



"Addressing the problem of dust collection during the milling of Zirconium"

By: Vaniman Manufacturing, Inc.

There is no question that the CAD/CAM revolution is here to stay. There are currently over 30 scanners and milling systems of all shapes and sizes to choose from. These systems offer more accuracy, increased productivity, and new material options. All of these dry milling systems still create dust and debris which if not addressed properly can create an unpleasant health and safety environment. OSHA has established permissible exposure limits for zirconium and zirconium compounds for both an 8-hour time-weighted average and a 15-minute, short-term limit. Zirconium dust and how it can affect the performance of a dust collector needs to be understood by the mill manufacturer and the end user.

It is important to understand there are two types of single and multiple station dust collectors currently available to the laboratory industry, high suction and high volume. Understanding which of these technologies is best suited for the collection of Zirconium is very important to the operation of the milling machine and the health and well being of employees. The use of HEPA filtration at a minimum is suggested for any dust collector used for the milling of Zirconium.

Movement of air through vacuum sources is measured two ways: Flow (cubic feet per minute) and static pressure (inches of water). Static pressure is a measure of how forcibly the vacuum source operates. Vacuums that generate high static pressure utilize high-speed turbines to create high suction at the point of capture. Volume is the measure of how much air is moving to the vacuum source. Vacuums that generate high volume utilize low-speed fans to create large air flow but low suction at the point of capture.

High volume dust collectors should not be used when large amounts of Zirconium, stone, or porcelain dust is to be collected. This fine dust will

block airflow through the filter which drastically reduces air flow at the source capture point and can cause damage to systems.

Conversely, a high suction dust collector with a bypass motor is very well suited for collecting fine dust as described above. A high suction motor will overcome a clogged filter, continuing to provide suction at the source capture point. While filter maintenance is not as critical in high suction units as it is in high volume units, it is still important to maintain a good filter maintenance program to ensure optimal performance.

The other important factor to be considered when choosing a dust collector is the duty cycle the dust collector motor must achieve. A milling operation can run for a few hours a day or around the clock, which can mean a standard brush motor will require maintenance or replacement in a matter of weeks or months. Brushless motors can have a duty cycle 5 to 10 times as long. While dust collectors with brushless motors are more expensive initially, they more than make up for the cost by being maintenance free over their life.

Proper dust collection is extremely important to achieving optimal performance from the milling machine, extend the life of cutting tools and keep dust under control. Consulting with dust collector manufacturers will ensure you are applying the proper dust collection technology to your milling process.