Safety Data Sheet

BASIN ELECTRIC POWER COOPERATIVE
A Touchstone Energy® Cooperative

Section 1: Identification

Product identifier

Product Name • **Fly Ash Class F (from Lignite and Sub-bituminous Coal)**

Synonyms • Fly Ash; LOS Unit 1 and Unit 2 Fly Ash

Product Description • Fly ash is a by-product of North Dakota and Wyoming coal combustion. The material is composed primarily of complex aluminosilicate glass, mullite, hematite, magnetite spinel, and quartz. Ingredient percentages will vary as a result of coal quality fluctuations.

Relevant identified uses of the substance or mixture and uses advised against

Recommended use • Used as a cementitious material

Details of the supplier of the safety data sheet

Manufacturer • Basin Electric Power Cooperative
Leland Olds Station
3901 Hwy 200A Stanton, ND 58571
United States
www.basinelectric.com

Telephone (General) • 701-745-3371

Emergency telephone number

Manufacturer • 701-745-3371

Section 2: Hazard Identification

United States (US)

According to OSHA 29 CFR 1910.1200 HCS

Classification of the substance or mixture

OSHA HCS 2012 •
Skin Corrosion 1A - H314
Serious Eye Damage 1 - H318
Germ Cell Mutagenicity 2 - H341
Carcinogenicity 1A - H350
Specific Target Organ Toxicity Repeated Exposure 1 - H372

Label elements

OSHA HCS 2012

DANGER

Hazard statements

- Causes severe skin burns and eye damage. - H314
  Causes serious eye damage - H318
  Suspected of causing genetic defects. - H341
  May cause cancer. - H350
  Causes damage to organs - Lungs through prolonged or repeated exposure - H372

Precautionary statements

Prevention

- Obtain special instructions before use. - P201
  Do not handle until all safety precautions have been read and understood. - P202
  Do not breathe dust. - P260
  Wash thoroughly after handling. - P264
  Do not eat, drink or smoke when using this product. - P270
  Wear protective gloves/protective clothing/eye protection/face protection. - P280

Response

- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. - P304+P340
  IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. - P303+P361+P353
  Specific treatment, see supplemental first aid information. - P321
  Wash contaminated clothing before reuse. - P363
  IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. - P305+P351+P338
  Immediately call a POISON CENTER or doctor/physician. - P310
  IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. - P301+P330+P331
  IF exposed or concerned: Get medical advice/attention. - P308+P313

Storage/Disposal

- Store locked up. - P405
  Dispose of content and/or container in accordance with local, regional, national, and/or international regulations. - P501

Other hazards

OSHA HCS 2012

- Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

Section 3 - Composition/Information on Ingredients

Substances

- Material does not meet the criteria of a substance.

Mixtures

Composition				
Chemical Name	**Identifiers**	**%**	**LD50/LC50**	**Classifications According to Regulation/Directive**
Silicon dioxide	NDA	20% TO 35%	NDA	**OSHA HCS 2012:** Carc. 1A; STOT RE 1 (Lungs)
Silicon dioxide *[0% TO 100%]*	**CAS:**14808-60-7	*0% TO 100%*	NDA	**OSHA HCS 2012:** Carc. 1A; STOT RE 1 (Lungs)
Silicon dioxide *[0% TO 100%]*	**CAS:**7631-86-9	*0% TO 100%*	NDA	**OSHA HCS 2012:** Not Classified

Calcium oxide	**CAS:**1305-78-8	15% TO 30%	NDA	**OSHA HCS 2012:** Skin Corr. 1C; Eye Dam 1
Sulfur trioxide	**CAS:**7446-11-9	12% TO 25%	NDA	**OSHA HCS 2012:** Skin Corr. 1A; Eye Dam. 1
Aluminum oxide	**CAS:**1344-28-1	10% TO 15%	NDA	**OSHA HCS 2012:** STOT RE 2 (Lungs, Inhl)
Magnesium oxide	**CAS:**1309-48-4	5% TO 10%	NDA	**OSHA HCS 2012:** Not Classified
Iron oxide	**CAS:**1309-37-1	5% TO 8.5%	NDA	**OSHA HCS 2012:** Not Classified
Sodium oxide	**CAS:**1313-59-3	1% TO 6%	NDA	**OSHA HCS 2012:** Skin Corr. 1B; Eye Dam. 1
Potassium oxide	**CAS:**12136-45-7	0.5% TO 5%	NDA	**OSHA HCS 2012:** Skin Corr. 1B; Eye Dam. 1
Titanium dioxide	**CAS:**13463-67-7	0.5% TO 1%	NDA	**OSHA HCS 2012:** Carc. 2; STOT RE 2 (Lungs); Muta. 2
Phosphorus oxide	**CAS:**1314-56-3	0.1% TO 1%	Inhalation-Rat LC50 • 1217 mg/m³ 1 Hour(s)	**OSHA HCS 2012:** Skin Corr. 1B; Eye Dam. 1
Strontium oxide	**CAS:**1314-11-0	0% TO 0.5%	NDA	**OSHA HCS 2012:** Not Classified
Barium oxide	**CAS:**1304-28-5	0.1% TO 0.5%	NDA	**OSHA HCS 2012:** Not Classified
Manganese dioxide	**CAS:**1313-13-9	0% TO 0.1%	Ingestion/Oral-Rat LD50 • 3478 mg/kg	**OSHA HCS 2012:** STOT RE 1 (CNS, Inhl); Ox. Sol. 3

Section 4: First-Aid Measures

Description of first aid measures

Inhalation

- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Administer oxygen if breathing is difficult. Give artificial respiration if victim is not breathing. Do not use mouth-to-mouth method if victim inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. If signs/symptoms continue, get medical attention.

Skin

- In case of contact, immediately flush with plenty of water for at least 15 minutes. Wash skin with soap and water. If skin irritation occurs: Get medical advice/attention.

Eye

- Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first five minutes, then continue rinsing eye. Get medical attention immediately.

Ingestion

- Do NOT induce vomiting. Dilute by drinking milk or water. Never give anything by mouth to an unconscious person. Get medical attention immediately if symptoms occur.

Most important symptoms and effects, both acute and delayed

- Refer to Section 11 - Toxicological Information.

Indication of any immediate medical attention and special treatment needed

Notes to Physician

- All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

Section 5: Fire-Fighting Measures

Extinguishing media

Suitable Extinguishing Media
- In case of fire use media as appropriate for surrounding materials.

Unsuitable Extinguishing Media
- No data available

Special hazards arising from the substance or mixture

Unusual Fire and Explosion Hazards
- Material is non-combustible and is not expected to pose a fire or explosion hazard.

Hazardous Combustion Products
- No data available

Advice for firefighters

- Fire fighters should wear complete protective clothing including self-contained breathing apparatus.

Section 6 - Accidental Release Measures

Personal precautions, protective equipment and emergency procedures

Personal Precautions
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Wear appropriate personal protective equipment, avoid direct contact.

Emergency Procedures
- Keep unauthorized personnel away. Ventilate closed spaces before entering.

Environmental precautions

- Avoid run off to waterways and sewers.

Methods and material for containment and cleaning up

Containment/Clean-up Measures
- Stop leak if you can do it without risk.
  Avoid generating dust.
  Spills may be cleaned up by sweeping or by using an industrial vacuum cleaner, vacuum truck, or front-end loader.
  Spilled material may be dampened with a water mist to control airborne dust before removal.

Section 7 - Handling and Storage

Precautions for safe handling

Handling
- Avoid eye contact ad prolonged contact with skin. Avoid prolonged or repeated inhalation of ash particulates in air. Avoid accidental release. Avoid creating dust. When handling fly ash, use local mechanical ventilation or extraction in areas where dust could escape into the work environment. For bulk deliveries, closed pumping systems are recommended. When handled pneumatically use standard dust filters on vehicles and silos. Work areas should be cleaned regularly. If generating dust cannot be avoided, follow personal protective equipment recommendations.

Conditions for safe storage, including any incompatibilities

Storage
- Store dry and away from water. Keep container/package tightly closed and in a well-ventilated place.

Section 8 - Exposure Controls/Personal Protection

Control parameters

Exposure Limits/Guidelines				
	Result	**ACGIH**	**NIOSH**	**OSHA**
	Ceilings	Not established	Not established	5 mg/m3 Ceiling (as Mn) *as Manganese compounds*

Manganese dioxide as Manganese compounds	STELs	Not established	3 mg/m3 STEL (as Mn) *as Manganese compounds*	Not established
	TWAs	Not established	1 mg/m3 TWA (as Mn) *as Manganese compounds*	Not established
Silicon dioxide (14808-60-7)	TWAs	0.025 mg/m3 TWA (respirable fraction)	0.05 mg/m3 TWA (respirable dust)	Not established
Silicon dioxide (7631-86-9)	TWAs	Not established	6 mg/m3 TWA	Not established
Titanium dioxide (13463-67-7)	TWAs	10 mg/m3 TWA	Not established	15 mg/m3 TWA (total dust)
Iron oxide (1309-37-1)	TWAs	5 mg/m3 TWA (respirable fraction)	5 mg/m3 TWA (dust and fume, as Fe)	10 mg/m3 TWA (fume); 15 mg/m3 TWA (total dust, listed under Rouge); 5 mg/m3 TWA (respirable fraction, listed under Rouge)
Magnesium oxide (1309-48-4)	TWAs	10 mg/m3 TWA (inhalable fraction)	Not established	15 mg/m3 TWA (fume, total particulate)
Aluminum oxide (1344-28-1)	TWAs	1 mg/m3 TWA (respirable fraction) *as Aluminum insoluble compounds*	Not established	15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)
Calcium oxide (1305-78-8)	TWAs	2 mg/m3 TWA	2 mg/m3 TWA	5 mg/m3 TWA

Exposure controls

Engineering Measures/Controls

- Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Personal Protective Equipment

Respiratory

- In case of insufficient ventilation, wear suitable respiratory equipment. For prolonged exposure use an air-purifying respirator with high efficiency particulate air (HEPA) filters.

Eye/Face

- Wear safety goggles.

Skin/Body

- Wear appropriate gloves. Wear long sleeves and/or protective coveralls.

Environmental Exposure Controls

- Follow best practice for site management and disposal of waste. Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

Key to abbreviations

ACGIH = American Conference of Governmental Industrial Hygiene
NIOSH = National Institute of Occupational Safety and Health
OSHA = Occupational Safety and Health Administration
STEL = Short Term Exposure Limits are based on 15-minute exposures
TWA = Time-Weighted Averages are based on 8h/day, 40h/week exposures

Section 9 - Physical and Chemical Properties

Information on Physical and Chemical Properties

Material Description			
Physical Form	Solid	Appearance/Description	Tan to gray powder with no odor.
Color	Tan to gray.	Odor	Odorless
Odor Threshold	No data available		

General Properties			
Boiling Point	> 1000 C(> 1832 F)	Melting Point	> 1000 C(> 1832 F)
Decomposition Temperature	No data available	pH	10 to 12 when mixed with water
Specific Gravity/Relative Density	1.3 Water=1	Water Solubility	No data available
Viscosity	No data available	Explosive Properties	No data available
Oxidizing Properties:	No data available		
Volatility			
Vapor Pressure	No data available	Vapor Density	No data available
Evaporation Rate	No data available		
Flammability			
Flash Point	No data available	UEL	No data available
LEL	No data available	Autoignition	No data available
Flammability (solid, gas)	No data available		
Environmental			
Octanol/Water Partition coefficient	No data available		

Section 10: Stability and Reactivity

Reactivity

- No dangerous reaction known under conditions of normal use.

Chemical stability

- Stable under normal temperatures and pressures.

Possibility of hazardous reactions

- Hazardous polymerization will not occur.

Conditions to avoid

- Must be kept dry. Reacts with water to form Calcium Hydroxide.

Incompatible materials

- No data available

Hazardous decomposition products

- None known.

Section 11 - Toxicological Information

Information on toxicological effects

Components		
Sulfur trioxide (12% TO 25%)	7446-11-9	**Acute Toxicity:** Inhalation-Guinea Pig LCLo • 30 mg/m³ 6 Hour(s); *Liver*:**Hepatitis (hepatocellular necrosis), diffuse**; *Lungs, Thorax, or Respiration*:**Structural or functional change in trachea or bronchi**; *Endocrine*:**Other changes**
Aluminum oxide (10% TO 15%)	1344-28-1	**Multi-dose Toxicity:** Inhalation-Rabbit TCLo • 200 mg/m³ 5 Hour(s) 28 Week(s)-Intermittent; *Lungs, Thorax, or Respiration*:**Structural or functional change in trachea or bronchi**; *Lungs, Thorax, or Respiration*:**Chronic pulmonary edema**; *Related to Chronic Data*:**Death in the Other Multiple Dose data type field**; Inhalation-Rat TCLo • 200 mg/m³ 5 Hour(s) 28 Week(s)-Intermittent; *Lungs, Thorax, or Respiration*:**Structural or functional change in trachea or bronchi**; *Lungs, Thorax, or Respiration*:**Chronic pulmonary edema**; *Related to Chronic Data*:**Death in the Other Multiple Dose data type field**

Iron oxide (5% TO 8.5%)	1309-37-1	**Multi-dose Toxicity:** Inhalation-Rat TCLo • 500 µg/m³ 24 Hour(s) 61 Day(s)-Continuous; *Brain and Coverings*:**Other degenerative changes**; *Blood*:**Changes in serum composition (e.g., TP, bilirubin cholesterol)**; *Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels*:**True cholinesterase**
Magnesium oxide (5% TO 10%)	1309-48-4	**Multi-dose Toxicity:** Inhalation-Rat TCLo • 1000 mg/m³ 4 Hour(s) 50 Day(s)-Intermittent; *Lungs, Thorax, or Respiration*:**Other changes**; *Blood*:**Other hemolysis with or without anemia**
Titanium dioxide (0.5% TO 1%)	13463-67-7	**Irritation:** Skin-Human • 300 µg 3 Day(s)-Intermittent • Mild irritation; **Multi-dose Toxicity:** Inhalation-Rat TCLo • 10 mg/m³ 6 Hour(s) 13 Week(s)-Intermittent; *Lungs, Thorax, or Respiration*:**Fibrosis (interstitial)**; *Lungs, Thorax, or Respiration*:**Other changes**; *Biochemical:Metabolism (intermediary)*:**Effect on inflammation or mediation of inflammation**; **Tumorigen / Carcinogen:** Inhalation-Rat TCLo • 250 mg/m³ 6 Hour(s) 2 Year(s)-Intermittent; *Tumorigenic*:**Carcinogenic by RTECS criteria**; *Lungs, Thorax, or Respiration*:**Tumors**
Phosphorus oxide (0.1% TO 1%)	1314-56-3	**Acute Toxicity:** Inhalation-Rat LC50 • 1217 mg/m³ 1 Hour(s); *Lungs, Thorax, or Respiration*:**Chronic pulmonary edema**; *Lungs, Thorax, or Respiration*:**Other changes**; *Blood*:**Hemorrhage**
Silicon dioxide (0% TO 100%)	7631-86-9	**Acute Toxicity:** Inhalation-Rat LCLo • >200 g/m³ 1 Hour(s); *Lungs, Thorax, or Respiration*:**Fibrosis, focal (pneumoconiosis)**; **Irritation:** Eye-Rabbit • 25 mg 24 Hour(s) • Mild irritation

GHS Properties	Classification
Acute toxicity	**OSHA HCS 2012** • No data available
Aspiration Hazard	**OSHA HCS 2012** • No data available
Carcinogenicity	**OSHA HCS 2012** • Carcinogenicity 1A
Germ Cell Mutagenicity	**OSHA HCS 2012** • Germ Cell Mutagenicity 2
Skin corrosion/Irritation	**OSHA HCS 2012** • Skin Corrosion 1A
Skin sensitization	**OSHA HCS 2012** • No data available
STOT-RE	**OSHA HCS 2012** • Specific Target Organ Toxicity Repeated Exposure 1
STOT-SE	**OSHA HCS 2012** • No data available
Toxicity for Reproduction	**OSHA HCS 2012** • No data available
Respiratory sensitization	**OSHA HCS 2012** • No data available
Serious eye damage/Irritation	**OSHA HCS 2012** • Serious Eye Damage 1

Target Organs
- Lungs

Route(s) of entry/exposure
- Inhalation, Skin, Eye, Ingestion

Potential Health Effects

Inhalation

Acute (Immediate)
- Particle inhalation may cause nasal dryness, irritation and obstruction, coughing sneezing, sinusitis, frequent headaches and upper respiratory symptoms such as shortness of breath and reduced pulmonary function.

Chronic (Delayed)
- Chronic overexposure to dust containing respirable sized crystalline silica can cause delayed lung injury (silicosis).

Skin

Acute (Immediate)
- Causes severe skin burns and eye damage.

Chronic (Delayed)
- No data available

Eye

Acute (Immediate)
- Causes serious eye damage.

Chronic (Delayed)
- No data available

Ingestion

Acute (Immediate)
- May cause abdominal discomfort.

Chronic (Delayed)
- No data available

Mutagenic Effects
- Repeated and prolonged exposure may cause mutagenic effects.

Carcinogenic Effects
- Repeated and prolonged exposure may cause cancer.

Carcinogenic Effects			
	CAS	IARC	NTP
Silicon dioxide	14808-60-7	Group 1-Carcinogenic	Known Human Carcinogen
Titanium dioxide	13463-67-7	Group 2B-Possible Carcinogen	Not Listed
Sulfur trioxide	7446-11-9	Group 1-Carcinogenic	Not Listed

Key to abbreviations
MLD = Mild
TC = Toxic Concentration

Section 12 - Ecological Information

Toxicity
- Non-mandatory section - information about this substance not complied for this reason.

Persistence and degradability
- Non-mandatory section - information about this substance not complied for this reason.

Bioaccumulative potential
- Non-mandatory section - information about this substance not complied for this reason.

Mobility in Soil
- Non-mandatory section - information about this substance not complied for this reason.

Other adverse effects
- Non-mandatory section - information about this substance not complied for this reason.

Section 13 - Disposal Considerations

Waste treatment methods

Product waste
- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Packaging waste
- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Section 14 - Transport Information

	UN number	UN proper shipping name	Transport hazard class(es)	Packing group	Environmental hazards
DOT	NDA	Not regulated	NDA	NDA	NDA

Special precautions for user • None known.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code • Not relevant.

Section 15 - Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture

SARA Hazard Classifications • Acute, Chronic

Inventory						
Component	**CAS**	**Canada DSL**	**Canada NDSL**	**EU EINECS**	**EU ELNICS**	**TSCA**
Aluminum oxide	1344-28-1	Yes	No	Yes	No	Yes
Barium oxide	1304-28-5	Yes	No	Yes	No	Yes
Calcium oxide	1305-78-8	Yes	No	Yes	No	Yes
Iron oxide	1309-37-1	Yes	No	Yes	No	Yes
Magnesium oxide	1309-48-4	Yes	No	Yes	No	Yes
Manganese dioxide	1313-13-9	Yes	No	Yes	No	Yes
Phosphorus oxide	1314-56-3	Yes	No	Yes	No	Yes
Potassium oxide	12136-45-7	Yes	No	Yes	No	Yes
Silicon dioxide	14808-60-7	Yes	No	Yes	No	Yes
Silicon dioxide	7631-86-9	Yes	No	Yes	No	Yes
Sodium oxide	1313-59-3	Yes	No	Yes	No	Yes
Strontium oxide	1314-11-0	Yes	No	Yes	No	Yes
Sulfur trioxide	7446-11-9	Yes	No	Yes	No	Yes
Titanium dioxide	13463-67-7	Yes	No	Yes	No	Yes

Canada

Labor

Canada - WHMIS - Classifications of Substances

• Sodium oxide	1313-59-3	E
• Potassium oxide	12136-45-7	E
• Barium oxide	1304-28-5	D1B, D2B
• Barium oxide as Barium compounds, n.o.s.		Not Listed
• Phosphorus oxide	1314-56-3	D1A, E
• Sulfur trioxide	7446-11-9	Not Listed
• Strontium oxide	1314-11-0	E
• Calcium oxide	1305-78-8	E
• Iron oxide	1309-37-1	Uncontrolled product according to WHMIS classification criteria
• Iron oxide as Iron compounds		Not Listed
• Magnesium oxide	1309-48-4	Uncontrolled product according to WHMIS classification criteria
• Titanium dioxide	13463-67-7	D2A (In certain cases, this classification does not apply. For more information, consult the section Substance Specific Issues - Titanium dioxide,

		mixture containing on Health Canada's WHMIS Division website.)
• Titanium dioxide as Titanium compounds		Not Listed
• Aluminum oxide	1344-28-1	Uncontrolled product according to WHMIS classification criteria
• Manganese dioxide	1313-13-9	C, D2B
• Manganese dioxide as Manganese compounds		Not Listed
• Silicon dioxide	7631-86-9	Uncontrolled product according to WHMIS classification criteria
• Silicon dioxide	14808-60-7	D2A (In certain cases, this classification does not apply. For more information, consult the section Substance Specific Issues - Silica, crystalline, encapsulated on Health Canada's WHMIS Division website.)

Canada - WHMIS - Ingredient Disclosure List

• Sodium oxide	1313-59-3	Not Listed
• Potassium oxide	12136-45-7	Not Listed
• Barium oxide	1304-28-5	Not Listed
• Barium oxide as Barium compounds, n.o.s.		Not Listed
• Phosphorus oxide	1314-56-3	1 %
• Sulfur trioxide	7446-11-9	1 %
• Strontium oxide	1314-11-0	Not Listed
• Calcium oxide	1305-78-8	1 %
• Iron oxide	1309-37-1	1 %
• Iron oxide as Iron compounds		Not Listed
• Magnesium oxide	1309-48-4	1 %
• Titanium dioxide	13463-67-7	Not Listed
• Titanium dioxide as Titanium compounds		Not Listed
• Aluminum oxide	1344-28-1	1 %
• Manganese dioxide	1313-13-9	Not Listed
• Manganese dioxide as Manganese compounds		1 %
• Silicon dioxide	7631-86-9	1 %
• Silicon dioxide	14808-60-7	1 %

Environment

Canada - CEPA - Priority Substances List

• Sodium oxide	1313-59-3	Not Listed
• Potassium oxide	12136-45-7	Not Listed
• Barium oxide	1304-28-5	Not Listed
• Barium oxide as Barium compounds, n.o.s.		Not Listed
• Phosphorus oxide	1314-56-3	Not Listed
• Sulfur trioxide	7446-11-9	Not Listed
• Strontium oxide	1314-11-0	Not Listed
• Calcium oxide	1305-78-8	Not Listed
• Iron oxide	1309-37-1	Not Listed
• Iron oxide as Iron compounds		Not Listed
• Magnesium oxide	1309-48-4	Not Listed
• Titanium dioxide	13463-67-7	Not Listed

• Titanium dioxide as Titanium compounds		Not Listed
• Aluminum oxide	1344-28-1	Not Listed
• Manganese dioxide	1313-13-9	Not Listed
• Manganese dioxide as Manganese compounds		Not Listed
• Silicon dioxide	7631-86-9	Not Listed
• Silicon dioxide	14808-60-7	Not Listed

United States

Labor

U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals

• Sodium oxide	1313-59-3	Not Listed
• Potassium oxide	12136-45-7	Not Listed
• Barium oxide	1304-28-5	Not Listed
• Barium oxide as Barium compounds, n.o.s.		Not Listed
• Phosphorus oxide	1314-56-3	Not Listed
• Sulfur trioxide	7446-11-9	1000 lb TQ
• Strontium oxide	1314-11-0	Not Listed
• Calcium oxide	1305-78-8	Not Listed
• Iron oxide	1309-37-1	Not Listed
• Iron oxide as Iron compounds		Not Listed
• Magnesium oxide	1309-48-4	Not Listed
• Titanium dioxide	13463-67-7	Not Listed
• Titanium dioxide as Titanium compounds		Not Listed
• Aluminum oxide	1344-28-1	Not Listed
• Manganese dioxide	1313-13-9	Not Listed
• Manganese dioxide as Manganese compounds		Not Listed
• Silicon dioxide	7631-86-9	Not Listed
• Silicon dioxide	14808-60-7	Not Listed

U.S. - OSHA - Specifically Regulated Chemicals

• Sodium oxide	1313-59-3	Not Listed
• Potassium oxide	12136-45-7	Not Listed
• Barium oxide	1304-28-5	Not Listed
• Barium oxide as Barium compounds, n.o.s.		Not Listed
• Phosphorus oxide	1314-56-3	Not Listed
• Sulfur trioxide	7446-11-9	Not Listed
• Strontium oxide	1314-11-0	Not Listed
• Calcium oxide	1305-78-8	Not Listed
• Iron oxide	1309-37-1	Not Listed
• Iron oxide as Iron compounds		Not Listed
• Magnesium oxide	1309-48-4	Not Listed
• Titanium dioxide	13463-67-7	Not Listed
• Titanium dioxide as Titanium compounds		Not Listed
• Aluminum oxide	1344-28-1	Not Listed
• Manganese dioxide	1313-13-9	Not Listed
• Manganese dioxide as Manganese compounds		Not Listed
• Silicon dioxide	7631-86-9	Not Listed
• Silicon dioxide	14808-60-7	Not Listed

Environment

U.S. - CAA (Clean Air Act) - 1990 Hazardous Air Pollutants

• Sodium oxide	1313-59-3	Not Listed
• Potassium oxide	12136-45-7	Not Listed

• Barium oxide	1304-28-5	Not Listed
• Barium oxide as Barium compounds, n.o.s.		Not Listed
• Phosphorus oxide	1314-56-3	Not Listed
• Sulfur trioxide	7446-11-9	Not Listed
• Strontium oxide	1314-11-0	Not Listed
• Calcium oxide	1305-78-8	Not Listed
• Iron oxide	1309-37-1	Not Listed
• Iron oxide as Iron compounds		Not Listed
• Magnesium oxide	1309-48-4	Not Listed
• Titanium dioxide	13463-67-7	Not Listed
• Titanium dioxide as Titanium compounds		Not Listed
• Aluminum oxide	1344-28-1	Not Listed
• Manganese dioxide	1313-13-9	Not Listed
• Manganese dioxide as Manganese compounds		(including any unique chemical substance that contains Manganese as part of its infrastructure)
• Silicon dioxide	7631-86-9	Not Listed
• Silicon dioxide	14808-60-7	Not Listed

U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities

• Sodium oxide	1313-59-3	Not Listed
• Potassium oxide	12136-45-7	Not Listed
• Barium oxide	1304-28-5	Not Listed
• Barium oxide as Barium compounds, n.o.s.		Not Listed
• Phosphorus oxide	1314-56-3	Not Listed
• Sulfur trioxide	7446-11-9	Not Listed
• Strontium oxide	1314-11-0	Not Listed
• Calcium oxide	1305-78-8	Not Listed
• Iron oxide	1309-37-1	Not Listed
• Iron oxide as Iron compounds		Not Listed
• Magnesium oxide	1309-48-4	Not Listed
• Titanium dioxide	13463-67-7	Not Listed
• Titanium dioxide as Titanium compounds		Not Listed
• Aluminum oxide	1344-28-1	Not Listed
• Manganese dioxide	1313-13-9	Not Listed
• Manganese dioxide as Manganese compounds		Not Listed
• Silicon dioxide	7631-86-9	Not Listed
• Silicon dioxide	14808-60-7	Not Listed

U.S. - CERCLA/SARA - Radionuclides and Their Reportable Quantities

• Sodium oxide	1313-59-3	Not Listed
• Potassium oxide	12136-45-7	Not Listed
• Barium oxide	1304-28-5	Not Listed
• Barium oxide as Barium compounds, n.o.s.		Not Listed
• Phosphorus oxide	1314-56-3	Not Listed
• Sulfur trioxide	7446-11-9	Not Listed
• Strontium oxide	1314-11-0	Not Listed
• Calcium oxide	1305-78-8	Not Listed
• Iron oxide	1309-37-1	Not Listed
• Iron oxide as Iron compounds		Not Listed
• Magnesium oxide	1309-48-4	Not Listed
• Titanium dioxide	13463-67-7	Not Listed
• Titanium dioxide as Titanium compounds		Not Listed

• Aluminum oxide	1344-28-1	Not Listed
• Manganese dioxide	1313-13-9	Not Listed
• Manganese dioxide as Manganese compounds		Not Listed
• Silicon dioxide	7631-86-9	Not Listed
• Silicon dioxide	14808-60-7	Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs

• Sodium oxide	1313-59-3	Not Listed
• Potassium oxide	12136-45-7	Not Listed
• Barium oxide	1304-28-5	Not Listed
• Barium oxide as Barium compounds, n.o.s.		Not Listed
• Phosphorus oxide	1314-56-3	Not Listed
• Sulfur trioxide	7446-11-9	100 lb EPCRA RQ
• Strontium oxide	1314-11-0	Not Listed
• Calcium oxide	1305-78-8	Not Listed
• Iron oxide	1309-37-1	Not Listed
• Iron oxide as Iron compounds		Not Listed
• Magnesium oxide	1309-48-4	Not Listed
• Titanium dioxide	13463-67-7	Not Listed
• Titanium dioxide as Titanium compounds		Not Listed
• Aluminum oxide	1344-28-1	Not Listed
• Manganese dioxide	1313-13-9	Not Listed
• Manganese dioxide as Manganese compounds		Not Listed
• Silicon dioxide	7631-86-9	Not Listed
• Silicon dioxide	14808-60-7	Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs

• Sodium oxide	1313-59-3	Not Listed
• Potassium oxide	12136-45-7	Not Listed
• Barium oxide	1304-28-5	Not Listed
• Barium oxide as Barium compounds, n.o.s.		Not Listed
• Phosphorus oxide	1314-56-3	Not Listed
• Sulfur trioxide	7446-11-9	100 lb TPQ (This material is a reactive solid. The TPQ does not default to 10000 pounds for non-powder, non-molten, non-solution form)
• Strontium oxide	1314-11-0	Not Listed
• Calcium oxide	1305-78-8	Not Listed
• Iron oxide	1309-37-1	Not Listed
• Iron oxide as Iron compounds		Not Listed
• Magnesium oxide	1309-48-4	Not Listed
• Titanium dioxide	13463-67-7	Not Listed
• Titanium dioxide as Titanium compounds		Not Listed
• Aluminum oxide	1344-28-1	Not Listed
• Manganese dioxide	1313-13-9	Not Listed
• Manganese dioxide as Manganese compounds		Not Listed
• Silicon dioxide	7631-86-9	Not Listed
• Silicon dioxide	14808-60-7	Not Listed

U.S. - CERCLA/SARA - Section 313 - Emission Reporting

• Sodium oxide	1313-59-3	Not Listed
• Potassium oxide	12136-45-7	Not Listed
• Barium oxide	1304-28-5	Not Listed

• Barium oxide as Barium compounds, n.o.s.		1.0 % de minimis concentration (does not include Barium sulfate CAS 7727-43-7, Chemical Category N040)
• Phosphorus oxide	1314-56-3	Not Listed
• Sulfur trioxide	7446-11-9	Not Listed
• Strontium oxide	1314-11-0	Not Listed
• Calcium oxide	1305-78-8	Not Listed
• Iron oxide	1309-37-1	Not Listed
• Iron oxide as Iron compounds		Not Listed
• Magnesium oxide	1309-48-4	Not Listed
• Titanium dioxide	13463-67-7	Not Listed
• Titanium dioxide as Titanium compounds		Not Listed
• Aluminum oxide	1344-28-1	1.0 % de minimis concentration (fibrous forms)
• Manganese dioxide	1313-13-9	Not Listed
• Manganese dioxide as Manganese compounds		1.0 % de minimis concentration (Chemical Category N450)
• Silicon dioxide	7631-86-9	Not Listed
• Silicon dioxide	14808-60-7	Not Listed

U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing

• Sodium oxide	1313-59-3	Not Listed
• Potassium oxide	12136-45-7	Not Listed
• Barium oxide	1304-28-5	Not Listed
• Barium oxide as Barium compounds, n.o.s.		Not Listed
• Phosphorus oxide	1314-56-3	Not Listed
• Sulfur trioxide	7446-11-9	Not Listed
• Strontium oxide	1314-11-0	Not Listed
• Calcium oxide	1305-78-8	Not Listed
• Iron oxide	1309-37-1	Not Listed
• Iron oxide as Iron compounds		Not Listed
• Magnesium oxide	1309-48-4	Not Listed
• Titanium dioxide	13463-67-7	Not Listed
• Titanium dioxide as Titanium compounds		Not Listed
• Aluminum oxide	1344-28-1	Not Listed
• Manganese dioxide	1313-13-9	Not Listed
• Manganese dioxide as Manganese compounds		Not Listed
• Silicon dioxide	7631-86-9	Not Listed
• Silicon dioxide	14808-60-7	Not Listed

United States - California

Environment

U.S. - California - Proposition 65 - Carcinogens List

• Sodium oxide	1313-59-3	Not Listed
• Potassium oxide	12136-45-7	Not Listed
• Barium oxide	1304-28-5	Not Listed
• Barium oxide as Barium compounds, n.o.s.		Not Listed
• Phosphorus oxide	1314-56-3	Not Listed
• Sulfur trioxide	7446-11-9	Not Listed
• Strontium oxide	1314-11-0	Not Listed
• Calcium oxide	1305-78-8	Not Listed

• Iron oxide	1309-37-1	Not Listed
• Iron oxide as Iron compounds		Not Listed
• Magnesium oxide	1309-48-4	Not Listed
• Titanium dioxide	13463-67-7	carcinogen, initial date 9/2/11 (airborne, unbound particles of respirable size)
• Titanium dioxide as Titanium compounds		Not Listed
• Aluminum oxide	1344-28-1	Not Listed
• Manganese dioxide	1313-13-9	Not Listed
• Manganese dioxide as Manganese compounds		Not Listed
• Silicon dioxide	7631-86-9	Not Listed
• Silicon dioxide	14808-60-7	carcinogen, initial date 10/1/88 (airborne particles of respirable size)

U.S. - California - Proposition 65 - Developmental Toxicity

• Sodium oxide	1313-59-3	Not Listed
• Potassium oxide	12136-45-7	Not Listed
• Barium oxide	1304-28-5	Not Listed
• Barium oxide as Barium compounds, n.o.s.		Not Listed
• Phosphorus oxide	1314-56-3	Not Listed
• Sulfur trioxide	7446-11-9	Not Listed
• Strontium oxide	1314-11-0	Not Listed
• Calcium oxide	1305-78-8	Not Listed
• Iron oxide	1309-37-1	Not Listed
• Iron oxide as Iron compounds		Not Listed
• Magnesium oxide	1309-48-4	Not Listed
• Titanium dioxide	13463-67-7	Not Listed
• Titanium dioxide as Titanium compounds		Not Listed
• Aluminum oxide	1344-28-1	Not Listed
• Manganese dioxide	1313-13-9	Not Listed
• Manganese dioxide as Manganese compounds		Not Listed
• Silicon dioxide	7631-86-9	Not Listed
• Silicon dioxide	14808-60-7	Not Listed

U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)

• Sodium oxide	1313-59-3	Not Listed
• Potassium oxide	12136-45-7	Not Listed
• Barium oxide	1304-28-5	Not Listed
• Barium oxide as Barium compounds, n.o.s.		Not Listed
• Phosphorus oxide	1314-56-3	Not Listed
• Sulfur trioxide	7446-11-9	Not Listed
• Strontium oxide	1314-11-0	Not Listed
• Calcium oxide	1305-78-8	Not Listed
• Iron oxide	1309-37-1	Not Listed
• Iron oxide as Iron compounds		Not Listed
• Magnesium oxide	1309-48-4	Not Listed
• Titanium dioxide	13463-67-7	Not Listed
• Titanium dioxide as Titanium compounds		Not Listed
• Aluminum oxide	1344-28-1	Not Listed
• Manganese dioxide	1313-13-9	Not Listed
• Manganese dioxide as Manganese compounds		Not Listed
• Silicon dioxide	7631-86-9	Not Listed
• Silicon dioxide	14808-60-7	Not Listed

U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)

• Sodium oxide	1313-59-3	Not Listed
• Potassium oxide	12136-45-7	Not Listed
• Barium oxide	1304-28-5	Not Listed
• Barium oxide as Barium compounds, n.o.s.		Not Listed
• Phosphorus oxide	1314-56-3	Not Listed
• Sulfur trioxide	7446-11-9	Not Listed
• Strontium oxide	1314-11-0	Not Listed
• Calcium oxide	1305-78-8	Not Listed
• Iron oxide	1309-37-1	Not Listed
• Iron oxide as Iron compounds		Not Listed
• Magnesium oxide	1309-48-4	Not Listed
• Titanium dioxide	13463-67-7	Not Listed
• Titanium dioxide as Titanium compounds		Not Listed
• Aluminum oxide	1344-28-1	Not Listed
• Manganese dioxide	1313-13-9	Not Listed
• Manganese dioxide as Manganese compounds		Not Listed
• Silicon dioxide	7631-86-9	Not Listed
• Silicon dioxide	14808-60-7	Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Female

• Sodium oxide	1313-59-3	Not Listed
• Potassium oxide	12136-45-7	Not Listed
• Barium oxide	1304-28-5	Not Listed
• Barium oxide as Barium compounds, n.o.s.		Not Listed
• Phosphorus oxide	1314-56-3	Not Listed
• Sulfur trioxide	7446-11-9	Not Listed
• Strontium oxide	1314-11-0	Not Listed
• Calcium oxide	1305-78-8	Not Listed
• Iron oxide	1309-37-1	Not Listed
• Iron oxide as Iron compounds		Not Listed
• Magnesium oxide	1309-48-4	Not Listed
• Titanium dioxide	13463-67-7	Not Listed
• Titanium dioxide as Titanium compounds		Not Listed
• Aluminum oxide	1344-28-1	Not Listed
• Manganese dioxide	1313-13-9	Not Listed
• Manganese dioxide as Manganese compounds		Not Listed
• Silicon dioxide	7631-86-9	Not Listed
• Silicon dioxide	14808-60-7	Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Male

• Sodium oxide	1313-59-3	Not Listed
• Potassium oxide	12136-45-7	Not Listed
• Barium oxide	1304-28-5	Not Listed
• Barium oxide as Barium compounds, n.o.s.		Not Listed
• Phosphorus oxide	1314-56-3	Not Listed
• Sulfur trioxide	7446-11-9	Not Listed
• Strontium oxide	1314-11-0	Not Listed
• Calcium oxide	1305-78-8	Not Listed
• Iron oxide	1309-37-1	Not Listed
• Iron oxide as Iron compounds		Not Listed
• Magnesium oxide	1309-48-4	Not Listed
• Titanium dioxide	13463-67-7	Not Listed

• Titanium dioxide as Titanium compounds		Not Listed
• Aluminum oxide	1344-28-1	Not Listed
• Manganese dioxide	1313-13-9	Not Listed
• Manganese dioxide as Manganese compounds		Not Listed
• Silicon dioxide	7631-86-9	Not Listed
• Silicon dioxide	14808-60-7	Not Listed

Other Information

- WARNING: This product contains a chemical known to the State of California to cause cancer.

Section 16 - Other Information

Last Revision Date
- 11/March/2014

Preparation Date
- 05/June/2012

Disclaimer/Statement of Liability
- The information contained in this Safety Data Sheet (SDS) is believed to be correct since it was obtained from sources we believe are reliable. However, no representation, guarantees or warranties of any kind are made as to its accuracy, suitability for particular applications, hazards connected with the use of the material, or the results to be obtained from the use thereof. User assumes all risks and liability of any use, processing or handling of any material, variation in methods, conditions and equipment used to store, handle, or process the material and hazards connected with the use of the material are solely the responsibility of the user and remain at his sole discretion. Compliance with all applicable federal, state, and local laws and regulations remains the responsibility of the user, and the user has the responsibility of provide a safe work place to examine all aspects of its operation and to determine if or where precautions, in addition to those described herein, are required.

Key to abbreviations

NDA = No Data Available