PMC Kiln Exposure Monitoring Emissions Test

In response to concerns about the safety of metal clay and related materials, a controlled test was conducted to measure the quantity and severity of fumes produced during the firing process. In addition to all types of Precious Metal Clay (PMC), testing was also done on popular core materials including Styrofoam, cork clay, and paper. The results demonstrated that the operation of the kiln, PMC, and core materials pose no health hazard to anyone working with or nearby the kiln.

This page presents a description of the process and the results that were determined by an independent testing laboratory. While these results are accurate and reliable, it is also true that each individual is unique. In this as in any other aspect of studio life, each artist must take responsibility for personal safety. If you are experiencing discomfort, adapt your methods appropriately.

The Test

This air-sampling survey done on December 18th, 2007 at the Rio Grande facility using a type of passive badge called an Organic Vapor Monitor, (OVM). No unusual or special circumstances were occurring at this facility on the day of the air sampling survey. This test was overseen by a private consulting company, Risk Consultants, Inc. The passive air monitoring devices were processed by Parker Laboratories.

Tests were conducted in the Saul Bell Room, a conventional and representative studio.

The Process

Four separate tests were run to determine the emissions from firing typical PMC materials in a programmable PMC Kiln (Rio # 703-101). Access to the room was limited to those running the test. No other activities were held in the room during the testing period. An Organic Vapor Monitor, (OVM) testing device was positioned 18 inches away from the test kiln. A new testing device was used for each firing. The OVM units were labeled, sealed, and mailed to the lab on the same date as the test.

Materials used:

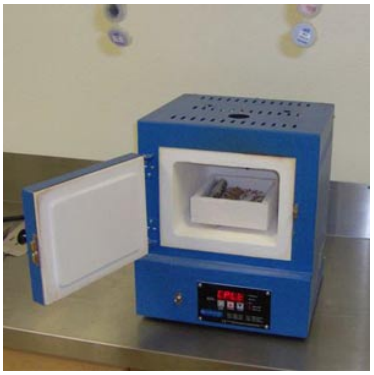
- Original PMC, PMC+, and PMC3
- Vermiculite
- Styrofoam balls, 1" dia.
- Cork Clay
- 4" newspaper rolls
- 6" by 6" Solderite board

Firing and Fume Monitoring

Four tests were conducted, each using a firing schedule of 1650° F (900° C) for 10 minutes. In each test, various combinations of the materials listed above were burned and whatever gasses were released were captured by the monitoring badges.

All measurements were made with passive badges that were attached to a mount 18" from the kiln. These chemical badges require no calibration or assistance to operate efficiently and are accurate to laboratory certification standards. The following data was reported by location and the corresponding measurements are from the Parker Services Laboratory Report.

Samples ready to be tested.



Test Kiln PMC with OVM Monitors

Summary

Based on the conditions observed and measured, along with the exposure parameters determined by OSHA, the following conclusions were reached:

1. Exposure to Styrene (Organic Vapor Monitor (OVM) was well below the OSHA Permissible Exposure Level (PEL) of 100 Parts per Million, PPM. The measurement was 10 ppm.
2. Exposure to formaldehyde was well below the OSHA Permissible Exposure Level (PEL) of 0.75 PPM. The measurement was .07 ppm.

Conclusion

The operation of the kiln, PMC, and shaping mediums, using generally accepted safety practices and operated within recommended guidelines should pose no health hazard to anyone operating on or around the kiln.

Data Results of Off-Gassing During Normal Firing Procedures

Passive Badge	Contaminant	PEL (OSHA)	Actual
GA6216	Organics (Styrene)	100 PPM	less than 10 PPM
8A6065	Organics (Styrene)	100 PPM	less than 10 PPM
GA5983	Organics (Styrene)	100 PPM	less than 10 PPM
GB5428	Formaldehyde	0.75 PPM	.07 PPM
GB4978	Formaldehyde	0.75 PPM	.07 PPM

All organic badges were below the detection limits of the laboratory test capabilities. Twenty-five organic compounds were tested with the primary focus on Styrene. The formaldehyde badges showed trace levels but were far below the OSHA permissible levels. A required field blank (i.e., control sample) was submitted to the lab to maintain the lab's accreditation.

The PMC Guild and members of the metal clay community want to thank Rio Grande for undertaking these tests and sharing the results.