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QUARTZ
QUARTZ
QUARTZ

MATERIAL SAFETY DATA SHEET

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SUBSTANCE IDENTIFICATION

SUBSTANCE: **QUARTZ**

CAS-NUMBER 14808-60-7

TRADE NAMES/SYNONYMS:

AGATE; AVENTURINE; CRYSTALITE A 1; CRYSTALITE A 2; AMETHYST;
SILICON DIOXIDE; SILICA FLOUR; ROSE QUARTZ; SEA SAND; ROCK CRYSTAL;
QUARTZ (SiO₂); SILICON DIOXIDE, CRYSTALLINE; MARSHALITE; TIGER-EYE;
ALPHA-QUARTZ; SIDERITE; SILICA, CRYSTALLINE; OTTAWA SAND STANDARD;
S150; S151; S152; S153; S23; O2SI; ACCO9890

CHEMICAL FAMILY:
SILICA

MOLECULAR FORMULA: Si-O₂

MOLECULAR WEIGHT: 60.09

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=0 PERSISTENCE=3
NFPA RATINGS (SCALE 0-4): HEALTH=U FIRE=0 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: QUARTZ
CAS# 14808-60-7

PERCENT: 100

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:

QUARTZ:
0.1 MG/M³ OSHA TWA (RESPIRABLE DUST)
0.1 MG/M³ ACGIH TWA (RESPIRABLE DUST)
50 UG/M³ NIOSH RECOMMENDED 10 HOUR TWA

SUBJECT TO CALIFORNIA PROPOSITION 65 CANCER AND/OR REPRODUCTIVE TOXICITY
WARNING AND RELEASE REQUIREMENTS- (OCTOBER 1, 1988)

PHYSICAL DATA

DESCRIPTION: AN ODORLESS, TRANSPARENT, COLORLESS, AND TASTELESS SOLID

BOILING POINT: 4046 F (2230 C) MELTING POINT: 2930 F (1610 C)

SPECIFIC GRAVITY: 2.635-2.660 VAPOR PRESSURE: 10 MMHG @ 1732 C

SOLUBILITY IN WATER: INSOLUBLE

SOLVENT SOLUBILITY: SOLUBLE IN HYDROFLUORIC ACID; VERY SLIGHTLY SOLUBLE IN
ALKALIES

MOHS HARDNESS: 7

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
NEGLIGIBLE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FIREFIGHTING MEDIA:
EXTINGUISH USING AGENT SUITABLE FOR TYPE OF SURROUNDING FIRE.

FIREFIGHTING:
NO ACUTE HAZARD. MOVE CONTAINER FROM FIRE AREA IF POSSIBLE. AVOID BREATHING
VAPORS OR DUSTS; KEEP UPWIND.

Chemistry

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TOXICITY

QUARTZ:

TOXICITY DATA: 16 MILLION PARTICLES/FT3/8 HOURS/17.9 YEARS INTERMITTENT INHALATION-HUMAN TCLO; 300 UG/M3/10 YEARS INTERMITTENT INHALATION-HUMAN LCLO; 200 MG/KG INTRATRACHEAL-RAT LDLO; 90 MG/KG INTRAVENOUS-RAT LDLO; 40 MG/KG INTRAVENOUS-MOUSE LDLO; 20 MG/KG INTRAVENOUS-DOG LDLO; TUMORIGENIC DATA (RTECS).
CARCINOGEN STATUS: HUMAN LIMITED EVIDENCE, ANIMAL SUFFICIENT EVIDENCE (IARC GROUP-2A). A SIGNIFICANT INCIDENCE OF ADENOCARCINOMAS AND SQUAMOUS-CELL CARCINOMAS OF THE LUNG WAS INDUCED IN RATS EXPOSED TO QUARTZ DUSTS FOLLOWING INHALATION AND INTRATRACHEAL ADMINISTRATION, INTRAPERITONEAL AND INTRATRACHEAL INJECTIONS IN RATS OF SUSPENSIONS OF SEVERAL TYPES OF QUARTZ RESULTED IN THORACIC AND ABDOMINAL MALIGNANT LYMPHOMAS. EPIDEMIOLOGIC STUDIES INDICATE LUNG CANCER OCCURS MORE FREQUENTLY AMONG SILICOTICS THAN IN THE GENERAL POPULATION.
ACUTE TOXICITY LEVEL: INSUFFICIENT DATA.
TARGET EFFECTS: POISONING MAY AFFECT THE LUNGS.
AT INCREASED RISK FROM EXPOSURE: PERSONS WITH DECREASED PULMONARY FUNCTION.
ADDITIONAL DATA: CIGARETTE SMOKING MAY ENHANCE THE TOXIC EFFECTS.

HEALTH EFFECTS AND FIRST AID

INHALATION:

QUARTZ:

CARCINOGEN.

ACUTE EXPOSURE- EXPOSURE TO HIGH CONCENTRATIONS MAY CAUSE PHYSICAL DISCOMFORT OF THE UPPER RESPIRATORY TRACT.
CHRONIC EXPOSURE- INHALATION OF VERY HIGH CONCENTRATIONS OF FINELY DIVIDED CRYSTALLINE SILICA DUST, EXPOSURE RANGING FROM A FEW WEEKS TO 4-5 YEARS, MAY CAUSE A RAPIDLY DEVELOPING SILICOSIS, CHARACTERIZED BY PULMONARY INSUFFICIENCY WITH SEVERE DYSPNEA, VIOLENT COUGHING, TACHYPNEA, WEIGHT LOSS, AND CYANOSIS LEADING TO THE DEVELOPMENT OF COR PULMONALE AND DEATH WITHIN A RELATIVELY SHORT PERIOD OF TIME. A SLOWLY DEVELOPING SILICOSIS MAY RESULT FROM EXPOSURE FOR 6 MONTHS-30 YEARS TO RELATIVELY LOW LEVELS OF THE DUST. THE FIRST SYMPTOM IS USUALLY A SLOWLY INCREASING, NON-DISABLING, EXERTIONAL DYSPNEA DUE TO PULMONARY FIBROSIS AND THE EMPHYSEMA ASSOCIATED WITH IT. CONTINUED EXPOSURE MAY INCREASE THE RATE OF PROGRESSION OF THE DISEASE. ALSO, THE FIBROGENIC ACTION MAY CONTINUE WHEN EXPOSURE CEASES. AS THE FIBROSIS ADVANCES, OTHER SYMPTOMS MAY INCLUDE SHORTNESS OF BREATH, PRODUCTIVE COUGH, WHEEZING, CHEST TIGHTNESS OR PAIN, MARKED WEAKNESS, DECREASED CAPACITY FOR WORK, AND REPEATED NON-SPECIFIC CHEST ILLNESSES. CYANOSIS, CLUBBING OF DIGITS, ORTHOPNEA, OR SERIOUS WEIGHT LOSS ARE NOT USUALLY EVIDENT UNTIL THE DISEASE IS ADVANCED. PULMONARY INFECTIONS, WHICH MAY BE INDICATED BY HEMOPTYSIS, AND CARDIAC DECOMPENSATION MAY EXACERBATE THE SYMPTOMS. THREE MAJOR COMPLICATIONS, WHICH ARE THE MOST FREQUENT CAUSES OF DEATH, ARE PULMONARY TUBERCULOSIS, RESPIRATORY INSUFFICIENCY WHICH IS DUE TO THE MASSIVE EMPHYSEMATOUS AND FIBROTIC CHANGES AND IS SOMETIMES ACCOMPANIED BY CHRONIC COR PULMONALE, AND ACUTE BRONCHOPULMONARY INFECTION. A NUMBER OF STUDIES HAVE SHOWN THAT PERSONS DIAGNOSED AS HAVING SILICOSIS HAVE AN INCREASED RISK FOR DYING FROM LUNG CANCER. THIS INCREASE HAS BEEN SEEN AMONG MINERS, QUARRY WORKERS, FOUNDRY WORKERS, CERAMIC WORKERS, GRANITE WORKERS, AND STONE CUTTERS. IN SOME OF THESE STUDIES, THE RISK OF LUNG CANCER INCREASED WITH THE DURATION OF EMPLOYMENT. VARIOUS FORMS AND PREPARATIONS OF CRYSTALLINE SILICA PRODUCED ADENOCARCINOMAS AND SQUAMOUS CELL CARCINOMAS OF THE LUNGS IN RATS.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:

QUARTZ:

ACUTE EXPOSURE- MAY CAUSE IRRITATION OF INTACT SKIN DUE TO MECHANICAL ABRASION. IF THE SKIN IS ABRADED, A HEAVY GROWTH OF SCAR TISSUE MAY BE INDUCED.
CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:

QUARTZ:

ACUTE EXPOSURE- MAY CAUSE IRRITATION DUE TO MECHANICAL ACTION. PARTICLES OF SILICA IN THE RANGE OF 2-3 MICROMETERS INTRODUCED INTO THE CORNEAL STROMA OF RABBIT EYES CAUSED VERY LITTLE REACTION. THESE SAME PARTICLES INTRODUCED INTO THE ANTERIOR CHAMBER RESULTED IN AN INFLAMMATORY REACTION IN 3-5 WEEKS WITH THE FORMATION OF FIBROTIC NODULES IN THE IRIDOCORNEAL ANGLE. FINELY DIVIDED SILICA INJECTED INTO THE VITREOUS OF RABBIT EYES HAS CAUSED NECROSIS OF THE RETINA AND ATROPHY OF THE CHOROID.
CHRONIC EXPOSURE- AN ABNORMALLY HIGH SILICON CONTENT IN THE CORNEA, AND A GRADUAL DECREASE IN VISUAL ACUITY DUE TO CORNEAL OPACITIES IN THE PUPILLARY AREA, HAVE BEEN REPORTED IN A GROUP OF FOUNDRY WORKERS WHO DEVELOPED PULMONARY SILICOSIS.

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FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:

QUARTZ:

ACUTE EXPOSURE- EFFECTS OF INGESTION ARE DUE TO MECHANICAL ACTION AS CRYSTALLINE SILICAS ARE BIOLOGICALLY INERT.
CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY. IF VOMITING OCCURS, KEEP HEAD LOWER THAN HIPS TO PREVENT ASPIRATION.

ANTIDOTE:

NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY:

STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:

SILICON DIOXIDE, CRYSTALLINE:
CHLORINE TRIFLUORIDE: MAY IGNITE.
FLUORINE: FIRE AND EXPLOSION HAZARD.
HYDROFLUORIC ACID: MAY BE ATTACKED.
MANGANESE TRIFLUORIDE: MAY CAUSE VIOLENT REACTION IF HEATED WITH RELEASE OF SILICON TRIFLUORIDE.
MANGANESE TRIOXIDE: POSSIBLE FIRE AND EXPLOSION.
OXYGEN DIFLUORIDE: FIRE HAZARD.
SODIUM (BURNING): MAY REACT.
XENON HEXAFLUORIDE: MAY DETONATE WITH THE FORMATION OF XENON TRIOXIDE.

DECOMPOSITION:

THERMAL DECOMPOSITION MAY RELEASE TOXIC AND/OR HAZARDOUS GASES.

POLYMERIZATION:

HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

STORAGE

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

CONDITIONS TO AVOID

PREVENT DISPERSION OF DUST IN AIR.

SPILL AND LEAK PROCEDURES

OCCUPATIONAL SPILL:

FOR LARGE SPILLS, SWEEP UP WITH A MINIMUM OF DUSTING AND PLACE INTO SUITABLE CLEAN, DRY CONTAINERS FOR RECLAMATION OR LATER DISPOSAL.

RESIDUE SHOULD BE CLEANED UP USING A HIGH-EFFICIENCY PARTICULATE FILTER VACUUM.

ISOLATE SPILL AREA. CLEAN UP BY WET MOPPING OR VACUUMING WITH A HEPA VACUUM.

PROTECTIVE EQUIPMENT

VENTILATION:

PROVIDE LOCAL EXHAUST OR PROCESS ENCLOSURE VENTILATION TO MEET PUBLISHED EXPOSURE LIMITS.

RESPIRATOR:

THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS; NIOSH CRITERIA DOCUMENTS OR BY THE U.S. DEPARTMENT OF LABOR, 29 CFR 1910 SUBPART Z.
THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

SILICA (CRYSTALLINE):

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AT ANY DETECTABLE CONCENTRATION:

ANY SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE AND OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.
ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE AND OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

ESCAPE- ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER.
ANY APPROPRIATE ESCAPE-TYPE SELF-CONTAINED BREATHING APPARATUS.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

ANY SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE AND OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:

EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT EYE CONTACT WITH THIS SUBSTANCE.

EMERGENCY EYE WASH: WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

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