

Missouri Fireclay, Flint Clay, Plastic Fireclay, Hawthorn Bond®, Hawthorn Red, Cement Clay, #2 Clay, #1 Clay, JSM Clay, Christy Gold, Raw Flint Clay, Raw Plastic Clay

Safety Data Sheet
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations
Revision Date: 06/06/2013

Version: 1.0

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY

Product Identifier

Product Form: Mixture

Product Name: Missouri Fireclay, Flint Clay, Plastic Fireclay, Hawthorn Bond®, Hawthorn Red, Cement Clay, #2 Clay, #1 Clay, JSM Clay, Christy Gold, Raw Flint Clay, Raw Plastic Clay

Intended Use of the Product

Use of the Substance/Mixture: High temperature bonding agent, raw feed stock in refractories

Name, Address, and Telephone of the Responsible Party

Christy Minerals LLC
833 Booneslick Rd.
High Hill, MO 63350
T (636)585-2214
christyco.com

Emergency Telephone Number

Emergency Number : 1-800-535-5053 Domestic, 1-352-323-3500 International

SECTION 2: HAZARDS IDENTIFICATION

Classification of the Substance or Mixture

GHS-US Classification

Carc. 1A H350
STOT RE 1 H372

Label Elements

GHS-US Labeling

Hazard Pictograms (GHS-US) :



GHS08

Signal Word (GHS-US) :

Danger

Hazard Statements (GHS-US) :

H350 - May cause cancer (inhalation)
H372 - Causes damage to organs through prolonged or repeated exposure (inhalation)

Precautionary Statements (GHS-US) :

P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P260 - Do not breathe dust.
P264 - Wash hands, forearms, and other exposed areas thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P271 - Use only outdoors or in a well-ventilated area.
P280 - Wear protective gloves, protective clothing, eye protection, respiratory protection.
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P308+P313 - If exposed or concerned: Get medical advice/attention.
P312 - Call a POISON CENTER or doctor if you feel unwell.
P314 - Get medical advice and attention if you feel unwell.
P403+P233 - Store in a well-ventilated place. Keep container tightly closed.
P501 - Dispose of contents/container according to local, regional, national, territorial, provincial, and international regulations.

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Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Other Hazards Not available

Unknown Acute Toxicity (GHS-US): Not available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Substances

Mixture

| Name | Product Identifier | % (w/w) | GHS-US Classification |
|------------------|---------------------|----------|-----------------------------------|
| Kaolin | (CAS No) 1332-58-7 | 60 - 100 | Not classified |
| Quartz | (CAS No) 14808-60-7 | 20 - 30 | Carc. 1A, H350 STOT RE 1, H372 |
| Titanium dioxide | (CAS No) 13463-67-7 | 0 - 2.75 | Not classified |

Full text of H-phrases: see section 16

SECTION 4: FIRST AID MEASURES

Description of First Aid Measures

General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

Inhalation: When symptoms occur: go into open air and ventilate suspected area. If exposed or concerned: Get medical advice/attention

Skin Contact: Remove contaminated clothing. Drench affected area with water for at least 15 minutes. Obtain medical attention if irritation persists.

Eye Contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention if pain, blinking or redness persist.

Ingestion: Rinse mouth. Do NOT induce vomiting. Seek medical attention.

Most Important Symptoms and Effects Both Acute and Delayed

General: Causes damage to organs through prolonged or repeated exposure (inhalation)

Inhalation: May cause cancer by inhalation. Dust from this product may cause irritation to the respiratory tract

Skin Contact: Prolonged contact with large amounts of dust may cause mechanical irritation.

Eye Contact: Prolonged contact with large amounts of dust may cause mechanical irritation.

Ingestion: If a large quantity has been ingested :intestinal blockage. Gastrointestinal irritation

Chronic Symptoms: Repeated or prolonged exposure to respirable crystalline silica dust will cause lung damage in the form of silicosis. Symptoms will include progressively more difficult breathing, cough, fever, and weight loss. Acute silicosis can be fatal.

Indication of Any Immediate Medical Attention and Special Treatment Needed

If exposed or concerned, get medical advice and attention.

SECTION 5: FIREFIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media: Use extinguishing media appropriate for surrounding fire.

Unsuitable Extinguishing Media: Do not use a heavy water stream. Use of heavy stream of water may spread fire.

Special Hazards Arising From the Substance or Mixture

Fire Hazard: Not flammable

Explosion Hazard: Product is not explosive

Reactivity: Hazardous reactions will not occur under normal conditions.

Advice for Firefighters

Precautionary Measures Fire: Exercise caution when fighting any chemical fire.

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Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Firefighting Instructions: Use water spray or fog for cooling exposed containers.

Protection During Firefighting: Do not enter fire area without proper protective equipment, including respiratory protection.

Hazardous Combustion Products: Not available

Other information: Do not allow run-off from fire fighting to enter drains or water courses.

Reference to Other Sections

Refer to section 9 for flammability properties.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

General Measures: Do not breathe dust. Avoid generating dust.

For Non-Emergency Personnel

Protective Equipment: Use appropriate personal protection equipment (PPE).

Emergency Procedures: Evacuate unnecessary personnel.

For Emergency Personnel

Protective Equipment: Equip cleanup crew with proper protection.

Emergency Procedures: Ventilate area.

Environmental Precautions

Prevent entry to sewers and public waters.

Methods and Material for Containment and Cleaning Up

For Containment: Avoid generation of dust during clean-up of spills.

Methods for Cleaning Up: Clear up spills immediately and dispose of waste safely. Vacuum must be fitted with HEPA filter to prevent release of particulates during clean-up. Avoid generation of dust during clean-up of spills.

Reference to Other Sections

See heading 8, Exposure Controls and Personal Protection.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling

Additional Hazards When Processed: Do not breathe dust. Avoid dust production. Repeated or prolonged exposure to respirable crystalline silica dust will cause lung damage in the form of silicosis. Symptoms will include progressively more difficult breathing, cough, fever, and weight loss. Acute silicosis can be fatal.

Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking, or smoking and again when leaving work. Do not eat, drink or smoke when using this product. Wash hands, forearms, and other exposed areas thoroughly after handling.

Conditions for Safe Storage, Including Any Incompatibilities

Storage Conditions: Keep container closed when not in use.

Incompatible Materials: Strong acids, strong bases, strong oxidizers.

Specific End Use(s)

High temperature bonding agent, raw feed stock in refractories

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

| Quartz (14808-60-7) | | |
|---------------------|--------------------------------------|-------------------------|
| Mexico | OEL TWA (mg/m ³) | 0.1 mg/m ³ |
| USA ACGIH | ACGIH TWA (mg/m ³) | 0.025 mg/m ³ |
| USA NIOSH | NIOSH REL (TWA) (mg/m ³) | 0.05 mg/m ³ |
| USA IDLH | US IDLH (mg/m ³) | 50 mg/m ³ |

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Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

| | | |
|-------------------------|------------------------------|--|
| Alberta | OEL TWA (mg/m ³) | 0.025 mg/m ³ |
| British Columbia | OEL TWA (mg/m ³) | 0.025 mg/m ³ |
| Manitoba | OEL TWA (mg/m ³) | 0.025 mg/m ³ |
| New Brunswick | OEL TWA (mg/m ³) | 0.1 mg/m ³ |
| Newfoundland & Labrador | OEL TWA (mg/m ³) | 0.025 mg/m ³ |
| Nova Scotia | OEL TWA (mg/m ³) | 0.025 mg/m ³ |
| Nunavut | OEL TWA (mg/m ³) | 0.3 mg/m ³ (total mass) |
| Northwest Territories | OEL TWA (mg/m ³) | 0.3 mg/m ³ (total mass) |
| Ontario | OEL TWA (mg/m ³) | 0.10 mg/m ³ (designated substance regulation) |
| Prince Edward Island | OEL TWA (mg/m ³) | 0.025 mg/m ³ |
| Québec | VEMP (mg/m ³) | 0.1 mg/m ³ |
| Saskatchewan | OEL TWA (mg/m ³) | 0.05 mg/m ³ |
| Yukon | OEL TWA (mg/m ³) | 300 particle/mL |

Titanium dioxide (13463-67-7)

| | | |
|-------------------------|-------------------------------------|--|
| Mexico | OEL TWA (mg/m ³) | 10 mg/m ³ |
| Mexico | OEL STEL (mg/m ³) | 20 mg/m ³ |
| USA ACGIH | ACGIH TWA (mg/m ³) | 10 mg/m ³ |
| USA OSHA | OSHA PEL (TWA) (mg/m ³) | 15 mg/m ³ |
| USA IDLH | US IDLH (mg/m ³) | 5000 mg/m ³ |
| Alberta | OEL TWA (mg/m ³) | 10 mg/m ³ |
| British Columbia | OEL TWA (mg/m ³) | 3 mg/m ³ |
| Manitoba | OEL TWA (mg/m ³) | 10 mg/m ³ |
| New Brunswick | OEL TWA (mg/m ³) | 10 mg/m ³ |
| Newfoundland & Labrador | OEL TWA (mg/m ³) | 10 mg/m ³ |
| Nova Scotia | OEL TWA (mg/m ³) | 10 mg/m ³ |
| Nunavut | OEL TWA (mg/m ³) | 10 mg/m ³ (total mass) |
| Northwest Territories | OEL TWA (mg/m ³) | 10 mg/m ³ (total mass) |
| Ontario | OEL TWA (mg/m ³) | 10 mg/m ³ |
| Prince Edward Island | OEL TWA (mg/m ³) | 10 mg/m ³ |
| Québec | VEMP (mg/m ³) | 10 mg/m ³ (containing no Asbestos and <1% Crystalline silica) |
| Saskatchewan | OEL STEL (mg/m ³) | 20 mg/m ³ |
| Saskatchewan | OEL TWA (mg/m ³) | 10 mg/m ³ |
| Yukon | OEL STEL (mg/m ³) | 20 mg/m ³ |
| Yukon | OEL TWA (mg/m ³) | 10 mg/m ³ |

Kaolin (1332-58-7)

| | | |
|--------|------------------------------|----------------------|
| Mexico | OEL TWA (mg/m ³) | 10 mg/m ³ |
|--------|------------------------------|----------------------|

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Safety Data Sheet

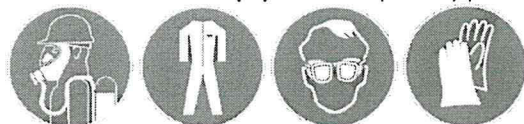
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

| | | |
|-------------------------|--------------------------------------|--|
| Mexico | OEL STEL (mg/m ³) | 20 mg/m ³ |
| USA ACGIH | ACGIH TWA (mg/m ³) | 2 mg/m ³ |
| USA OSHA | OSHA PEL (TWA) (mg/m ³) | 5 mg/m ³ |
| USA NIOSH | NIOSH REL (TWA) (mg/m ³) | 5 mg/m ³ |
| Alberta | OEL TWA (mg/m ³) | 2 mg/m ³ |
| British Columbia | OEL TWA (mg/m ³) | 2 mg/m ³ (particulate matter containing no Asbestos and <1% Crystalline silica) |
| Manitoba | OEL TWA (mg/m ³) | 2 mg/m ³ |
| New Brunswick | OEL TWA (mg/m ³) | 2 mg/m ³ |
| Newfoundland & Labrador | OEL TWA (mg/m ³) | 2 mg/m ³ |
| Nova Scotia | OEL TWA (mg/m ³) | 2 mg/m ³ |
| Nunavut | OEL TWA (mg/m ³) | 10 mg/m ³ (total mass) |
| Northwest Territories | OEL TWA (mg/m ³) | 10 mg/m ³ (total mass) |
| Ontario | OEL TWA (mg/m ³) | 2 mg/m ³ (containing no Asbestos and <1% Crystalline silica) |
| Prince Edward Island | OEL TWA (mg/m ³) | 2 mg/m ³ |
| Québec | VEMP (mg/m ³) | 5 mg/m ³ (containing no Asbestos and <1% Crystalline silica) |
| Saskatchewan | OEL STEL (mg/m ³) | 4 mg/m ³ |
| Saskatchewan | OEL TWA (mg/m ³) | 2 mg/m ³ |
| Yukon | OEL STEL (mg/m ³) | 20 mg/m ³ |
| Yukon | OEL TWA (mg/m ³) | 10 mg/m ³ |

Exposure Controls

Appropriate Engineering Controls: Provide adequate ventilation to minimize dust concentrations. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

Personal Protective Equipment: Respiratory protection of the dependent type. Protective clothing. Protective goggles. Gloves.



Materials for Protective Clothing: Chemically resistant materials and fabrics

Hand Protection: Protective gloves.

Eye Protection: Chemical goggles or safety glasses.

Skin and Body Protection: Wear suitable protective clothing.

Respiratory Protection: Use NIOSH-approved air-purifying or supplied-air respirator where airborne concentrations of dust are expected to exceed exposure limits.

Other Information: When using, do not eat, drink or smoke.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on Basic Physical and Chemical Properties

Physical State : Solid

Appearance : White to grey, aggregate to powder, lumps to powder

Odor : Earthy

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Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

| | |
|---|-----------------------|
| Odor Threshold | : Not available |
| pH | : 6 - 8 |
| Relative Evaporation Rate (butylacetate=1) | : Not available |
| Melting Point | : > 1200 °C (>2192°F) |
| Freezing Point | : Not available |
| Boiling Point | : Not available |
| Flash Point | : Not available |
| Auto-ignition Temperature | : Not available |
| Decomposition Temperature | : Not available |
| Flammability (solid, gas) | : Not available |
| Lower Flammable Limit | : Not available |
| Upper Flammable Limit | : Not available |
| Vapor Pressure | : Not available |
| Relative Vapor Density at 20 °C | : Not available |
| Relative Density | : Not available |
| Specific Gravity | : 1.5-2.5 g/cc |
| Solubility | : Not available |
| Log Pow | : Not available |
| Log Kow | : Not available |
| Viscosity, Kinematic | : Not available |
| Viscosity, Dynamic | : Not available |
| Explosion Data – Sensitivity to Mechanical Impact | : Not available |
| Explosion Data – Sensitivity to Static Discharge | : Not available |

SECTION 10: STABILITY AND REACTIVITY

Reactivity: Hazardous reactions will not occur under normal conditions.

Chemical Stability: Stable at standard temperature and pressure.

Possibility of Hazardous Reactions: Hazardous polymerization will not occur.

Conditions to Avoid: Incompatible materials.

Incompatible Materials: Strong acids, strong bases, strong oxidizers.

Hazardous Decomposition Products: Not available

SECTION 11: TOXICOLOGICAL INFORMATION

Information on Toxicological Effects - Product

Acute Toxicity : Not classified

LD50 and LC50 Data Not available

Skin Corrosion/Irritation: Not classified **pH: 6 - 8**

Serious Eye Damage/Irritation: Not classified **pH: 6 - 8**

Respiratory or Skin Sensitization: Not classified

Germ Cell Mutagenicity: Not classified

Teratogenicity: Not available

Carcinogenicity: May cause cancer (inhalation).

Specific Target Organ Toxicity (Repeated Exposure): Causes damage to organs through prolonged or repeated exposure (inhalation).

Reproductive Toxicity: Not classified

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Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Specific Target Organ Toxicity (Single Exposure): Not classified

Aspiration Hazard: Not classified

Symptoms/Injuries After Inhalation: May cause cancer by inhalation. Dust from this product may cause irritation to the respiratory tract.

Symptoms/Injuries After Skin Contact: Prolonged contact with large amounts of dust may cause mechanical irritation.

Symptoms/Injuries After Eye Contact : Prolonged contact with large amounts of dust may cause mechanical irritation.

Symptoms/Injuries After Ingestion: If a large quantity has been ingested: intestinal blockage. Gastrointestinal irritation.

Chronic Symptoms: Repeated or prolonged exposure to respirable crystalline silica dust will cause lung damage in the form of silicosis. Symptoms will include progressively more difficult breathing, cough, fever, and weight loss. Acute silicosis can be fatal.

Information on Toxicological Effects - Ingredient(s)

LD50 and LC50 Data

| | |
|--|---------------|
| Quartz (14808-60-7) | |
| LD50 Oral Rat | > 5000 mg/kg |
| Titanium dioxide (13463-67-7) | |
| LD50 Oral Rat | > 10000 mg/kg |
| Quartz (14808-60-7) | |
| IARC Group | 1 |
| National Toxicity Program (NTP) Status | 2 |
| Titanium dioxide (13463-67-7) | |
| IARC Group | 2B |
| National Toxicity Program (NTP) Status | 1 |

SECTION 12: ECOLOGICAL INFORMATION

Toxicity

Not available

Persistence and Degradability

Missouri Fireclay, Flint Clay, Plastic Fireclay, Hawthorn Bond[®], Hawthorn Red, Cement Clay, #2 Clay, #1 Clay, JSM Clay, Christy Gold, Raw Flint Clay, Raw Plastic Clay

Persistence and Degradability | Not established.

Bioaccumulative Potential

Missouri Fireclay, Flint Clay, Plastic Fireclay, Hawthorn Bond[®], Hawthorn Red, Cement Clay, #2 Clay, #1 Clay, JSM Clay, Christy Gold, Raw Flint Clay, Raw Plastic Clay

Bioaccumulative Potential | Not established.

Mobility in Soil Not available

Other Adverse Effects

Other Information: Avoid release to the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Recommendations: Dispose of waste material in accordance with all local, regional, national, provincial, territorial and international regulations.

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Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

SECTION 14: TRANSPORT INFORMATION

In Accordance With ICAO/IATA/DOT/TDG

UN Number Not regulated for transport

UN Proper Shipping Name Not regulated for transport

Additional Information Not regulated for transport

Transport by Sea Not regulated for transport

Air Transport Not regulated for transport

SECTION 15: REGULATORY INFORMATION

US Federal Regulations

Missouri Fireclay, Flint Clay, Plastic Fireclay, Hawthorn Bond®, Hawthorn Red, Cement Clay, #2 Clay, #1 Clay, JSM Clay, Christy Gold, Raw Flint Clay, Raw Plastic Clay

SARA Section 311/312 Hazard Classes

Delayed (chronic) health hazard
Immediate (acute) health hazard

Quartz (14808-60-7)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

Titanium dioxide (13463-67-7)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

Kaolin (1332-58-7)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

US State Regulations

Quartz (14808-60-7)

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

WARNING: This product contains chemicals known to the State of California to cause cancer.

Titanium dioxide (13463-67-7)

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

WARNING: This product contains chemicals known to the State of California to cause cancer.

Quartz (14808-60-7)

U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) List

Titanium dioxide (13463-67-7)

U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) List

Kaolin (1332-58-7)

U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) List

Canadian Regulations

Missouri Fireclay, Flint Clay, Plastic Fireclay, Hawthorn Bond®, Hawthorn Red, Cement Clay, #2 Clay, #1 Clay, JSM Clay, Christy Gold, Raw Flint Clay, Raw Plastic Clay

WHMIS Classification

Class D Division 2 Subdivision A - Very toxic material causing other toxic effects
Class D Division 2 Subdivision B - Toxic material causing other toxic effects

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Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations



Quartz (14808-60-7)

Listed on the Canadian DSL (Domestic Substances List) inventory.

Listed on the Canadian Ingredient Disclosure List

WHMIS Classification Class D Division 2 Subdivision A - Very toxic material causing other toxic effects

Titanium dioxide (13463-67-7)

Listed on the Canadian DSL (Domestic Substances List) inventory.

WHMIS Classification Class D Division 2 Subdivision A - Very toxic material causing other toxic effects

Kaolin (1332-58-7)

Listed on the Canadian DSL (Domestic Substances List) inventory.

WHMIS Classification Class D Division 2 Subdivision A - Very toxic material causing other toxic effects

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by CPR.

SECTION 16: OTHER INFORMATION

Indication of Changes : 06/06/2013

Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

GHS Full Text Phrases:

| | |
|-----------|--|
| Carc. 1A | Carcinogenicity Category 1A |
| Carc. 2 | Carcinogenicity Category 2 |
| STOT RE 1 | Specific target organ toxicity (repeated exposure) Category 1 |
| H350 | May cause cancer |
| H351 | Suspected of causing cancer |
| H372 | Causes damage to organs through prolonged or repeated exposure |

Party Responsible for the Preparation of This Document

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High Hill, MO 63350
(636)585-2214

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North America GHS US 2012 & WHMIS