condition (less than 1% wear) during the roughing operation. This can not be done with copper electrodes.

Electrode fabrication is much easier in graphite. Graphite machines 2-3 times faster than metals without handwork, whereas handwork is needed to de-burr the copper electrode. High-speed graphite machining centers make electrode fabrication fast and efficient without dust problems. The selection of proper tooling and graphite grades that are not too hard will reduce cutter wear and scraping of electrodes.

The designing of graphite electrodes is also different. In many shops it is common practice to make the roughing and finishing copper electrodes a different undersize. Graphite electrodes can be exactly the same reducing CAD/CAM and machining times. For this reason alone, the accuracy of the cavity is improved.

There is a perception that graphite will not produce a mirror finish, but the technology available on some machines makes this possible and very practical. Many of today's plastic consumer goods take advantage of the EDM finish produced by a particular grade of graphite, that eliminates cavity polishing and chemical texturing to achieve the desired surface. It is impossible to produce this kind of finish using copper electrodes without the added time and steps to texture the mold.

Comparison of a typical job in both graphite and copper shows that milling time for two electrodes is 67% faster in graphite and the cavity can be EDMed 58% faster with graphite electrodes than with copper. Machine time is significantly reduced to increase productivity and reduce the cost of the job.

There are many advantages to converting to an all-graphite EDM operation. The success of this conversion may take assistance from the OEM and the graphite manufacturer to obtain the knowledge and training necessary to achieve the desired results. However, many shops have made this transition and are pleased with the competitive advantages graphite allows them.