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School Materials Safety Manual:

No. 245 Quartz
Issued 9/90

♦ SECTION 1 INTRODUCTION

Material Quartz, ca 100%

Chemical Formula SiO_2

CAS Number 14808-60-7

DOT Classification Not listed as a Hazardous Material for Transportation (49 CFR 172.101)

EPA Classification Not listed as a RCRA Hazardous Waste (40 CFR 261.33), a CERCLA Hazardous Substance (40 CFR 302.4), a SARA Extremely Hazardous Substance (40 CFR 355), or a SARA Toxic Chemical (40 CFR 372.65)

OSHA Classification Listed as an Air Contaminant (29 CFR 1910.1000, Table Z-3)

Synonyms Silicon dioxide, sand, rose quartz, silicic anhydride, amethyst

NFPA Hazard Rating

Not found

Genium Hazard Rating

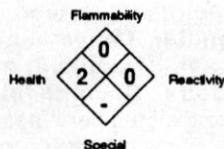
4 = Extreme

3 = High

2 = Moderate

1 = Slight

0 = Minimum



Description Occurring widely in nature, this crystallized silicon dioxide is also grown by mass production methods under carefully regulated temperature and concentration.

Overview Used in electronic components, radio and TV components, and wave filters; as a barrel finishing abrasive; as a piezoelectric control in filters; in oscillators; and in frequency standards. Exposure to quartz occurs in sandblasting, granite-cutting, and tombstone-making; in manufacturing pottery and porcelain; in hard rock mining; in polishing and grinding operations which use natural abrasive wheels; in foundries; in manufacturing silica firebrick; and in spraying of vitreous enamels. Primary use of quartz in the school environment would be in the earth science laboratory. Polishing or grinding activities in art or industrial arts classes are other possible areas of exposure. Presents few hazards if used with care and reasonable precautions.

Manufacturer Always request an up-to-date MSDS from your chemical supplier. That sheet should identify the substance's manufacturer and include an emergency phone number. This *Manual's* Resources/Manufacturers Index lists some larger manufacturers and available emergency phone numbers.

♦ SECTION 2 USE AND STORAGE DATA

Preliminary Planning Considerations Plan and provide for safe disposal of all school-generated chemical waste. Check applicable regulations prior to use. If quartz dust is generated, provide adequate ventilation or restrict use to fume hood to avoid exceeding the TLV (Sec. 4). For safety, *do not wear contact lenses in the lab*; soft lenses may absorb, and all lenses concentrate, irritants. Particles adhering to contact lens surfaces can cause corneal dam-

age. Employees and students should know the location of eyewash and shower facilities near where chemicals are used. Be sure that eyewash stations and safety showers are in good working order.

Usage Precautions and Procedure Before using, read any precautionary statements accompanying quartz materials and follow all recommendations. Avoid inhalation of quartz dust. Do not create airborne dusty conditions by shattering quartz particles. Practice good housekeeping to avoid unintentionally mixing incompatibles. Do not allow dust buildup in lab or work areas. Wear safety glasses or goggles and appropriate protective clothing to work with this substance. Keep this material away from notebooks, textbooks, and personal belongings to avoid transporting dust from the lab/work area. After working with chemical materials, and before eating, drinking, or smoking, always wash hands and face. Remove and launder contaminated clothing before reusing.

Additional Data Quartz is stable at room temperature under normal handling and storage conditions. It does not polymerize. Its incompatibilities include powerful oxidizers such as chlorine trifluoride (ClF_3), manganese trifluoride (MnF_3), oxygen difluoride (OF_2), vinylacetate, and certain other fluorine-containing compounds (unlikely encountered in a school setting). It is attacked by strong alkalis. Upon heating at high temperatures, quartz combines chemically with many metallic oxides.

Preferred Storage Location and Methods To separate incompatible chemicals, store by chemical family, not by alphabetical name. Protect all chemical containers from physical damage. Prohibit smoking in chemical storage areas. Purchase amounts equal to only a year's needs, if at all.

♦ SECTION 3 SPILL/DISPOSAL PROCEDURES

If Spilled Ventilate spill area. Clean up spilled material promptly and thoroughly. Cleanup personnel should protect against inhalation. Use dustless systems (vacuum or wet sweeping) for cleanup so that airborne dust does not exceed the PEL. Do not dry sweep.

Disposal of Small Quantities Check regulations before disposal is necessary. Quartz can probably be disposed of with ordinary trash and taken to a landfill. If this method is not practical, feasible, or in accord with existing regulations, contact your supplier or a licensed disposal contractor for specific treatment/disposal procedures.

Disposal of Larger Amounts Contact your supplier or a licensed disposal company.

Follow all applicable local, state, and Federal regulations for all waste disposal.

♦ SECTION 4 HEALTH HAZARDS

Quartz is a crystalline form of silica. Exposure to these respirable quartz particles may cause silicosis, a chronic pneumoconiosis. The nature of this lung disease varies depending on particle size and the exposure's duration and

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intensity. Chronic silicosis may result from long-term, low-concentration exposure over 20 or more years. Accelerated silicosis may occur after 4 to 8 years of moderately high exposure. The onset of acute silicosis is more rapid and severe in persons exposed to high dust concentrations for less than 3 years. This distinction is important in terms of clinical course and prognosis. Silicosis is characterized by scarring in the lungs seen as nodules and/or fibrosis. In complicated or acute forms, this scarring causes shortness of breath starting with exertion, weight loss, fever, cough, and deterioration that may lead to respiratory failure, heart failure, and death. A high incidence of tuberculosis is associated with silicosis and may be a major cause of illness or death in silicosis patients. The only treatment for silicosis is to avoid additional exposure and to get supportive care.

1989-90 ACGIH TLV 8-hr TWA: 0.1 mg/m³

1987 NIOSH REL 10-hr TWA: 50 µg/m³

1989 OSHA PEL 8-hr TWA: 10 mg/m³ divided by (%SiO₂ + 2)* (respirable), 30 mg/m³ divided by (%SiO₂ + 2)* (total dust)

1985-6 Toxicity Data Human, inhalation, TC_{Lo}: 16 mppcf of air administered intermittently during 8-hr periods over 17.9 years produces pulmonary fibrosis, cough, and difficult breathing; Human, inhalation, LC_{Lo}: 300 µg/m³ administered intermittently over a 10-year period affects the liver

Carcinogenicity Not listed by the NTP, IARC, or OSHA
Acute Effects Acute silicosis is manifested by dyspnea, fever, cough, and weight loss. In cases of exposures to very high concentrations in short periods of time, severe respiratory symptoms may lead to death. Exposure to both crystalline and amorphous quartz dust has a drying effect on the skin and mucous membranes.

Chronic Effects Chronic symptoms include cough, dyspnea, wheezing, increased susceptibility to tuberculosis, decreased chest expansion, and repeated nonspecific chest illnesses. Chronic exposure may also cause fissures, thickening, and general breakdown of skin. Pulmonary function impairment may be progressive with pulmonary infections and cardiac decompensation. As the disease progresses, shortness of breath becomes worse, the cough more productive, leading to extreme dyspnea and cyanosis, marked fatigue, appetite loss, pleuritic pain, and total incapacity to work.

* The formula's percentage of quartz is the amount determined from air-borne samples. By the use of size-selective sampling devices, a fraction of dust is collected and the weight concentration of airborne quartz in the size fraction correlated to the degree of health hazard.

◆ SECTION 5 FIRST AID PROCEDURES

Eye Contact Promptly flush eyes with plenty of running water for at least 15 min, including under the eyelids. Get prompt medical attention.

Skin Contact Wash exposed areas with soap and water.

Inhalation Remove victim from exposure to fresh air and support breathing as necessary.

Ingestion Get *prompt* medical attention. Never give anything by mouth to an unconscious or convulsing person. If ingested, have a conscious person drink 1 to 2 glasses of water, then induce vomiting.

Get proper in-school, paramedic, or community medical attention and support.

◆ SECTION 6 FIRE PROCEDURES AND DATA

Fire Hazards None reported. For major fires, or for fires involving large quantities, firefighters should wear appropriate protective clothing and respirators. A self-contained breathing apparatus (SCBA) is recommended. Be aware of runoff from fire control methods. Do not release contaminated runoff to sewers or waterways.

Flash Point and Method None reported

Autoignition Temperature None reported

Flammability Limits in Air (vol. %) None reported

Hazardous Decomposition Products When exposed to high temperatures, quartz (amorphous silica) can change crystal structure to form tridymite [above 158 °F (870 °C)] or cristobalite [above 2678 °F (1470 °C)] which have greater health hazards than quartz.

Extinguishing Media Since this material is noncombustible, use extinguishing media appropriate to the surrounding fire.

◆ SECTION 7 PHYSICAL DATA

Boiling Point (at 1 atm) 4064 °F (2230 °C)

Melting Point (at 1 atm) 3110 °F (1710 °C)

Vapor Pressure 10 mm at 3150 °F (1732 °C)

Solubility in Water (at 25 °C) Insoluble

Molecular Weight 60.09

Specific Gravity (H₂O = 1) 2.65

References 1, 2-12, 19, 24-27, 31, 34, 37, 38, 71, 73, 87-89, 100, 103, 123, 126, 127; Genium's *Material Safety Data Sheets Collection*, No. 71 (9/80)

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