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SAFETY DATA SHEET

Section 1- IDENTIFICATION		
COMPOSITION NiO		PRODUCT NAME Nickel Oxide
SUPPLIER: Plasmaterials, Inc. 2268 Research Drive Livermore, CA 94550 Ph: 925-447-4030	RECOMMENDED USE: Laboratory Chemicals Scientific Research	EMERGENCY TELEPHONE NUMBERS US: 001-800-424-9300 Europe: 001-703-527-3887

Section 2- HAZARD(S) IDENTIFICATION	
HEALTH HAZARDS: Skin Sensitization: Category 1 (H317) Carcinogenicity (Inhalation): Category 1A (H350) Specific Target Organ Toxicity, Repeated Exposure: Category 1 (H372)	
ENVIRONMENTAL HAZARDS: -Hazardous to the aquatic environment, long-term hazard: Category 1 (H411)	
Physical Hazards: Not Classified	OSHA Defined Hazards: Not Classified
LABEL ELEMENTS: Signal Word: Danger	
	
HAZARD STATEMENTS	
-H317: May cause an allergic skin reaction -H350: May cause cancer by inhalation -H372: Causes damage to organs through prolonged or repeated exposure -H411: Toxic to aquatic life with long lasting effects	
PRECAUTIONARY STATEMENTS	
-P201: Obtain special instructions before use -P202: Do not handle until all safety precautions have been read and understood -P260: Do not breath dust/fume/gas/mist/vapors/spray -P264: Wash thoroughly after handling. -P270: Do not eat, drink, or smoke when using this product. -P272: Contaminated work clothing must not be allowed out of the workplace -P273: Avoid release to the environment -P280: Wear protective gloves, protective clothing, eye protection, face protection -P302+P352: If on skin: Wash with plenty of water -P308+P313: If exposed or concerned: Get medical advice/attention -P333+P313: If skin irritation or rash occurs: Get medical advice/attention -P363: Wash contaminated clothing before reuse. -P391: Collect spillage -P405: Store locked up.	

-P501: Dispose of contents/container in accordance with local, regional, national, and international regulations.

Hazards not otherwise classified (HNOC):

-None identified

Section 3- COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENT	CAS-No	Molecular Weight
Nickel Oxide	1313-99-1	74.69 g/mol

Section 4- FIRST AID MEASURES

GENERAL ADVICE: If exposed or concerned: get medical advice/attention. If you feel unwell, seek medical advice (show label where possible). Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

INHALATION: Remove victim from exposure to fresh air and keep at rest in a position comfortable for breathing. Give oxygen or artificial respiration if needed. Call a doctor/physician if symptoms develop and/or persist.

SKIN CONTACT: Immediately take off all contaminated clothing. Wash off with soap and plenty of water. In case of eczema or other skin disorders: Seek medical attention and take along these instructions. Wash work clothing and protective equipment to remove contaminants before reuse.

EYE CONTACT: Do not rub eyes. Flush eyes with plenty of water, lifting upper and lower lids, for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and/or persists.

INGESTION: Rinse mouth. Get medical attention if symptoms occur.

MOST IMPORTANT SYMPTOMS/EFFECTS: Dusts may irritate the respiratory tract, skin, and eyes. May cause an allergic skin reaction. Dermatitis. Rash. Prolonged exposure may cause chronic effects.

NOTES TO PHYSICIAN: Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.

Section 5- FIREFIGHTING MEASURES

Suitable Extinguishing Media:

Water fog, Foam, Dry Chemical Powder, Carbon Dioxide (CO₂)

Unsuitable Extinguishing Media:

Do not use water jet as an extinguisher, as this will spread the fire.

Specific Hazards Arising from the Chemical:

During fire, gases hazardous to health may be formed.

Protective Equipment & Precautions for Firefighters:

As in any fire, Firefighters must wear full face, self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective clothing to prevent contact with skin and eyes.

Firefighting Instructions/Specific Methods:

Move containers from fire area if you can do so without risk. Use standard firefighting procedures and consider the hazards of other involved materials.

General Fire Hazards:

No unusual fire or explosion hazards noted.

Section 6- ACCIDENTAL RELEASE MEASURES

Personal Precautions: Keep unnecessary personnel away. Wear appropriate protective equipment and clothing during clean-up. Do not breath dust. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see Section 8.

Environmental Precautions: Avoid release to the environment. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground. Inform appropriate managerial or supervisory personnel of all environmental releases.

Methods for Containment & Clean Up: Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air). Stop the flow of material if this is without risk. Collect dust using a vacuum cleaner

equipped with HEPA filter.
 -Large Spills: Wet down with water and dike for later disposal. Shovel the material into waste container. Prevent product from entering drains. Following product recovery, flush area with water.
 -Small Spills: Sweep up or vacuum up spillage and collect in suitable container for disposal.
 -Never return spills to original containers for re-use.
 -For waste disposal, see Section 13.

Section 7- HANDLING AND STORAGE

Handling: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Minimize dust generation and accumulation. Provide appropriate exhaust ventilation at places where dust is formed. Do not breath dust/fume/gas/mist/vapors/spray. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. When using do not eat, drink, or smoke. Should be handled in closed systems, if possible. Wear appropriate personal protection equipment. Avoid release to the environment. Observe good industrial hygiene practices. Wash hands thoroughly after handling.

Storage: Store locked up. Store in original tightly closed container. Store in a well-ventilated place.

Section 8- EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines:

Component	CAS-No.	Type	Control Parameters	Basis
Nickel Oxide	1313-99-1	PEL	1 mg/m ³	USA. Occupational Exposure Limits (OSHA) Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)
		TWA	0.2 mg/m ³	US ACGIH Threshold Limit Values
		TWA	0.015 mg/m ³	US NIOSH Pocket Guide to Chemical Hazards
		PEL	0.1 mg/m ³	California Code of Regulations, Title 8, Section 5155. Airborne Contaminants

Biological Limit Values: No biological exposure limits noted for the ingredient(s)

Engineering Measures: Follow standard monitoring procedures. Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. If engineering measures are not sufficient to maintain concentrations of dust particulates below the Occupational Exposure Limit (OEL), suitable respiratory protection must be worn. If material is ground, cut, or used in any operation which may generate dusts, use appropriate local exhaust ventilation to keep exposures below the recommended exposure limits.

Hygiene Measures: Handle in accordance with good industrial hygiene and safety practice. Keep away from food and drink. Wash thoroughly after handling and before eating, drinking and/or smoking. Wash hands before breaks and at the end of the workday. Routinely wash work clothing and protective equipment to remove contaminants. Contaminated work clothing should not be allowed out of the workplace.

Personal Protective Equipment:

Eye/Face Protection: Wear chemical respirator with organic vapor cartridge, full facepiece, dust, and mist filter.

Skin and Body Protection: Handle with chemical resistant gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.
 Wear appropriate chemical resistant protective clothing. Use of an impervious apron is recommended. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory Protection: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU) if there is a risk of exposure to dust/fume at levels exceeding the exposure limits. Chemical respirator with organic vapor cartridge, full facepiece, dust, and mist filter.

Thermal Hazards: Wear appropriate thermal protective clothing, when necessary.

Section 9- PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Solid
Appearance: Not Available
Odor: Not Applicable
Odor Threshold: No information available
pH: No information available
Melting Point/Range: 1955°C (3551°F)
Initial Boiling Point/Range: No information available
Flash Point: No information available
Evaporation Rate: No information available
Flammability (solid,gas): No information available
Flammability or Exposure Limits:
 Upper: No information available
 Lower: No information available
Vapor Pressure: No information available
Vapor Density: No information available
Relative Density: No information available
Solubility (Water): No information available
Partition coefficient; n-octanol/water: No information available
Auto Ignition Temperature: Not Applicable
Decomposition Temperature: No information available
Viscosity: No information available
Density: 6.72 g/cm³ estimated
Specific Gravity: 6.72
Explosive Properties: Not explosive
Oxidizing Properties: Not oxidizing

Section 10- STABILITY AND REACTIVITY

Reactive Hazard: Stable and non-reactive under normal conditions of use, storage, and transport.
Stability: Stable under normal conditions.
Conditions to Avoid: Contact with incompatible materials
Incompatible Materials: Strong oxidizing agents
Hazardous Decomposition Products: No information available
Hazardous Polymerization: No information available
Hazardous Reactions: No information available

Section 11- TOXICOLOGICAL INFORMATION

Information on likely Routes of Exposure:

Inhalation: May cause cancer by inhalation. May cause damage to organs through prolonged or repeated exposure by inhalation. Dust may irritate respiratory system.

Skin Contact: Dust or powder may irritate the skin. May cause an allergic skin reaction.

Eye Contact: Dust may irritate the eyes

Ingestion: Expected to be a low ingestion hazard

Symptoms Related to the Physical, Chemical & Toxicological Characteristics: Dust may irritate the respiratory tract, skin, and eyes. May cause an allergic skin reaction. Dermatitis. Rash.

Information on Toxicological Effects:

Acute Toxicity: May cause an allergic skin reaction.

Skin Corrosion/Irritation: Prolonged skin contact may cause temporary irritation

Serious Eye Damage/Eye Irritation: Direct contact with eyes may cause temporary irritation

Respiratory Sensitization: No information available
Skin Sensitization: May cause an allergic skin reaction
Carcinogenicity: May cause cancer
-IARC Monographs Overall Evaluation of Carcinogenicity: Nickel Oxide (CAS No. 1313-99-1) – 1 Carcinogenic to humans
-OSHA Specifically Regulated Substances (29 CFR 1910.1001-1052): Not regulated
-US National Toxicology Program (NTP) Report on Carcinogens: Nickel Oxide (CAS No. 1313-99-1) – Known to be Human Carcinogen
Germ Cell Mutagenicity: No information available
Reproductive Toxicity: No information available
Development Toxicity: No information available
Specific Target Organ Toxicity – single exposure: No information available
Specific Target Organ Toxicity – repeated exposure: Causes damage to organs through prolonged or repeated exposure.
Aspiration Hazard: No information available
Chronic Effects: Causes damage to organs through prolonged or repeated exposure. Prolonged inhalation may be harmful. Prolonged exposure may cause chronic effects.
-To the best of our knowledge, the chemical, physical and toxicological properties have not been thoroughly investigated.

Section 12- ECOLOGICAL INFORMATION

Ecotoxicity: Toxic to aquatic life with long lasting effects
Persistence and Degradability: No information available
Bioaccumulation/Accumulation: No information available
Mobility in soil: No information available
Other Adverse Effects: No information available

Section 13- DISPOSAL CONSIDERATIONS

Waste Disposal Instructions: Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways, or ditches with chemical or used container. Dispose of empty containers and contaminated packaging as unused product. Dispose of contents/container in accordance with local/regional/national/international regulations.

Section 14- TRANSPORT INFORMATION

DOT: Not regulated as dangerous goods
IATA: Not regulated as dangerous goods
IMDG: Not regulated as dangerous goods

Section 15- REGULATORY INFORMATION

US Federal Regulations: This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the US EPA TSCA Inventory List.
TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D): Not regulated
CERCLA Hazardous Substance List (40 CFR 302.4): Nickel Oxide (CAS No. 1313-99-1)
U.S. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1052): Not regulated
SARA 302 Extremely Hazardous Substance: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302
SARA 304 Emergency Release Notification: Not Regulated
SARA 311/312 Hazardous Chemical: Yes
SARA 313 (TRI Reporting):

Chemical Name	CAS-No	% by Weight
Nickel Oxide	1313-99-1	90-100

Safe Drinking Water Act (SWDA): Not regulated

Clean Water Act (CWA) Section 112(r) (40 CFR 68.130): Priority pollutant, Toxic pollutant

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List: Nickel Oxide (CAS No. 1313-99-1)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130): Not regulated

US California Proposition 65: WARNING: This product contains a chemical known to the State of California to cause cancer.

California Proposition 65-CRT: Listed Date/Carcinogenic Substance

Listed: October 1, 1989 – Nickel Oxide (CAS No. 1313-99-1)

US California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3 subd. (a)): Nickel oxide (CAS No. 1313-99-1)

Section 16- OTHER INFORMATION

The above information is accurate to the best of our knowledge. However, since data, safety standards and government regulations are subject to change, the conditions of handling and use, or misuse are beyond our control, Plasmaterials, Inc. makes no warranty, either expressed or implied, with respect to the completeness or continuing accuracy of the information contained herein and disclaims all liability for reliance thereon. Users should satisfy themselves that they have all current data relevant to their particular use.

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REVISION: 05-16-19