Safety Data Sheet

Skyspring Nanomaterials, Inc. www.ssnano.com

Revision date: 02/01/2016

1 Identification of substance:

- **Product details:**
- **Trade name:** Nickel powder, 180nm
- **Stock number:** 9211NG
- **Manufacturer/Supplier:**
  SkySpring Nanomaterials, Inc.
  2935 Westhollow Dr., Houston, TX 77082, USA
  Phone: 281-870-1700, Fax: 281-870-8002,
  Email: sales@ssnano.com

2 Composition/Data on components:

- **Chemical characterization:**

Description: (CAS#)
Nickel (CAS# 7440-02-0), 100%

- **Identification number(s):**
- **EINECS Number:** 231-111-4
- **EU Number:** 028-002-00-7

3 Hazards identification

- **Hazard description:**
  Xn Harmful
  F flammable
- **Information pertaining to particular dangers for man and environment**
  R 11 flammable.
  R 40 Limited evidence of carcinogenic effects.
  R 43 May cause sensitization by skin contact.

4 First aid measures

- **After inhalation**
  Supply fresh air. If required, provide artificial respiration. Keep patient warm.
  Seek immediate medical advice.
- **After skin contact**

Immediately wash with water and soap and rinse thoroughly.
Seek immediate medical advice.

- **After eye contact**
  Rinse opened eye for several minutes under running water.
  Then consult a doctor.
- **After swallowing** Seek immediate medical advice.

5 Fire fighting measures

- **Suitable extinguishing agents** Extinguishing powder. Do not use water.
- **For safety reasons unsuitable extinguishing agents**
  Water
  Carbon dioxide
- **Special hazards caused by the material, its products of combustion or resulting gases:**
  In case of fire, the following can be released:
  Toxic metal oxide fume
- **Protective equipment:**
  Wear self-contained respirator.
  Wear fully protective impervious suit.

6 Accidental release measures

- **Person-related safety precautions:**
  Wear protective equipment. Keep unprotected persons away.
  Ensure adequate ventilation
  Keep away from ignition sources
- **Measures for environmental protection:**
  Do not allow material to be released to the environment without proper governmental permits.
- **Measures for cleaning/collecting:**
  Dispose contaminated material as waste according to item 13.
  Ensure adequate ventilation.
  Keep away from ignition sources.
- **Additional information:**
  See Section 7 for information on safe handling
  See Section 8 for information on personal protection equipment.
  See Section 13 for disposal information.

7 Handling and storage

- **Handling**
- **Information for safe handling:**
  Keep container tightly sealed.
  Store in cool, dry place in tightly closed containers.
  Ensure good ventilation at the workplace.
  Prevent formation of dust.
- **Information about protection against explosions and fires:**
  Keep ignition sources away.
  Protect against electrostatic charges.
  Fumes can combine with air to form an explosive mixture.

- **Storage**
- **Requirements to be met by storerooms and receptacles:**
  Store in a cool location.
- **Information about storage in one common storage facility:**
  Store away from oxidizing agents.
  Store away from halogens.
  Do not store together with acids.
- **Further information about storage conditions:**
  Keep container tightly sealed.
  Store in cool, dry conditions in well sealed containers.

8 Exposure controls and personal protection

- **Additional information about design of technical systems:**
  Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Components with limit values that require monitoring at the workplace:

Nickel and inorganic compounds, as Ni

	mg/m3
ACGIH TLV	1.5, A5-inhalable particulate (metal)
	0.2, A1-inhalable particulate (insoluble compounds)
	0.1, A4-inhalable particulate (soluble compounds)
Austria	Carcinogen
Denmark TWA	0.5
Finland TWA	0.1 (skin) Carcinogen
France VME	1; C3-Carcinogen
Germany	Carcinogen

Hungary	0.005-STEL; Carcinogen (insoluble compounds)
Japan	1; 2B-Carcinogen
Netherlands MAC-TGG	1; Carcinogen 1 (insoluble compounds)
Poland TWA	0.25
Russia	0.05-STEL
Sweden NGV	0.5 (dust)
Switzerland MAK-W	0.5; Carcinogen
United Kingdom TWA	0.1
USA PEL	1

- **Additional information:** No data

- **Personal protective equipment**
- **General protective and hygienic measures**
  The usual precautionary measures for handling chemicals should be followed.
  Keep away from foodstuffs, beverages and feed.
  Remove all soiled and contaminated clothing immediately.
  Wash hands before breaks and at the end of work.
- **Breathing equipment:**
  Use suitable respirator when high concentrations are present.
- **Protection of hands:** Impervious gloves
- **Eye protection:** Safety glasses
- **Body protection:** Protective work clothing.

9 Physical and chemical properties:

- **General Information**

- **Form:** Powder
- **Color:** Black
- **Odor:** Odorless

	Value/Range	Unit	Method
Change in condition			
Melting point/Melting range:	1453	° C	
Boiling point/Boiling range:	2730	° C	
Sublimation temperature / start:	Not determined		

- **Flash point:** Not applicable
- **Flammability (solid, gaseous)** Highly flammable.
- **Ignition temperature:** Not determined
- **Decomposition temperature:** Not determined
- **Explosion limits:**
- **Lower:** Not determined
- **Upper:** Not determined
- **Vapor pressure:** Not determined
- **Density:** at 20 ° C 8.908 g/cm³
- **Solubility in / Miscibility with**
- **Water:** Insoluble

10 Stability and reactivity

- **Thermal decomposition / conditions to be avoided:** Decomposition will not occur if used and stored according to specifications.
- **Materials to be avoided:**
  Acids
  Oxidizing agents
  Interhalogens
  Halogens
  Sulfur
  Ammonia
- **Dangerous reactions** Very fine powder: spontaneously flammable in air.
- **Dangerous products of decomposition:** Metal oxide fume

11 Toxicological information

- **Acute toxicity:**
- **Primary irritant effect:**
- **on the skin:** Irritant to skin and mucous membranes.
- **on the eye:** Irritating effect.
- **Sensitization:** Sensitization possible through skin contact.
- **Other information (about experimental toxicology):** Tumorigenic effects have been observed on tests with

laboratory animals.

- **Subacute to chronic toxicity:**
  Nickel and nickel compounds may cause a form of dermatitis known as nickel itch. They may also cause intestinal disorders, convulsions and asphyxia. Airborne nickel contaminated dusts are regarded as carcinogenic to the respiratory tract.

- **Additional toxicological information:**
  To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
  EPA-A: human carcinogen: sufficient evidence from epidemiologic studies to support a causal association between exposure and cancer.
  IARC-2B: Possibly carcinogenic to humans: limited evidence in humans in the absence of sufficient evidence in experimental animals.
  NTP-2: Reasonably anticipated to be a carcinogen: limited evidence from studies in humans or sufficient evidence from studies in experimental animals.
  ACGIH A5: Not suspected as a human carcinogen: Not suspected as a human carcinogen on the basis of properly conducted epidemiologic studies in humans. Studies have sufficiently long follow-up, reliable exposure histories, sufficiently high dose, and adequate statistical power to conclude that exposure to the agent does not convey a significant risk of cancer to humans. Evidence suggesting a lack of carcinogenicity in experimental animals will be considered if it is supported by other relevant data.
  The Registry of Toxic Effects of Chemical Substances (RTECS) contains tumorigenic and/or carcinogenic and/or neoplastic data for components in this product.

12 Ecological information:

- **General notes:**
  Do not allow material to be released to the environment without proper governmental permits.

13 Disposal considerations

- **Product:**

- **Recommendation**
  Consult state, local or national regulations to ensure proper disposal.

- **Uncleaned packagings:**

- **Recommendation:**
  Disposal must be made according to official regulations.

14 Transport information

- **DOT regulations:**
- **Hazard class:** 4.1
- **Identification number:** UN3089
- **Packing group:** II
- **Proper shipping name (technical name):**
  Metal powders, flammable, n.o.s., nickel powder

- **Land transport ADR/RID (cross-border)**
- **ADR/RID class:** 4.1 Flammable solids
- **Item:** 13b
- **Danger code (Kemler):** 40
- **UN-Number:** 3089
- **Description of goods:** Metal powders, flammable, n.o.s., nickel
  powder

- **Maritime transport IMDG:**
- **IMDG Class:** 4.1
- **UN Number:** 3089
- **Packaging group:** II
- **Proper shipping name:** Metal powders, flammable, n.o.s., nickel
  powder

- **Air transport ICAO-TI and IATA-DGR:**
- **ICAO/IATA Class:** 4.1
- **UN/ID Number:** 3089
- **Packaging group:** II
- **Proper shipping name:** Metal powders, flammable, n.o.s., nickel

powder

15 Regulations

- **Product related hazard informations:**
- **Hazard symbols:**
  Xn Harmful F Highly flammable
- **Risk phrases:**
  11 Highly flammable.
  40 Limited evidence of carcinogenic effects.
  43 May cause sensitization by skin contact.
- **Safety phrases:**
  22 Do not breathe dust.
  36 Wear suitable protective clothing.
- **National regulations**
  All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical Substance Inventory.
  This product contains a chemical known to the state of California to cause cancer or reproductive toxicity.
- **Information about limitation of use:**
  For use only by technically qualified individuals.
  This product contains nickel and is subject to the reporting requirements of section 313 of the Emergency Planning and Community Right to Know act of 1986 and 40CFR372.

16 Other information:

- Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.