



MATERIAL SAFETY DATA SHEET

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

Product Name: Friction Material, Brake Lining

Manufacturer:
Product Number: No. 0240

MDS05, MDS06, MDS07, MDS08, MDS09,
MDS10, MDS19, MDS20, MDS22, MDS23,
MDS24, MDS25, MDS26, MDS30, FA400,
FA4000, FA401, FA4001, FA402, FA4003,
FA4004, FA5001, FA503, FA5003, FA5005,
FM2045, FM2091, FM2114

Federal-Mogul Corporation
26555 Northwestern Highway
Southfield, MI 48033

24hr Emerg # (Infotrac): 1-800-535-5053
International: 001-352-323-3500
Non-Emerg #: 248-354-9844

SECTION 2: COMPOSITION/INFORMATION ON HAZARDOUS INGREDIENTS

Although several of the ingredients used to formulate this product may be hazardous in their raw state, the manufacturing process results in a solid, infusible form, binding or otherwise rendering the mixture inert. We have identified below those hazardous constituents present in quantities greater than 1% (0.1% for carcinogens) that may be released from the product by overheating, burning, machining, or abrading.

Ingredient*	CAS No.:	% Weight	OSHA PEL	ACGIH TLV (2003)
Acrylic fibers	24980-62-9	>1	1 fiber/cc ^a	1 fiber/cc ^a
Alumina silicate	1335-30-4	>1	None Established	None Established
Aluminum oxide	1344-28-1	>1	15 mg/m ³ ^{b, c}	10 mg/m ³
Aluminum	7429-90-5	>1	15 mg/m ³	10 mg/m ³
Aluminum hydroxide	21645-51-2	>1	None Established	None Established
Amporphous silica	112926-00-8	>1	20 mppcf ^d	10 mg/m ³
Antimony trioxide	1309-64-4	>1	0.5 mg/m ³	L, A2
Antimony sulfide	1345-04-6	>1	None Established	None Established
Aramid fiber	26125-61-1	>1	1 fiber/cc ^a	1 fiber/cc ^a
Barium sulfate	7727-43-7	>1	15 mg/m ³ ^c	10 mg/m ³
Brass	None	>1	None Established	None Established
Butyl rubber	9010-85-9	>1	None Established	None Established
Calcium carbonate	1317-65-3	>1	15 mg/m ³ ^c	10 mg/m ³
Calcium fluoride (as fluoride)	7789-75-5	>1	0.2 mg/m ³	0.6 mg/m ³
Carbon black	1333-86-4	>1	3.5 mg/m ³	3.5 mg/m ³

SECTION 2: COMPOSITION/INFORMATION ON HAZARDOUS INGREDIENTS (continued)

Carbon – purified	7440-44-0	>1	None Established	None Established
Cashew resin – cured	69012-00-6	>1	None Established	None Established
Cashew resin – cured	68333-96-0	>1	None Established	None Established
Cashew resin -- cured	67700-42-9	>1	None Established	None Established
Cashew particle	68333-94-8	>1	None Established	None Established
Cellulose	9004-34-6	>1	15 mg/m ³ ^c	10 mg/m ³
Ceramic fibers	142844-00-6	>1	1 fiber/cc ^a	0.2 fiber/cc (refractory)
Chlorobutyl rubber	9010-85-9	>1	None Established	None Established
Chromite	1308-31-2	>1	None Established	None Established
Coke	64743-05-1	>1	None Established	None Established
Copper (dust)	7440-50-8	>1	1 mg/m ³	1 mg/m ³
Di (2-ethylhexyl) phthalate	117-81-7	>1	5 mg/m ³	5 mg/m ³ , A3
Dicumyl peroxide	80-43-3	>1	None Established	None Established
Fillite	61132-18-1	>1	None Established	None Established
Graphite	7782-42-5	>1	15 mppcf ^d	2 mg/m ³ (respirable fraction)
Hydrated lime	1305-62-0	>1	None Established	None Established
Iron oxide (dust)	1309-37-1	>1	10 mg/m ³	5 mg/m ³
Iron powder (as iron)	7439-89-6	>1	None Established	None Established
Iron pyrite (as iron)	1317-37-9	>1	None Established	None Established
Kyanite	1302-76-7	>1	None Established	None Established
Lead	7439-92-1	<0.1	0.05 mg/m ³	0.05 mg/m ³ , A3
Manganese	7439-96-5	<0.1	5 mg/m ³ , C	0.2 mg/m ³ , NIC
Magnesium oxide	1309-48-4	>1	None Established	10 mg/m ³
Mica	12001-26-2	>1	20 mppcf, <1% silica	3 mg/m ³ (respirable fraction)
Mineral fibers	None	>1	None Established	None Established
Mineral fibers	Established			
Mineral fibers	65997-17-3	>1	1 fiber/cc ^a	1 fiber/cc ^a
Mineral fiber (biosoluble)	287922-11-6	>1	None Established	None Established
Molybdenum sulfide	1317-33-5	>1	None Established	None Established
Mullite	1302-76-7	>1	None Established	None Established
Mullite	1302-93-8	>1	None Established	None Established
Mullite	7631-86-9	>1	None Established	None Established
Nitrite rubber	9003-18-3	>1	None Established	None Established
Phenolic resin-cured	9003-35-4	>1	None Established	None Established
Potassium titanate	12056-51-8	>1	None Established	None Established
Potassium oxide	12136-45-7	>1	None Established	None Established
Rubber (powdered)	9006-04-6	>1	None Established	None Established
SBR rubber	9003-55-8	>1	None Established	None Established
Silica (crystalline quartz)	14808-60-7	0.1	30 mg/m ³	0.05 mg/m ³ (respirable fraction)
Silicon carbide	409-21-2	>1	%SiO ₂ + 2 15 mg/m ³ ^c	3 mg/m ³ (respirable fraction)
Sodium hexametaphosphat	68915-31-1	>1	None Established	None Established
Steel fiber	65997-19-5	>1	None Established	None Established
Sulfur	7704-34-9	>1	None Established	None Established
Talc	14807-96-6	>1	20 mppcf ^d	2 mg/m ³ , A4
Titanium dioxide	13463-67-7	>1	None Established	None Established
Titanium dioxide	1317-80-2	>1	15 mg/m ³ ^c	10 mg/m ³
Vermiculite	1318-00-9	>1	None Established	None Established
Wollastonite	13983-17-0	>1	None Established	None Established
Zinc	7440-66-6	>1	None Established	None Established
Zinc oxide	1314-13-2	>1	15 mg/m ³ ^c	2 mg/m ³ (respirable fraction)
Zinc sulfide	1314-98-3	>1	None Established	None Established
Zirconium oxide	1314-23-4	>1	5 mg/m ³ (as zirconium)	5 mg/m ³ (as zirconium)
Zirconium silicate (zircon)	14940-68-2	>1	5 mg/m ³ (as zirconium)	5 mg/m ³ (as zirconium)

*: The products listed in Section 1 do not contain all of the ingredients listed above

a.: As synthetic vitreous fibers per cubic centimeter of sampled air

b.: Milligrams of compound per cubic meter of sampled air, on a weight-to-volume basis

c.: As total particulate (not otherwise regulated)

L: Exposures should be carefully controlled as low as feasible.

NIC: Notice of Intended Change to 0.03 mg/m³ for the respirable fraction

A2: ACGIH has classified the compound as a suspected human carcinogen.

A3: ACGIH has classified the compound as a confirmed animal carcinogen with unknown relevance to humans.

d.: Millions of particles per cubic foot of sampled air

C: Ceiling limit, as fume

OSHA Regulatory Status: This product is classified as hazardous under OSHA regulations.

SECTION 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Shipped friction materials are not considered hazardous, but operations (overheating, burning, machining, abrading, or riveting) that can create airborne dust should be avoided. Such operations could cause exposures in excess of permissible exposure limits for the respective ingredient and should be considered hazardous.

POTENTIAL HEALTH EFFECTS

Inhalation: Dust may cause irritation. Fume produced at high temperatures may cause metal fume fever, a 24-to 48-hour "flu-like" illness. Repeated inhalation of dust over time may affect a variety of organs (See Chronic Section below).

Skin: May cause irritation. Prolonged skin contact may cause skin sensitization and/or dermatitis.

Eye: Dust may cause irritation and redness. Particles may scratch the eye.

Ingestion: Ingestion may cause irritation, nausea, vomiting, and diarrhea.

Chronic: Repeated inhalation of dust over time may cause fibrotic lung disease and increased risk of sinus and respiratory cancer. Long-term dust inhalation may also harm the nervous, gastrointestinal, renal (kidneys), and hematological (blood) systems.

Carcinogenicity:

	COMPONENT
	NTP
	IARC
	OSHA
Silica (crystalline)	Yes 1 Yes
Antimony trioxide, Carbon black, Ceramic fibers, Mineral fibers (respirable)	No 2B No
Chromite	No* 3 No
Di (2-ethylhexyl) phthalate	Yes 3 No

Mineral wool/fiber**

	Yes
	3**
	No
Acrylic fiber, Aramid fiber, Antimony sulfide	
	No
	3
	No
Titanium dioxide	
	No
	3
	No
Talc	
	No
	3
	No
Lead	
	Yes
	No
	No
Acrylic fibers, Aluminum oxide, Barium sulfate, Brass, Butyl rubber, Calcium carbonate, Calcium fluoride, Cashew resin-cured, Cellulose, Chlorobutyl rubber, Coal, Coke, Copper, Fillite, Graphite, Hydrated lime, Iron powder, Iron oxide, Iron pyrite, Kyanite, Magnesium oxide, Mica, Molybdenum sulfide, Mullite, Nitrile rubber, Phenolic resin-cured, Potassium titanate, Rubber (powdered), Silicon carbide, SBR rubber, Sodium hexametaphosphate, Steel fiber, Sulfur, Vermiculite, Wollastonite, Zinc, Zinc sulfide, Zinc oxide, Zirconium oxide, Zirconium silicate	
	No
	No
	No
* Although not explicitly listed, chromite ore causes sarcomas. ** The mineral fiber used has been classified as bio-soluble and exonerated under ECC directive 97/69/EC Note Q. The IARC has recently changed the classification of Mineral Fibers to Group 3 "unclassifiable" from Group 2 "possible carcinogen."	
Signs and Symptoms: Skin may become red and itchy with repeated contact. Metal fume fever is characterized by chills, fever, muscle aches, and metallic taste. Anemia may cause dizziness and fatigue. Muscle weakness, fatigue, irritability, poor memory, and headache may indicate neurological effects. Gastrointestinal effects may result in nausea, abdominal pain, diarrhea, constipation, nausea and vomiting.	
Medical Conditions Aggravated by Exposure: Overexposure may aggravate pre-existing skin, respiratory, kidney, blood, gastrointestinal and nervous system disorders.	
Target Organs: Skin, eyes, lungs, gastrointestinal system.	

POTENTIAL HEALTH EFFECTS (continued)
Symptoms and Effects of Exposure to Selected Individual Components

ACRYLIC FIBERS

Inhalation hazard(s) – Overexposure to respirable fibers by inhalation may cause mild and temporary upper respiratory irritation, with discomfort or cough. The toxicological properties of this material have not been fully investigated. The oral and dermal animal testing LD₅₀ values were greater than 5.0 g/kg and 2.0 g/kg, respectively.

Other hazard(s) – Skin sensitization has not been observed in human tests. The mechanical action of fibers may cause slight skin irritation at clothing binding points and mild irritation of the eyes and nasal passages.

ALUMINUM OXIDE

Inhalation hazard(s) – Exposure to alumina may cause coughing and shortness of breath.

Chronic: Prolonged exposure may affect breathing capacity.

Other hazard(s) – Ingestion is not recommended, but adverse effects have not been reported. Alumina is not absorbed through the skin, but contact may cause abrasion. Dust may irritate eyes.

ANTIMONY COMPOUNDS

Inhalation hazard(s) – There are no reported serious health risks from exposure other than a possible change in blood pressure. Prolonged exposure may cause irritation of the nose, throat, and mouth.

Other hazard(s) – Skin or eye contact may result in coughing, dizziness, headache, nausea, vomiting, diarrhea, stomach cramps, and insomnia.

ARAMID FIBERS

Inhalation hazard(s) – Overexposure to respirable fibers by inhalation may cause mild temporary upper respiratory irritation, with discomfort or cough. Based on animal testing, prolonged and repeated exposure to excessive concentrations of respirable fibers may cause permanent lung injury.

Other hazard(s) – Skin sensitization has not been observed in human tests. The mechanical action of fibers may cause slight skin irritation at clothing points and mild irritation of the eyes and nasal passages.

BARIUM SULFATE

Inhalation hazard(s) – Should be treated as a nuisance dust. Exposure to barium sulfate may cause paroxysmal coughing, wheezing, difficult breathing, and upper respiratory tract irritation.

Other hazard(s) – Adverse effects have not been reported from ingestion. Eye contact may cause temporary discomfort and irritation.

BRASS AND COPPER

Inhalation hazard(s) – Acute: May produce irritation of the nose and/or trachea. May produce acute gastroenteric symptoms resulting in vomiting or inflammation and may cause metal fume fever.

Chronic: Prolonged exposure may cause injury to liver, kidneys or spleen; anemia may develop.

Chronic toxicity is reportedly confined to those persons suffering from pre-existing Wilson's disease.

Other hazard(s) – Copper dusts and mists are eye and mucous membrane irritants and skin sensitizers. Acute exposure may cause metallic taste and nasal ulceration and perforation. Prolonged skin contact may produce sensitization dermatitis. Exposure may result in discoloration of the skin and hair. Ingestion of copper compounds may cause vomiting and collapse. Hemolysis, jaundice, anuria, hypertension and convulsions characterize acute poisoning.

Symptoms and Effects of Exposure to Selected Individual Components (continued)**BUTYL RUBBER**

A reclaimed material that encapsulates various chemicals in a fully cured butyl rubber matrix.

Inhalation hazard(s) – May cause mild irritation of the respiratory tract.

Other hazard(s) – Eyes – may cause mild transient eye irritation.

CALCIUM CARBONATE

A white, finely pulverized powder with no odor.

Inhalation hazard(s) – Limestone dust is considered a nuisance dust. Prolonged exposure may cause irritation to throat and lungs. Silica content is not considered high enough to cause silicosis unless exposures are extremely high and prolonged.

Other hazard(s) – Eyes – may cause mild transient eye irritation.

CALCIUM FLUORIDE

Inhalation hazard(s) - Toxic effects are not reported, but exposure to dust may cause coughing and respiratory tract irritation.

Other hazard(s) – Contact may cause eye irritation. Long-term fluoride exposure can cause fluorosis with bone degeneration and teeth mottling.

CARBON BLACK

Inhalation hazard(s) – Should be treated as a nuisance dust. Exposure may cause temporary upper respiratory tract discomfort. IARC classifies carbon black as Group 2, possibly carcinogenic to humans. Proposition 65 lists carbon black as a cancer-causing chemical.

CASHEW RESIN – CURED, CASHEW PARTICLE

Inhalation hazard(s) – Cured cashew particles are generally considered to be a nuisance dust, but prolonged exposure may cause irritation of nasal and respiratory tracts leading to sensitization. In the unlikely event of formaldehyde vapors and/or uncured cashew liquid being present, this may cause dermatitis and could lead to a form of nasal cancer.

CELLULOSE

A non-toxic, fibrous flock, practically odorless.

Inhalation hazard(s) – Acute: Dryness of nose, eye irritation, and nasal obstruction. Chronic: No data available.

CERAMIC FIBERS

Inhalation hazard(s) – Overexposure to respirable fibers by inhalation may cause mild and temporary upper respiratory irritation, with discomfort or cough. NTP has listed respirable ceramic fibers as Group B, reasonably anticipated to cause cancer in humans. IARC has listed ceramic fibers as Group 2B, possibly carcinogenic to humans. ACGIH classifies refractory ceramic fibers as A2, a suspected human carcinogen.

Other hazard(s) – The mechanical action of fibers may cause slight skin irritation and mild irritation of the eyes and nasal passages. Ingestion may cause gastrointestinal irritation, vomiting, and diarrhea.

COKE, CALCINED

Inhalation hazard(s) – May irritate mucous membranes by mechanical or chemical means. May cause lung inflammation.

Other hazard(s) – May cause slight to moderate eye irritation. May cause skin irritation.

CHROMITE

Chromite (chromite ore) is a trivalent chromium compound.

Inhalation hazard(s) – Negligible.

Other hazard(s) – LD₅₀(oral) > 10g/kg. IARC states “Chromite ore has been extensively tested in rats by intrabronchial, intrapleural, and intrafemoral administration; no increase in the incidence of tumors was seen.” Chromite ore is not explicitly listed by NTP but the text, under “chromium and certain chromium compounds” states: “Injection-site sarcomas were produced in rats and mice after intramuscular, intrapleural, and subcutaneous injections of chromite ore...”

Symptoms and Effects of Exposure to Selected Individual Components (continued)**CHLOROBUTYL RUBBER**

Inhalation hazard(s) – Negligible at ambient temperatures (-18 to 38°C).

Other hazards – Eye contact: slightly irritating, but will not injure eye tissue. Prolonged exposure to elevated temperature (>170°C) leads to decomposition to low molecular weight halogenated hydrocarbons and HCl. These species may be potential irritants or cause systemic effects.

DI (2-ETHYLHEXYL) PHTHALATE (DEHP)

Inhalation hazard(s) – Can cause irritation of the nasal passages and throat resulting in coughing and wheezing.

Other hazard(s) – Causes irritation of the eyes and skin. High or repeated exposure may affect the liver.

DICUMYL PEROXIDE

Inhalation hazard(s) – Inhalation of dust may cause mild respiratory tract irritation.

Other hazard(s) – May cause mild eye and skin irritation.

FILLITE

A hollow glass bubble.

Inhalation hazard(s) – Considered a nuisance dust, otherwise benign.

Other hazard(s) – Contains up to 1.5% bound quartz.

GRAPHITE

Inhalation hazard(s) – Acute: Exposure may result in cough, dyspnea, black sputum, and fibrosis. Chronic: Prolonged exposure may cause pneumoconiosis. It is reported that diseases of the respiratory and cardiovascular system may be aggravated by exposure.

HYDRATED LIME

Inhalation hazard(s) – Dust may cause irritation of nasal and respiratory passages.

Other hazard(s) – Lime is a strong eye irritant, and may cause corrosive damage and blindness. Exposure to dust may cause severe skin irritation, drying and burning, particularly with damaged skin. Swallowing excessive amounts may damage mucous membranes and the digestive system. There are no known chronic hazards.

IRON DUST (IRON OXIDE)

Inhalation hazard(s) – Repeated or prolonged exposures to iron dust may cause a form of benign pneumoconiosis called siderosis. Exposure is generally not associated with pulmonary fibrosis or disability unless there is concurrent exposure to other fibrosis-producing materials such as silica.

Other hazard(s) – Contact may cause skin and eye irritation.

IRON PYRITE (IRON DISULFIDE)

Iron pyrite is classified as a nuisance particulate.

Inhalation hazard(s) – Excessive inhalation of respirable dust may produce pleuritis, and/or fatal pneumonia. Acute – Irritation of the eyes, skin, nose, throat and respiratory system. Chronic – Exposure to high concentrations of dust and fume containing iron compounds (at least 6-10 years) may produce siderosis with changes visible on chest X-rays.

KYANITE

Inhalation hazard(s) – May cause coughing, and shortness of breath.

Other hazard(s) – May irritate eyes and abrade the skin.

LEAD

Inhalation hazard(s) – Acute: Exposure may cause muscle and joint pain, and damage to the brain and nervous system.

Ingestion hazard(s) – May affect kidneys.

Symptoms and Effects of Exposure to Selected Individual Components (continued)**MAGNESIUM OXIDE**

Inhalation hazard(s) – Inhalation of fume may cause metal fume fever.

Other hazard(s) – Serious hazard from burns. Overexposure may result in eye, skin or respiratory irritation over a long period of time.

MAN-MADE MINERAL FIBERS – (SYNTHETIC VITREOUS FIBERS)

Inhalation hazard(s) – Exposure to respirable fibers by inhalation may cause temporary upper respiratory irritation, with discomfort and cough. Prolonged exposure may cause chronic lung disease. IARC classifies man-made mineral fibers (diameter <1 µm) as Group 2B, possibly carcinogenic to humans. ACGIH classifies synthetic vitreous fibers as A3, an animal carcinogen with unknown relevance to humans.

Other hazard(s) – The mechanical action of fibers may cause skin irritation and irritation of the eyes and nasal passages. Ingestion may cause gastrointestinal irritation, vomiting, and diarrhea.

Note: The emergence of “biosoluble” forms of man-made fibers has allowed these types to be exonerated from classification as a carcinogen according to Note Q in EU Commission Directive 97/69/EC.

MICA/VERMICULITE

Thin amber flakes that are odorless. Long-term exposure to a respirable airborne concentration exceeding the TLV may lead to pneumoconiosis, but usually no functional lung impairment. The symptoms most frequently reported are chronic cough and dyspnea. May contain naturally occurring trace amounts of crystalline silica.

MOLYBDENUM SULFIDE

Inhalation hazard(s) – Causes lung irritation, chest pain, difficult breathing and coughing.

Other hazard(s) – Nausea, stomach irritation, vomiting and minor irritation to skin. Can cause abrasive damage to outer eye surface.

MULLITE

A mixture of bauxitic kaolin and amorphous glass. May contain naturally occurring trace amounts of crystalline silica. Inhalation hazards – Dust may cause irritation of nasal and respiratory tracts. Long-term exposure may aggravate pre-existing respiratory conditions and may cause pneumoconiosis (kaolinosi).

Other hazard(s) – May cause irritation to the skin and eyes. Can cause abrasive damage to outer eye surface. Non-toxic if ingested.

NITRILE RUBBER

Inhalation hazard(s) - Gases and fumes from thermal processing or decomposition of this product may cause irritation of respiratory tract, skin, and eyes.

Other hazard(s) – Eyes – may cause eye irritation if material is introduced into the eye. Eyes may feel scratchy, become red, and tear.

POTASSIUM TITANATE

Inhalation hazard(s) – May cause irritation of respiratory system. May contain naturally occurring trace amounts of naturally occurring crystalline silica.

Other hazard(s) – May be abrasive to skin and eyes. Note: The potassium titanates used here are of the non-acicular forms.

PHENOLIC RESIN – CURED

Inhalation hazard(s) – Dust may cause irritation of nasal and respiratory tracts. Product is fully cured, so formaldehyde vapor should not be present. If formaldehyde is present, inhalation may cause a form of nasal cancer.

Other hazard(s) – Prolonged exposure can cause irritation, redness, tearing of the eyes, and may lead to sensitization of the skin and dermatitis.

Symptoms and Effects of Exposure to Selected Individual Components (continued)**RUBBER (POWDERED)**

Inhalation hazard(s) – May cause mild irritation of the respiratory tract. Repeated and prolonged inhalation of dust may lead to a benign pneumoconiosis. This condition may cause some lung function impairment, but is reversible with reduced exposure.

Other hazard(s) – Eyes – may cause mild transient eye irritation.

SBR RUBBER

Inhalation hazard(s) – Exposure to fine dust may cause mild irritation of respiratory tract.

Other hazard(s) – Prolonged exposure may cause mild transient eye or skin irritation.

SODIUM HEXAMETAPHOSPHATE

Inhalation hazard(s) – Exposure to fine dust may cause mild irritation of respiratory tract.

Other hazard(s) – Prolonged exposure may cause mild transient eye or skin irritation. Material is non-hazardous, and is considered a nuisance dust.

SILICA DUST

Inhalation hazard(s) – Acute: Exposure to silica dust may cause paroxysmal coughing, wheezing, dyspnea and upper respiratory tract irritation. Chronic: Prolonged exposure to silica dust may cause silicosis.

Crystalline silica has been classified by IARC as, Group 1, carcinogenic to humans. ACGIH classifies crystalline silica as A2, suspected human carcinogen.

Other hazard(s) – Eye or skin contact can cause temporary discomfort and irritation.

SILICON CARBIDE

Inhalation hazard(s) – May cause coughing/shortness of breath.

Other hazard(s) – Abrasive to skin.

STEEL FIBER

Inhalation hazard(s) – Acute: Metal fume fever with symptoms of chills, fever, cough, muscle aches, and difficulty in breathing from manganese; silicon can cause respiratory tract irritation; copper can cause irritation of eyes, nose, throat and lungs with possibility of metal fume fever, chills, nausea, fever, dry throat, cough, and metallic taste. Chronic: Repeated exposure to iron over time may cause lung changes and benign pneumoconiosis; cumulative central nervous system and lung damage may occur with manganese as well as insomnia, and malaise; may cause irritation of the lungs and discoloration of the skin and hair.

Other hazard(s) – May cause mechanical damage to skin and eyes.

SULFUR

Inhalation hazard(s) – Exposure may cause irritation to mucous membranes and upper respiratory tract. Symptoms include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, vomiting.

Other hazard(s) – May also irritate by ingestion and skin absorption.

TITANIUM DIOXIDE

Inhalation hazard(s) – May cause irritation of the respiratory system. Extreme exposures have been reported to lead to granulomatous lesions.

Other hazard(s) – Causes irritation to the eyes and skin. Considered a potential occupational carcinogen by NIOSH, but the IARC considers titanium dioxide to be Group 3, unclassifiable.

WOLLASTONITE

A non-metallic mineral powder, white in color with a faint odor.

Inhalation hazard(s) – Long-term cumulative inhalation of high concentrations may cause restriction of the large airways.

Other hazard(s) – May cause minor skin irritation.

Symptoms and Effects of Exposure to Selected Individual Components (continued)**ZINC SULFIDE**

Inhalation hazard(s) – May cause irritation of the respiratory system.

Other hazard(s) – May cause irritation to the eyes and skin.

ZINC and ZINC OXIDE

Inhalation hazard(s) – Exposure to zinc oxide can cause a flu-like illness called metal fume fever, with symptoms of metallic taste in the mouth, headaches, cough, shortness of breath, aches and chills, upset stomach and chest pain.

Other hazard(s) – Zinc oxide may be absorbed through the skin to produce the above symptoms. Repeated high exposure may cause ulcer symptoms and affect liver function.

ZIRCONIUM COMPOUNDS

Inhalation hazard(s) – Avoid inhalation of zirconium containing aerosols, which can cause lung granulomas.

Other hazard(s) – Most zirconium compounds in common use are insoluble and are considered inert. Can cause damage to outer eye surface.

SECTION 4: FIRST AID MEASURES

Ingestion: Seek medical attention.

Inhalation: Move to fresh air. Seek medical attention.

Eye Contact: Flush with water to remove particulate. Seek medical attention.

Skin Contact: Wash thoroughly with soap and water. If persistent irritation develops, seek medical attention.

SECTION 5: FIRE FIGHTING MEASURES

Flashpoint: N/A

LEL: N/A

UEL: N/A

Autoignition Temperature: This product is inherently flame resistant, but may ignite at temperatures exceeding 1,112°F (600°C) in an oxygen-enriched atmosphere.

Extinguishing Media: Use media suitable for surrounding fire.

Unusual Fire and Explosion Hazards: None

Special Fire Fighting Procedures: Heating to very high temperatures may result in toxic decomposition products (See Section 10).

SECTION 6: ACCIDENTAL RELEASE MEASURES

If a release of dust occurs during machining, abrading, or riveting, remove dust by vacuuming or wet mopping. Vacuums used for this purpose should be equipped with HEPA filters. Do not use compressed air to blow dust in the workplace.

SECTION 7: HANDLING AND STORAGE

Store in a dry place. Shipping and storage may result in accumulation of dust in shipping containers. If this occurs, dispose of the container in an airtight polyethylene bag (see disposal instructions below) or remove dust by vacuuming or wet mopping. Vacuums used for this purpose should be equipped with HEPA filters. Do not use compressed air to blow dust from storage containers.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Ventilation Protection: Any operation which may produce dust, including machining, grinding, riveting, or abrading this product, should be adequately exhausted to prevent inhalation of dust.

Respiratory Protection: Use a NIOSH-approved respirator if there is a potential for exposure to dust, vapor, or fume exceeding PELs or TLVs. (See 29 CFR 1910.134, respiratory protection standard).

Skin Protection: If skin irritation occurs, gloves and other protective garments may be worn.

Eyes: Wear safety glasses or goggles, as necessary, if dust exposure is possible.

Other: None known.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES (as lead)

Boiling Point:	N/A	Vapor Pressure:	N/A
Melting Point:	N/A	Vapor Density (air = 1):	N/A
pH:	N/A	% Volatile:	N/A
Specific Gravity:	2.00 – 3.70 g/cc	Evaporation Rate:	N/A
Water Solubility:	Insoluble	Appearance and Odor:	Solid, phenolic

SECTION 10: STABILITY AND REACTIVITY

Stability: Stable at normal temperatures and storage conditions.

Incompatibility (Materials/Conditions to Avoid): None.

Hazardous Polymerization: Will not polymerize. This product is fully cured in the manufacturing process.

Decomposition Products: Oxides of carbon, nitrogen and sulfur; hydrocarbons; ammonia; and other trace organic compounds.

SECTION 11: TOXICOLOGICAL INFORMATION

Inhalation: Refer to Section 3

Skin: Refer to Section 3

Eye: Refer to Section 3

Ingestion: Refer to Section 3

Acute: Skin and eye irritation may occur with repeated contact to dust.

Chronic: This product is a mixture of chemicals physically bonded together. Therefore, in the “as supplied” state, this product is considered non-hazardous. If in the event that dust is generated, some of the ingredients can have acute and chronic effects (See Section 3 for details).

SECTION 12: ECOLOGICAL INFORMATION

Soluble copper is known to be an ecotoxin. A study conducted by the Santa Clara Valley Authority identified copper from disc brake pad wear debris as a major contributor to the high level of copper in San Francisco Bay. These findings have been disputed and are currently under review by the Brake Manufacturers Council PEC Committee, Santa Clara Valley Authority, MEMA, and the International Copper Association

SECTION 13: DISPOSAL CONSIDERATIONS

Federal and state law regulates disposal of solid waste. Waste should be placed in airtight containers. Disposal must be in accordance with 49CFR261, 40CFR262, and applicable state and local regulations

SECTION 14: TRANSPORTATION INFORMATION

Proper Shipping Name:	Not regulated by these modes of transportation
Hazard Class:	None
Identification Number:	None
Packing Group:	N/A
Shipping Label:	None
Additional Marking Requirement:	None

SECTION 15: REGULATORY INFORMATION

U.S. TSCA: All chemicals used in the manufacture of this product are listed on the U.S. Toxic Substances Control Act (TSCA) Inventory

California Proposition 65: This product contains ingredients known to the State of California to cause cancer, birth defects or other reproductive effects.

SARA Title III – Section 313 Supplier Notification: This product contains the following chemicals subject to SARA Title III/CERCLA “reportable quantities” (RQs) and/or “threshold planning quantities” (TPQs) and/or are classified as “Toxic Chemicals” under the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and 40 CFR 372:

Ingredient:	CAS Number	% Weight
Aluminum oxide (Fibrous)	1344-28-1	>1
Antimony and Compounds	1345-04-6, 1309-64-4	>1
Brass (as zinc compounds)	None	>1
Copper and Compounds	7440-50-8	>1
Di (2-ethylhexyl) Phthalate	117-81-7	>1
Zinc and Compounds	1314-13-2, 1314-98-3, 7440-66-6	>1

RCRA Hazardous Waste Code: Not Available

CERCLA Hazardous Substances: Not Available

OSHA: Not Available

WHMIS Classification: Not Available

SECTION 16: OTHER INFORMATION

Abbreviations:

CAS #:	Chemical Abstract Services Number
OSHA PEL:	U.S. Occupational Safety and Health Administration Permissible Exposure Limits
ACGIH TLV:	American Conference of Governmental Industrial Hygienists Threshold Limit Value (2003)
fibers/cc:	Fibers per cubic centimeter of sampled air
mg/m ³ :	Milligrams of contaminant per cubic meter of sampled air, on a weight-to-volume basis
N/A:	Not Applicable
NIOSH	National Institute for Occupational Safety and Health
IARC:	International Agency for Research on Cancer
NTP:	National Toxicology Program
HEPA:	High-efficiency particulate air

This product does not contain any deliberate addition of asbestos.

The information provided on this data sheet was abstracted from a supplier MSDS and standard references in occupational health and toxicology. Federal-Mogul makes no representation or warranty with respect to the information obtained from such references. The information provided is, however, as of the date below, true and accurate to the best of Federal-Mogul's knowledge.