

Section 1 Identification

Product Name: CenterLine® Cold Spray Feedstock Powder – Nickel- -Aluminum Oxide
Product Numbers: SST-N0006, SST-N00036
Synonyms: Ni-Al₂O₃ Blend, Nickel Alumina Blend
Recommended Use: Low Pressure Cold Spray
Manufacturer: CenterLine (Windsor) Ltd, 415 Morton Drive, Windsor, Ontario N9J 3T8, Canada
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Section 2 Hazard(s) identification**Classification of the Substance****Regulation (EC) No.1272/2008 (CLP)**

Skin Sens. 1: H317
Carc. (inhal) 2: H351
STOT RE (inhal.) 1: H372
Aquatic chronic 3: H412

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Skin sensitization (Category 1), H317
Carcinogenicity (Category 2), H351
Specific target organ toxicity - repeated exposure, Inhalation (Category 1), H372
Chronic aquatic toxicity (Category 3), H412

Label Elements**Regulation (EC) No.1272/2008 (CLP)****Pictogram(s):****Signal word: DANGER****Hazard statement:**

H317 - May cause an allergic skin reaction
H351 - Suspected of causing cancer by inhalation
H372 - Causes damage to organs through prolonged or repeated exposure by inhalation
H412 - Harmful to aquatic life with long lasting effects

Precautionary statements:

P260 - Do not breathe dust/fume/gas/mist/vapours/spray
P273 - Avoid release to the environment
P281 - Use personal protective equipment as required
P308 + P313 - IF exposed or concerned: Get medical advice/attention
P302 + P352 - IF ON SKIN: Wash with plenty of soap and water.
P333 + P313 - If skin irritation or rash occurs: Get medical advice/attention.

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**Pictogram(s):****Signal Words: WARNING****Hazard Statements:**

H317 - May cause an allergic skin reaction.
H351 - Suspected of causing cancer.

H372 - Causes damage to organs through prolonged or repeated exposure if inhaled.
 H412 - May cause long lasting harmful effects to aquatic life.

Precautionary statements:

- P264 - Wash hands thoroughly after handling.
- P261 - Avoid breathing dust/fume/gas/mist/vapors/spray.
- P270 - Do not eat, drink or smoke when using this product.
- P273 - Avoid release to the environment.
- P284 - Wear respiratory protection.
- P301 + P330 - IF SWALLOWED: Rinse mouth with water.
- P304 + P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- P314 - Get Medical advice/attention if you feel unwell.
- P333 + P313 - If skin irritation or rash occurs: Get medical advice/ attention.
- P363 - Wash contaminated clothing before reuse.

Section 3 Composition/information on ingredients

| Ingredients | CAS Number | EINECS NO. | % WT | OSHA-PEL | ACGIH-TLV |
|--------------------------------|------------|------------|-------|--|--------------------------------------|
| Ni | 7440-02-0 | 231-111-4 | 40-80 | 1.0 mg/m ³ | 1.5 mg/m ³ (Dust) |
| Al ₂ O ₃ | 1344-28-1 | 215-691-6 | 20-60 | 15 mg/m ³ (Total) 5 mg/m ³ (Resp) | 1 mg/m ³ (as Al, Resp) |

Section 4 First-aid measures

- Skin:** Gently brush away excess chemical quickly, then wash with water and soap. If irritation develops and persists, seek medical attention.
- Eyes:** Rinse with large amounts of water for at least 15 minutes, and then seek medical attention. Contact lenses should not be worn while handling this material.
- Inhalation:** Remove the person to fresh air, and if problems with breathing still persist supply respiratory support. If they are not breathing perform artificial respiration. Seek medical attention.
- Ingestion:** Rinse mouth with water and then get medical attention immediately. Do not induce vomiting unless directed to do so by medical personnel.

Section 5 Fire-fighting measures

- Flammable Conditions:** Non-Flammable. May oxidize to Nickel Oxide if exposed to high temperatures within a fire. Keep containers cool with water spray.
- Means of Extinction:** Any, type to be selected according to materials in the immediate neighborhood.
- Hazardous Combustion Products:** Nickel oxide fume, carbon dioxide and carbon monoxide.
- Special Fire Fighting Procedures:** Use water spray to cool fire-exposed surfaces and to protect personnel. Shut off "fuel" to fire. If a leak or spill has not ignited, use water spray to disperse the vapors. Either allow fire to burn under controlled conditions or extinguish with foam or dry chemical. Try to cover liquid spills with foam. Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full face piece operated in pressure demand or positive-pressure mode.
- Unusual Fire and Explosion Hazards:** May oxidize to nickel oxide if exposed to high temperatures within a fire. Under special conditions nickel can react with carbon monoxide in reducing atmospheres to form Nickel Carbonyl, Ni(CO)₄, a toxic gas. Metal powders when heated in reducing atmospheres may become pyrophoric.

Section 6 Accidental release measures

- Clean-Up Procedures:** Reseal container. Remove all sources of ignition. Prohibit smoking in area. Use non-sparking conductive tools to transfer spilled material to a leak-proof container. Brushes/Brooms should have natural bristles. Avoid synthetic materials. Avoid generation of dust cloud during clean-up. Ensure adequate ventilation. Avoid inhalation of dust and fumes. Wear suitable protective equipment. Place in a suitable container for recycling or disposal in accordance with local, state and federal laws.
- Personal precautions, protective equipment and emergency procedures:** Wear appropriate respiratory and protective equipment specified in section 8. Isolate spill area and provide ventilation. Avoid breathing dust or fume. Avoid contact with skin and eyes. Eliminate all sources of ignition. Refer to Section 8.



Environmental precautions: Do not allow to enter drains or to be released to the environment. Refer to Section 12.

Section 7 Handling and storage

Safe handling procedure: Avoid contact with your eyes and skin. Do not ingest the product. Carry the product in a closed container. Wear appropriate personal protection, see Section 8.

Hygienic Practices: Wash hands thoroughly after handling, and before eating or smoking. Smoking and consumption of food or beverages should be restricted from areas where hazardous dust or chemical may be present. Do not shake clothing, rags, or other items to remove dust. Dust should be removed by laundering or vacuuming (with appropriate filters) the clothing, rags, or other items.

Conditions for safe storage: Keep container(s) tightly closed and properly labeled. Store in cool, dry, well ventilated place away from heat, direct sunlight, strong oxidizers and any incompatibles. Store in approved containers and protect against physical damage. Keep containers securely sealed when not in use. Indoor storage should meet OSHA standards and appropriate fire codes. Containers that have been opened must be carefully resealed to prevent leakage. Empty containers retain residue and may be dangerous. Avoid water contamination.

Section 8 Exposure controls/personal protection

Exposure Limits: Refer to Section 3.

Appropriate engineering controls: Local exhaust ventilation or process enclosure. In order to understand the type of controls needed to keep dust levels below OSHA PEL's and ACGIH TLV's the ACGIH manual "Industry Ventilation" can be helpful. An emergency eye bath and deluge shower meeting ANSI should be provided.

Individual protection measures:

Gloves: Wear any liquid-tight gloves such as butyl rubber, neoprene or PVC. A gauntlet type glove or long sleeve shirt should also be worn if skin contact is probable and skin is sensitive.

Respiratory Protection: For protection in normal use, where particulate concentrations do not reach IDLH conditions, a Full Face piece, Positive-Pressure or Pressure-Demand, Supplied-Air Respirator (SAR) or Airline Respirator is recommended. For IDLH or Hazardous situations a Helmet/Hood or Full Face piece, Pressure-Demand or Positive-Pressure, Self-Contained Breathing Apparatus is recommended. Respirator selection is determined based on air born particulate concentration, and therefore will vary from location to location. This could be due to differences in facilities, ventilation, as well as the number of processes causing dust emissions. Should a respirator be needed, follow OSHA respirator regulations 29 CFR 1910.134 and European Standards EN 141, 143 and 371; wear an MSHA/NIOSH or European Standards EN 141, 143 and 371 approved respirators equipped with particulate filter.

Eye Protection: Safety glasses with side shields per OSHA eye- and face-protection regulations 29 CFR 1910.133 and European Standard EN166. Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of, or in conjunction with contact lenses.

Footwear: Wear safety boots.

Clothing: Wear coveralls or other appropriate protective clothing to prevent skin exposure.

Other: Coveralls should be made from fire resistive materials which tend to not accumulate static charges. They should be designed in such a way as to avoid accumulation of dust in cuffs, pockets, etc.

Section 9 Physical and chemical properties

Table with 3 columns: Property, Nickel, Aluminum Oxide. Rows include Physical State, Odour and Appearance, Odour Threshold, Specific Gravity, Vapour Density, Vapour Pressure, Evaporation Rate, Boiling Point, Freezing Point, PH, Coefficient of Water/Oil Distribution, Solubility in Water.



| | | |
|-------------------------|--|---------------------------------------|
| 3.97 | NA | Essentially 0 at room temperature. |
| Evaporation Rate | Boiling Point (°C) | Freezing Point (°C) |
| NA | 2980 | 2054 |
| pH | Coefficient of Water/Oil Distribution | Solubility in Water (optional) |
| NA | ND | Insoluble |

Note: These are typical values and do not constitute a specification.

Section 10 Stability and reactivity

Reactivity: Stable under normal temperatures and pressures. Material does not pose a dust explosion hazard.

Chemical Stability: The product is stable under normal conditions (room temperature).

Conditions to avoid: This product can react vigorously with acids to liberate hydrogen, which can form explosive mixtures with air. Under special conditions nickel can react with carbon monoxide in reducing atmospheres to form nickel carbonyl, Ni(CO)₄, a toxic gas. Metal powders when heated in reducing atmospheres may become pyrophoric.

Incompatible materials: Acids, Oxidizing agents, Sulphur compounds, Hydrogen gas, Oxygen, Methanol, organic solvents, Aluminum, Fluorine, Ammonia

Hazardous decomposition products: Nickel carbonyl gas.

Section 11 Toxicological information

Irritancy of Product: Product may cause irritation to eyes, nose, and throat, along with some potential for skin irritation.

Skin Sensitization: Potentially

Respiratory Sensitization: ND

Carcinogenicity:

This product is not listed as a carcinogen or potential carcinogen by OSHA, ACGIH, IARC or NTP.

Reproductive Toxicity:

Animal experiments indicate that soluble nickel ingestion causes adverse effects on fetal development at a threshold oral exposure of 2.2 mg/Ni/kg/day by pregnant rats. Data are insufficient to determine if this effect occurs in humans and no regulatory agency has classified soluble forms of nickel as reproductive risks for humans.

Teratogenicity: ND

Embryotoxicity: ND

Mutagenicity: No Effect

Name of Toxicologically Synergistic Products/Effects: ND

Symptoms related to the physical, chemical and toxicological characteristics:

May cause allergic skin reaction. Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

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

Skin: Nickel metal is a well-known skin sensitizer. Direct and prolonged skin contact with metallic nickel may induce and elicit allergic skin reactions in those people already sensitized to nickel, so called nickel allergic contact dermatitis.

Eye Contact: Small copper particles in the eyes may cause irritation, discoloration, and damage.

Inhalation: To date, there is no evidence that nickel metal causes cancer in humans based on epidemiology data from workers in the nickel producing and nickel consuming industries. A recent animal (rat) inhalation study showed no increased respiratory cancer risk for nickel metal powder indicating that no carcinogen classification is warranted for nickel metal. The U.S. National Toxicology Program has listed metallic nickel as reasonably anticipated to be a human carcinogen. The International Agency for Research on Cancer (IARC)(Vol 49) found there was inadequate evidence that metallic nickel is carcinogenic to humans but since there was sufficient evidence that it is carcinogenic to animals, IARC concluded that metallic nickel is possibly carcinogenic to humans (Group 2B). In 1997, the ACGIH categorized elemental nickel as: AS "Not Suspected as a Human Carcinogen". Epidemiological studies of workers exposed to nickel powder and to dust and fume generated in the production of nickel alloys and of stainless steel have not indicated the presence of a significant respiratory cancer hazard.

Ingestion: The U.S. National Institute for Occupational Safety and Health (NIOSH) concluded that there is no evidence that nickel metal is carcinogenic when ingested.

Effects of Acute exposure: May cause sensitization by skin contact. Nickel and nickel compounds may cause a



form of dermatitis known as nickel itch. May cause an allergic skin reaction. Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing.

Effects of Chronic Exposure: Animal studies (rats) show that repeated dose inhalation of nickel damages the lung. Chronic inflammation, lung fibrosis and accumulation of nickel particles were observed. Direct and prolonged skin contact with nickel metal may cause nickel sensitization resulting in nickel allergic contact dermatitis /skin rash.

Numerical measures of toxicity:

Nickel: LD₅₀, mouse, oral >9,000 mg/kg.

Section 12 Ecological information

Very toxic to aquatic organisms. For ecological information pertaining to these chemicals, data can be obtained through such organizations as The Ministry of Environment, ESIS: European chemical Substances Information System, as well as the HSDB: Hazardous Substance Data Bank.

Section 13 Disposal considerations

Waste Disposal Methods: Recover or recycle if possible. Dispose of contents in accordance with local, state or national legislation. Do not contaminate ground or surface waters via drainage, by cleaning of equipment or disposal of wastes. Any hazardous wastes should be shipped to a permitted waste disposal facility. Due to the fact that processing/use of the product could potentially alter its characteristics (and consequently its waste management classification), instructions on proper disposal processes should be identified through contact with appropriate environmental regulatory agencies.

Section 14 Transport information

| | |
|-----------------------|---|
| DOT: | UN3077, Environmentally Hazardous Substance, Solid NOS (Nickel Powder), 9, III Marine Pollutant. Applies to nickel powders if they are less than 100 micron in particle size and if they are packaged in quantities greater than 100 pounds |
| DOT EXCEPTION: | Under 49 CFR 171.4, except when transporting aboard a vessel, the requirements of this subchapter specific to marine pollutants do not apply to non-bulk packaging transported by motor vehicles, rail cars, and aircraft |
| ADR/RID: | UN3077, Environmentally Hazardous Substances, Solid, NOS (Nickel Powder), 9, III Marine Pollutant. |
| IMO/IMDG: | UN3077, Environmentally Hazardous Substances, Solid, NOS (Nickel Powder), 9, III Marine Pollutant. |
| ICAO/IATA: | Not regulated if shipped in non-bulk packaging. |

Section 15 Regulatory information

EU regulations

Refer to Directive on Major accident hazard 96/82/EC: 9.a Dangerous for the environment - 50t/200t

Refer to Directive 94/33/EC on the protection of young people at work

Refer to 552/2009/EC amending Regulation 1907/2006/EC: Annex XVII point 27

| | |
|---------------|--|
| CEHS: | Neither Nickel or aluminum oxide is listed under the CEHS's Non-hazardous waste disposal list. |
| CFR: | Respiratory protection information was obtained from 29 CFR 1910.134 or 42 CFR 84. |
| DSL: | All ingredients are listed. |
| TSCA : | All ingredients are listed. |
| IARC: | Nickel is listed in the 10 th Report on Carcinogens for 'Known Human Carcinogens', or 'Reasonably Anticipated to be Human Carcinogens' lists. Aluminum oxide is not listed. |
| NTP: | Nickel is listed in the 10 th Report on Carcinogens for 'Known Human Carcinogens', or 'Reasonably Anticipated to be Human Carcinogens' lists. Aluminum oxide is not listed. |



OSHA: Nickel is listed. Aluminum oxide (with less than 1% crystalline silica) as A4 (Not Classifiable as a Human Carcinogen).

TDG: Nickel is flammable or spontaneously combustible, and is not listed under this Regulation.

Section 16 Other information

Acronyms:

| | |
|------------------|---|
| ACGIH | = American Conference of Governmental Industrial Hygienists |
| CAS | = Chemical Abstract Service |
| CEHS | = Center for Environmental Health & Safety |
| CFR | = Code of Federal Regulations |
| DOT | = Department of Transportation |
| DSL | = Domestic Substances List |
| EINECS | = European Inventory of Existing Commercial Substances |
| IMDG | = International Maritime Dangerous Goods |
| IARC | = International Agency for Research on Cancer |
| IDLH | = Immediately Dangerous to Life or Health |
| LC ₅₀ | = Lethal dose (50 percent kill) |
| LD _{Lo} | = Lowest published lethal dose |
| NA | = Not applicable |
| ND | = Not determined |
| OSHA | = Occupational Safety and Health Administration |
| PEL | = Permissible exposure limit |
| TDG | = Transportation of Dangerous Goods |
| TDUST | = Total dust |
| TLV | = Threshold limit value |
| TSAC | = Toxic Substances Control Act (United States) |
| UN | = United Nations |
| % WT | = Percent weight |

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