



MATERIAL SAFETY DATA SHEET

Ferro Corporation
Industrial Coatings Group
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Emergency telephone number
CHEMTREC: 1-800-424-9300
CHEMTREC (outside U.S.): 1-703-527-3887
Plant Number: 1-216-641-8580

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product Name: PE RTU GC BIK RM27 100LB BAG **Date of Preparation:** 01/19/2011
Chemical Name: Frit mixture
Synonym: Glassy mixture of chemical substances made by smelting and quenching.
CAS-No.: Mixture
Formula: TSCA Description: "Frit is a mixture of inorganic chemical substances produced by rapidly quenching a molten, complex combination of materials, confining the chemical substances thus manufactured as non-migratory components of glassy solid flakes or granules."
Product Code: 1016148

2. HAZARDS IDENTIFICATION

Emergency Overview

Warning
May cause respiratory tract, eye and skin irritation. Do not breathe vapours/dust. Contains crystalline silica which causes silicosis and lung cancer.

		HMIS	NFPA 704
Color:	Grey	2*	2
Physical state:	Solid	0	0
Odor:	Odorless	0	0
		X	

Potential Health Effects

Principle routes of exposure: Inhalation, ingestion, skin and eye contact.

Eye contact: Contact with eyes may cause irritation.

Skin contact: Prolonged skin contact may cause skin irritation. May cause allergic skin reaction.

Inhalation: Dust or fumes from firing irritating to respiratory tract. Fumes may cause lung inflammation. May cause severe allergic respiratory reaction. Metal fumes containing fluoride may cause lung inflammation. Symptoms may include chest pains, chills, cough, headache, and diarrhea.

Ingestion: May irritate digestive tract.

Chronic toxicity: Excessive inhalation of fumes or dust may cause chemical pneumonitis, cyanosis, and pulmonary edema. Suspect cancer hazard (cobalt compound). Titanium Dioxide is listed by IARC as possibly carcinogenic to humans (Group 2B) based on inadequate evidence of carcinogenicity in humans and sufficient evidence in experimental animals. Chronic overexposure to fluoride may result in digestive disturbances, mottled tooth enamel, abnormal hardening of the bones and other bone changes, and damage to the liver and kidneys. Skin rashes and worker complaints related to bones, joints, and muscles have been reported. Long term inhalation causes lung damage (silicosis and cancer). Respirable crystalline silica has been classified as a Group I (sufficient evidence in humans for carcinogenicity) carcinogenic by IARC and is listed by NTP as a substance which may reasonably be anticipated to be a carcinogen.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %
Frit		100%(Contains-see below)

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Metal Oxides		
Kaolin	1332-58-7	30 - 40%
Fluorine	7782-41-4	5 - 10%
Copper chromite black spinel	68186-91-4	1 - 5%
Quartz silica	14808-60-7	1 - 5%
Titanium Dioxide	13463-67-7	1 - 5%
Nickel oxide	1313-99-1	1 - 5%
Cobalt (III) oxide	1308-04-9	0.1 - 0.5%

Frit is a fused metal oxide mixture.

This product contains trace quantities of naturally occurring radioactive uranium, thorium and radium (<0.01% total). Overexposure by inhalation to respirable dusts containing uranium, thorium and radium may cause cancer, however, observance of the OSHA limit for respirable dusts of 5 mg/m³ will ensure the use of this product to be well below the regulatory limits established for these components.

4. FIRST AID MEASURES

Eye contact:	Rinse thoroughly with plenty of water, also under the eyelids. Get medical attention if irritation develops.
Skin contact:	Wash off immediately with soap and plenty of water. Get medical attention if irritation develops.
Inhalation:	Move to fresh air. If breathing is difficult, give oxygen. If symptoms persist, call a physician.
Ingestion:	Drink plenty of water. Do not induce vomiting without medical advice. Get medical attention if irritation develops.
Notes to physician:	Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flash point (°C): Non combustible

Suitable extinguishing media:	The product itself does not burn. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapors. Heavy metal compounds.
Special protective equipment for firefighters:	As in any fire, wear self-contained breathing apparatus (pressure-demand, NIOSH approved or equivalent) and full protective gear.
Unusual hazards:	None known.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Avoid dust formation. Do not breathe vapors/dust. Avoid contact with skin, eyes and clothing. Use personal protective equipment. Ensure adequate ventilation. Wear personal protective equipment.
Environmental precautions:	Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. Do not flush into surface water or sanitary sewer system.
Methods for cleaning up:	Wear personal protective equipment. Use approved industrial vacuum cleaner for removal. Dispose of promptly. Shovel into suitable container for disposal. Clean contaminated surface thoroughly.

7. HANDLING AND STORAGE

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Handling:

Handle in accordance with good industrial hygiene and safety practice. Use only in area provided with appropriate exhaust ventilation. In case of insufficient ventilation, wear suitable respiratory equipment. Avoid contact with skin, eyes and clothing. Do not eat, drink, or smoke in areas of use or storage.

Storage:

Keep in a dry, cool and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limits

Minimize exposure in accordance with good hygiene practice.

Components	OSHA	ACGIH
Boric Oxide	15 mg/m ³ TWA total dust	10 mg/m ³ TWA
Kaolin	15 mg/m ³ TWA total dust 5 mg/m ³ TWA respirable fraction	2 mg/m ³ TWA particulate matter containing no asbestos and <1% crystalline silica, respirable fraction
Calcium Oxide	5 mg/m ³ TWA	2 mg/m ³ TWA
Fluorine	0.1 ppm TWA 0.2 mg/m ³ TWA	2 ppm STEL 1 ppm TWA
Copper chromite black spinel	0.5 mg/m ³ TWA Cr	1 mg/m ³ TWA Cu dust and mist 0.5 mg/m ³ TWA Cr
Quartz silica	Listed	0.025 mg/m ³ TWA respirable fraction
Titanium Dioxide	15 mg/m ³ TWA total dust	10 mg/m ³ TWA
Nickel oxide	1 mg/m ³ TWA Ni	0.2 mg/m ³ TWA Ni inhalable fraction
Nitrogen dioxide	5 ppm Ceiling 9 mg/m ³ Ceiling	5 ppm STEL 3 ppm TWA
Cobalt (III) oxide	Not established	0.02 mg/m ³ TWA Co

- Engineering measures:** Provide appropriate exhaust ventilation at machinery and at places where dust or fumes can be generated.
- Eye protection:** Safety glasses with side-shields.
- Skin and body protection:** Lightweight protective clothing. Keep working clothes separately. Remove and wash contaminated clothing before re-use.
- Hand protection:** Impervious gloves.
- Respiratory protection:** Use NIOSH approved respirator when ventilation is inadequate. In case of insufficient ventilation wear suitable respiratory equipment. Seek professional advise prior to respirator selection and use. NIOSH-approved respirators should be worn where engineering controls and work practices do not reduce exposure to or below the PEL.
- Hygiene measures:** Wash hands before breaks and at the end of workday. Wash contaminated clothing before re-use.

9. PHYSICAL AND CHEMICAL PROPERTIES

Color:	Grey	Physical state:	Solid
Odor:	Odorless	Molecular weight:	No data available
Boiling point/range (°C):	No data available	pH:	No data available
Melting point/range (°C):	> 1200	Specific gravity (Water =1):	1.600 - 3.000
Vapor pressure :	No data available	Water solubility:	Negligible
VOC content (%)	No data available		

10. STABILITY AND REACTIVITY

- Stability:** Stable at normal conditions.
- Polymerization** Will not occur.

Hazardous decomposition products: No decomposition if stored normally. Thermal decomposition can lead to release of irritating gases and vapors.

Materials to avoid: None known.

Conditions to avoid None known.

11. TOXICOLOGICAL INFORMATION

Acute toxicity: No data is available on the product itself.

Chronic Toxicity: Contains crystalline silica which causes silicosis and lung cancer. In lifetime inhalation studies of rats, airborne respirable size titanium dioxide particles have been shown to cause lung tumors at concentrations associated with substantial particle lung burdens and consequential pulmonary overload and inflammation. However, other laboratory animals such as mice and hamsters did not develop lung tumors under similar testing with titanium dioxide. Human epidemiology studies do not suggest an association between occupational exposure to titanium dioxide and risk for cancer.

Carcinogenic Effects: IARC has identified Cobalt and Cobalt compounds as "possibly carcinogenic" as a group; however IARC did not specifically identify the cobalt compound in this product as a possible carcinogen. Respirable crystalline silica has been classified as a Group I (sufficient evidence in humans for carcinogenicity) carcinogenic by IARC and is listed by NTP as a substance which may reasonably be anticipated to be a carcinogen. Crystalline silica is also a known cause of silicosis, a non-cancerous lung disease caused by excessive exposure to crystalline silica. IARC has identified Cobalt and Cobalt compounds as "possibly carcinogenic" as a group.

Target Organ Effects: Nickel compounds: Lungs, skin. Cobalt compound: Skin, respiratory system. Silica: Respiratory system. Titanium dioxide: Respiratory system.

Component information, if any, is listed below

Quartz silica

OSHA - Select Carcinogens: Present
NTP: Known Human Carcinogen
IARC - Group 1: Listed

Titanium Dioxide

OSHA - Select Carcinogens: Present
IARC - Group 2B: Listed

Nickel oxide

OSHA - Select Carcinogens: Present
NTP: Known Human Carcinogen
IARC - Group 1: Listed

Cobalt (III) oxide

OSHA - Select Carcinogens: Present
IARC - Group 2B: Listed

12. ECOLOGICAL INFORMATION

Aquatic toxicity: Not determined.

Boric Oxide

Ecotoxicity - Fish Species Data:
72 h LC50 (Carassius auratus) = 0.57 g/L flow-through
Ecotoxicity - Water Flea Data:
48 h EC50 (Daphnia magna) = 370 - 490 mg/L

Calcium Oxide

Ecotoxicity - Fish Species Data:
96 h LC50 (Cyprinus carpio) = 1070 mg/L static

Nickel oxide

Ecotoxicity - Fish Species Data:
96 h LC50 (Brachydanio rerio) = 100 mg/L static
Ecotoxicity - Water Flea Data:
48 h EC50 (Daphnia magna) = 100 mg/L
Ecotoxicity - Freshwater Algae Data:
72 h EC50 (Pseudokirchneriella subcapitata) = 127.3 mg/L

Persistence and degradability: No information available.

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste must be disposed of in accordance with federal, state and local environmental control regulations. Where possible recycling is preferred to disposal or incineration.

14. TRANSPORT INFORMATION

DOT (U.S.)

Proper shipping name: Not regulated.

TDG (Canada)

Proper shipping name: Not regulated.

15. REGULATORY INFORMATION

U.S. Regulations:

TSCA: Not subject to TSCA 12(b) Export Notification

SARA 313:

Components	SARA 313:
Fluorine (1 - 5%)	1.0 % de minimis concentration
Copper chromite black spinel (1 - 5%)	1.0 % de minimis concentration (Chemical Category N100)
Nickel oxide (1 - 5%)	0.1 % de minimis concentration (Chemical Category N495)

State Regulations

This product or its ingredients have been evaluated for New Jersey, Pennsylvania, and California Prop 65 supplier notification requirements. Substances that are subject to notification requirements, if any, are listed below.

Components	State Regulations - NJ; PA
Quartz silica	Listed (NJRTK) Listed (PARTK)

Components	State Regulation - CA Prop65
Quartz silica	Carcinogen

Components	State Regulation - CA Prop65
Nickel oxide	Carcinogen

Canadian WHMIS

WHMIS hazard class: D2B Toxic materials

Canadian Ingredient Disclosure List (IDL):

Components	Canada - WHMIS Ingredient Disclosure:
Boric Oxide	1
Calcium Oxide	1
Fluorine	1
Copper chromite black spinel	1
Quartz silica	1
Nickel oxide	0.1

International Inventories

TSCA 8(b): Listed or exempt.
Canadian DSL/NDSL list All ingredient(s) are listed on the DSL or NDSL
EC-No. One or more ingredient(s) are not on the EINECS list.
Philippines (PICCS): Listed.
Japan (ENCS): One or more ingredient(s) are not on the ENCS list.
Korea (KECL): Listed.
China (IECS): Listed.
Australia (AICS): Listed.
New Zealand (NZIoC): One or more ingredient(s) are not on the NZIoC list.

16. OTHER INFORMATION

For Industrial Use Only.

Prepared by: Ferro Technical Center

Disclaimer: The information and recommendations contained in this Material Safety Data Sheet have been compiled from sources believed to be reliable and to represent the most reasonable current opinion on the subject when the MSDS was prepared. No warranty, guaranty or representation is made as to the correctness or sufficiency of the information. The user of this product must decide what safety measures are necessary to safely use this product, either alone or in combination with other products, and determine its environmental regulatory compliance obligations under any applicable federal or state laws.

End of Safety Data Sheet