



IN REPLY  
REFER TO:

**DNSC-C**

**DEFENSE LOGISTICS AGENCY**  
DEFENSE NATIONAL STOCKPILE CENTER  
8725 JOHN J. KINGMAN ROAD, SUITE 3229  
FT. BELVOIR, VIRGINIA 22060-6223

**May 1, 2006**

**AMENDMENT NO. 008 TO  
SOLICITATION OF OFFERS FOR  
ALUMINUM OXIDE – ABRASIVE GRAIN  
UNDER DLA-ALUMINUM OXIDE-ABRASIVE GRAIN-003**

The above referenced Solicitation of Offers, DLA-ALUMINUM OXIDE-ABRASIVE GRAIN-003, dated July 29, 2003, for the sale of aluminum oxide-abrasive grain is hereby amended to provide a **May 15, 2006** offering, revise Section A.I a. Introduction and other sections of the solicitation, and to update the listing of available material as follows:

**1. SECTION A - SOLICITATION, Subsection A.1 Introduction (AUG 05), Paragraph a.**

Delete this paragraph in its entirety and replace with the following:

**a.** The Defense Logistics Agency (DLA), Defense National Stockpile Center (DNSC), is soliciting offers for the sale of approximately **6,000 short tons of aluminum oxide-abrasive grain** for one or more contracts with a contract period not to exceed **180** calendar days. The offering will be held at 1:30 P.M., on **Monday, May 15, 2006**. Offers must be received at the address in Section B.2.a. by **1:30 P.M.** local time, Fort Belvoir, VA. In the event that DNSC is closed at that time, offers for that day will be received at 1:30 P.M. on the next DNSC business day.

**2. Section I.2 Item Offer Page - DLA-ALUMINUM OXIDE-ABRASIVE GRAIN-003 (JAN 06)** is hereby replaced with the attached **Section I.2 Item Offer Page - DLA-ALUMINUM OXIDE-ABRASIVE GRAIN-003 (APR 06)**.

**3. Section J.3 Material Safety Data Sheet (MAR 05)** is hereby deleted in its entirety and replaced with the attached **Section J.3 Material Safety Data Sheet (MAR 06)**.

**4. Offerors shall indicate acknowledgment of receipt of this Amendment by signing in the space provided below and returning this form and Sections I.1 Sale of Government Property Negotiated Sales Contract (JUN 05), I.3 Certificate of Independent Price Determination (JAN 01) and Section I.4 Certification Regarding Debarment, Suspension, Proposed Debarment, Environmental Compliance and Other Responsibility Matters (JUL 97)** from the initial solicitation of offers for Aluminum Oxide, Abrasive Grain-003 dated, July 29, 2003 along with their offer to:

ATTN: DNSC-R/Bid Custodian  
Defense National Stockpile Center  
8725 John J. Kingman Road Suite 3229  
Fort Belvoir, VA 22060-3229  
Facsimile No. (703) 767-5541

Failure to acknowledge receipt of this Amendment may result in the Offeror being ineligible for award.

Except as provided herein, all other terms and conditions of DLA-ALUMINUM OXIDE-ABRASIVE GRAIN-003 and (as amended by) Amendments No. 001, 004, 005,006 and 007 remain unchanged and in full force and effect.

**NAME OF FIRM:** \_\_\_\_\_

**ADDRESS:** \_\_\_\_\_

\_\_\_\_\_

**TELEPHONE:** \_\_\_\_\_

**FACSIMILE:** \_\_\_\_\_

**EMAIL:** \_\_\_\_\_

**BY:** \_\_\_\_\_

**SIGNATURE:** \_\_\_\_\_

**TITLE:** \_\_\_\_\_

**DATE:** \_\_\_\_\_

Solicitation of Offers DLA-ALUMINUM OXIDE-ABRASIVE GRAIN-003, Amendment Nos. 001, 004, 005, 006, 007 and this amendment, are available on the DNSC Website: <https://www.dnsc.dla.mil>.

**SECTION I - SUBMITTALS**

COMPLETE AND RETURN ALL OF THE FOLLOWING WITH YOUR OFFER, UNLESS ANNUAL REPRESENTATIONS, CERTIFICATIONS, AND IDENTIFICATIONS HAVE BEEN SUBMITTED THIS FISCAL YEAR, THEN SUBMIT I.1, I.2, I.3, AND I.4 ONLY:

- I.1 Sale of Government Property Negotiated Sales Contract (JUN 05)**
- I.2 Item Offer Page - DLA-ALUMINUM OXIDE-ABRASIVE GRAIN-003 (APR 06)**
- I.3 Certificate of Independent Price Determination (JAN 01)**
- I.4 Certification Regarding Debarment, Suspension, Proposed Debarment, Environmental Compliance, and Other Responsibility Matters (JUL 97)**
- I.5 Type of Business Organization (APR 96)**
- I.6 Authorized Negotiators (JUN 95)**
- I.7 Persons Authorized to Request Shipment of Material (FEB 98)**
- I.8 Offeror's Billing Address (JUL 95)**

**I.1 Sale of Government Property Negotiated Sales Contract (JUN 05)**

<b>SALE OF GOVERNMENT PROPERTY NEGOTIATED SALES CONTRACT</b>		<b>CONTRACT NUMBER</b>		<b>PAGE 1 OF</b>	
<p>This contract is entered into by and between the United States of America, hereinafter called the "Government", represented by the Contracting Officer executing this Contract and the Contractor identified below. The Government agrees to sell and the Contractor agrees to buy the material described below in accordance with the terms and conditions of DLA-ALUMINUM OXIDE-ABRASIVE GRAIN-003. In the event of a conflict between the terms on the Solicitation and this Negotiated Sales Contract, the terms on the Negotiated Sales Contract shall govern.</p>					
	<b>PROPERTY DESCRIPTION AND LOCATION</b>	<b>QUANTITY</b>	<b>UNIT</b>	<b>UNIT PRICE</b>	<b>AMOUNT</b>
<b>ALUMINUM OXIDE-ABRASIVE GRAIN:</b>					
<b>CONTRACT PERIOD EXPIRES ON:</b>					
<b>EXECUTION BY CONTRACTOR</b>			<b>EXECUTION BY GOVERNMENT</b>		
DATE (Day, Month, Year)			UNITED STATES OF AMERICA		DATE:
NAME and SIGNATURE OF CONTRACTOR Name and Title:  _____  Signature and Title of Person Authorized to Sign			BY: _____		
CONTRACTOR'S NAME AND ADDRESS (Street, City, State and Zip)  _____ _____ _____ _____  Telephone Number: _____ Facsimile Number: _____			NAME AND TITLE OF CONTRACTING OFFICIAL  Name: _____  Contracting Officer <span style="float: right;">DNSC-C</span>		

## I.2 Item Offer Page-DLA-ALUMINUM OXIDE-ABRASIVE GRAIN-003 (APR 06)

## ALUMINUM OXIDE - CATEGORY I Grain Size - 36-220

ITEM NUMBER	STORAGE LOCATION	COUNTRY OF ORIGIN	GRAIN SIZE	RANGE OF BULK DENSITY	NUMBER OF DRUMS	NUMBER OF POUNDS	SHORT TONS	BID QUANTITY (SHORT TONS)	UNIT PRICE (per ST)	TOTAL BID PRICE
10	Scotia, NY	Domestic	46	1.82 - 1.91	258	265,215	132.61		\$	\$
11	Scotia, NY	Domestic	54	1.81 - 1.90	604	621,255	310.63		\$	\$
50	Somerville, NJ	Domestic	46	1.82 - 1.91	2,550	2,525,388	1,262.69		\$	\$
51	Somerville, NJ	Domestic	54	1.81-1.90	1,806	1,765,059	882.53		\$	\$
94	Warren, OH	Domestic	46	1.82-1.91	693	713,900	356.00		\$	\$
95	Warren, OH	Domestic	54	1.81-1.90	272	278,000	139.00		\$	\$
143	Hammond, IN	Domestic	36	1.83-1.92	1,025	1,076,250	538.064		\$	\$
144	Hammond, IN	Domestic	46	1.82-1.91	921	962,445	480.015		\$	\$
145	Hammond, IN	Domestic	54	1.81-1.90	1,116	1,163,988	581.753		\$	\$
146	Hammond, IN	Domestic	60	1.78-1.87	2	2,048	4.280		\$	\$

## ALUMINUM OXIDE - CATEGORY II Grain Size 8-30

66	New Haven, IN	Domestic	20	1.93 - 2.02	740	743,900	372.00		\$	\$
67	New Haven, IN	Domestic	24	1.90 - 1.99	381	384,350	193.00		\$	\$
141	Hammond, IN	Domestic	24	1.90-1.99	894	948,000	474.00		\$	\$
142	Hammond, IN	Domestic	30	1.86-1.95	319	335,714	167.857		\$	\$

COMPANY NAME: \_\_\_\_\_

NAME: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

TITLE: \_\_\_\_\_

DATE: \_\_\_\_\_

\* Minimum offer is 20 ST or a full line item if that line item quantity is less than 20 ST.

### I.3 Certificate of Independent Price Determination (JAN 01)

- a. The Offeror certifies that:
- (1) The prices in this offer have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other Offeror or competitor relating to (i) those prices, (ii) the intention to submit an offer, or (iii) the methods or factors used to calculate the prices offered;
  - (2) The prices in this offer have not been and will not be knowingly disclosed by the Offeror, directly or indirectly, to any other Offeror or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a negotiated solicitation) unless otherwise required by law; and
  - (3) No attempt has been made or will be made by the Offeror to induce any other concern to submit or not to submit an offer for the purpose of restricting competition.

- b. Each signature on the offer is considered to be a certification by the signatory that the signatory:

- (1) Is the person in the Offeror's organization responsible for determining the prices being offered in this bid or offer, and that the signatory has not participated and will not participate in any action contrary to subparagraphs a.(1) through a.(3) above; or
- (2)(i) Has been authorized, in writing, to act as agent for the following principals in certifying that those principals have not participated, and will not participate in any action contrary to subparagraphs a.(1) through a.(3), above

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*(insert full name of person(s) in the Offeror's organization responsible for determining the prices offered in this bid or offer, and the title of his or her position in the Offeror's organization);*

- (ii) As an authorized agent, does certify that the principals named in subdivision b.(2)(i) above have not participated, and will not participate, in any action contrary to subparagraphs a.(1) through a.(3) above; and
  - (iii) As an agent, has not personally participated, and will not participate, in any action contrary to subparagraphs a.(1) through a.(3) above.
- c. If the Offeror deletes or modifies subparagraph a.(2) above, the Offeror must furnish with its offer a signed statement setting forth in detail the circumstances of the disclosure.

### I.4 Certification Regarding Debarment, Suspension, Proposed Debarment, Environmental Compliance and Other Responsibility Matters (JUL 97)

- a.(1) The Offeror certifies, to the best of its knowledge and belief, that -
- (i) The Offeror and/or any of its Principals -
    - (A) Are  are not  presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency;
    - (B) Have  have not , within a three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, state or local) contract or subcontract; violation of Federal or state antitrust statutes relating to the

submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property; and  
 (C) Are  are not  presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in subdivision **a. (1)(i)(B)** of this provision.

(D) Are  are not  presently indicted for or otherwise criminally or civilly charged by a Federal, state or local entity with violation of any environmental laws;

(E) Have  have not  within the three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for violation of a Federal, state or local environmental statute or regulation.

(ii) The Offeror has  has not , within a three-year period preceding this offer, had one or more contracts terminated for default by any Federal agency.

(2) "Principals," for the purposes of this certification, means officers; directors; owners; partners; and, persons having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager; head of a subsidiary, division, or business segment, and similar positions).

(3) If the Offeror answers affirmatively to **(a)(1)**, above, the Offeror shall include in its offer an explanation of the circumstances, including the outcome.

This certification concerns a matter within the jurisdiction of an agency of the United States and the making of a false, fictitious, or fraudulent certification may render the maker subject to prosecution under section 1001, title 18, United States Code.

- b. The Offeror shall provide immediate written notice to the Contracting Officer if, at any time prior to contract award, the Offeror learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
- c. A certification that any of the items in paragraph **a.** of this provision exists will not necessarily result in withholding of an award under this Solicitation. However, the certification will be considered in connection with a determination of the Offeror's responsibility. Failure of the Offeror to furnish a certification or provide such additional information as requested by the Contracting Officer may render the Offeror nonresponsible.
- d. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by paragraph **a.** of this provision. The knowledge and information of an Offeror is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
- e. The certification in paragraph **a.** of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Offeror knowingly rendered an erroneous certification, in addition to the other remedies available to the Government, the Contracting Officer may terminate the contract resulting from this Solicitation for default.

### **I.5 Type of Business Organization (APR 96)**

The Offeror represents that--

- a. It operates as  a corporation incorporated under the laws of the State of \_\_\_\_\_,  an individual,  a partnership,  a nonprofit organization, or  a joint venture.

- b. If the Offeror is a foreign entity, it operates as  an individual,  a partnership,  a nonprofit organization,  a joint venture, or  a corporation registered for business in \_\_\_\_\_ (country)
- c. If the Offeror is a corporation, it is  independent (not owned or controlled by another company),  owned or controlled by \_\_\_\_\_ corporation company registered for business in \_\_\_\_\_ (state/country).
- d. If the Offeror is owned or controlled by another, state the relationship (e.g., wholly owned subsidiary, etc.):  
\_\_\_\_\_
- e. The Offeror agrees to provide additional information relating to the above representations if requested to do so by the Contracting Officer.

**I.6 Authorized Negotiators (JUN 95)**

The Offeror represents that the following individuals are authorized to negotiate on its behalf.

TYPED NAME	TITLE	TELEPHONE NO.

**I.7 Persons Authorized to Request Shipment of Material (FEB 98)**

The Offeror shall provide the name(s), title(s), signature(s), and telephone number(s) of representative(s) authorized to sign Section J.3 Shipping Instructions:

TYPED NAME	SIGNATURE	TITLE	TELEPHONE NO.

**I.8 Offeror's Billing Address (JUL 95)**

The Offeror shall provide its billing address, billing facsimile number and email address below.

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**FAX** \_\_\_\_\_ **Email:** \_\_\_\_\_

Section J.3 MATERIAL SAFETY DATA SHEET (MAR 06)

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1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

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DEFENSE LOGISTICS AGENCY  
DEFENSE NATIONAL STOCKPILE CENTER  
8725 JOHN J. KINGMAN ROAD  
SUITE 3339  
FORT BELVOIR, VA 22060-6223

EMERGENCY TELEPHONE NUMBER:  
1-800-424-9300 (NORTH AMERICA)  
1-703-527-3887 (INTERNATIONAL)

SUBSTANCE: ALUMINUM OXIDE, ABRASIVE GRAIN

TRADE NAMES/SYNONYMS:  
DLANA381

CREATION DATE: Jul 24 1992  
REVISION DATE: Mar 16 2006

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2. COMPOSITION, INFORMATION ON INGREDIENTS

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COMPONENT: ALUMINUM OXIDE  
CAS NUMBER: 1344-28-1  
EC NUMBER (EINECS): 215-691-6  
PERCENTAGE: >94.0

COMPONENT: TITANIUM DIOXIDE  
CAS NUMBER: 13463-67-7  
EC NUMBER (EINECS): 236-675-5  
PERCENTAGE: 2.0-3.0

COMPONENT: SILICON DIOXIDE  
CAS NUMBER: 7631-86-9  
EC NUMBER (EINECS): 231-545-4  
PERCENTAGE: <2.0

COMPONENT: FERRIC OXIDE RED  
CAS NUMBER: 1309-37-1  
EC NUMBER (EINECS): 215-168-2  
PERCENTAGE: <0.75

COMPONENT: CALCIUM OXIDE  
CAS NUMBER: 1305-78-8  
EC NUMBER (EINECS): 215-138-9  
PERCENTAGE: <0.35

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3. HAZARDS IDENTIFICATION

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**NFPA RATINGS (SCALE 0-4):** HEALTH=1 FIRE=0 REACTIVITY=0



**EMERGENCY OVERVIEW:**

**COLOR:** gray to brown, red to brown

**PHYSICAL FORM:** solid

**MAJOR HEALTH HAZARDS:** cancer hazard (in humans)

**POTENTIAL HEALTH EFFECTS:**

**INHALATION:**

**SHORT TERM EXPOSURE:** irritation, metal fume fever, chest pain, difficulty breathing

**LONG TERM EXPOSURE:** irritation, cough, weight loss, chest pain, difficulty breathing, bluish skin color, lung damage, cancer

**SKIN CONTACT:**

**SHORT TERM EXPOSURE:** irritation

**LONG TERM EXPOSURE:** irritation

**EYE CONTACT:**

**SHORT TERM EXPOSURE:** irritation

**LONG TERM EXPOSURE:** eye damage

**INGESTION:**

**SHORT TERM EXPOSURE:** irritation

**LONG TERM EXPOSURE:** no information on significant adverse effects

**CARCINOGEN STATUS:**

**OSHA:** No

**NTP:** Yes

**IARC:** Yes

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**4. FIRST AID MEASURES**

**INHALATION:** If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

**SKIN CONTACT:** Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

**EYE CONTACT:** Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

**INGESTION:** If a large amount is swallowed, get medical attention.

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**5. FIRE FIGHTING MEASURES**

**FIRE AND EXPLOSION HAZARDS:** Negligible fire hazard.

**EXTINGUISHING MEDIA:** Use extinguishing agents appropriate for surrounding fire.

**FIRE FIGHTING:** Move container from fire area if it can be done without risk. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.

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## 6. ACCIDENTAL RELEASE MEASURES

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### **WATER RELEASE:**

Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65).  
Keep out of water supplies and sewers.

### **OCCUPATIONAL RELEASE:**

Large spills: Collect spilled material in appropriate container for disposal. Avoid generating dust.  
Clean up residue with a high-efficiency particulate filter vacuum.

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## 7. HANDLING AND STORAGE

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**STORAGE:** Store and handle in accordance with all current regulations and standards. See original container for storage recommendations. Keep separated from incompatible substances.

**HANDLING:** Use methods to minimize dust.

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## 8. EXPOSURE CONTROLS, PERSONAL PROTECTION

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### **EXPOSURE LIMITS:**

#### **ALUMINUM OXIDE:**

#### **ALUMINUM OXIDE (ALUMINA):**

5 mg/m<sup>3</sup> OSHA TWA (respirable dust fraction)

15 mg/m<sup>3</sup> OSHA TWA (total dust)

10 mg/m<sup>3</sup> OSHA TWA (total particulate) (vacated by 58 FR 35338, June 30, 1993)

10 mg/m<sup>3</sup> ACGIH TWA

1.5 mg/m<sup>3</sup> DFG MAK (respirable fraction) (peak limitation category - II, with excursion factor of 8) (fume)

0.25 fibers/cc AGS TRK (fibrous forms) (effective 1 Jan 2005 no longer valid per amendment)

10 mg/m<sup>3</sup> UK WEL TWA (total inhalable dust)

4 mg/m<sup>3</sup> UK WEL TWA (respirable dust)

**MEASUREMENT METHOD:** Particulate filter; Gravimetric; NIOSH IV # 0500, Nuisance Dust (total), # 0600 (respirable)

#### **TITANIUM DIOXIDE:**

15 mg/m<sup>3</sup> OSHA TWA (total dust)

10 mg/m<sup>3</sup> OSHA TWA (total particulate) (vacated by 58 FR 35338, June 30, 1993)

10 mg/m<sup>3</sup> ACGIH TWA

NIOSH TWA (lowest feasible concentration)

1.5 mg/m<sup>3</sup> DFG MAK (respirable fraction)

10 mg/m<sup>3</sup> UK WEL TWA (total inhalable dust)

4 mg/m<sup>3</sup> UK WEL TWA (respirable dust)

**MEASUREMENT METHOD:** Particulate filter; Acid; Flame atomic absorption spectrometry; NIOSH II(3) # S385

#### **SILICON DIOXIDE:**

**SILICON DIOXIDE, AMORPHOUS (SILICA, AMORPHOUS):**

20 mppcf OSHA TWA (<1% crystalline silica)  
OSHA TWA (<1% crystalline silica) (80 mg/m<sup>3</sup> divided by %SiO<sub>2</sub>)  
10 mg/m<sup>3</sup> ACGIH TWA (inhalable fraction) (no asbestos and <1% crystalline silica)  
3 mg/m<sup>3</sup> ACGIH TWA (respirable fraction) (no asbestos and <1% crystalline silica)  
6 mg/m<sup>3</sup> NIOSH recommended TWA 10 hour(s)  
4 mg/m<sup>3</sup> DFG MAK (inhalable fraction)  
0.3 mg/m<sup>3</sup> DFG MAK (respirable fraction)  
6 mg/m<sup>3</sup> UK WEL TWA (total inhalable dust)  
2.4 mg/m<sup>3</sup> UK WEL TWA (respirable dust)

**MEASUREMENT METHOD:** Particulate filter; Low-temperature ashing; X-ray diffraction spectrometry; NIOSH IV # 7501

**QUARTZ:**

0.3 mg/m<sup>3</sup> OSHA TWA (total dust) (30 mg/m<sup>3</sup> divided by %SiO<sub>2</sub> + 2, based on size/aerodynamic characteristics)  
0.1 mg/m<sup>3</sup> OSHA TWA (respirable dust) (10 mg/m<sup>3</sup> divided by %SiO<sub>2</sub> + 2, based on size/aerodynamic characteristics)  
2.38 mppcf OSHA TWA (respirable dust) (250 mppcf divided by %SiO<sub>2</sub> in airborne sample + 5)  
0.05 mg/m<sup>3</sup> ACGIH TWA (respirable fraction)  
0.05 mg/m<sup>3</sup> NIOSH recommended TWA 10 hour(s) (respirable dust)  
0.3 mg/m<sup>3</sup> UK WEL TWA (respirable particulate) (Chemical Hazard Alert Notice issued)

**MEASUREMENT METHOD:** Particulate filter; Low-temperature ashing; X-ray diffraction spectrometry; NIOSH IV # 7500; ALSO # 7601, # 7602

**VENTILATION:** Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

**EYE PROTECTION:** Wear splash resistant safety goggles. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

**CLOTHING:** Wear appropriate chemical resistant clothing.

**GLOVES:** Wear appropriate chemical resistant gloves.

**RESPIRATOR:** Under conditions of frequent use or heavy exposure, respiratory protection may be needed. Respiratory protection is ranked in order from minimum to maximum. Consider warning properties before use.

Any dust, mist, and fume respirator.

Any air-purifying respirator with a high-efficiency particulate filter.

Any powered, air-purifying respirator with a dust, mist, and fume filter.

Any powered, air-purifying respirator with a high-efficiency particulate filter.

**For Unknown Concentrations or Immediately Dangerous to Life or Health -**

Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.

Any self-contained breathing apparatus with a full facepiece.

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**PHYSICAL STATE:** solid  
**COLOR:** gray to brown, red to brown  
**ODOR:** Not available  
**BOILING POINT:** Not applicable  
**MELTING POINT:** Not available  
**VAPOR PRESSURE:** Not applicable  
**VAPOR DENSITY:** Not applicable  
**SPECIFIC GRAVITY:** Not available  
**WATER SOLUBILITY:** Not available  
**PH:** Not applicable  
**VOLATILITY:** Not applicable  
**ODOR THRESHOLD:** Not available  
**EVAPORATION RATE:** Not applicable  
**COEFFICIENT OF WATER/OIL DISTRIBUTION:** Not available

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## 10. STABILITY AND REACTIVITY

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**REACTIVITY:** Stable at normal temperatures and pressure.

**CONDITIONS TO AVOID:** Avoid generating dust.

**INCOMPATIBILITIES:** halo carbons, halogens, combustible materials, oxidizing materials, metals, acids, metal salts

ALUMINUM OXIDE (ALUMINA):

CHLORINATED RUBBER (HOT): Incompatible.

CHLORINE TRIFLUORIDE: Violent reaction and possible ignition.

ETHYLENE OXIDE: May initiate explosive polymerization.

HALOCARBONS: Exothermic reaction above 200 C.

HALOCARBONS + METALS: Exothermic reaction at ambient temperatures.

OXYGEN DIFLUORIDE: Exothermic reaction.

SODIUM NITRATE: May form explosive mixture.

VINYL ACETATE: Possible vigorous reaction.

TITANIUM DIOXIDE:

ALUMINUM: Reaction is accompanied by incandescence.

CALCIUM: Reaction is accompanied by incandescence.

LITHIUM: Reaction occurs around 200 C, with incandescence.

MAGNESIUM: Reaction is accompanied by incandescence.

POTASSIUM: Reaction is accompanied by incandescence.

SODIUM: Reaction is accompanied by incandescence.

ZINC: Reaction is accompanied by incandescence.

SILICON DIOXIDE:

CHLORINE TRIFLUORIDE: Fire hazard.

FLUORINE: Fire hazard.

HYDROCHLORIC ACID + WATER: Explosion hazard with gel form.

HYDROFLUORIC ACID: Dissolves, releasing silicon tetrafluoride.

HYDROGEN FLUORIDE: Incompatible.

HYDROGENATED VEGETABLE OILS: Incompatible.  
MAGNESIUM (POWDERED): Explosion hazard on heating in the presence of moisture.  
MANGANESE TRIFLUORIDE: May react violently on heating, releasing silicon tetrafluoride.  
OXIDIZERS (STRONG): Fire and explosion hazard.  
OXYGEN DIFLUORIDE: Explosion hazard under certain conditions and in the presence of moisture.  
OZONE: Potential explosion hazard at low temperatures if organic material is present.  
PHOSPHORIC ACID (CONCENTRATED): Attacks on heating.  
SODIUM (BURNING): Reacts with finely divided silica.  
VINYL ACETATE (VAPOR): May react vigorously with gel form.  
XENON HEXAFLUORIDE: May react explosively by forming xenon trioxide.

**HAZARDOUS DECOMPOSITION:**

Thermal decomposition products: miscellaneous decomposition products

**POLYMERIZATION:** Will not polymerize.

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11. TOXICOLOGICAL INFORMATION

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**ALUMINUM OXIDE:**

**TOXICITY DATA:**

>3600 mg/kg intraperitoneal-mouse LD50; 200 mg/m<sup>3</sup>/5 hour(s)-28 week(s) intermittent inhalation-rat TCl<sub>0</sub>; 200 mg/m<sup>3</sup>/5 hour(s)-28 week(s) intermittent inhalation-rabbit TCl<sub>0</sub>

**CARCINOGEN STATUS:** ACGIH: A4 -Not Classifiable as a Human Carcinogen

**ACUTE TOXICITY LEVEL:** Insufficient Data.

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** respiratory disorders

**TUMORIGENIC DATA:**

90 mg/kg intrapleural-rat TDLo; 200 mg/kg implant-rat TDLo; 200 mg/kg implant-rat TD

**TITANIUM DIOXIDE:**

**IRRITATION DATA:**

300 ug/3 day(s)-intermittent skin-human mild

**TOXICITY DATA:**

6820 mg/m<sup>3</sup>/4 hour(s) inhalation-rat LC50; >24000 mg/kg oral-rat LD50; >100 ug/kg intratracheal-rat LD; 60 gm/kg oral-rat TDLo; 100 mg/kg intratracheal-mouse TDLo; 250 mg/m<sup>3</sup>/6 hour(s)-4 week(s) intermittent inhalation-rat TCl<sub>0</sub>; 50 mg/m<sup>3</sup>/6 hour(s)-13 week(s) intermittent inhalation-rat TCl<sub>0</sub>; 10 mg/m<sup>3</sup>/6 hour(s)-13 week(s) intermittent inhalation-mouse TCl<sub>0</sub>; 250 mg/m<sup>3</sup>/6 hour(s)-13 week(s) intermittent inhalation-hamster TCl<sub>0</sub>

**CARCINOGEN STATUS:** IARC: Human Inadequate Evidence, Animal Limited Evidence, Group 3; ACGIH: A4 -Not Classifiable as a Human Carcinogen

Increased incidences of lung adenomas in rats of both sexes and of cystic keratinizing lesions diagnosed as squamous-cell carcinomas in female rats were observed in animals that had inhaled high but not low doses of titanium dioxide. Intratracheal administration of titanium dioxide in combination with benzo(a)pyrene to hamsters resulted in an increase in the incidence of benign and malignant tumors of the larynx, trachea and lungs over that in benzo(a)pyrene-treated controls.

**ACUTE TOXICITY LEVEL:**

Moderately Toxic: inhalation

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** respiratory disorders

**TUMORIGENIC DATA:**

250 mg/m<sup>3</sup> inhalation-rat TCLo/6 hour(s)-2 year(s) intermittent; 360 mg/kg intramuscular-rat TDLo/2 year(s) intermittent; 260 mg/kg intramuscular-rat TD/84 week(s) intermittent; 10 mg/m<sup>3</sup> inhalation-rat TC/18 hour(s)-2 year(s) intermittent

**MUTAGENIC DATA:**

micronucleus test - mouse intraperitoneal 3 gm/kg 3 day(s)-continuous; micronucleus test - hamster ovary 5 umol/L; DNA inhibition - hamster lung 500 mg/L; sister chromatid exchange - hamster ovary 1 umol/L

**SILICON DIOXIDE:**

**TOXICITY DATA:**

>200 gm/m<sup>3</sup>/1 hour(s) inhalation-rat LC; 224 mg/kg/4 week(s) continuous oral-dog TDLo

**CARCINOGEN STATUS:** IARC: Human Inadequate Evidence, Animal Inadequate Evidence, Group 3 (Amorphous silica)

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** respiratory disorders

**QUARTZ:**

**TOXICITY DATA:**

16 mppcf/8 hour(s)-17.9 year(s) intermittent inhalation-human TCLo; 300 ug/m<sup>3</sup>/10 year(s) intermittent inhalation-human LCLo; 90 mg/kg intravenous-rat LDLo; 200 mg/kg intratracheal-rat LDLo; 40 mg/kg intravenous-mouse LDLo; >20 mg/kg intratracheal-mouse LD; 20 mg/kg intravenous-dog LDLo; 200 mg/kg inhalation-rat TCLo; 250 mg/kg intratracheal-rat LDLo; 240 mg/kg/1 hour(s) intratracheal-rat TDLo; 1.5 mg/kg intratracheal-rat TDLo; 120 gm/kg oral-rat TDLo; 15.69 mg/kg intratracheal-rat TDLo; 16.7 mg/kg intratracheal-mouse TDLo; 40 mg/kg inhalation-mouse TCLo; 25 mg/kg intratracheal-rat TDLo; 20 mg/kg implant-rabbit TDLo; 80 mg/kg intratracheal-mouse TDLo; 150 mg/kg intratracheal-rat TDLo; 40 mg/kg inhalation-mouse TCLo; 80 mg/kg intratracheal-mouse TDLo; 100 mg/kg intratracheal-mouse TDLo; 80 mg/m<sup>3</sup>/26 week(s) intermittent inhalation-rat TCLo; 108 mg/m<sup>3</sup>/6 hour(s)-3 day(s) intermittent inhalation-rat TCLo; 58 mg/m<sup>3</sup>/13 week(s) intermittent inhalation-rat TCLo; 1475 ug/m<sup>3</sup>/8 hour(s)-21 week(s) intermittent inhalation-mouse TCLo; 4932 ug/m<sup>3</sup>/24 hour(s)-39 week(s) continuous inhalation-mouse TCLo; 28 mg/m<sup>3</sup>/3 week(s) intermittent inhalation-guinea pig TCLo; 3 mg/m<sup>3</sup>/6 hour(s)-78 week(s) intermittent inhalation-hamster TCLo; 1000 gm/m<sup>3</sup>/10 day(s) intermittent inhalation-domestic animal TCLo; 2.88 mg/kg/12 week(s) intermittent intratracheal-rat TDLo; 11.52 mg/kg/12 week(s) intermittent intratracheal-rat TDLo; 15 mg/m<sup>3</sup>/26 week(s) intermittent inhalation-rat TCLo; 0.74 mg/m<sup>3</sup>/2 year(s) intermittent inhalation-rat TCLo; 10 mg/m<sup>3</sup>/75 day(s) intermittent inhalation-rat TCLo; 10 mg/m<sup>3</sup>/818 day(s) intermittent inhalation-monkey TCLo; 240 ug/kg/12 week(s) intermittent intratracheal-rat TDLo; 960 ug/kg/12 week(s) intermittent intratracheal-rat TDLo

**CARCINOGEN STATUS:** NTP: Known Human Carcinogen; IARC: Human Sufficient Evidence, Animal Sufficient Evidence, Group 1; ACGIH: A2 -Suspected Human Carcinogen; EC: Category 2 Adenocarcinomas and squamous-cell carcinomas of the lung in rats were produced after inhalation or repeated intratracheal instillation of various forms of crystalline silica. Malignant lymphomas developed in rats after intrapleural and intraperitoneal injections of quartz suspensions and intrapleural injection of cristobalite and tridymite. Epidemiologic studies indicate lung cancer occurs more frequently among silicotics than in the general population.

**ACUTE TOXICITY LEVEL:** Insufficient Data.

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** respiratory disorders

**TUMORIGENIC DATA:**

50 mg/m<sup>3</sup> inhalation-rat TCLo/6 hour(s)-71 week(s) intermittent; 45 mg/kg intraperitoneal-rat TDLo; 90 mg/kg intravenous-rat TDLo; 90 mg/kg intrapleural-rat TDLo; 111 mg/kg intratracheal-

rat TDLo; 100 mg/kg intratracheal-rat TDLo/19 week(s) intermittent; 900 mg/kg implant-rat TDLo; 4000 mg/kg implant-mouse TDLo; 83 mg/kg intrapleural-hamster TDLo; 90 mg/kg intraperitoneal-rat TD/4 week(s) intermittent; 450 mg/kg intraperitoneal-rat TD/4 week(s) intermittent; 4554 mg/kg implant-rat TD; 200 mg/kg intrapleural-rat TD; 100 mg/kg intrapleural-rat TD; 100 mg/kg intrapleural-rat TD; 100 mg/kg intrapleural-rat TD

**MUTAGENIC DATA:**

micronucleus test - human lung 40 ug/cm<sup>2</sup>; micronucleus test - hamster lung 160 ug/cm<sup>2</sup>; DNA damage - rat intratracheal 3 mg/kg

**ADDITIONAL DATA:** Smoking may enhance the toxic effects.

**HEALTH EFFECTS:**

**INHALATION:**

ALUMINUM OXIDE (ALUMINA): Inhalation of high concentrations may cause coughing, shortness of breath, respiratory tract irritation due to mechanical action, unpleasant deposits in the nasal passages, and exacerbation of symptoms in persons with impaired pulmonary function. Humans exposed chronically to aluminum oxide, particle size approximately 1.2 microns, did not experience either systemic or respiratory adverse effects. Hydrated aluminum oxide, injected intratracheally, produced dense and numerous nodules of advanced fibrosis in rats, a reticulin network with occasional collagen fibers in mice and guinea pigs, and only a slight reticulin network in rabbits. A production process in which aluminum oxide (bauxite), iron, coke, and silica are fused at 2000 C poses a threat of Shaver's disease, a rapidly progressive and often fatal interstitial fibrosis of the lungs. See information on metal fume fever.

**ACUTE EXPOSURE:**

METAL FUME FEVER: Metal fume fever, an influenza-like illness, may occur due to the inhalation of freshly formed metal oxide particles sized below 1.5 microns and usually between 0.02-0.05 microns. Symptoms may be delayed 4-12 hours and begin with a sudden onset of thirst, and a sweet, metallic or foul taste in the mouth. Other symptoms may include upper respiratory tract irritation accompanied by coughing and a dryness of the mucous membranes, lassitude and a generalized feeling of malaise. Fever, chills, muscular pain, mild to severe headache, nausea, occasional vomiting, exaggerated mental activity, profuse sweating, excessive urination, diarrhea and prostration may also occur. Tolerance to fumes develops rapidly, but is quickly lost. All symptoms usually subside within 24-36 hours.

TITANIUM DIOXIDE: Inhalation may cause irritation with cough and sneezing. Nuisance dusts may cause unpleasant deposits in the nasal passages.

SILICON DIOXIDE: Dusts may cause irritation of the respiratory tract and coughing.

QUARTZ: Exposure to high concentrations may cause physical discomfort of the upper respiratory tract.

**CHRONIC EXPOSURE:**

METAL FUME FEVER: There is no form of chronic metal fume fever, however, repeated bouts with symptoms as described above are quite common. Resistance to the condition develops after a few days of exposure, but is quickly lost in 1 or 2 days.

TITANIUM DIOXIDE: Long-term exposure may cause pulmonary irritation with cough, difficulty breathing, a decline in pulmonary function, and x-ray evidence of mild fibrosis. A few cases of slight fibrosis without disabling injury have been reported from occupational exposure. Rats repeatedly exposed to concentrations of 10-328 million particles/ft<sup>3</sup> for as long as 13 months

showed small focal areas of emphysema which were attributed to large deposits of dust. Rats exposed to concentrations of 10, 50, and 250 mg/m<sup>3</sup> for 6 hours/day, 5 days/week, for 2 years, showed no abnormal clinical signs, body weight changes, or excess mortality in any exposed group. There were, however, dose-dependent increases in the incidence of pneumonia, tracheitis, and rhinitis, with squamous metaplasia in the anterior nasal cavity. At 10 mg/m<sup>3</sup>, the pulmonary response satisfied the criteria for a nuisance dust. Bronchioalveolar adenomas and cystic keratinizing squamous cell carcinomas occurred only at the 250 mg/m<sup>3</sup> level, twenty-five times the threshold limit value. These lung tumors were different from common human lung cancers in terms of tumor type, location, and tumorigenesis, and were devoid of tumor metastasis.

**SILICON DIOXIDE:** Exposure to dusts of crystalline or amorphous silica for 6 months to 30 years may result in silicosis with symptoms of cough, chest pain, dyspnea, tachypnea, marked weakness and weight loss. This pulmonary insufficiency may be characterized by diffuse nodular fibrosis, distortion of bronchi, diminished chest expansion, decreased vital capacity and compensatory and bullous emphysema. Although pulmonary fibrosis has been reported from workers exposed to amorphous silica, the crystalline form is the established cause of fibrotic response in the lung. However, the amorphous form has been reported fibrogenic to a lesser extent. As the disease progresses, cor pulmonale, cardiorespiratory failure, and death may occur. Various forms and preparations of crystalline silica produced adenocarcinomas and squamous cell carcinomas of the lungs in rats.

**QUARTZ:** 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.

**SKIN CONTACT:**

**ACUTE EXPOSURE:**

**ALUMINUM OXIDE (ALUMINA):** Contact may cause an irritant dermatitis accompanied by pruritis.

**TITANIUM DIOXIDE:** Topically, it is reported to be devoid of toxicity and chemically non-irritating. However, titanium dioxide may occasionally be so occlusive that it produces miliaria.

SILICON DIOXIDE: Prolonged skin contact with dry particulate may cause drying of the skin.

QUARTZ: 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:**

ALUMINUM OXIDE (ALUMINA): No data available.

TITANIUM DIOXIDE: Application of 300 ug for 3 days intermittently to human skin produced mild irritation.

SILICON DIOXIDE: No data available.

QUARTZ: No data available.

**EYE CONTACT:**

**ACUTE EXPOSURE:**

ALUMINUM OXIDE (ALUMINA): Dust may cause mechanical irritation with redness and possibly swelling of the conjunctiva.

TITANIUM DIOXIDE: Introduction by tattooing into the cornea of rabbit eyes and patients with corneal scars resulted in permanent white coloration, but no irritation.

SILICON DIOXIDE: Dusts may cause irritation with redness and pain.

QUARTZ: 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:**

ALUMINUM OXIDE (ALUMINA): No data available.

TITANIUM DIOXIDE: No data available.

SILICON DIOXIDE: No data available.

QUARTZ: 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.

**INGESTION:**

**ACUTE EXPOSURE:**

ALUMINUM OXIDE (ALUMINA): No data available.

TITANIUM DIOXIDE: Titanium dioxide has been reported to be physiologically inert. Ingestion of large quantities may cause intestinal obstruction. However, a pound has been ingested without apparent harm or distress.

SILICON DIOXIDE: The effects of ingestion are purely mechanical as the substance is inert chemically and biologically.

QUARTZ: Effects of ingestion are due to mechanical action as crystalline silicas are biologically inert.

**CHRONIC EXPOSURE:**

ALUMINUM OXIDE (ALUMINA): Some aluminum compounds cause constipation.

TITANIUM DIOXIDE: Mice and rats fed 50,000 and 25,000 ppm for 103 weeks showed no evidence of toxicity and no increased incidence of tumors.

SILICON DIOXIDE: No data available.

QUARTZ: No data available.

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12. ECOLOGICAL INFORMATION

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Not available

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13. DISPOSAL CONSIDERATIONS

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Dispose in accordance with all applicable regulations.

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14. TRANSPORT INFORMATION

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**U.S. DEPARTMENT OF TRANSPORTATION:** No classification assigned.

**CANADIAN TRANSPORTATION OF DANGEROUS GOODS:** No classification assigned.

**LAND TRANSPORT ADR:** No classification assigned.

**LAND TRANSPORT RID:** No classification assigned.

**AIR TRANSPORT IATA:** No classification assigned.

**AIR TRANSPORT ICAO:** No classification assigned.

**MARITIME TRANSPORT IMDG:** No classification assigned.

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15. REGULATORY INFORMATION

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**U.S. REGULATIONS:**

**CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):** Not regulated.

**SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30):**  
Not regulated.

**SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.40):**  
Not regulated.

**SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):**  
ACUTE: No  
CHRONIC: Yes  
FIRE: No  
REACTIVE: No  
SUDDEN RELEASE: No

**SARA TITLE III SECTION 313 (40 CFR 372.65):** Not regulated.

**OSHA PROCESS SAFETY (29CFR1910.119):** Not regulated.

**STATE REGULATIONS:**

**California Proposition 65:**

Known to the state of California to cause the following:

**Silica, crystalline (airborne particles of respirable size)**

Cancer (Oct 01, 1988)

**CANADIAN REGULATIONS:**

**WHMIS CLASSIFICATION:** Not determined.

**EUROPEAN REGULATIONS:**

**EC CLASSIFICATION (CALCULATED):** Not determined.

**NATIONAL INVENTORY STATUS:**

**U.S. INVENTORY (TSCA):** All the components of this substance are listed on or are exempt from the inventory.

**TSCA 12(b) EXPORT NOTIFICATION:** Not listed.

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[16. OTHER INFORMATION](#)

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**MSDS SUMMARY OF CHANGES**

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

11. TOXICOLOGICAL INFORMATION