Graphite and It's Effects on the Human Body and Toolroom Equipment

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The health and welfare of toolmakers that use graphite to make electrodes for use in the EDM department should be a high priority for management. In addition to the health issues for the workers, the very expensive machinery, such as the EDM machines and milling machines, must be protected from the damaging effects of graphite dust.

Anyone who has worked with graphite in the manufacturing of EDM electrodes is keenly aware of the need for proper dust removal during the machining process. Many ill-equipped shops have very little equipment to handle the dust generated during milling and grinding operations.

Safety

The MSDS (material safety data sheet) for the synthetic graphite used in EDM show that there are no carcinogenic properties associated with graphite. It is a chemically inert material and contains no volatile components. It is also used for medical purposes, such as implants and heart valves in the human body.

This is not to say that graphite is totally harmless though. It can be very irritating to the skin, eyes, and nasal passages. It can cause stinging, redness and watering of the eyes, and itching of the skin. This can be a very annoying experience when a toolmaker is expected to produce a close-tolerance electrode with a fine finish.

Controlling the Dust

The simple but very ineffective solution is to wear particle masks. Experience shows that this stop-gap measure is a failure. The mask soon is clogged with the fine dust and the operator is left breathing a disgusting blend of bad-breath and graphite dust!

Portable vacuums are the next best solution, but this also has many drawbacks. Often the filter in the portable shop vacuum is not fine enough to trap the microscopic sized particles, and they are simply blown back into the air. Also, because the vacuum hose is often cumbersome to manipulate, operators fail to properly align the hose to capture the most dust.

Many shops use a centralized vacuum system designed for the removal of fine dust particles, such as graphite. It is important to have enough air velocity in the vacuum system to be effective. It is recommended to have an air velocity of 500 ft. per minute and the air in the lines should travel at a rate of 2,000 ft. per minute in order to prevent the dust from settling inside the duct work.

With a centralized system it is much easier to efficiently manage the dust from the various machine tools because the system is more efficient and the hoses can be strategically placed. Special wheel guards are available for surface grinders that act as a turbo to remove the dust into the vacuum system.

Newer milling machines which are more or less dedicated to electrode machining are equipped with extremely effective dust removal systems. The sealed chamber around the work area enables the vacuum to capture a high percentage of the dust. This development has dramatically reduced the amount of graphite dust in the shop environment.

An additional method of dust removal is the use of a curtain of coolant surrounding the milling cutter. This prevents the dust from ever escaping and is very efficient. This feature is available on some milling machines as well as an accessory that is easily installed.

A Clean Shop Environment

Graphite dust is highly conductive and has been responsible for the damage of many expensive tools and machines. Glass scales can give false measurements due to the settling of dust. Electronic equipment can be short-circuited by the dust as well. The grimy nature of graphite makes it especially annoying if it accumulates on work-benches and desks.

It is in the best interest of everyone to make every effort of maintain a clean and pleasant atmosphere in a moldmaking or EDM shop. The toolmakers will be happier, the work will be better and the machinery will perform as it should. It is also very impressive to visitors to see a clean, dust-free shop.

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About the Author

Master moldmaker for 25 years with a degree in manufacturing. Was EDM operator for many years as well as the maker of more electrodes than I care to remember!

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