

NUCOR

SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Trade Name: Aluminum and Aluminum Alloys

CAS Number: Not applicable

Synonyms:

Use/Description: Fabricated parts (Rivets...)

Company Identification:

Nucor LMP Steel, Inc
2000 East First Street
Maryville, MO 64468

24 Hour Contact – CHEMTREC 1-800-424-9300

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
Flammable Solid

GHS Classification: Acute Toxicity (Category 4)
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.

H228: Flammable solid as aluminum powder.

H261: Aluminum powder releases flammable gas in contact with water.

Precautionary Statement(s)

Aluminum and Aluminum Alloys

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 result 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 explosive 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.

Aluminum and Aluminum Alloys

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS No.	% Weight	Exposure Limits			
			ACGIH TLV (mg/m ³)		OSHA PEL (mg/m ³)	
Iron (Fe)	7439-89-6	0.1 - 5	5	Oxide Dust/Fume	10	Oxide Dust/Fume
Aluminum (Al)	7429-90-5	80-100	10 5 5	Dust Fume Pyro powder	15 5	Dust Respirable fraction
Bismuth (Bi)	0.1 - 3	0.1 - 3		Not Established		Not Established
Copper (Cu)	7440-50-8	0.1 - 10	1 0.2	Dust Fume	1 0.1	Dust Fume
Magnesium (Mg)	7439-95-4	0.1 - 10		Not Established		Not Established
Manganese (Mn)	7439-96-5	0.1 - 5	0.2	Elemental Mn and Inorg Compounds	5	Fume (Ceiling)
Silicon (Si)	7440-21-3	0.1 - 15	10	Dust	15	Dust
Tin (Sn)	7440-31-5	0.1 - 2	2	Metal, Oxide and Inorganic Compounds	2	Inorganic Compounds
Zinc (Zn)	7440-66-6	0.1 - 10	10 5 10	Oxide Dust Oxide Fume Oxide Fume (STEL)	5 10	Oxide Fume Oxide Dust
Coating Oil	64771-72-8	0.1 - 1		Not Established		Not Established

NOTE: The above listing is a summary of elements used in alloying Nucor Products. Various grades will contain different combinations of these elements and/or trace materials. Exact specifications may be found by calling the division and asking for a specifications sheet.

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.

Aluminum and Aluminum Alloys

Special Fire Fighting Procedures - Do not use water on molten metal. Do not use Carbon Dioxide (CO₂). 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.

Aluminum and Aluminum Alloys

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.

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.

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.

Aluminum and Aluminum Alloys

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.

Zinc: Zinc poisoning can cause anemia, lethargy and dizziness. Inhalation of zinc fumes may cause metal fume fever, a flu-like illness generally lasting 24 hours or less.

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

Tin: Prolonged exposure to high concentration of tin-containing dusts and/or fumes may result in the development of Stannosis which is a rare benign pneumoconiosis. The maximum concentration of tin in the product is such that Stannosis should not present a potential hazard.

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

15. REGULATORY INFORMATION

This product is not hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200. However, dusts and fumes from this product may be combustible or hazardous and require protection to comply with applicable Federal, state and local laws and regulations.

California Proposition 65: This product contains no chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

Massachusetts Substance List: Aluminum, Copper, Magnesium, Manganese, Silicon, Tin, Zinc

Pennsylvania Hazardous Substance List: Aluminum, Copper, Magnesium, Manganese, Silicon, Tin, Zinc

New Jersey Hazardous Substance List: Aluminum, Copper, Magnesium, Manganese, Silicon, Tin, Zinc

Toxic Substances Control Act (TSCA)

Components of this product are listed on the TSCA Inventory.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)

<u>Chemical Name</u>	<u>Reportable Quantity (in lb)</u>
Copper	5000*
Zinc	1000*

Aluminum and Aluminum Alloys

Superfund Amendments and Reauthorization Act of 1986 (SARA), Title III

SECTION 311/312 HAZARD CATEGORIES: Immediate Health Effect

This product contains the following EPCRA Section 313 chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right – To – Know Act of 1986 (40 CFR 372):

SECTION 313 REPORTABLE INGREDIENTS:

<u>Chemical Name</u>	<u>CAS Number</u>	<u>Concentration (% by weight)</u>	<u>Reportable</u>
Aluminum	7429-90-5	80-100	Yes – Greater than 1%
Copper	7440-50-8	< 2.0	Yes – Greater than 1%
Manganese	7439-96-5	< 2.0	Yes – Greater than 1%
Zinc	7440-66-6	0.1-10	Yes – Greater than 1%

Concentrations based on analytical data and process knowledge of typical products distributed by the facility.

16. OTHER INFORMATION

This SDS covers Nucor product as delivered from the Nucor facility, but does not include chemicals that may be applied by subsequent handlers and/or distributors of this product. This could include a variety of materials including oils, paints, galvanization, etc. that are not included in this SDS. Additionally, specialty orders may require application of coating material not listed in this SDS. SDSs for any Nucor-applied specialty coating will be provided separately. During welding, precautions should be taken for airborne contaminants that may originate from components of the welding rod. Arc or spark generated when welding or burning could be a source of ignition for combustible and/or flammable materials. The information in this Safety Data Sheet (SDS) was obtained from sources which we believe are reliable; however, the information is provided without any representation or warranty, expressed or implied, regarding the accuracy or correctness. The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage, or expense arising out of or in any way connected with the handling, storage, use, or disposal of this product.