Section 1 Identification

Product Name: **CenterLine® Cold Spray Feedstock Powder – Aluminum**
Product Numbers: SST-A0017, SST-A0018, SST-A5001, SST-A5003, SST-A5004, SST-A5005, SST-A5008, and SST-A5011
Synonyms: Aluminum powder, Pure Aluminum Powder, Al 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): Not Applicable
GHS Classification in accordance with 29 CFR 1910 (OSHA HCS): Not Applicable

Label Elements

Regulation (EC) No.1272/2008 (CLP): Not Required
GHS Classification in accordance with 29 CFR 1910 (OSHA HCS):
Pictogram(s):

Signal Words: WARNING
Hazard Statements: H320 - Causes eye irritation
H335 - May cause respiratory irritation
Precautionary statements:
P261 - Avoid breathing dust/fume/gas/mist/vapors/spray.
P264 - Wash hand thoroughly after handling.
P305+351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

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

The Aluminum 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
Al	7429-90-5	231-072-3	> 99	15 mg/m^3 (Total) 5 mg/m^3 (Resp)	1 mg/m^3 (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: Do not induce vomiting unless instructed by a physician. Never give anything by mouth to an unconscious person. Dilute by drinking water. Recommend quantities up to 1 oz. in children and 9 oz. in adults. Consult a physician.

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. If the 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: Use gentle surface application of Class D extinguishing media or dry sand to cover and ring the burning material. If possible, isolate the burning material. Allow the fire to burn out. Do not disturb the material until completely cool.

Hazardous Combustion Products: Combustion of this powder/dust will cause the formation of irritating and/or toxic gases.

Special Fire Fighting Procedures: Avoid water, halogenated extinguishing agents. Avoid generation of dust. Cover to eliminate oxygen. Isolate burning material with ring of dry sand or Type D extinguishment. Do not disturb burning powder until completely cool. Use of ABC rated extinguishers may accelerate fire.

Unusual Fire and Explosion Hazards: Reacts with water, acids, and alkalis to produce hydrogen. Dust/air mixture may explode violently when ignited. High heat of fire may cause underlying concrete to fracture. Dust/Fines in contact with metal oxides (e.g. rust) may present hazard of a thermite reaction. Dust/fines in contact with water may generate hazardous quantities of flammable/explosive hydrogen gas. Avoid risk of secondary explosion by limiting accumulations of fugitive dust.

Explosivity Characteristics	
Minimum Ignition Temperature (MIT):	650 °C (cloud) 760 °C (layer)
Minimum Explosible Concentration (MEC)	45 - 120 gm/m^3
Minimum Ignition Energy (MIE)	4 - 13 mJ
Deflagration Index (K_{st})	90 – 300 bar-m/sec
Note: These values may vary with particle size. Refer to NFPA 484 for further data for specific particle sizes.	

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.

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 accumulations of dust. Good housekeeping practices are essential to mitigate/prevent risk of secondary explosions. Local ventilation and vacuum systems must be suitable for use with Group E explosive dusts. Do not store in areas protected by automatic sprinkler systems. Do not store with oxidizing materials.

Proper grounding of process equipment is essential. Use non-sparking, conductive tools. Proper bonding of containers during transfer operations is essential. All electrical equipment must be suitable for Class II, Group E locations. Avoid static build-up and discharge.

Prohibit smoking in areas where aluminum silicon powders are stored or handled. Refer to Aluminum Association Bulletin TR-2 "Recommendations for Storage and Handling of Aluminum Powders and Pastes" for more detailed information (see Section 16). For further information on control of static electricity and bonding and grounding procedures, see NFPA # 77(see section 16). For detailed information on handling and storage of aluminum powders, refer to NFPA # 484 (see Section 16).

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: Store the material in a cool, dry, well-ventilated area, away from direct sunlight, water, sources of ignition, and incompatible substances. A waterproof storage area with no water services is recommended. Keep all containers tightly closed when they are not being used or are empty.

Section 8 Exposure controls/personal protection

Exposure Limits: Refer to Section 3.

Appropriate engineering controls Provide showers, and NIOSH approved eye wash stations. System enclosure, ventilation (local exhaust), and explosion proof electrical equipment and lighting are recommended. Prevent as much dust build-up as possible. Try to ensure that there is no accumulation of electrostatic charges by grounding the equipment. Local ventilation systems must be suitable for Class II, Group E dusts, per the National Electrical Code, NFPA 70. See NFPA #484 for detailed information on requirements for ventilation systems handling combustible metal dusts

Individual protection measures

Gloves: As needed. Glove material should be electrically conductive to avoid static build-up and discharge.

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. Employers should review the NIOSH/ANSI standards for Assigned Protection Factors in order to choose a correct respirator based on particulate concentration. 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 dust filters.

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 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, silver gray	**Odour Threshold (ppm)** ND
Specific Gravity 2.70	**Vapour Density** NA	**Vapour Pressure (mmHg)** 1 mm Hg @ 1284 °C
Evaporation Rate ND	**Boiling Point (°C)** 2519	**Melting Point (°C)** 650
PH NA	**Coefficient of Water/Oil Distribution** ND	**Solubility in Water (optional)** Insoluble
Note: These are typical values and do not constitute a specification.		

Section 10 Stability and reactivity

Reactivity: The material should be kept away from any sources of ignition, moisture, or incompatible substances.

Chemical Stability: Stable under normal shipping and handling conditions.

Conditions to avoid: Conditions involving moisture (moist air) and any incompatibles

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: Exothermic reaction with water, acids, alkalis, to generate hydrogen and heat. Flammable hydrogen gas, aluminum 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: Low potential	**Respiratory Sensitization:** Potentially

Carcinogenicity

None of the components of this product are listed as a carcinogen or potential carcinogen by OSHA, AGCIH, IARC or NTP.

Reproductive Toxicity: ND	**Teratogenicity:** ND
Embryotoxicity: ND	**Mutagenicity:** ND
Name of Toxicologically Synergistic Products/Effects: ND	

Symptoms related to the physical, chemical and toxicological characteristics:

Under normal handling and use, exposure to product presents few health hazards. Dusts may cause mechanical irritation to eyes and skin resulting in itching and redness. Ingestion may cause transient irritation of throat, stomach and gastrointestinal tract. Inhalation may cause coughing, nose and throat irritation, and sneezing. Higher dust exposures may cause difficulty breathing, congestion, and chest tightness.

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

Inhalation: Dust may irritate nose and throat. If heated, aluminum fumes may cause metal fume fever, a delayed, benign, transient flu-like condition.

Skin contact: May cause skin irritations. Prolonged skin contact with coated aluminum may cause skin irritation in sensitive individuals. Workers with anemia, kidney damage, digestive, respiratory, nervous systems, pregnant women and fertile females warrant particular attention.

Skin absorption: Not applicable for product in purchased form.

Eye contact: High concentrations of dust may cause irritation to the eyes. Fumes can cause eye irritations.

Ingestion: Ingestion of significant amounts of product is unlikely. If swallowed and person is conscious, give large quantities of water to drink. Get medical attention as soon as possible. Serious effects may occur if large amounts of dust are swallowed.

Acute exposure: If acute exposure is experienced, irritation to the eyes, skin, respiratory and potentially the gastrointestinal tract may be experienced. If exposed to any of the metal's fumes, there is a potential to develop metal fume fever (characterized by fever, chills, chest tightness, and coughing).

Effects of Chronic Exposure: Aluminum dust is considered to be a nuisance particulate by OSHA. Continued exposure to concentrations above the recommended TLV may cause irritation of the eye, mucous membranes and upper respiratory tract.

Numerical measures of toxicity

The following data has been determined for the elements that may be constituents:

Aluminum, LD50/LC50: Oral - rat - > 2,000 mg/kg
Inhalation - rat - 4 h - > 888 mg/l

Section 12 Ecological information

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: Reuse or recycle product whenever possible. Material unfit for reuse may be sent to a

metals recovery facility that is properly equipped to handle finely divided materials. Material that cannot be reclaimed or recycled should be disposed of in accordance with applicable Federal, State and Local regulations. 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: Not regulated as dangerous goods.
IATA: Not regulated as dangerous goods.
IMDG Code: Not regulated as dangerous goods.

Section 15 Regulatory information

IARC: Not Listed
NTP: Not Listed
OSHA: Not Listed
TDG: Not Listed
DSL: Listed.
TSCA: Listed.
Substances of Very High Concern (SVHC) according to REACH, Article 57: Not Listed
ANNEX XIV of the REACH: Not Listed
Chemical Safety Assessment: No

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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* End of SDS CWL-F101-AE *