SAFETY DATA SHEET

1. Identification

Product identifier **NAO no Copper (see Section 16)**

Other means of identification

Product code 332

Recommended use Friction Material, Brake Lining.

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer/Supplier Federal-Mogul Motorparts
World Headquarters
27300 West 11 Mile Road
Southfield, Michigan 48034
USA

Contact person: msds.request@federalmogul.com

Emergency Telephone: 24hr EP (INFOTRAC): 1-800-535-5053
International: (001) 352-323-3500

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards Not classified.

OSHA defined hazards Not classified.

Label elements

Hazard symbol None.

Signal word None.

Hazard statement Exempt (manufactured article).

Precautionary statement

Prevention Observe good industrial hygiene practices.

Response No specific first aid measures noted.

Storage Store in original container.

Disposal Dispose of waste and residues in accordance with local authority requirements.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information None.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Barium sulphate	7727-43-7	8 - 45
Calcium carbonate	1317-65-3	5 - 40
Talc	14807-96-6	10 - 30
Aluminum oxide	1344-28-1	0.5 - 25
Magnesium oxide	1309-48-4	8 - 15
Glass fiber	65997-17-3	1 - 18
Calcined petroleum coke	64743-05-1	3 - 15

Cashew Friction Particle	68647-81-4	3 - 13
Graphite	7782-42-5	1 - 15
Ceramic Fiber	142844-00-6	5 - 10
Kyanite	1302-76-7	3 - 7
1,4-benzenedicarbonyl dichloride polymer with 1,4-benzenediamine	26125-61-1	0.1 - 7
Kaolin	1332-58-7	1 - 5
Wollastonite	13983-17-0	1 - 5
Crystalline silica	1317-95-9	0.5 - 3
Carbon black	1333-86-4	0.1 - 3

Composition comments All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

The ingredients may be released as general dust from the product by operations such as overheating, burning, machining, abrading, or riveting. This product contains a variety of ingredients all of which have become part of a bound system both physically and chemically and do not necessarily exhibit the properties of the individual components.

4. First-aid measures

Inhalation Move injured person into fresh air and keep person calm under observation. If necessary, seek hospital and take along these instructions.

Skin contact Remove contaminated clothing immediately and wash skin with soap and water. Get medical attention if irritation develops and persists.

Eye contact Immediately flush with plenty of water for up to 15 minutes. Remove any contact lenses and open eyelids wide apart. Get medical attention promptly if symptoms persist or occur after washing.

Ingestion If swallowed, rinse mouth with water (only if the person is conscious). Get medical attention if any discomfort continues.

Most important symptoms/effects, acute and delayed Exposed individuals may experience eye tearing, redness, and discomfort.

Indication of immediate medical attention and special treatment needed Treat symptomatically.

General information Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media Use fire-extinguishing media appropriate for surrounding materials.

Unsuitable extinguishing media None.

Specific hazards arising from the chemical By heating and fire, toxic vapors/gases may be formed.

Special protective equipment and precautions for firefighters Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Fire fighting equipment/instructions Use standard firefighting procedures and consider the hazards of other involved materials.

General fire hazards This product is not flammable.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures Use explosion-proof electrical equipment if airborne dust levels are high. Avoid dust formation. Avoid inhalation of dust and contact with skin and eyes. Wear necessary protective equipment. See Section 8 of the SDS for Personal Protective Equipment.

Methods and materials for containment and cleaning up

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. Collect powder using special dust vacuum cleaner with particle filter or carefully sweep into closed container. Do not vacuum clean unless vacuum cleaners are equipped with HEPA filter. For waste disposal, see Section 13 of the SDS.

Environmental precautions

Avoid discharge into drains, water courses or onto the ground. Collect and dispose of spillage as indicated in Section 13 of the SDS.

7. Handling and storage

Precautions for safe handling

Provide adequate ventilation. Avoid dust formation. Avoid inhalation of dust and contact with skin and eyes. Use work methods which minimize dust production. See Section 8 of the SDS for Personal Protective Equipment. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Store in tightly closed original container. Avoid conditions which create dust. Protect against direct sunlight.

8. Exposure controls/personal protection

Occupational exposure limits

U.S. - OSHA

Components	Type	Value	Form
Calcined petroleum coke (CAS 64743-05-1)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Components	Type	Value
Crystalline silica (CAS 1317-95-9)	TWA	0.05 mg/m3

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value	Form
Aluminum oxide (CAS 1344-28-1)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
Barium sulphate (CAS 7727-43-7)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
Calcium carbonate (CAS 1317-65-3)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
Carbon black (CAS 1333-86-4)	PEL	3.5 mg/m3	
Crystalline silica (CAS 1317-95-9)	PEL	0.05 mg/m3	Respirable dust.
Graphite (CAS 7782-42-5)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
Kaolin (CAS 1332-58-7)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
Magnesium oxide (CAS 1309-48-4)	PEL	15 mg/m3	Total particulate.

US. OSHA Table Z-3 (29 CFR 1910.1000)

Components	Type	Value	Form
Aluminum oxide (CAS 1344-28-1)	TWA	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
		50 mppcf	Total dust.
		15 mppcf	Respirable fraction.
Barium sulphate (CAS 7727-43-7)	TWA	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.

US. OSHA Table Z-3 (29 CFR 1910.1000)

Components	Type	Value	Form
		50 mppcf	Total dust.
		15 mppcf	Respirable fraction.
Graphite (CAS 7782-42-5)	TWA	15 mppcf	
Kaolin (CAS 1332-58-7)	TWA	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
		50 mppcf	Total dust.
		15 mppcf	Respirable fraction.
Magnesium oxide (CAS 1309-48-4)	TWA	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
		50 mppcf	Total dust.
		15 mppcf	Respirable fraction.
Talc (CAS 14807-96-6)	TWA	0.1 mg/m3	Respirable.
		20 mppcf	
		2.4 mppcf	Respirable.

ACGIH

Components	Type	Value	Form
Calcined petroleum coke (CAS 64743-05-1)	TWA	3 mg/m3	Respirable fraction.
		10 mg/m3	Total dust.

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Aluminum oxide (CAS 1344-28-1)	TWA	1 mg/m3	Respirable fraction.
Barium sulphate (CAS 7727-43-7)	TWA	5 mg/m3	Inhalable fraction.
Carbon black (CAS 1333-86-4)	TWA	3 mg/m3	Inhalable fraction.
Crystalline silica (CAS 1317-95-9)	TWA	0.025 mg/m3	Respirable fraction.
Graphite (CAS 7782-42-5)	TWA	2 mg/m3	Respirable fraction.
Kaolin (CAS 1332-58-7)	TWA	2 mg/m3	Respirable fraction.
Kyanite (CAS 1302-76-7)	TWA	1 mg/m3	Respirable fraction.
Magnesium oxide (CAS 1309-48-4)	TWA	10 mg/m3	Inhalable fraction.
Talc (CAS 14807-96-6)	TWA	2 mg/m3	Respirable fraction.

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
Barium sulphate (CAS 7727-43-7)	TWA	5 mg/m3	Respirable.
		10 mg/m3	Total
Calcium carbonate (CAS 1317-65-3)	TWA	5 mg/m3	Respirable.
		10 mg/m3	Total
Carbon black (CAS 1333-86-4)	TWA	3.5 mg/m3	
Ceramic Fiber (CAS 142844-00-6)	TWA	3 fibers/cm3	Fibrous dust.

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
		3 fibers/cm3	Fiber.
		5 mg/m3	fibers, total dust
		5 mg/m3	Fiber, total
Crystalline silica (CAS 1317-95-9)	TWA	0.05 mg/m3	Respirable dust.
Glass fiber (CAS 65997-17-3)	TWA	3 fibers/cm3	Fibrous dust.
		3 fibers/cm3	Fiber.
		5 mg/m3	Fiber, total
		5 mg/m3	fibers, total dust
Graphite (CAS 7782-42-5)	TWA	2.5 mg/m3	Respirable.
Kaolin (CAS 1332-58-7)	TWA	5 mg/m3	Respirable.
		10 mg/m3	Total
Talc (CAS 14807-96-6)	TWA	2 mg/m3	Respirable.

Biological limit values No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls Use explosion-proof electrical equipment if airborne dust levels are high. Provide adequate ventilation. Observe Occupational Exposure Limits and minimize the risk of inhalation of dust.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear approved safety goggles.

Skin protection

Hand protection Wear protective gloves (i.e. latex, nitrile). Suitable gloves can be recommended by the glove supplier.

Other Wear suitable protective clothing.

Respiratory protection If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. During dust-raising work: In the United States of America, if respirators are used, a program should be instituted to assure compliance with OSHA Standard 1910.134. Respirator type: Any powered, air-purifying respirator with a high-efficiency particulate filter.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance Solid (article).

Physical state Solid.

Form Solid.

Color Brownish grey.

Odor None.

Odor threshold Not applicable.

pH Not applicable.

Melting point/freezing point Not applicable.

Initial boiling point and boiling range Not applicable.

Flash point Not applicable.

Evaporation rate Not available.

Flammability (solid, gas) Not applicable.

Upper/lower flammability or explosive limits

Flammability limit - lower (%) Not applicable.

Flammability limit - upper (%)	Not applicable.
Vapor pressure	Not applicable.
Vapor density	Not applicable.
Relative density	1.5 - 3.5 (20 °C)
Solubility(ies)	
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not applicable.
Decomposition temperature	Not available.
Viscosity	Not applicable.
Other information	
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.

10. Stability and reactivity

Reactivity	The product is stable and non reactive under normal conditions of storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Will not occur.
Conditions to avoid	None known.
Incompatible materials	None known.
Hazardous decomposition products	Carbon dioxide. Carbon monoxide.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Dust may irritate respiratory system. Inhalation may lead to deposition in lung and in sufficient quantities produce baritosis.
Skin contact	Dust may irritate skin.
Eye contact	Dust may irritate the eyes.
Ingestion	May cause discomfort if swallowed.
Symptoms related to the physical, chemical and toxicological characteristics	Exposed individuals may experience eye tearing, redness, and discomfort.

Information on toxicological effects

Acute toxicity The ingredients may be released as general dust from the product by operations such as overheating, burning, machining, abrading, or riveting. Dust may cause eye, skin and respiratory tract irritation.

Components	Species	Test Results
Barium sulphate (CAS 7727-43-7)		
Acute		
Oral		
LD50	Rat	307 g/kg
Carbon black (CAS 1333-86-4)		
Acute		
Dermal		
LD50	Rabbit	> 3000 mg/kg
Oral		
LD50	Rat	> 8000 mg/kg

Components	Species	Test Results
Graphite (CAS 7782-42-5)		
Acute		
Oral		
LD50	Rat	> 10000 mg/kg
Kaolin (CAS 1332-58-7)		
Acute		
Dermal		
LD50	Rat	> 5000 mg/kg
Inhalation		
LC50	Rat	> 2 mg/l, 4 Hours
Oral		
LD50	Rat	> 5000 mg/kg
Magnesium oxide (CAS 1309-48-4)		
Acute		
Oral		
LD50	Rat	3870 - 3990 mg/kg
Talc (CAS 14807-96-6)		
Acute		
Oral		
LD50	Rat	> 5000 mg/kg

Skin corrosion/irritation Dust may irritate skin.

Serious eye damage/eye irritation Dust may irritate the eyes.

Respiratory or skin sensitization

Respiratory sensitization No data available.

Skin sensitization Not a skin sensitizer.

Germ cell mutagenicity No data available.

Carcinogenicity Not classified. Inhalation of Carbon black and Ceramic fiber dust may cause cancer, however due to the physical form of the product, inhalation of dust is not likely.

IARC Monographs. Overall Evaluation of Carcinogenicity

1,4-benzenedicarbonyl dichloride polymer with 1,4-benzenediamine (CAS 26125-61-1)	3 Not classifiable as to carcinogenicity to humans.
Carbon black (CAS 1333-86-4)	2B Possibly carcinogenic to humans.
Ceramic Fiber (CAS 142844-00-6)	2B Possibly carcinogenic to humans.
Crystalline silica (CAS 1317-95-9)	1 Carcinogenic to humans.
Glass fiber (CAS 65997-17-3)	3 Not classifiable as to carcinogenicity to humans.
Wollastonite (CAS 13983-17-0)	3 Not classifiable as to carcinogenicity to humans.

NTP Report on Carcinogens

Crystalline silica (CAS 1317-95-9)	Known To Be Human Carcinogen.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Crystalline silica (CAS 1317-95-9)	Cancer

Reproductive toxicity No data available.

Specific target organ toxicity - single exposure No data available.

Specific target organ toxicity - repeated exposure No data available.

Aspiration hazard Not relevant, due to the form of the product.

Chronic effects The ingredients may be released as general dust from the product by operations such as overheating, burning, machining, abrading, or riveting. May cause lung damage.

12. Ecological information

Ecotoxicity Not relevant, due to the form of the product in its manufactured and shipped state.

Components		Species	Test Results
Barium sulphate (CAS 7727-43-7)			
Aquatic			
Crustacea	EC50	Tubificid worm (Tubifex tubifex)	28.61 - 38.03 mg/l, 48 hours
Carbon black (CAS 1333-86-4)			
Aquatic			
Acute			
Fish	LC50	Leuciscus idus	>= 1000 mg/l, 96 Hours
Kaolin (CAS 1332-58-7)			
Aquatic			
Acute			
Crustacea	LC50	Daphnia magna	> 1.1 g/l, 48 Hours

Persistence and degradability The product contains inorganic compounds which are not biodegradable.

Bioaccumulative potential No data available.

Mobility in soil Not relevant, due to the form of the product.

Mobility in general Not relevant, due to the form of the product.

Other adverse effects No data available.

13. Disposal considerations

Disposal instructions Disposal recommendations are based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

Local disposal regulations Dispose of in accordance with local regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of waste and residues in accordance with local authority requirements.

Contaminated packaging Since emptied containers retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

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

15. Regulatory information

US federal regulations Under some use conditions, this material may be considered to be hazardous in accordance with OSHA 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Barium sulphate (CAS 7727-43-7) Listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Crystalline silica (CAS 1317-95-9) Cancer
lung effects
immune system effects
kidney effects

Toxic Substances Control Act (TSCA)

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Aluminum oxide	1344-28-1	0.5 - 25

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Contains component(s) regulated under the Safe Drinking Water Act.

US state regulations

US. Massachusetts RTK - Substance List

Aluminum oxide (CAS 1344-28-1)
Barium sulphate (CAS 7727-43-7)
Calcium carbonate (CAS 1317-65-3)
Carbon black (CAS 1333-86-4)
Ceramic Fiber (CAS 142844-00-6)
Crystalline silica (CAS 1317-95-9)
Graphite (CAS 7782-42-5)
Kaolin (CAS 1332-58-7)
Magnesium oxide (CAS 1309-48-4)
Talc (CAS 14807-96-6)

US. New Jersey Worker and Community Right-to-Know Act

Aluminum oxide (CAS 1344-28-1)
Barium sulphate (CAS 7727-43-7)
Calcium carbonate (CAS 1317-65-3)
Carbon black (CAS 1333-86-4)
Ceramic Fiber (CAS 142844-00-6)
Crystalline silica (CAS 1317-95-9)
Glass fiber (CAS 65997-17-3)
Graphite (CAS 7782-42-5)
Kaolin (CAS 1332-58-7)
Magnesium oxide (CAS 1309-48-4)
Talc (CAS 14807-96-6)

US. Pennsylvania Worker and Community Right-to-Know Law

Aluminum oxide (CAS 1344-28-1)
Barium sulphate (CAS 7727-43-7)
Calcium carbonate (CAS 1317-65-3)
Carbon black (CAS 1333-86-4)
Ceramic Fiber (CAS 142844-00-6)
Crystalline silica (CAS 1317-95-9)
Graphite (CAS 7782-42-5)
Kaolin (CAS 1332-58-7)
Magnesium oxide (CAS 1309-48-4)
Talc (CAS 14807-96-6)

US. Rhode Island RTK

Aluminum oxide (CAS 1344-28-1)
Barium sulphate (CAS 7727-43-7)
Calcium carbonate (CAS 1317-65-3)
Carbon black (CAS 1333-86-4)
Ceramic Fiber (CAS 142844-00-6)
Crystalline silica (CAS 1317-95-9)
Glass fiber (CAS 65997-17-3)
Graphite (CAS 7782-42-5)
Kaolin (CAS 1332-58-7)
Magnesium oxide (CAS 1309-48-4)

Talc (CAS 14807-96-6)

California Proposition 65

WARNING: This product can expose you to chemicals including Crystalline silica, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

California Proposition 65 - CRT: Listed date/Carcinogenic substance

Carbon black (CAS 1333-86-4)	Listed: February 21, 2003
Crystalline silica (CAS 1317-95-9)	Listed: October 1, 1988

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

Carbon black (CAS 1333-86-4)
Glass fiber (CAS 65997-17-3)
Magnesium oxide (CAS 1309-48-4)
Talc (CAS 14807-96-6)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 19-May-2016

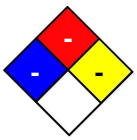
Revision date 23-July-2019

Version # 04

Further information 1083-07, 1083-63, 1184-41, 1224-78, 3027-73, 3027-85, 3030-067, 3030-197, 3079-36, 3115-05, 3115-36, 3115-49, 3164-09, 3173-385, 3173-435, 3173-627, 3173-627A, 3173-644, ABEX 19K PT-1, 3173-677, 3173-677A, 3173-811, ABEX6326, ABEX 20K P-2, ABEX 20K P55-2, ABEX 23K PT-1, Abex 6297D, ABB 2007, ABEX 6000, ABEX 6008-1, ABEX 6011, ABEX 6015, ABEX 6028, ABEX 6055, ABEX 6062, ABEX 6260S, ABEX 6098, ABEX 6133, ABEX 6133-1, ABEX 6139, ABEX 6166, ABEX 6260, ABEX FT, ABEX SM, AT 110, FA PM 17/20-1, FA FM200-1, FA MET, FA OE 456, FA PMT, FERODO 385, FERODO 397, FERODO 3013, FERODO OPTIPRO 825, FERODO OPTIOPRO 827, FERODO OPTIPRO 839, FERODO OPTIPRO 839-1, FC20, HD 7000, MTP 20, OEH20, OFS 20P, OFS 20PS, OTR Blue, OTR Gold, OTR Orange, OTR Silver, PC23-1, PP20, PP23S, SBP20, SBP20S, NP 20, H20167XF, H20167SF, H20168XF, H20158XF, H26167XF, H26168XF, ULTRAA20.

Dash "-"next to the NFPA ratings indicates Not Applicable.

NFPA ratings



List of abbreviations LD50: Lethal Dose, 50%.
LC50: Lethal Concentration, 50%.

Disclaimer The information provided on this data sheet was abstracted from supplier material safety data sheets 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 is however, as of the date provided, true and accurate to the best of Federal-Mogul's knowledge, and should be used to make an independent determination of the methods to safeguard workers and the environment.