

Workplace Quality News



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Innovative Dust Collection Solutions for RCF Finishing Operations

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One of the many challenges facing the users of refractory ceramic fiber (RCF) and RCF-containing products is the need to process these materials while at the same time controlling workplace exposures to airborne

dust. A primary function of the product stewardship program (PSP) for RCF is to identify new dust collection technologies, test these technologies within RCF industry specific applications, and communicate to RCF end users about promising new equipment that may be useful within their operations. We have consulted with numerous manufacturers in our search for tools and systems that are both effective for the control of airborne RCF dust and that are at the same time, cost effective and easy to use. One manufacturer in particular, DCM Clean-Air Products, Inc. in Fort Worth, Texas, has stood out among the rest. DCM Clean-Air Products is a leader in point-of-generation "source capture" equipment, manufacturing shrouded power hand tools, and vacuum systems that are specifically designed for collecting airborne particulate.

One of the obstacles in developing shrouded hand tools for dust capture is how to recover dust, while also allowing the operator a clear view of their work. DCM Clean-Air Products has overcome this problem through a unique "stair-step" design of their patented shroud vacuum system, such as the one found on their disc sanders. The design of the abrasive disc, holder, and shroud allows the operator to see the edge of the abrasive disc while capturing 60 – 70% of the dust through the vacuum holes in the abrasive disc holder assembly with the balance of the dust being collected



DCM Product line

around the periphery of the shroud. This design maximizes collection efficiency without impeding the operator's ability to see the work surface.

In addition to the shrouding systems, the other key component of the power hand tool line offered by DCM is the vacuum system. DCM has developed portable vacuums, both pneumatic and electric, designed specifically for the capture of fine dusts. Their industrial vacuums are the strongest portable vacuums available on the market. These low-volume/high-velocity vacuums use small volumes of air at high velocities to capture the dust through the capture system on the shrouded hand tools.

In May of 2002, representatives of the Unifrax Corporation, Niagara Falls, New York, visited DCM Clean-Air Products, Inc. located in Fort Worth, Texas, to conduct an indus-

trial hygiene engineering control evaluation on various shrouded power hand tools. Working directly with Doug Chilton, President, DCM Clean-Air Products, Inc., five power tools were evaluated in a study designed specifically to assess their effectiveness at controlling airborne RCF emissions under extreme working conditions.

Five shrouded power tools were tested in all. Each power tool was tested under three separate controlled conditions; first using a pneumatic vacuum with a HEPA filter; second using an electric vacuum also equipped with a HEPA filter; and a third without the use of any dust collection systems. The pneumatic HEPA vacuum produced 170 CFM with 180 inches of static pressure. The electric HEPA vacuum produced 115 CFM with 95 inches of static pressure. For each test, two samples were collected;

one area sample was collected from approximately 12 inches above the work surface, while another personal sample was collected from the breathing zone of the equipment operator. In each test, the tools were used on 1" Duraboard® LD. The shrouded power tools were used under carefully controlled conditions. The number of cuts made, holes drilled or material sanded, as well as the time allotted for each set of repetitions, was held constant. In order to isolate the true effectiveness of the control devices being evaluated, the speed or rate at which the work was performed, the amount of material used, and the technique used by the tool operator was also carefully monitored and replicated throughout each series of tests.

The objective of the testing was to isolate and measure the effectiveness of the dust collection systems

TABLE I
INDUSTRIAL HYGIENE SAMPLING ON MAY 8, 2002
AIRBORNE FIBER REDUCTION RESULTS
 Expressed as a Percent (%) Reduction

TOOL	SAMPLE	PNEUMATIC HEPA VAC	ELECTRIC HEPA VAC
Drill	Area	99 %	99 %
	Personal	> 99 %	99 %
1/4" Router	Area	> 99 %	> 99 %
	Personal	> 99 %	> 99 %
3/8" Router	Area	98 %	99 %
	Personal	97 %	> 99 %
3" Cut Saw	Area	94 %	> 99 %
	Personal	> 99 %	99 %
4" Trim Saw	Area	> 97 %	> 99 %
	Personal	> 99 %	> 99 %



without dust collection

being evaluated and then to compare those results with the results of the same power tools being used without the benefit of dust capture systems. It is important to note that this study DID NOT replicate an actual product finishing operation but rather, used the power tools as “dust generation devices” for purposes of evaluating the effectiveness of the engineered controls incorporated into the tool.

The test results demonstrated a significant percent reduction in airborne fiber emissions for each tool tested, with many tools showing greater than 99 percent reduction in airborne fiber release (see Table 1). An added benefit that was noted during the testing was the significant reduction in housekeeping (cleanup) required when effective emission controls were used.

DCM Clean-Air Products, Inc., has a large offering of shrouded power hand tools including; sanders (both inline and random orbital), saws, routers, drills, air files, countersinks, rotary scalers, needle scalers, and smoke and fume extraction systems for MIG welding applications. Vacuum offerings include 5 gallon and 15 gallon HEPA filtered systems as well as specialty vacuums including wet bath and wet/dry systems to handle all aspects of portable airborne dust capture. In addition to shrouded power hand tools, DCM also designs custom shrouds and vacuum control systems for fixed station power tools.

One recent addition to the DCM product line is a vacuum manifold system designed for stationary band saws. This new point-of-generation dust collection system is easy to install, has no moving parts, and has proven highly effective at collecting dust when con-



with dust collection

nected to a DCM portable vacuum system. This unique, economical, and innovative manifold system does not interfere with the operation of the band saw or obstruct the operator’s view of their work. In summary, DCM shrouded power hand tools and vacuum systems performed extremely well throughout our testing. We could foresee many potential applications for these tools within the RCF industry, particularly for the finishing of vacuum formed shapes and processing of board products.

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Disclaimer — The information presented herein is provided in good faith and believed to be an accurate representation of the aforementioned dust control tools and their effectiveness when used on RCF-containing materials. This information is not intended to substitute for a product and application-specific evaluation of this equipment by potential buyers. The Unifrax Corporation is not affiliated with DCM Clean-Air Products, Inc., and does not extend any warranty (expressed or implied), assume responsibility, or make any representation regarding the completeness of this information or its suitability for any given RCF application.

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NUMBER 19

(Order Code: CHQ-wqn-19)
• Innovative Dust Collection Solutions

NUMBER 18

(Order Code: CHQ-wqn-18)
• Advancements in Engineering Control Technology
• New Customer Self-Monitoring Program

NUMBER 17

(Order Code: CHQ-wqn-17)
• 2002 American Industrial Hygiene Conference and Exposition
• Biopersistence Certificates Available on www.unifrax.com
• A New CAS Number for Alkaline Earth Silicate wools

NUMBER 16

(Order Code: CHQ-wqn-16)
• OSHA Signs Letter of Support for RCFC's PSP
• No Change in IARC Carcinogen Classification
• Fiber Ranges Chart

NUMBER 15

(Order Code: CHQ-wqn-15)
• FoamFrax™ Insulation
• New Magnesium Silicate Fiber "Isofrax™"
• Health and Safety Resources

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