

# The 5 Performance Factors of EDM Graphite

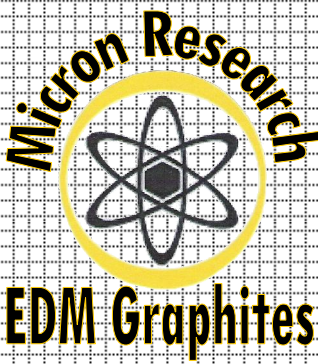
With the unique concept of bundled graphite technology developed by Micron Research, the EDMer of today can expect significant improvements in electrode performance. Measuring the improvements achievable with the Micron Research family of EDM graphites comes through using the time tested Five Performance Factors of EDM Graphite. These performance factors are directly related to the physical properties of this revolutionary graphite. The factors are Graphite Machining, Metal Removal Rate, Wear Resistance, Surface Finish, and the true Value that the EDMer derives from using any one graphite material.

**1** **Machining** - Strength and hardness are the relevant properties affecting graphite machining. Here the Micron Research materials benefit from the unique bundled technology. The higher levels of bonding within bundles produces stronger graphite. Thin ribs and complex geometries are readily achievable. Surprisingly to many, the high strengths do not come with excessive hardness. There is little fear of chipping or cracking when fabricating electrodes, and tool wear is lower than with conventional graphites.

**2** **Metal Removal Rate** - The metal removal rate is dependant on the average particle size of the graphite. Micron Research manufactures graphite in three classes to meet the requirements of every EDMer. In the Ultra-Premium class is the E-970 with a particle size of less than 4 microns. The Premium class has the very popular E-940 with a particle size under 7 microns. Finally in the Superfine class there are two grades to choose from depending on the particular job requirements the EDMer may have. These are the E-900 at 8 microns, and the E-888 at 14 microns.

**3** **Wear Resistance** - Use of the bundled technology available in the Micron Research graphites effectively sidesteps the biggest cause of wear occurring on an electrode. Conventionally produced graphites see the majority of their wear occurring when particles are dislodged during EDMing. This happens because the dangerous interconnected porosity of conventional graphite allows dielectric fluids to penetrate the near surface region of the electrode. At the time of discharge the trapped fluids vaporize with explosive force, knocking the individual particles loose. Micron Research EDM graphites, with their dense bundles and tight, closed porosity minimize the Intraporosity Explosive Vaporization (IEV). The space between bundles does not depend on particle/point bonding but uses the much stronger face bonding. Thus wear on bundled technology graphite is much less, and since it occurs primarily at the molecular level, much more uniform.

**4** **Surface Finish** - The effective particle size of a given graphite material determines the surface finish that can be achieved during EDMing. With conventionally produced graphites the effective particle size and the actual particle size are the same. In the case of graphite manufactured with bundled technology an effective particle size smaller than the actual particle size is created. It has been theorized that this comes about because the bundles themselves are denser, and the bundle interfaces develop the unique face bonding between the bundles rather than the more fragile particle/point bonding typical in conventional graphite. The result is a bridging effect that smoothes the space between particles and between the bundles themselves. Thus the surface finish that can be achieved is typically like that of other graphites with particles that are 2-3 microns smaller than the Micron Research materials.



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**5 Value** - The experienced EDMer understands that material cost is not a significant factor when selecting an EDM electrode material. Real value for the EDMer is realized from the use of the correct material. EDMers receive enormous advantages from the use of the Micron Research materials. The extremely tight process controls that have been developed by the scientists at Micron Research produce a graphite with levels of uniformity never seen before. Density variations within individual blocks are absolutely minimal. Block-to-block variations within batches, as well as batch-to-batch variations, are at levels no other graphite company can match. Thus, the EDMer today can truly engineer his process around the performance of this revolutionary new electrode material.

An added benefit seen with the bundled technology employed by Micron Research is the fantastic interplay between the metal removal rates and the surface finishes for each of their grades. For example, the E-940 grade has metal removal rates that reflect its 7 micron particle size- fast and efficient. But the surface finish that can be achieved with this remarkable graphite is every bit as good as the very best conventional 5 micron graphite. And all of this with wear rates significantly better than any EDMer ever thought possible.

How can you get this remarkable material?

**CONTACT:**



Or contact Micron Research to get the name of the local distributor in your area.

## Typical Physical Properties

	<u>E-970</u>	<u>E-940</u>	<u>E-900</u>	<u>E-888</u>
<b>Average Particle Size (μ)</b>	<4	<7	<8	14
<b>Flexural Strength (psi)</b>	13,600	11,500	10,000	7,500
<b>Apparent Density (g/cc)</b>	1.85	1.80	1.78	1.69
<b>Hardness (Shore)</b>	76	72	70	63
<b>Electrical Resistivity (μΩin)</b>	520	600	600	650