

Section 1 Identification

Product Name: CenterLine® Cold Spray Feedstock Powder – Zinc
Product Numbers: SST-Z5001, SST-Z5002
Synonyms: Zinc Powder, Zn Powder, Pure Zinc Powder
Recommended Use: Low Pressure Cold Spray
Manufacturer: CenterLine (Windsor) Ltd, 415 Morton Drive, Windsor, Ontario N9J 3T8, Canada
US Office: 1985 Ring Drive, Troy MI 48083, USA
General Information: T:519-734-8464 / F:519-734-2000 / Email: info@cntrline.com
Emergency: 800-423-0367 / 519-259-4307

Section 2 Hazard(s) identification

Classification of the Substance
Regulation (EC) No.1272/2008 (CLP)
 Aquatic Acute 1: H400
 Aquatic Chronic 1: H410
GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
 Acute aquatic toxicity (Category 1)
 Chronic aquatic toxicity (Category 1)

Label Elements
Regulation (EC) No.1272/2008 (CLP)
GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Pictogram(s):



Signal word: WARNING

Hazard statement:

H410 - Very toxic to aquatic life with long lasting effects

Precautionary statements:

P273 - Avoid release to the environment

P391 - Collect Spillage

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

Hazards not otherwise classified (HNOC) or not covered by GHS

The Zinc powders were tested in accordance with the UN Model Regulations on the Transport of Dangerous Goods, Manual of Tests and Criteria and have been found to **NOT** meet the definition of a hazard class 4. Care should be taken, however, during bulk handling to prevent accumulation/generation over time of 75 micron or finer particles. Use only non-sparking tools and natural bristle brushes. Keep away from heat/sparks/open flames/hot surfaces. No smoking. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Prevent dust accumulation to minimize explosion hazard. Take precautionary measures against static discharge.

Section 3 Composition/information on ingredients

Ingredients	CAS Number	EINECS NO.	% WT	OSHA-PEL	ACGIH-TLV
Zn	7440-66-6	231-175-3	>99	5 mg/m ³ (as ZnO Fume)	5 mg/m ³ (as ZnO Fume)

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: The powder is a flammable solid, and may ignite in air (as a dust cloud), especially in moist air. material is ignited it will produce irritating and/or toxic fumes (or gases). On contact with water or moist air, flammable hydrogen gas will be formed. It may be ignited by heat, sparks or flames.

Means of Extinction: Apply dry chemical, dry sand, or special powder extinguishing (Class D) media. Do NOT use water, carbon dioxide or foam on molten metals. Water may be ineffective for extinguishing a fire but should be used to keep fire exposed billets, ingots and castings cool.

Hazardous Combustion Products: Toxic fumes of ZnO

Special Fire Fighting Procedures: If possible, move material not yet involved in the fire from the fire area. If this is not possible, cool fire-exposed zinc by applying hose streams or fogs. Apply only dry chemical, sand, or special powder extinguishing media to any molten or burning zinc metal. Take extreme caution to prevent contact of water with molten or burning zinc. Zinc foil in particular may ignite in the presence of water. Zinc oxide fumes may evolve in fires. Fire fighters should be fully trained and wear full protective clothing including an approved, self-contained breathing apparatus which supplies a positive air pressure within a full face-piece mask. Use NIOSH/MSHA approved self-contained breathing apparatus. Do not spread burning material. Smother and allow fire to go out. Dry zinc dust will not ignite spontaneously, but once ignited, may burn readily in air. Contact with water liberates extremely flammable gases. Thermal decomposition can lead to release of irritating gases and vapors. Keep product and empty container away from heat and sources of ignition.

Unusual Fire and Explosion Hazards: Bulk dust in contact with water or damp air evolves hydrogen. The heat produced during this reaction could ignite the hydrogen. An explosive condition may exist if this happens in a confined space. Dry dust may form a dust explosive mixture in air. Zinc oxide fume may result from combustion of zinc dust.

Explosivity Characteristics	
Minimum Ignition Temperature (MIT):	460 °C (cloud)
	690 °C (layer)
Minimum Explosible Concentration (MEC)	500 gm/m ³
Minimum Ignition Energy (MIE)	960 mJ
Deflagration Index (K_{st})	0 – 200 bar-m/sec
<i>Note: These values may vary with particle size. Refer to NFPA 484 for further data for specific particle sizes.</i>	

Section 6 Accidental release measures

Clean-Up Procedures: Control source of release if possible to do so safely. Clean up spilled material immediately observing precautions in Section 8, Personal Protection. Molten metal should be allowed to cool and harden before cleanup. Once solidified wear gloves, pick up and return to process. Powder or dust should be cleaned up by sweeping/shoveling, etc. Solid metal is recyclable. Return uncontaminated spilled material to the process if possible. Place contaminated material in clean, dry, suitably labelled containers for later recovery or disposal. Treat or dispose of waste material in accordance with all local, state/provincial, and national requirements.

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: Zinc metal has relatively low bioavailability and poses no immediate ecological risks. Depending on physicochemical characteristics (e.g., pH, water hardness), compounds of zinc metal can be toxic, particularly in the aquatic environment. Zinc also has the potential to bioaccumulate in plants and animals in both aquatic and terrestrial environments. Releases of the product to water and soil should be prevented.

Section 7 Handling and storage



Safe handling procedure: Use only under a chemical fume hood. Wear personal protective equipment. Avoid dust formation. Avoid contact with skin, eyes and clothing. Avoid ingestion and inhalation. Handle under an inert atmosphere. Do not allow contact with air. Do not allow contact with water. Keep away from open flames, hot surfaces and sources of ignition. Use spark-proof tools and explosion-proof equipment. Take precautionary measures against static discharges.

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

Physical State Solid powder	Odour and Appearance Odourless, Grey	Odour Threshold (ppm) NA
Specific Gravity 7.14	Vapour Density NA	Vapour Pressure (mmHg) 1 mmHg at 487 °C
Evaporation Rate NA	Boiling Point (°C) 908	Melting Point (°C) 419
PH NA	Coefficient of Water/Oil Distribution ND	Solubility in Water (optional) Insoluble

Section 10 Stability and reactivity

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

Chemical Stability: Stable under normal shipping and handling conditions.



Conditions to avoid: Avoid dust formation. Incompatible products. Exposure to air. Exposure to moist air or water. Keep away from open flames, hot surfaces and sources of ignition.

Incompatible materials: Acids, bases, water, halogens, oxidizing agents (e.g., Dinitrogen tetroxide, bromates, chlorates, sodium peroxide), carbon dioxide, chlorinated hydrocarbons, halogenated hydrocarbons, sulfates, phosphorous, sulfur, some organic matter, nitrates, magnesium, chlorine trifluoride, fluorochloro-lubricants, nitrate-nitrite, silver chloride, sodium carbonate, antimony, carbon disulfide, arsenic, selenium, metal oxides, oxosalts or sulfides (e.g., Copper or lead oxides, nitrates, sulfates), interhalogens, nitro compounds, non-metal alides (e.g., Phosphorous pentoxide), carbon disulfide, nitrous oxide, phosgene, sulfur dioxide, diborane, alcohols, halocarbons, alkali hydroxides, ammonium nitrate, chromic anhydride, cadmium, hydrazine mononitrate, hydroxylamine, selenium, chlorinated rubber, catalytic metals, nitrobenzene, potassium nitrate, lead azide, ethylene oxide, oxygen difluoride, vinyl acetate.

Hazardous decomposition products: Flammable hydrogen gas and zinc oxide.

Section 11 Toxicological information

Irritancy of Product: Material may cause irritation to the eyes (most likely only as a foreign object), skin, and respiratory system. It may cause gastrointestinal irritation if large amounts are consumed.

Skin Sensitization: Potentially

Respiratory Sensitization: ND

Carcinogenicity:

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

Reproductive Toxicity: ND

Teratogenicity: ND

Embryotoxicity: ND

Mutagenicity: No Effect

Name of Toxicologically Synergistic Products/Effects: ND

Symptoms related to the physical, chemical and toxicological characteristics:

Inhalation of high levels of zinc oxide may result in tightness of chest, metallic taste, cough, dizziness, fever, chills, headache, nausea, and dry throat. Overexposure may produce symptoms known as metal fume fever or "zinc shakes"; an acute, self-limiting condition without recognized complications. Symptoms of metal fume fever include: chills, fever, muscular pain, nausea and vomiting. Like any finely divided particulate matter, zinc oxide may cause mechanical irritation to skin and eyes.

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

Skin: There may be irritation and redness at the site of contact.

Eye Contact: There may be irritation and redness. The eyes may water profusely.

Inhalation: Zinc dust is discomforting to the respiratory tract when inhaled and initially acts as a respiratory irritant. Zinc oxide fumes and vapour produced from high temperature processes can produce 'metal fume fever'. Symptoms include headache, nausea, chills, muscle aches, fever, coughing, chest tightness and a metallic taste in the mouth. The onset of symptoms may be delayed by up to 24 hours after exposure however normally symptoms present between 3 and 10 hours post exposure and can last for approximately 48 hours. Personnel may be particularly susceptible to metal fume fever after a period of non-exposure.

Ingestion: Not normally a hazard due to the physical form of the product. Material is discomforting to the digestive tract and may cause nausea, vomiting, headache, abdominal discomfort and diarrhea. Convulsion, collapse and unconsciousness and death may occur in severe cases.

Effects of Acute exposure: NA

Effects of Chronic Exposure: Inhalation of zinc oxide fumes can cause fever, muscle pains, shivering and nausea. In general these troubles last only 24 hours without any after-effect (zinc fever).

Numerical measures of toxicity

Zn: LD₅₀, mouse, oral > 2,000 mg/kg
Inhalation - rat - 4 h - > 5.4 mg/l

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 (Zinc, Zinc oxide), 9, III Marine Pollutant.
ADR/RID:	UN3077, Environmentally Hazardous Substances, Solid, NOS (Zinc, Zinc oxide), 9, III Marine Pollutant.
IMO/IMDG:	UN3077, Environmentally Hazardous Substances, Solid, NOS ((Zinc, Zinc oxide), 9, III Marine Pollutant.
ICAO/IATA:	Not regulated if shipped in non-bulk packaging.

Section 15 Regulatory information

Substances of Very High Concern (SVHC) according to REACH, Article 57: Not Listed

ANNEX XIV of the REACH: Not Listed

IARC:	Not listed.
NTP:	Not listed in the 10 th Report on Carcinogens for 'Known Human Carcinogens', or 'Reasonably Anticipated to be Human Carcinogens' lists.
OSHA:	Not listed.
TDG:	Listed.
DSL:	Listed.
TSCA:	Listed.

Chemical Safety Assessment: No

Hazardous Material Identification System (HMIS):

Health Hazard:	1
Flammability Hazard	1
Reactivity Hazard:	1
Maximum Personal Protection:	E

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
NTP	= National Toxicology Program
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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