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For Ford Motor Company Use Only

SAFETY DATA SHEET

Issuing Date 09-Oct-2017

Revision Date 1-Dec -2017

Revision Number 5

This document complies with the US OSHA Hazard Communication Standard (29 CFR 1910.1200), Canada WHMIS 2015 which includes the amended Hazardous Products Act (HPA) and the Hazardous Products Regulation (HPR), and Mexico's NMX-R-019-SC-2011.

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING**GHS product identifier****Product Name** Non-Asbestos Friction Material NS456, NS456H**Other means of identification****Product Code(s)** AFL108H**Synonyms** Brake Pad Friction Material**Other Information****THIS PRODUCT IS AN ARTICLE AS DEFINED UNDER OSHA REGULATION 29 CFR 1910.1200 AND IS EXEMPT FROM CLASSIFICATION. IN PRESENT FORM, THIS PRODUCT IS NOT EXPECTED TO BE HAZARDOUS.**

However, certain processing conditions which will alter the present form may change the hazardous nature of the product leading to a potential for chemical exposure. The classification presented below is based on the potential of chemical exposure upon alteration of the present form.

Recommended use of the chemical and restrictions on use**Recommended Use** Automotive brakes**Uses advised against** No information available**Supplier's details****Supplier Address**

Akebono Brake Corp.
34385 W. Twelve Mile Rd
Farmington Hills, MI 48331
U.S.A.
TEL: 248.489.7400

Emergency telephone number**Company Emergency Phone Number** See phone number above.**Emergency Telephone Number** For Hazardous Materials [or Dangerous Goods] Incidents ONLY (spill, leak, fire, exposure or accident), call CHEMTREC at 1-800-424-9300**2. HAZARDS IDENTIFICATION****Classification****THIS PRODUCT IS AN ARTICLE AS DEFINED UNDER OSHA REGULATION 29 CFR 1910.1200 AND IS EXEMPT FROM CLASSIFICATION. IN PRESENT FORM, THIS PRODUCT IS NOT EXPECTED TO BE HAZARDOUS.**

Label Elements

None

Physical and Health Hazards Not Otherwise Classified

Not applicable.

Precautionary Statements**Prevention**

- Obtain special instructions before use.
- Do not handle until all safety precautions have been read and understood.
- Use personal protective equipment as required.

General Advice

- If exposed or concerned: Get medical attention/advice

Storage

- Store locked up.

Disposal

- Dispose of contents/container to an approved waste disposal plant.

Other information

Harmful to aquatic life. Harmful to aquatic life with long lasting effects.

Unknown acute toxicity

67.9% of the mixture consists of ingredient(s) of unknown toxicity.

3. COMPOSITION/INFORMATION ON INGREDIENTS**Synonyms**

Brake Pad Friction Material

Chemical Name	CAS-No	Weight %	Hazardous Material Information Review Act registry number (HMIRA registry #)	Date HMIRA filed and date exemption granted (if applicable)
Iron	7439-89-6	25-30	-	-
Calcined Petroleum Coke	54743-05-1	10-15	-	-
Graphite	7782-42-5	5-10	-	-
Tin sulfide (SnS)	1314-95-0	5-10	-	-
Barium sulfate	7727-43-7	5-10	-	-
Formaldehyde, polymer with phenol and 1,3,5,7-tetraazatricyclo[3.3.1.1 ^{3#} ,7]decane	37337-65-8	5-10	-	-
Magnesium oxide	1309-48-4	3 -7	-	-
Tin oxide (SnO ₂)	18282-10-5	3 -7	-	-
Para-aramid Pulp	26125-61-1	1-5	-	-
Vermiculite	1318-00-9	1-5	-	-
Cashew Polymer Particle	68602-89-1	1-5	-	-
Molybdenum (IV) sulfide	1317-33-5	1-5	-	-
Chromite ore	1308-31-2	1-5	-	-
Zinc (powder)	7440-66-6	1-5	-	-
Calcium silicate	1344-95-2	1-5	-	-
Polypropylene	9003-07-0	1-5	-	-
Calcium Carbonate	471-34-1	0.1-1	-	-
Cellulose	9004-34-6	0.1-1	-	-
Aluminum oxide	1344-28-1	0.1-1	-	-
Kaolin	1332-58-7	0.1-1	-	-
Manganese	7439-96-5	0.1-1	-	-
Quartz	14808-60-7	0.001-0.02	-	-

Zinc oxide	1314-13-2	<0.1	-	-
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4. FIRST AID MEASURES

Description of necessary first-aid measures

Eye Contact	Not an expected route of exposure in its current form. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately if irritation persists.
Skin Contact	Wash skin with soap and water. Get medical attention immediately if symptoms occur.
Inhalation	Not an expected route of exposure in its current form. IF INHALED: If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing.
Ingestion	Not an expected route of exposure in its current form. IF INGESTED: Rinse mouth and drink plenty of water. Do NOT induce vomiting. Get medical attention.
Protection of First-aiders	Use personal protective equipment. Avoid contact with skin, eyes and clothing.

Most important symptoms/effects, acute and delayed

Most Important Symptoms/Effects None

Indication of immediate medical attention and special treatment needed, if necessary

Notes to Physician Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media None

Specific Hazards Arising from the Chemical No information available.

Explosion Data

Sensitivity to Mechanical Impact	None.
Sensitivity to Static Discharge	None.

Protective Equipment and Precautions for Firefighters As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Corrosive hazard. Wear protective gloves/clothing and eye/face protection.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal Precautions None required for material as supplied. Wash thoroughly after handling. Refer to Section 8 for personal protective equipment.

Environmental Precautions

Environmental Precautions See Section 12 for additional Ecological Information. Avoid release to the environment. Collect spillage. Dispose of contents/container to an approved waste disposal plant.

Methods and materials for containment and cleaning up

Methods for Containment Not applicable.

Methods for Cleaning Up Take up mechanically and collect in suitable container for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling

Handling Wash thoroughly after handling.

Conditions for safe storage, including any incompatibilities

Storage Keep in a dry, cool and well-ventilated place. Keep out of the reach of children.

Incompatible Products None known.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Graphite 7782-42-5	TWA: 2 mg/m ³ respirable particulate matter all forms except graphite fibers	TWA: 15 mg/m ³ total dust synthetic TWA: 5 mg/m ³ respirable fraction synthetic (vacated) TWA: 2.5 mg/m ³ respirable dust natural (vacated) TWA: 10 mg/m ³ total dust synthetic (vacated) TWA: 5 mg/m ³ respirable fraction synthetic TWA: 15 mppcf natural	IDLH: 1250 mg/m ³ TWA: 2.5 mg/m ³ natural respirable dust
Barium sulfate 7727-43-7	TWA: 5 mg/m ³ inhalable particulate matter, particulate matter containing no asbestos and <1% crystalline silica	TWA: 15 mg/m ³ total dust TWA: 5 mg/m ³ respirable fraction (vacated) TWA: 10 mg/m ³ total dust (vacated) TWA: 5 mg/m ³ respirable fraction	TWA: 10 mg/m ³ total dust TWA: 5 mg/m ³ respirable dust
Tin sulfide (SnS) 1314-95-0	TWA: 2 mg/m ³ Sn except Tin hydride	TWA: 2 mg/m ³ Sn except oxides (vacated) TWA: 2 mg/m ³ Sn except oxides	IDLH: 100 mg/m ³ Sn TWA: 2 mg/m ³ except Tin oxides Sn
Magnesium oxide 1309-48-4	TWA: 10 mg/m ³ inhalable particulate matter	TWA: 15 mg/m ³ fume, total particulate (vacated) TWA: 10 mg/m ³ total particulate	IDLH: 750 mg/m ³ fume
Tin oxide (SnO ₂) 18282-10-5	TWA: 2 mg/m ³ Sn TWA: 2 mg/m ³ Sn except Tin hydride	TWA: 2 mg/m ³ Sn except oxides (vacated) TWA: 2 mg/m ³ Sn except oxides	IDLH: 100 mg/m ³ Sn TWA: 2 mg/m ³ Sn
Aluminum oxide 1344-28-1	TWA: 1 mg/m ³ respirable particulate matter	TWA: 15 mg/m ³ total dust TWA: 5 mg/m ³ respirable fraction (vacated) TWA: 10 mg/m ³ total dust (vacated) TWA: 5 mg/m ³ respirable fraction	-
Molybdenum (IV) sulfide 1317-33-5	TWA: 10 mg/m ³ Mo inhalable particulate matter TWA: 3 mg/m ³ Mo respirable particulate matter	TWA: 15 mg/m ³ total dust (vacated) TWA: 10 mg/m ³ Mo	IDLH: 5000 mg/m ³ Mo
Chromite ore 1308-31-2	-	TWA: 0.5 mg/m ³ Cr (vacated) TWA: 0.5 mg/m ³ Cr	IDLH: 25 mg/m ³ Cr(III) TWA: 0.5 mg/m ³ Cr
Kaolin	TWA: 2 mg/m ³ particulate matter	TWA: 15 mg/m ³ total dust	TWA: 10 mg/m ³ total dust

1332-58-7	containing no asbestos and <1% crystalline silica, respirable fraction	TWA: 5 mg/m ³ respirable fraction (vacated) TWA: 10 mg/m ³ total dust (vacated) TWA: 5 mg/m ³ respirable fraction	TWA: 5 mg/m ³ respirable dust
Manganese 7439-96-5	TWA: 0.02 mg/m ³ respirable particulate matter TWA: 0.1 mg/m ³ inhalable particulate matter	(vacated) TWA: 1 mg/m ³ fume (vacated) STEL: 3 mg/m ³ fume (vacated) Ceiling: 5 mg/m ³ fume Ceiling: 5 mg/m ³ fume	IDLH: 500 mg/m ³ TWA: 1 mg/m ³ fume STEL: 3 mg/m ³
Quartz 14808-60-7	TWA: 0.025 mg/m ³ respirable particulate matter	30/(%SiO ₂ +2) mg/m ³ TWA, Total Dust; 250/(%SiO ₂ +5) mppcf TWA, respirable fraction; 10/(%SiO ₂ +2) mg/m ³ TWA, respirable TWA: 0.1 mg/m ³ (vacated)	IDLH: 50 mg/m ³ respirable dust TWA: 0.05 mg/m ³ respirable dust

ACGIH TLV: American Conference of Governmental Industrial Hygienists - Threshold Limit Value. OSHA PEL: Occupational Safety and Health Administration - Permissible Exposure Limits. NIOSH IDLH: Immediately Dangerous to Life or Health.

Appropriate engineering controls

Engineering Measures Showers
 Eyewash stations
 Ventilation systems

Individual protection measures, such as personal protective equipment

Eye/Face Protection No special protective equipment required. Risk of contact, wear: Safety glasses with side-shields.

Skin and Body Protection No protective equipment is needed under normal use conditions. Under non-recommended use conditions or altered form of product leather or canvas work gloves are recommended.

Respiratory Protection None required under normal usage of this product in its current form. If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn.

Hygiene Measures Do not eat, drink or smoke when using this product. Provide regular cleaning of equipment, work area and clothing. Keep away from food, drink and animal feeding stuffs.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical State	Solid (compressed).	Appearance	Grey.
Odor	Odorless.	Odor Threshold	No information available.

<u>Property</u>	<u>Values</u>	<u>Remarks/ - Method</u>
pH	Not applicable	None known
Melting Point/Range	Not applicable	None known
Boiling Point/Boiling Range	No data available	None known
Flash Point	No data available	None known
Evaporation rate	No data available	None known
Flammability (solid, gas)	No data available	None known
Flammability Limits in Air		
upper flammability limit	No data available	
lower flammability limit	No data available	
Vapor Pressure	No data available	None known
Vapor Density	No data available	None known
Relative Density	No data available	None known
Specific Gravity	2-3	None known
Water Solubility	No data available	None known
Solubility in other solvents	No data available	None known
Partition coefficient: n-octanol/water	No data available	None known
Autoignition Temperature	No data available	None known

Decomposition Temperature	No data available	None known
Viscosity	Not applicable	None known
Flammable Properties	Not flammable	
Explosive Properties	No data available	
Oxidizing Properties	No data available	

Other information

VOC Content (%) No data available

10. STABILITY AND REACTIVITY

<u>Reactivity</u>	Not reactive under normal conditions.
<u>Chemical stability</u>	Stable under recommended storage conditions.
<u>Possibility of hazardous reactions</u>	None under normal processing.
<u>Hazardous Polymerization</u>	Hazardous polymerization does not occur.
<u>Conditions to avoid</u>	None known.
<u>Incompatible materials</u>	None known.
<u>Hazardous decomposition products</u>	None known.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information	THIS PRODUCT IS NOT HAZARDOUS AS SUPPLIED. However, certain processing conditions such as cutting, grinding, melting, etc. may lead to the potential of exposure to the hazardous materials present in the article. The information presented below is based on this type of exposure.
Inhalation	May cause irritation of respiratory tract.
Eye Contact	May cause irritation.
Skin Contact	Based on human experience and handling of the product under multiple exposure scenarios, this product is not expected to be irritating and/or corrosive to skin.
Ingestion	Ingestion may cause irritation to mucous membranes.

Numerical measures of toxicity - Product

The following values are calculated based on chapter 3.1 of the GHS document:

LD50 Oral	5010 mg/kg; Acute toxicity estimate
Unknown acute toxicity	67.9% of the mixture consists of ingredient(s) of unknown toxicity.
Acute Oral Toxicity	57% of the mixture consists of ingredient(s) of unknown acute oral toxicity
Acute Dermal Toxicity	67.9% of the mixture consists of ingredient(s) of unknown acute dermal toxicity
Acute Inhalation (dust/mist) Toxicity	63.8% of the mixture consists of ingredient(s) of unknown acute inhalation (dust/mist) toxicity
Acute Inhalation (vapor) Toxicity	63.8% of the mixture consists of ingredient(s) of unknown acute inhalation (vapor) toxicity
Acute Inhalation (gas) Toxicity	63.8% of the mixture consists of ingredient(s) of unknown acute inhalation (gas) toxicity

Component Information

Chemical Name	LD50 Oral	LD50 Dermal	LC50 Inhalation
Graphite	> 10000 mg/kg (Rat)	-	-
Tin oxide (SnO2)	= 700 mg/kg (Rat) > 20 g/kg (Rat)	-	-

Aluminum oxide	> 5000 mg/kg (Rat)	-	-
Molybdenum (IV) sulfide	-	-	> 2820 mg/m ³ (Rat) 4 h
Kaolin	> 5 g/kg (Rat)	-	-
Manganese	= 9 g/kg (Rat)	-	-
Quartz	-	-	-

Symptoms related to the physical, chemical and toxicological characteristics

Symptoms No information available.

Delayed and immediate effects and also chronic effects from short and long term exposure

Respiratory or Skin Sensitization No information available.

Germ Cell Mutagenicity No information available.

Carcinogenicity This product contains crystalline silica (quartz) in a non-respirable form. Inhalation of crystalline silica is unlikely to occur from exposure to this product.

Chemical Name	ACGIH	IARC	NTP	OSHA
Chromite ore		Group 3	Known	X
Quartz	A2	Group 1	Known	X

ACGIH: (American Conference of Governmental Industrial Hygienists)

A2 - Suspected Human Carcinogen

IARC: (International Agency for Research on Cancer)

Group 1 - Carcinogenic to Humans

Group 3 - Not Classifiable as to its Carcinogenicity to Humans

NTP: (National Toxicity Program)

Known - Known Carcinogen

OSHA: (Occupational Safety & Health Administration)

X - Present

Reproductive Toxicity No information available.

STOT - single exposure No information available.

STOT - repeated exposure No information available.

Aspiration Hazard No information available.

12. ECOLOGICAL INFORMATION**Ecotoxicity**

Harmful to aquatic life with long lasting effects.

98.9 % of the mixture consists of component(s) of unknown hazards to the aquatic environment

Persistence and Degradability No information available.

Bioaccumulation No information available.

Mobility No information available.

Other Adverse Effects No information available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods Dispose of in accordance with federal, state, and local regulations.

Contaminated Packaging Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. TRANSPORT INFORMATION

DOT Not regulated

TDG Not regulated.

MEX Not regulated

IATA Not regulated.

IMDG/IMO Not regulated.

15. REGULATORY INFORMATION

International Regulations

Ozone depleting substances Not applicable

Persistent Organic Pollutants Not applicable

Hazardous Waste Not applicable

Chemical Name	Basel Convention (Hazardous Wastes)
Zinc oxide	Y23

The Rotterdam Convention (Prior Informed Consent) Not applicable

International Convention for the Prevention of Pollution from Ships (MARPOL) Not applicable

International Inventories

TSCA Complies

DSL Complies

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

U.S. Federal Regulations

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372:

Chemical Name	CAS-No	Weight %	SARA 313 - Threshold Values %
Barium sulfate	7727-43-7	5-10	1.0
Aluminum oxide	1344-28-1	1-5	1.0
Chromite ore	1308-31-2	1-5	1.0
Manganese	7439-96-5	0.1-1.0	1.0

SARA 311/312 Hazard Categories

Acute Health Hazard	No
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42):

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Chromite ore		X		
Zinc oxide		X		

CERCLA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

U.S. State Regulations**California Proposition 65**

This product contains the following Proposition 65 chemicals:

Chemical Name	CAS-No	California Prop. 65
Quartz	14808-60-7	Carcinogen

U.S. State Right-to-Know Regulations

This product does not contain any substances regulated by state right-to-know regulations.

Chemical Name	New Jersey	Massachusetts	Pennsylvania	Illinois	Rhode Island
Graphite	X	X	X		X
Barium sulfate	X	X	X		
Magnesium oxide	X	X	X		X
Tin oxide (SnO ₂)	X	X			
Aluminum oxide	X	X	X		X
Molybdenum (IV) sulfide		X			
Chromite ore	X	X	X	X	
Kaolin	X	X	X		X
Manganese	X	X	X	X	X
Quartz	X	X	X	-	X

U.S. EPA Label Information

EPA Pesticide Registration Number Not applicable

16. OTHER INFORMATION

NFPA Health Hazard 1 Flammability 0 Instability 0 Physical and Chemical Hazards -

HMIS Health Hazard 1* Flammability 0 Physical Hazard 0 Personal Protection X

*Indicates a chronic health hazard.

Prepared By

Product Stewardship
23 British American Blvd.
Latham, NY 12110
1-800-572-6501

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1-Dec-2017

Revision Note

Revised by Akebono Brake Corporation for Ford Motor Company Use.

General Disclaimer

The information provided on this SDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of Safety Data Sheet