

# TDX

Olmec Advanced Materials present a specialist range of fine grained graphites curated specifically for electrical discharge machining (EDM) / Spark erosion.



## Graphites for EDM

*Olmec Advanced Materials are the largest U.K. based supplier of graphite materials, built on experience in the industry over the last four decades.*

Our knowledge of graphite is constantly evolving. As a material that can be altered on a microscopic level in early stages of manufacturing, graphite offers an astounding variation of capabilities and applications across the manufacturing industry.

It can be treated, combined, or compressed to alter these capabilities. Isostatic graphites are particularly fine-grained graphites used for technical applications which require high quality surface finish, a homogeneous structure and often high electrical conductivity. Isostatic graphites are produced by compressing raw material mixture into blocks.

### PROPERTIES OF ISOSTATIC GRAPHITES:

- Extremely high thermal and chemical resistance
- High thermal conductivity
- Good machinability
- Excellent uniformity
- Fine grain size
- High electrical conductivity

# End uses for Electrical Discharge Machining

In the Electrical discharge machining industry, graphite is used to produce moulds which then go on to cast metal or plastic parts for a large variety of applications. Complex metal and plastic parts can be produced for end products across industries including the automotive, aerospace and even clothing industries.



The excellent machinability of graphite is a part of what makes it the most efficient material for this application, offering time savings of up to 70% for high speed cutting. Because of its high resistance and dimensional stability, it is possible to manufacture extremely fine geometries, without the need to manually refinish.



Graphite can then be used to produce moulds, dies and ribs with the capacity for fantastic surface finish and high shape precision, having saved you time and money along the way. This brochure will help you to select the right TDX material for your final application.



## Graphite for Electrodes

The graphite material used in the EDM process directly affects the performance and efficiency of the EDM burn. The electrode material used must be suited to the application it is used in, to ensure the highest success levels

We believe graphite to be the best material for EDM electrodes for many reasons, and we have listed the most important of these below. The process of choosing the right electrode material must take into account the technical properties detailed in the rest of this brochure, in order to find the best match for a particular application.

## Surface Finish

For optimal surface finish, the required conditions include the correct power setting, good flushing capacity and the appropriate electrode material. Essentially, the electrode's surface determines the final surface finish. Generally speaking, graphites with low particle sizes like our TDX-2 grade produce the best quality surface finishes, due to their low porosity.

## Wearing Properties

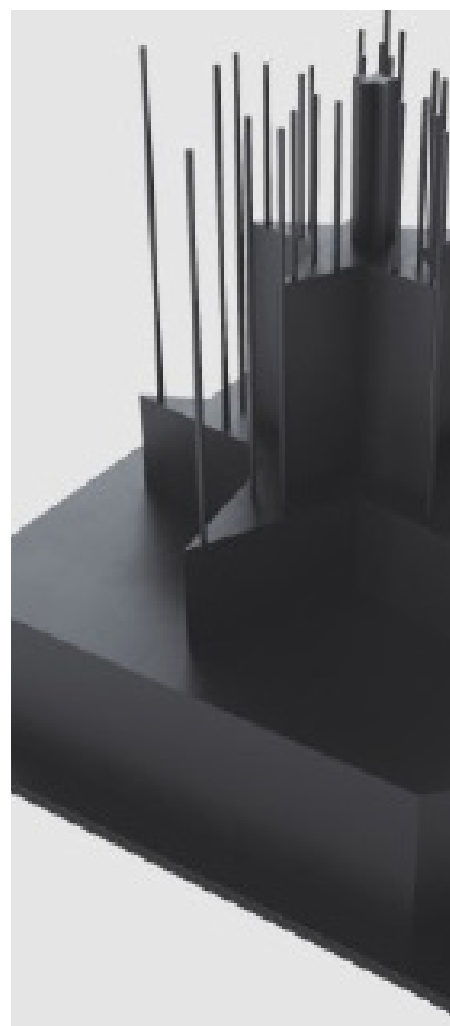
In the end, the ability to produce the desired cut relies heavily on the electrode's resistance to wear. This is particularly important from its edges, which are the most vulnerable or open to erosion.

## MMR (Metal Removal Rate)

Efficient MMR is absolutely crucial to the EDM process. Graphite electrodes are generally far superior to other metals in this area.

## Machinability

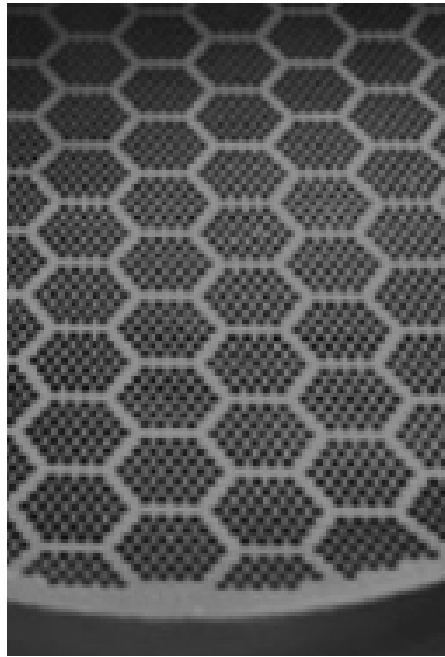
Though it is beneficial that graphite is easily cut/machined, it is also extremely important for the EDM process that the electrode materials have a high strength. This is where the particular strengths and other properties of graphite grades come into the decision for an electrode material, as the balance has to be right.



## Advantages of Olmec's TDX range for EDM

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Four decades of experience in the industry has taught us which crucial properties of our materials matter most for each intended application, so that when you come to us with an enquiry, we can give you considered and informed advice.



Our EDM electrode materials have been developed to offer the best option over a range of requirements within the sector. For each grade we have developed consistent materials which provide you with low wear and brilliant surface finishes.



## TDX Range

Olmec Advanced Materials offer a range of grades under the name TDX.

These are all isostatic graphites and are ideally suited to the EDM industry.

The range covers most requirements from roughing using TDX-6 to ultra-precise detailing with TDX-2.

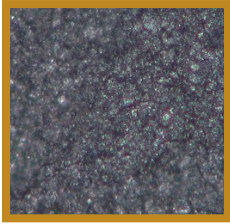
Range of application:

- Roughing (VDI 39-33)
- Semi-finishing (VDI 33-24)
- Finishing (VDI 27-21)
- Detailing (VDI 21-12)

We have become increasingly involved in the supply of graphite for spark eroding at our graphite engineering facility in Garstang, Lancashire.

All Olmec EDM graphites are manufactured using the isostatic process, resulting in excellent product uniformity.





TDX-6 and TDX-5 are suited to roughing and semi-finishing applications. They are easily machinable, have low carbon deposition rates and good surface finish levels, and are available at cost effective price levels.

Typical Applications:

- Die Casting
- Plastic Moulds
- Automotive Industry Mould
- Machining
- Large electrodes

### TDX-6

This grade is robust, ideal for applications requiring roughing graphite. This grade provides a range of surface finish quality from VDI 33-39.

| Particle Size ( $\mu$ ) | Flexural Strength (mPa) | Shore Hardness (D scale) | Electrical Resistivity ( $\mu\Omega\text{m}$ ) | Surface Finish (VDI 3400) |
|-------------------------|-------------------------|--------------------------|--|---------------------------|
| <15                     | 38                      | 60                       | 15   | 39-30                     |

### TDX-5

This grade could be used across multiple applications in both the roughing and semi-finishing areas.

Typical Applications:

- Aluminium die-casting
- Moulds for housings with large 3D contours/ less detailing.

| Particle Size ( $\mu$ ) | Flexural Strength (mPa) | Shore Hardness (D scale) | Electrical Resistivity ( $\mu\Omega\text{m}$ ) | Surface Finish (VDI 3400) |
|-------------------------|-------------------------|--------------------------|--|---------------------------|
| 8                       | 60                      | 70                       | 10   | 30-21                     |



Olmec's TDX-4 and TDX-3 are suitable for more fine detailing. In particular, the low grain size of TDX-3 lends itself to complex machining.

These grades can produce excellent surface finishes, and are extremely popular for the following applications:

- Die Casting
- Plastic Mould
- Small Diameter Dies
- Finishing electrodes (TDX-4)
- Fine Electrodes (TDX-3)
- Mobile phone mould
- Fine Aviation Components

### TDX-4

Olmec's fine grained isostatic graphite with high density, high strength and good wear resistance. TDX-4 is suitable for high end mould precision and smoother surfaces.

| Particle Size ( $\mu$ ) | Flexural Strength (mPa) | Shore Hardness (D scale) | Electrical Resistivity ( $\mu\Omega\text{m}$ ) | Surface Finish (VDI 3400) |
|-------------------------|-------------------------|--------------------------|--|---------------------------|
| 5                       | 70                      | 72                       | 11   | 24-18                     |

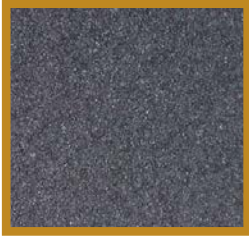
### TDX-3

TDX-3 has excellent surface finish capabilities. This grade is an ideal choice for fine electrodes.

This grade can be used for intricate detailing, and has very low loss machining properties.

| Particle Size ( $\mu$ ) | Flexural Strength (mPa) | Shore Hardness (D scale) | Electrical Resistivity ( $\mu\Omega\text{m}$ ) | Surface Finish (VDI 3400) |
|-------------------------|-------------------------|--------------------------|--|---------------------------|
| 3                       | 75                      | 90                       | 14   | 21-15                     |





### Typical Applications:

- Moulds with finest structural requirements.
- Highest precision.
- Highest quality surface finish.
- Multi-cavity dies.

## TDX-2

TDX-2 is our premium ultra-fine-grained grade, with the capacity to achieve surface finishes of VDI 12-18. This grade is best suited to the most complex, ultra-fine detailing requirements.

| Particle Size ( $\mu$ ) | Flexural Strength (mPa) | Shore Hardness (D scale) | Electrical Resistivity ( $\mu\Omega\text{m}$ ) | Surface Finish (VDI 3400) |
|-------------------------|-------------------------|--------------------------|--|---------------------------|
| 2                       | 80                      | 90                       | 13   | 18-12                     |

## Advantages of Graphite as an Electrode Material

For many years copper has been used as an electrode material. For applications such as mould production and micro machining, using graphite electrodes can lower overall costs, enable higher production figures and give extremely precise erosion results.

Graphite has many advantages over copper in this industry:

- Low electrode consumption loss
- Lower specific gravity
- Better machinability
- Comparatively high processing speed
- Easier surface treatment

## Overview

We provide expert advice which balances the desired precision, surface finish and production figures with lowest possible cost options.

| Grade | Particle Size (μ) | Flexural Strength (mPa) | Shore Hardness (D scale) | Electrical Resistivity (μΩm) | Surface Finish (VDI 3400) |
|-------|-------------------|-------------------------|--------------------------|------------------------------|---------------------------|
| TDX-6 | <15               | 38                      | 60                       | 14                           | 39-30                     |
| TDX-5 | 8                 | 60                      | 70                       | 12                           | 30-21                     |
| TDX-4 | 5                 | 70                      | 72                       | 11                           | 24-18                     |
| TDX-3 | 3                 | 75                      | 90                       | 14                           | 21-15                     |
| TDX-2 | 2                 | 80                      | 90                       | 13                           | 18-12                     |

\*these values are typical and are not guaranteed.

If you require any extra information regarding the optimal applications for our TDX range at your company, don't hesitate to get in touch at:

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Or please give us a call at:

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