SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Trade Name: Aluminum Alloys
CAS Number: Not applicable
Synonyms:
Use/Description: Angles...

Company Identification:	24 Hour Contact – CHEMTREC 1-800-424-9300
Nucor LMP Steel, Inc. 2000 East First Street Maryville, MO 64468	Safety Officer [8:00 am – 5:00 pm]: 1-(660)-582-3127

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW
PRODUCT AS SOLD BY NUCOR IS NOT HAZARDOUS PER OSHA GHS 29 CFR 1910, 1915, 1926. However, individual customer processes, (such as welding, sawing, brazing, grinding, abrasive blasting, and machining) may result in the formation of fumes, dust (combustible or otherwise), and/or particulate that may present the following hazards:

OSHA Hazards:
Acute Toxicant
Skin Sensitizer
Respiratory Sensitizer
Carcinogen
Target Organ Effect – Respiratory System
Mutagen
Reproductive Toxicant
Flammable Solid

GHS Classification:
Acute Toxicity (Category 4)
Skin Sensitization (Category 1)
Respiratory Sensitization (Category 1)
Carcinogenicity (Category 2)
Specific Target Organ Toxicity – Repeat Exposure (Category 1)
Mutagenicity (Category 2)
Reproductive Toxicity (Category 2)
Flammable Solid (Category 1)
Water React. Flam. Gas (Category 2)

Pictogram(s):

Signal Word: Danger

Hazard Statement(s)
H302: Dust/powder harmful if swallowed.
H332: Dust/powder/fumes harmful if inhaled.

H317: Dust/powder/fumes may cause an allergic skin reaction.
H351: Dust/powder/fumes suspected of causing cancer.
H372: Inhalation of dust/powder/fumes causes damage to respiratory tract, through prolonged or repeated exposure.
H361: Dust/powder/fumes suspected of damaging fertility or the unborn child
H341: Dust/powder/fumes suspected of causing genetic defects
H334: Dust/powder/fumes may cause allergy or asthma symptoms or breathing difficulties if inhaled
H228: Flammable solid as aluminum powder.
H261: Aluminum powder releases flammable gas in contact with water.

Precautionary Statement(s)
P202: Do not handle until all safety precautions have been read and understood.
P261: Avoid breathing dust/fumes.
P281: Use personal protective equipment as required.
P308+P313: If exposed or concerned: Get medical advice/attention.

Potential Health Effects

Eye Contact
Dusts or particulates may cause mechanical irritation including pain, tearing, and redness. Scratching of the cornea can occur if eye is rubbed. Fumes may be irritating. Eye contact with aluminum particles may cause corneal necrosis. Contact with the heated material may cause thermal burns.

Skin Contact
Dusts or powder may irritate the skin. Some products may contain residual coating. Prolonged skin contact with the coating oils may results in skin sensitization (allergy) in some individuals. Do not touch or handle cast aluminum or heated materials before determining the temperature. Aluminum does not change color on heating. Contact with hot metal may cause severe thermal burns.

Inhalation
Dusts may cause irritation of the nose, throat, and lungs. Excessive inhalation of metallic fumes and dusts may result in metal fume fever, an influenza-like illness. It is characterized by a sweet or metallic taste in the mouth, accompanied by dryness and irritation of the throat, cough, shortness of breath, pulmonary edema, general malaise, weakness, fatigue, muscle and joint pains, blurred vision, fever and chills. Typical symptoms last from 12 to 48 hours.

Ingestion
Not expected to be acutely toxic via ingestion based on the physical and chemical properties of the product. Swallowing of excessive amounts of the dust may cause irritation, nausea, and diarrhea.

Potential Fire and Explosion Hazards
Dust may form flammable or exposive mixture with air, especially when damp. Reacts violently and/or explosively with water, steam, or moisture. May ignite or explode on contact with moist air.

Chronic or Special Toxic Effects
Repeated exposure to fine dusts may inflame the nasal mucosa and cause changes to the lung. In addition, a red-brown pigmentation of the eye and/or skin may occur. Welding fumes have been associated with adverse health effects.

Target Organs
Overexposure to specific components of this product that are generated in dusts or fumes may cause adverse effects to the following organs or systems: eyes, skin, liver, kidney, central nervous system, cardiovascular system, respiratory system.

Medical Conditions Aggravated by Exposure
Diseases of the skin such as eczema may be aggravated by exposure. Also, disorders of the respiratory system including asthma, bronchitis, and emphysema. Long-term inhalation exposure to agents that cause pneumoconiosis (e.g. dust) may act synergistically with inhalation of oxide fumes or dusts of this product.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components		CAS No.	% Weight	Exposure Limits			
				ACGIH TLV (mg/m³)		OSHA PEL (mg/m³)	
Iron	(Fe)	7439-89-6	0 – 5.5	5	Oxide Dust/Fume	10	Oxide Dust/Fume
Aluminum	(Al)	7429-90-5	70 – 99.9	10 5 5	Dust Fume Pyro powder	15 5	Dust Respirable fraction
Bismuth	(Bi)	7440-69-9	0 – 2.1		Not Established		Not Established
Cadmium	(Cd)	7440-43-9	0 – 0.2	0.01	As Cadmium (A2 Carc.)	0.005	As Cadmium
Chromium	(Cr)	7440-47-3	0 – 0.6	0.5	Metal	1	Metal
Cobalt	(Co)	7440-48-4	0 – 2	0.02	As Cobalt (A3 Carc.)	0.1	Metal/Dust/Fume
Copper	(Cu)	7440-50-8	0 – 6.9	1 0.2	Dust Fume	1 0.1	Dust Fume
Magnesium	(Mg)	7439-95-4	0 – 8.6		Not Established		Not Established
Manganese	(Mn)	7439-96-5	0 – 2.0	0.2	Elemental Mn and Inorg Compounds	5	Fume (Ceiling)
Nickel	(Ni)	7440-02-0	0 – 2.4	1.5	Metal	1	Metal & Insol. Compounds
Silicon	(Si)	7440-21-3	0 – 22.0	10	Dust	15	Dust
Silver	(Ag)	7440-22-4	0 – 0.8	0.1	Dust, fume	0.01	

NOTE: The above listing is a summary of elements used in alloying Nucor Products.

4. FIRST AID MEASURES

Eye Contact - In case of overexposure to dusts or fumes, immediately flush eyes with plenty of water for at least 15 minutes occasionally lifting the eye lids. Get medical attention if irritation persists. Thermal burns should be treated as medical emergencies.
Skin Contact - In case of overexposure to dusts or particulates, wash with soap and plenty of water. Get medical attention if irritation develops or persists. If thermal burn occurs, flush area with cold water and get immediate medical attention.
Inhalation - In case of overexposure to dusts or fumes, remove to fresh air. Get immediate medical attention if symptoms described in this SDS develop.
Ingestion - Not considered an ingestion hazard. However, if excessive amounts of dust or particulates are swallowed, treat symptomatically and supportively. Get medical attention.
Notes to Physician - Inhalation of metal fume or metal oxides may produce an acute febrile state, with cough, chills, weakness, and general malaise, nausea, vomiting, muscle cramps, and remarkable leukocytosis. Treatment is symptomatic, and condition is self limited in 24-48 hours. Chronic exposure to dusts may result in pneumoconiosis of mixed type.

5. FIRE FIGHTING MEASURES

Flash Point (Method) - Not applicable
Flammable Limits (% volume in air) - Not applicable
Auto ignition Temperature - Not applicable
Extinguishing Media – Do NOT use water or halogenated agents. Use dry chemical, foam, carbon dioxide, water spray or water fog for oil fires. Use dry powder, talc, or sand to extinguish metal fires.

Material in or near fires should be cooled with a water spray or fog if compatible with fire fighting techniques for the other materials involved in the fire.
Special Fire Fighting Procedures - Do not use water on molten metal. Do not use Carbon Dioxide (CO_2). Firefighters should not enter confined spaces without wearing NIOSH/MSHA approved positive pressure breathing apparatus (SCBA) with full face mask and full protective equipment.
Unusual Fire or Explosion Hazards – Fresh, very finely ground aluminum, may be pyrophoric when its particle size is 0.03 um or less. Dust is moderately flammable/explosive by heat, flame or chemical reaction with powerful oxidizers. May ignite on contact with vapors of AsCl3, SCl2, Se2Cl2, PCl5; on contact with barium peroxide; contact with O2; mixtures with picric acid + water after a delayed period; exothermic reaction with water + iron powder which emits hydrogen gas; and spontaneously ignites in CS2 vapors.

6. ACCIDENTAL RELEASE MEASURES

Precautions if Material is Spilled or Released - Emergency response is unlikely unless in the form of combustible dust. Avoid inhalation, eye, or skin contact of dusts by using appropriate precautions outlined in this SDS (see section 8). Shovel the material into waste container. Avoid the generation of dusts during clean-up. When dealing with aluminum powder/dust, wear appropriate respiratory and protective equipment specified in Section 8. Isolate spill area, provide ventilation and extinguish sources of ignition. Vacuum up spill using a high efficiency particulate absolute (HEPA) air filter and place in a closed container for proper disposal. Use non-sparking tools. Specific standards and regulations may be applicable to materials generated by individual customer processes. As appropriate, these standards and regulations should be consulted for applicability.
Fire and Explosion Hazards - Some customer processes may generate combustible dust that may require specific precautions when cleaning spills or releases of dust.
Environmental Precautions - Some grades may contain reportable quantities of alloying elements. See Section 15 for additional information.
Waste Disposal Methods - Dispose of used or unused product in accordance with applicable Federal, State, and Local regulations. Please recycle.

7. HANDLING AND STORAGE

Storage Temperatures - Stable under normal temperatures and pressures.
Precautions to be Taken in Handling and Storing - Do not breathe fumes or dusts from this material. Use with adequate ventilation. Keep dusts and powders of this product from heat, sparks, or open flame. Use non-sparking tools when opening or closing containers. Do not touch or handle cast aluminum or heated materials before determining the temperature. Aluminum does not change color on heating. Series 2000 and 7000 alloy ingots must be stress relieved prior to being sawed to prevent an explosion or violent cracking. Products may have sharp edges. Handle with caution and wear appropriate personal protective equipment. Dry metal properly before loading in a melting furnace. Moisture trapped in crevices and occlusions can cause a violent explosion.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Operations with potential for generating high concentrations of airborne particulates or fumes should be evaluated and controlled as necessary.
Eye Protection - Use safety glasses. Dust resistant safety goggles are recommended under circumstances where particles could cause mechanical injury such as grinding or cutting. Face shield should be used when welding or cutting.
Skin - Appropriate protective gloves should be worn as necessary. Good personal hygiene practices should be followed including cleansing exposed skin several times daily with soap and water, and laundering or dry cleaning soiled work clothing.
Respiratory Protection - NIOSH/MSHA approved dust/fume/mist respirator should be used to avoid excessive exposure. See Section 3 for component material information exposure limits. If such concentrations are sufficiently high that this respirator is inadequate, or high enough to cause oxygen

deficiency, use a positive pressure self-contained breathing apparatus (SCBA). Follow all applicable respirator use, fitting, and training standards and regulations.
Ventilation - Provide general and/or local exhaust ventilation to control airborne levels of dust or fumes below exposure limits.
Exposure Guidelines - No permissible exposure limits (PEL) or threshold limit values (TLV) exist for aluminum products as sold. See Section 3 for component materials. Various grades will contain different combinations of these elements. Trace elements may also be present in minute amounts.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor – Solid metallic pieces, no odor
Boiling Point – Not available
Melting Point – 510-660 °C
pH - Not applicable
Specific Gravity (at 15.6°C) – 2.5-2.9 g/cc
Density (at 15.6 °C) - Not applicable
Vapor Pressure - Not applicable
Vapor Density (air = 1) - Not applicable
% Volatile, by Volume - Not applicable
Solubility in Water - <1%
Evaporation Rate (Butyl Acetate = 1) - Not applicable
Other Physical and Chemical Data - None

10. STABILITY AND REACTIVITY

Stability - Stable
Conditions to Avoid - Temperatures above the melting point may liberate fumes containing oxides of iron and alloying elements. Avoid generation of airborne fume. Series 2000 and 7000 alloy ingots must be stress relieved prior to being sawed to prevent an explosion or violent cracking. When melting aluminum, aluminum alloys, or aluminum scrap, care must be taken to exclude water or moisture. Water or moisture trapped under hot or molten metal can result in a violent explosion. Strong oxidizing agents must be excluded during heating and melting operations to prevent the possibility of an explosion. Finely divided aluminum dusts may form explosive mixtures in air. Care should be taken to employ effective dust control measures.
Hazardous Polymerization - Will not occur.
Incompatibility (Materials to Avoid) - This product may react with strong acids, bases and oxidizing agents to produce hydrogen gas, which is highly flammable. Contact with chlorinated solvents may release toxic and corrosive hydrogen chloride gas. Hot aluminum may react with chlorinated solvents to produce phosgene, a highly irritating and toxic gas.
Hazardous Decomposition Products - Decomposition of this product may yield metallic oxides, such as aluminum oxide. Hydrogen may also be produced when reacted with some acids and caustic solutions. Decomposition of coating oils present on some products will release carbon monoxide, carbon dioxide, and other hydrocarbon species.

11. TOXICOLOGICAL INFORMATION

Aluminum: Chronic overexposure to aluminum can result in lung damage and has been associated with asthma-like syndrome. Accumulation of aluminum in the body may result in neurological damage, anemia and bone softening. Repeated overexposure to high levels of aluminum oxide may lead to pulmonary fibrosis, a progressive lung disorder.

Cadmium: Ingestion of highly contaminated food or drink results in acute gastrointestinal effects with concomitant diarrhea and vomiting. Acute inhalation of Cd in air—for example, from soldering or welding fumes—may lead to severe chemical pneumonitis. Long-term exposure to low air levels may lead to chronic obstructive lung disease and possibly lung cancer. Long-term excessive exposure from the air or food leads to renal tubular dysfunction. There is sufficient evidence in humans for the carcinogenicity of cadmium and cadmium compounds.

Chromium: Prolonged and repeated overexposure to chromium dusts or fumes may cause skin ulcers, nasal irritation and ulceration, kidney damage and cancer of the respiratory system. Chromium is skin sensitizer. Cancer is generally attributed to the hexavalent (+6) form of chromium which is listed as a carcinogen by NTP and IARC (Group 1).

Cobalt: Inhalation and dermal exposure to cobalt can result in sensitization. Bronchial asthma has been described in workers exposed to various forms of cobalt. Interstitial lung disease caused by metallic cobalt particles is an occupational lung disease generally referred as hard metal lung disease. Mortality studies of the hard metal industry suggest an increase in lung cancer mortality.

Copper: Acute poisoning from ingestion of excessive copper can cause temporary gastrointestinal distress with symptoms such as nausea, vomiting, and abdominal pain. High levels of exposure to copper can cause destruction of red blood cells, possibly resulting in anemia.

Nickel: Prolonged and repeated contact with nickel may cause sensitization dermatitis. Inhalation of nickel compounds has caused lung damage as well as sinus, nasal and lung cancer in laboratory animals. Nickel is a listed carcinogen by NTP and IARC (Group 1).

Silicon: Silicon dust seems to have little adverse effect on lungs and does not appear to produce significant organic disease or toxic effects when exposures are kept under reasonable control.

Iron: Chronic inhalation of iron has resulted in mottling of the lungs, a condition referred to as siderosis. This is considered benign pneumoconiosis and does not ordinarily cause significant physiologic impairment.

Manganese: Overexposure to manganese may result in CNS effects, anemia and pneumonitis, which increased the risk of pneumonia.

12. ECOLOGICAL INFORMATION

Aquatic Ecotoxicological Data - No specific information available on this product.
Environmental Fate Data - No specific information available on this product.

13. DISPOSAL CONSIDERATIONS

Recovery and reuse, rather than disposal, should be the ultimate goal of handling efforts. Dispose in accordance with federal, state, and local health and environmental regulations. Prevent materials from entering drains, sewers, or waterways.

14. TRANSPORT INFORMATION

DOT Proper Shipping Name - Not regulated
DOT Hazard Classification - Not regulated
UN/NA Number - Not applicable
DOT Packing Group - Not applicable
Labeling Requirements - Not applicable
Placards - Not applicable
DOT Hazardous Substance - Not applicable
DOT Marine Pollutant - Not applicable