ZODIAQ®
QUARTZ SURFACES
DUPONT®

TECHNICAL BULLETIN

September 17, 2001

Safety Questions and Answers: Respirable Silica

Z-2001-012

DuPont's Commitment to Safety

DuPont is committed to selling only products that can be produced, handled and disposed of in a manner compatible with human safety and environmental best practices.

Zodiaq® quartz surfaces has been marketed and sold since April 2000. However, granite and other natural stone products have been fabricated for centuries. Categories of materials like engineered stone products have been manufactured and sold for the last two decades.

We offer the following information about DuPont Zodiaq® and encourage our distributors, marketers, authorized manufacturers, and authorized installers to share it freely.

What are the chemical components of DuPont Zodiaq® quartz surfaces?

Zodiaq® quartz surfaces are composed of approximately 93% quartz, a natural mineral that is commonly found in granite.

The other 7% are a combination of DuPont proprietary polymer, pigments, and other additives. The polymer acts as a binder, which holds the quartz together.
For additional information see the MSDS for Zodiaq®.

Are there health hazards associated with Zodiaq®?

In slab form, as sold by DuPont, Zodiaq® presents no inherent health hazards. Granite, engineered stone, and quartz surfaces, contain crystalline silica, or quartz, which only become a concern upon fabrication when the quartz can become a respirable dust.

What is known about the hazards of respirable crystalline silica dust?

Respirable crystalline silica dust represents a potential health risk.

Respirable dust is defined as dust that is hazardous when deposited in the gas-exchange region of the lung. The lungs take in air, extract oxygen, and release carbon dioxide.

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Respirable dusts clog passage ways by depositing solid material. The natural defense against this solid material is to remove, destroy or isolate the foreign solid particulate by isolation. If **an individual cannot** remove or destroy dust from **their** lungs, the dust particles **become** isolated with scar tissue. Excess scar tissue decreases lung capacity and makes breathing more difficult. This excess scar tissue build up is called pulmonary fibrosis. Pulmonary fibrosis caused by respirable crystalline silica is called silicosis.

Silicosis can be disabling, nonreversible and sometimes produce fatal lung disease. Silicosis is a chronic (caused by long term exposures) lung disease and is characterized by the formation of silica-containing nodules of scar tissue in the lungs. Simple silicosis, in which the nodules are less than 1 cm in diameter (as measured on chest X-ray films) is generally asymptomatic (without symptoms) but can be slowly progressive, even in the absence of continued exposure. Complicated silicosis (i.e., with nodules greater than 1 cm in diameter) is more often associated with disability and can also progress in the absence of continuing exposure.

In addition to silicosis, epidemiology studies show limited evidence of an excess of lung cancer in occupations involving exposures to crystalline silica, such as stone cutters and granite industry workers.

Individuals with preexisting diseases of the lungs may have increased susceptibility to the toxicity of excessive exposures.

What is a high concentration of dust?

The federal government, through the Occupational Safety and Health Administration (OSHA), has established a standard for how much respirable and total crystalline silica dust is allowed in the air in the workplace. The equation used to calculate the PEL, or permissible exposure limit for respirable crystalline silica is (10 mg/m^3)/(% SiO_2 + 2). For Zodiaq®, quartz surface this translates to a PEL for respirable crystalline silica of 0.105 mg/m^3. The equation used to calculate the PEL, or permissible exposure limit for total crystalline silica is (30 mg/m^3)/(% SiO_2 + 2). For Zodiaq®, quartz surface this translates to a PEL for total crystalline silica of 0.316 mg/m^3. In addition, the current American Conference of Governmental Industrial Hygienist (ACGIH) Threshold Limit Value or TLV is 0.05 mg/m^3 (Suspected Human Carcinogen), measured as respirable crystalline silica dust.

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Exposure is reported as a time weighted average (TWA). A TWA value represents the average concentration for a conventional 8-hour workday and a 40-hour workweek to which nearly all workers may be repeatedly exposed, day after day, without adverse effect. The total dust value indicates the combined respirable and non-respirable dust fractions.

What is known about how much dust is created by machining (cutting and grinding) Zodiaq® quartz surfaces?

DuPont has conducted a series of industrial hygiene surveys to assess the level of respirable crystalline silica produced by manufacturing granite and quartz surfaces. The amount of dust produced was dependent on the type of fabrication techniques used.

In areas tested with only wet cutting, grinding, and polishing techniques used the levels of respirable crystalline silica were below the TLV limit of 0.05 mg/m^3. This included areas with bridge saws, in line polishers, CNCs and wet hand polishing areas.

In areas tested with only dry cutting and grinding the levels of respirable crystalline silica were above the TLV of 0.05 mg/m^3 or PEL 0.105 mg/m^3. This included areas where all operations were exposed to dry cutting dust typically produced by a 4-5" blade attached to a right angle grinder. In addition, dust levels were also elevated when dry sweeping.

In areas tested where the dry cutting and grinding were concentrated within a designated area the levels of respirable crystalline silica exceeded the PEL by 2-17X. These areas were typically multiple hand dry cutting and grinding stations isolated by walls or curtains.

Should I expect similar levels in my shop?

Truly respirable dust particles can not be seen with the unaided eye. However, very few processes produce purely respirable dust. Most operations produce dust of which a portion (approximately 50%) is respirable. The remainder is larger particulate dust which is visible, however, does not reach the gas exchange region of the lung.

If your shop produces visible dust while fabricating granite, engineered stone, or quartz surfaces then it is likely that you are exceeding the TLV and possibly the PEL.

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Monitoring for respirable crystalline silica should be performed to insure that maximum allowable levels are not exceeded.

How can I reduce dust exposure in my shop?

OSHA 29CFR1910.1000(e) recommends controlling employee exposure to airborne contaminants through effective engineering controls.

There are several types of effective engineering controls possible to reduce employee exposure to respirable crystalline silica during the fabrication of quartz containing materials. One type of engineering control is to use wet fabrication techniques where all cutting, grinding, and shaping is done wet. The water containing the quartz residue should **NOT** be allowed to dry out on surfaces. Wet hosing rather than compressed air should be used for clean up.

A second type of engineering control is to use ventilation and filtration systems to selectively collect particles in the respirable range. HEPA, high efficiency particulate air, filter systems are designed to collect respirable particulate.

Respirators with high efficiency particulate air (HEPA) filters may also be effective in minimizing respirable crystalline silica dust inhalation where engineering controls fail to eliminate the risk.

Should I provide respirators?

OSHA's Respiratory Protection Standard (29 CFR 1910.134), found in the Code of Federal Regulations' most recent edition, outlines the specifics of a respirator program. OSHA's first recommendation is to control employee exposure to airborne contaminants through effective engineering controls.

Where industrial hygiene sampling indicates the potential for overexposure to dusts not controlled by effective engineering controls, the employer must develop a comprehensive written program to establish respiratory protection for employees before supplying respirators. The program also covers use of respirators by employees when respirators are not required, and information on voluntary use of dust masks by the employee.

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What if I have further questions about using Zodiaq®?

The first contact made should be to the Authorized distributor of Zodiaq® in your area. If the Authorized Distributor is not known you can contact DuPont at 1-877-229-3935.

For additional information about OSHA check the OSHA website at www.OSHA.gov.