

MATERIAL SAFETY DATA SHEET

1. Substance and source identification

U.S. Geological Survey
Reference Material Project
Denver Federal Center
Bldg 20 MS 964D
Denver, CO 80225

RM number: SGR-1b
MSDS Number: SGR-1b
RM Name: Shale

Date of Issue 1-25-2015

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Description: This reference material is a finely powdered shale material intended for use in evaluating the accuracy of analytical methods and instruments in the analysis of geologic type material. A unit of SGR-1b contains 25g of powder.

Substance: Finely powdered shale rock

Other Designation: Shalet

2. HAZARD IDENTIFICATION

NFPA Ratings (scale 0-4): Health = 2 Fire = 0 Reactivity = 0

Major Health Hazard: Respiratory irritation, lung damage, and cancer hazard in humans.

Physical Hazards: There are no physical hazards associated with this material.

Potential Health Effects:

Inhalation: Exposure may cause irritation, metal fume fever, difficulty breathing, bluish skin, and lung damage. Repeated or prolonged exposure may result in digestive disorders, wheezing, and cancer

Skin Contact: Exposure may cause drying of the skin, burns, and irritant dermatitis accompanied by pruritus

Eye Contact: Dust may cause irritation accompanied by redness, pain, burns, and swelling of the conjunctiva.

Ingestion: Ingestion of this material may result in constipation, digestive disorders, and gastrointestinal irritation.

Listed as a Carcinogen /Potential Carcinogen

	Yes	No
In the National Toxicology Program (NTP) report on carcinogens		<u>X^(a)</u>
In the International Agency Report on Carcinogens (IARC) Monographs	<u>X^(a,b)</u>	
By the Occupational Safety and Health Administration (OSHA)		<u>X</u>

(a) Silica (quartz and amorphous) may be included in the basalt rock. Quartz (as SiO₂) is identified due to its hazardous nature and the material's small particle size. NTP lists silica crystalline as a known carcinogen (respirable size); IARC lists silica (quartz) as Group I (carcinogenic to humans)

(b) IARC lists titanium dioxide as Group 2b (possibly carcinogenic to humans).

3. COMPOSITION AND INFORMATION ON HAZADOUS INGREDIENTS

Component^(a)	CAS Registry	EC Number (EINECS)	Concentration (%)
Shale, powder	n/a	n/a	100
Components			
Quartz (as SiO ₂)	14808-60-7	238-878-4	28.2
Aluminum Oxide	1344-28-1	215-691-6	6.52
Calcium Oxide	1305-78-8	215-138-9	8.38
Iron (III) oxide	1309-37-1	215-168-2	3.03
Sodium oxide	1313-59-3	215-208-9	2.99
Titanium Oxide	13463-67-7	236-675-5	0.25

(a) This material is a complex mixture that has not been tested as a whole. The concentrations of the components are listed as required by OSHA, 29 CFR 1910.1200, for MSDS information with hazardous components (1% or greater) and carcinogens (0.1% or greater). For the actual concentrations, see the certificate of analysis

EC Classification: No EC classification assigned to this material.

EC Risk (R No) and EC Safety (S No): Not assigned.

4. First Aid Measures

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

Eye Contact: Immediate flush eyes, including under the eyelids with copious amounts of water for at least 15 minutes. Seek immediate medical attention.

Skin Contact: Wash affected area with soap and water for at least 15 minutes while removing contaminated clothing. Seek medical attention, if needed

Ingestion: If a large amount is swallowed, seek immediate medical attention

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Negligible fire hazard.

Extinguishing Media: Use extinguishing agents appropriate for surrounding fire.

Fire Fighting: Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCUBA)

Flash point: Not applicable

Autoignition Temp: Not applicable

Flammability Limits in Air

Upper (Volume %): Not applicable

Lower (Volume %): Not applicable

6. ACCIDENTAL REALEASE MEASURES

Occupational Release: Collect spilled material in appropriate container for disposal. Avoid generating dust. Clean up with high efficiency particulate filter vacuum

7. HANGLING AND STORAGE

Handling and Storage: Store and handle in accordance with all current regulations and standards.

Store in a cool, dry place. Keep separated from incompatible substances.

Safe Handling Precautions: See Section 8, "Exposure Controls and Personal Protection".

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure limits			
Components	OSHA (PEL)	ACHIH (TLV)	NIOSH (REL)
Quartz	(30)/(%SiO ₂ +2)mg/m ³ TWA (total dust) (10)/(%SiO ₂ + 2) mg/m ³ TWA (respirabel fraction)	0.025 mg/m ³ TWA (respirabel fraction)	0.05 mg/m ³ TWA (respirabel dust) 50mg/m ³ IDLH respirabel dust)
Aluminum Oxide	15 mg/m ³ TWA (total dust) 5 mg/m ³ TWA (respirabel fraction)	1 mg/m ³ TWA (respirabel fraction, related to Aluminum insoluble compounds)	no occupational limits established
Calcium Oxide	5 mg/m ³ TWA	2 mg/m ³ TWA	2 mg/m ³ TWA 25 mg/m ³ IDLH
Iron oxide	10mg/m ³ TWA (fume)	5 mg/m ³ TWA (respirabel fraction)	5 mg/m ³ TWA (as Fe, dust and fume) 2500 mg/m ³ IDLH (as Fe, dust and fume)
Titanium dioxide	15 mg.m ³ TWA (total dust)	10 mg/m ³ TWA 5000 mg/m ³ IDLH	No occupational limits established

No occupational limits established for Iron (II) oxide and sodium oxide.

Ventilation: Use local exhaust ventilation system. Ensure compliance with applicable exposure limits.

Refer to the ACHIH document, *Industrial Ventilation, a Manual of Recommended Practices*.

Respirator: If workplace conditions warrant a respirator, a respirator protection program that meets OSHA 29 CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

Eye Protection: Wear chemical safety goggles. An eyewash station should be readily available near areas of use.

Personal Protection: Wear appropriate chemical resistant clothing and gloves to prevent skin exposure

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor: solid, fine powder; no odor available

Molecular Formula: Not applicable

Density: Not available

Melting point: Not available

Water Solubility: Insoluble

10. STABILITY AND REACTIVITY

Stability: X Stable Unstable

Stable at normal temperatures and pressure.

Conditions to avoid: Avoid generating dust. Avoid heat, flames, sparks and other sources of ignition

Incompatible Materials: Oxidizing materials, combustible materials, acids, metals and metal salts.

Fire/Explosion Information: See Section 5, "Fire Fighting Measures"

Hazardous Decomposition: Miscellaneous decomposition products.

Hazardous Polymerization Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Entry: Inhalation Skin Ingestion
Toxicity data and endpoints listed by Registry of Toxic Effects of Chemicals Substances (RETECS)

Components	Toxicity Data
Quartz	Rat, Oral LD ₅₀ >500 mg/kg Mutagenic: Human: 120 mg/L; 40µg/cm ² Reproductive: No data available Tumorigenic: Rat, Inhalation TCLo: 50mg/m ³ (6h)
Aluminum oxide	Rat, Oral LD ₅₀ >500 mg/kg Mutagenic: No data available Reproductive: No data available Tumorigenic: Rat, Inhalation TCLo: 90mg/kg
Calcium Oxide	Rat, Oral LD ₅₀ 500 mg/kg Mutagenic: No data available Reproductive: No data available Tumorigenic: No data available
Iron (III) oxide	Rat, Oral LD ₅₀ >10,000 mg/kg Mutagenic: Human: 40µg/disk (4h) Reproductive: No data available Tumorigenic: Rat, SubcutaneousTDL ₀ : 135 mg/kg
Titanium dioxide	Rat, Oral LD ₅₀ >10,000 mg/kg Mutagenic: Human: 5µmol/L (72 h) Reproductive: No data available Tumorigenic: Rat, Inhalation TDL ₀ : 250mg/m ³ (6h)

No toxicity data available for sodium oxide and iron (II) oxide

Health Effects (Acute and Chronic): See Section 2, "Hazards Identification" for potential health effects.

Target Organs: Lungs, respiratory tract

Medical Conditions Aggravated by Exposure: Respiratory disorders

12. ECOLOGICAL INFORMATION

Components	Ecotoxicity Data
Calcium oxide	Fish Toxicity: Common Carp (cyprinus carpio) LC ₅₀ (static): 1070 mg/L (96 h)

No ecotoxicity data available for quartz, aluminum oxide, iron (III) oxide, and titanium dioxide

13. Disposal Considerations

Waste disposal: Dispose in accordance with all applicable federal, state, and local requirements

14. Transportation Information

U.S. DOT and IATA: This material is not regulated by DOT or IATA

15. Regulatory Information

CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated for this material
SARA Title III Section 302 (40 CFR 355.30): Not regulated for this material
SARA Title III Section 304 (40 CFR 355.40): Not regulated for this material
SARA Title III Section 313 (40 CFR 372.65): Not regulated for this material
OSHA Process Safety (29 CFR 1910.119): Not regulated for this material

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

Acute:	Yes
Chronic	Yes
Fire:	No
Reactive	No
Sudden Release:	No

STATE REGULATIONS

California Proposition 65: Warning! This product contains quartz of respirable size that is known to the state of California to cause cancer

CANADIAN REGULATIONS

WHMIS Classification: Not provided for this material

EUROPEAN REGULATIONS

EC Classification: No classification assigned to this material.

EC Risk (R NO) and EC Safety (S No): Not assigned

NATIONAL INVENTORY STATUS

U.S. Inventory (TSCA): Aluminum oxide, quartz, calcium oxide, iron (II) oxide, iron (III) oxide, sodium oxide, and titanium dioxide are listed

TSCA 12 (b)

Export Notification: Not listed

16. OTHER INFORMATION

Sources: Chem Advisor, Inc., MSDS Aluminum Oxide, 20 December 2011
Chem Advisor, Inc., MSDS Quartz, 20 December 2011
Chem Advisor, Inc., MSDS Calcium Oxide, 20 December 2011
Chem Advisor, Inc., MSDS Iron (II) Oxide, 20 December 2011
Chem Advisor, Inc., MSDS Ferric Oxide red, 20 December 2011
Chem Advisor, Inc., MSDS Sodium Oxide, 20 December 2011
Chem Advisor, Inc., MSDS Titanium Oxide, 20 December 2011
Chem Advisor, Inc., MSDS Basalt Stone Wool,, 20 December 2011

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, USGS does not certify the data in the MSDS. The certified values for this material are given in the USGS Certificate