MATERIAL SAFETY DATA SHEET

LOVEJOY TOOL COMPANY, INC.
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Trade Name and Synonyms: Polycrystalline Diamond (PCD), Cubic Boron Nitride (CBN)

Chemical Family:

Formula:

Section 2 Product Description and Hazardous Ingredients/Identify Information

Material or Component	CAS No.	Percent
Diamond	7782-40-3	<99.9
Nickel	7440-02-0	>0.1
Cubic Boron Nitride	10043-11-5	100

Note: Nickel is a toxic chemical subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act (S.A.R.A.) of 1986 and 40 CFR Part 372.

Exposure Limit: Nickel - 1 Mg/M3 OSHA TWA; 1 Mg/M3 ACGIH TWA; 15 Ug/M3 NIOSH recommended 10 hour TWA; 1 pound CERCLA Section 103 reportable quantity.

Section 3 Physical Data

Polycrystalline Diamond

Melting Point F (C): 6690°F (3700°C)
Boiling Point: 7590°F (4200°C)
Specific Gravity (H2O = 1): 3.5
Solubility in Water: Insoluble
Other Solvents: Insoluble in alcohol
Appearance and Odor: Odorless clear, white to yellow to dark crystals

Cubic Boron Nitride

Melting Point F (C): 5432°F (3000°C), Sublimes
Specific Gravity (H2O = 1): 3.48
Solubility in Water: Insoluble
Other Solvents: Slightly soluble in hot acids
Appearance and Odor: Odorless black, amber to brown, or gray crystals with black spots

Section 4 Fire and Explosion Hazard Data

Unusual Fire and Explosion Hazards: Negligible fire hazard in metallic form; however, possible fire and explosion hazard in dust form when exposed to heat or flame.

Extinguishing Media: Use dry sand, dry dolomite, dry graphite, or sodium chloride. Do not use water.

Special Fire Fighting Procedures: Move container from fire area if possible. Cool containers exposed to the flame with water from side until well after fire is out. Stay away from storage tank ends. For massive fire in cargo area, use unmanned hose holder or monitor nozzles; else withdraw and let fire burn (1987 emergency response guidebook, DOT P 5800.4, guide page 32).

Important: Do not use water. Use graphite, soda ash, powdered sodium chloride, or suitable dry powder. Avoid breathing fumes from burning material.

Section 5 Health Hazard Data

Usual Route(s) of Entry: Inhalation, skin contact, eye contact, ingestion **Nickel**: Irritant/Sensitizer

Inhalation

Acute Exposure: May cause respiratory irritation, cough, pneumonitis and fever. Pulmonary edema may be a delayed symptom. Pulmonary sensitization may occur causing eosinophilic pneumonitis, asthma and host rejection of nickel containing prostheses. Two workers experienced severe, but transient pneumonitis after being exposed to 0.26 Mg/M3 for six hours.

Chronic Exposure: Repeated or prolonged inhalation may cause mucous membrane irritation and pulmonary sensitization. Workers exposed to nickel dust frequently developed chronic hypertrophic rhinitis and nasal sinusitis, anosmia, nasal polyposis and perforation of the nasal septum may also occur. Epidemiological studies conclusively demonstrate and excess risk of cancer of the nasal cavity and lungs in workers in nickel refineries and although the specific nickel compound(s) responsible have not been identified, all airborne nickel contaminating dusts should be regarded as carcinogenic.

First Aid: Remove from exposure area to fresh air immediately. If breathing has stopped, perform artificial respiration. Keep person warm and at rest. Get medical attention immediately.

Skin Contact

Acute Exposure: May cause irritation. Skin sensitization may occur in previously exposed individuals. "Nickel Itch" a type of dermatitis resulting from sensitization to nickel may begin with a sensation of burning and itching at the place of contact and usually occurs seven days before the characteristics skin eruptions appears. The primary skin eruption is erythematous or follicular; superficial discrete ulcers, which discharge and become crusted, may follow it. The eruption may spread to areas related to the activity of the primary site. Pigmented or depigmented plaques may be formed. Fever, stomatitis, gingivitis, conjunctivitis, paroxysmal asthmatic attacks and eosinophilic pneumonitis may accompany this sensitization reaction. Recovery usually occurs within seven days after exposure. Nickel is not absorbed through the unbroken skin amounts sufficient to cause intoxication.

Chronic Exposure: Repeated or prolonged skin contact may cause sensitization dermatitis.

First Aid: Remove contaminated clothing and shoes immediately. Wash affected area with soap or mild detergent and large amounts of water until no evidence of chemical remains (approximately 15-20 minutes). Get medical attention immediately.

Eye Contact

Acute Exposure: Dust may be irritating to the eyes.

First Aid: Wash eyes immediately with large amounts of water, occasionally lifting upper and lower lids, until no evidence of chemical remains (approximately 15-20 minutes). Get medical attention immediately.

Ingestion

Acute Exposure: Insoluble nickel compounds have a low level of toxicity due to poor absorption from the intestinal tract.

Chronic Exposure: Prolonged feeding studies with rats for many generations caused effects on the embryo.

First Aid: Treat symptomatically and supportively. Get medical attention immediately. If vomiting occurs, keep head lower than hips to prevent aspiration.

Section 6 Reactivity Data

Stability: Stable under normal temperatures and pressures

Incompatibility: Cubic Boron Nitride - sodium peroxide (molten) reacts with incandescence.
Polycrystalline Diamond - potassium dichromate - sulfuric acids; attacks

Hazardous Polymerization: Hazardous polymerization has not been reported to occur under normal temperatures and pressures.

Hazardous Decomposition Products: Thermal decomposition may release toxic and/or hazardous gases.

Conditions to Avoid: Avoid dispersion of dust in air. Finely divided particles, dust, or fumes may be flammable or explosive. Keep away from sparks or ignition sources.

Section 7 Spill or Leak Procedures

Steps to be taken in Case Material is Released or Spilled: For large spills, sweep up with a minimum of dusting and place into suitable clean, dry containers for later disposal. Residue should be cleaned up using a high efficiency particulate filter vacuum. The Superfund Amendments and Reauthorization Act (S.A.R.A.) Section 304 requires that a release equal to or greater than the reportable quantity established for that substance be immediately reported to the local emergency planning committee and the state emergency response commission (40 CFR 355.40). If the release of this substance is reportable under CERCLA Section 103, the National Response Center must be notified immediately at (800) 424-8802 or (202) 426-2675 in the Metropolitan Washington, D.C. area (40 CFR 302.6).

Ventilation: Provide local exhaust or general dilution ventilation to meet published exposure limits. Ventilation equipment must be explosion proof.

Respirator: The specific respirator selected must be based on the contamination levels found in the work place, must not exceed the working limits of the respirator and be jointly approved by the National Institute for Occupational Safety and Health and the Mine Safety and Health Administration.

The following respirators are recommended based on the data found in the Physical Data, Health Effects and Toxicity Sections. They are ranked in order from minimum to respiratory protection.

- Chemical cartridge respirator with an organic vapor cartridge(s) with a high efficiency particulate filter and full facepiece.
- High efficiency particulate respirator with a full facepiece.
- Powered air-purifying respirator with a high efficiency filter with a full facepiece.
- Type "C" supplied air respirator with a full facepiece operated in pressure demand or other positive pressure mode or with a full facepiece, helmet of hood operated continuous flow mode.
- Self-contained breathing apparatus with a full facepiece operated in pressure demand or other positive pressure mode.

For fire fighting and other immediately dangerous to life or health conditions

- Self-contained breathing apparatus with full facepiece operated in pressure demand or other positive pressure mode.
- Supplied air respirator with full facepiece and operated in pressure demand or other positive pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure demand or other positive mode.

Clothing: Employee must wear appropriate protective (impervious) clothing and equipment to prevent repeated or prolonged skin contact with this substance.

Gloves: Employee must wear appropriate protective gloves to prevent contact with this substance.

Eye Protection: Employee must wear splash proof or dust resistant safety goggles to prevent eye contact with this substance.

Section 9 Special Precautions

Precautions to be taken in Handling and Storing: Store away from incompatible substances.

Other Precautions: Observe all Federal, State and Local regulations when storing or disposing of this substance. The Superfund Amendments and Reauthorization Act (S.A.R.A.) Section 302 requires that each facility where any extremely hazardous substance is present in a quantity equal to or greater than the TPQ established for that substance notify the state emergency response commission for the state in which it is located. Section 303 S.A.R.A. requires these facilities to participate in local emergency response planning (40 CFR 355.30).

The toxicity of Polycrystalline Diamond and Cubic Boron Nitride has not been quantified.

Kel: 50 Mg/Kg Intravenous-Mouse LDLO; 10Mg/Kg Intravenous-Dog LDLO; 12 Mg/Kg Intratracheal-Rat LDLO; 7500 Ug/Kg Subcutaneous-Rabbit LDLO; 12,500 Ug/Kg Subcutaneous-Cat LDLO; 7 Mg/Kg Intraperitoneal-Rabbit LDLO; Mutagenic Data (RTECS); Reproductive Effects Date (RTECS); Tumorigenic Data (RTECS).

Carcinogen Status: Anticipated human carcinogen (NTP); human limited evidence (IARC); animal sufficient evidence (IARC); epidemiological studies conclusively demonstrate an excess risk of cancer of the nasal cavity and lung in workers in nickel refineries. It is likely that nickel in some form(s) is carcinogenic to man. Refinery workers studied were employed for at least five years. Men employed before 1925 were 5 to 10 times more likely to have lung cancer than the normal population, while death from cancer of the nasal cavities were 100 to 900 times the expected figures.

Nickel dust or powder is a skin and mucus membrane irritant and a skin and pulmonary sensitizer. Poisoning may affect the heart, liver, kidneys, and brain. Persons with preexisting skin or pulmonary disorders or a history of asthma, allergies or known sensitization to nickel may be at an increased risk from exposure.

Section 11 Disclaimer

Department of Transportation Hazard Classification 49 CFR 172.101: *Flammable Solid

Labeling Requirements 49 CFR 172.101 and 172.402: *Flammable Solid

Hazard Classification and Label applies to Dust and Powder Form only.

Section 12 Disclaimer

The information contained herein is based upon data provided by manufacturers and suppliers of raw materials used in the manufacture of Polycrystalline Diamond and Cubic Born Nitride. The information is offered in good faith as accurate and correct, but no representations, guarantees, or warranties of any kind are made as to its accuracy or completeness, suitability for particular applications, hazards connected with the use of the product, or the results to be obtained from the use of thereof. User assumes all risk and liability of any use or handling of any material beyond Lovejoy's control. Variations in methods, conditions, equipment used to store, handle, or process the material, and hazards connected with the use of the product are solely the responsibility of the user and remain at its sole discretion.

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IN CASE OF QUESTIONS PLEASE CALL

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