

SECTION 1: IDENTIFICATION

1.1. Product Identifier

Product Form: Mixture

Product Name: Addalloy® 5T

1.2. Intended Use of the Product

Additive Manufacturing. Research and Development. Industrial Uses.

1.3. Name, Address, and Telephone of the Responsible Party

NanoAL LLC

260 Eliot St, Suite 4A

Ashland MA 01721

+1 (833) 462-6625 (Toll-Free in North America)

+1 (508) 433-6290 (Elsewhere)

info@nanoal.com

1.4. Emergency Telephone Number

Emergency Number : ChemTel LLC

(800)255-3924 (North America)

+1 (813)248-0585 (International)

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the Substance or Mixture

GHS-US/CA Classification

Water-react. 3 H261

Comb. Dust

Full text of hazard classes and H-statements : see section 16

2.2. Label Elements

GHS-US/CA Labeling

Hazard Pictograms (GHS-US/CA) :



Signal Word (GHS-US/CA) :

Warning

Hazard Statements (GHS-US/CA) :

May form combustible dust concentrations in air.

H261 - In contact with water releases flammable gas.

Precautionary Statements (GHS-US/CA) :

P231+P232 - Handle under inert gas. Protect from moisture.

P280 - Wear protective gloves, protective clothing, and eye protection.

P370+P378 - In case of fire: Use appropriate media (see section 5) to extinguish.

P402+P404 - Store in a dry place. Store in a closed container.

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

Supplemental Information :

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Proper grounding procedures to avoid static electricity should be followed. Prevent dust accumulation (to minimize explosion hazard). Avoid generating dust.

2.3. Other Hazards

Exposure may aggravate pre-existing eye, skin, or respiratory conditions.

2.4. Unknown Acute Toxicity (GHS-US/CA)

No data available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

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According To Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules And Regulations And According To The Hazardous Products Regulation (February 11, 2015).

3.2. Mixture

Name	Synonyms	Product Identifier	% *	GHS Ingredient Classification
Aluminum	Aluminium / Aluminium metal / Aluminium, metal / Aluminum metal / Aluminum, elemental / Aluminum, metal / C.I. 77000 / Cl 77000 / Aluminium powder (stabilised) / Aluminium powder (stabilized) / Aluminium powder / Pigment Metal 1 / Aluminum powder / Aluminium metal, powder / Aluminium powder (pyrophoric) / aluminum	(CAS-No.) 7429-90-5	93-96	Flam. Sol. 1, H228 Water-react. 2, H261 Comb. Dust
Magnesium	Magnesium powder / Magnesium powder (pyrophoric) / MAGNESIUM POWDER	(CAS-No.) 7439-95-4	3-5	Flam. Sol. 1, H228 Self-heat. 1, H251 Water-react. 2, H261 Comb. Dust
Zirconium	Zirconium, elemental / Zirconium metal / Zirconium powder (pyrophoric) / Zirconium suspended in a flammable liquid / Zirconium powder, dry / Zirconium metallic / Zirconium dinitrate oxide / Zircon / zirconium	(CAS-No.) 7440-67-7	1-2	Self-heat. 1, H251 Comb. Dust

Full text of H-phrases: see section 16

*Percentages are listed in weight by weight percentage (w/w%) for liquid and solid ingredients. Gas ingredients are listed in volume by volume percentage (v/v%).

SECTION 4: FIRST AID MEASURES

4.1. Description of First-aid Measures

General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

Inhalation: Using proper respiratory protection, move the exposed person to fresh air at once. Encourage exposed person to cough, spit out, and blow nose to remove dust. Immediately call a poison center, physician, or emergency medical service.

Skin Contact: Immediately remove contaminated clothing. Brush off loose particles from skin. Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Cool skin rapidly with cold water after contact with molten product. Immerse in cool water/wrap in wet bandages. Seek medical attention for thermal burns.

Eye Contact: Rinse cautiously with water for at least 5 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention if irritation develops or persists.

Ingestion: Rinse mouth. Do NOT induce vomiting. Obtain medical attention.

4.2. Most Important Symptoms and Effects Both Acute and Delayed

General: Not expected to present a significant hazard under anticipated conditions of normal use.

Inhalation: Dust may be harmful or cause irritation.

Skin Contact: Contact with hot, molten metal will cause thermal burns. Prolonged exposure may cause skin irritation.

Eye Contact: Contact may cause irritation due to mechanical abrasion. May cause slight irritation to eyes.

Ingestion: Ingestion may cause adverse effects.

Chronic Symptoms: None expected under normal conditions of use.

4.3. Indication of Any Immediate Medical Attention and Special Treatment Needed

If exposed or concerned, get medical advice and attention. If medical advice is needed, have product container or label at hand.

SECTION 5: FIRE-FIGHTING MEASURES

5.1. Extinguishing Media

Suitable Extinguishing Media: For metal fires, dry sand, graphite, or dry table salt may be used. Class D fire extinguishers are also appropriate. Do not use water or Halons.

Unsuitable Extinguishing Media: Water. Halons. Carbon dioxide (CO2).

5.2. Special Hazards Arising From the Substance or Mixture

Fire Hazard: Reacts slowly with water to produce flammable gases which may ignite and cause a fire. Combustible Dust.

Explosion Hazard: Reacts slowly with water to emit flammable gases which could ignite and possibly cause an explosion. Dust explosion hazard in air.

Reactivity: Reacts slowly with water liberating highly flammable gases.

5.3. Advice for Firefighters

Precautionary Measures Fire: Exercise caution when fighting any chemical fire.

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Firefighting Instructions: Use water spray or fog for cooling exposed containers. In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion.

Protection During Firefighting: Do not enter fire area without proper protective equipment, including respiratory protection.

Hazardous Combustion Products: Metallic oxides.

Other Information: Risk of dust explosion.

5.4. Reference to Other Sections

Refer to Section 9 for flammability properties.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal Precautions, Protective Equipment and Emergency Procedures

General Measures: Keep away from heat, hot surfaces, sparks, open flames, and other ignition sources. No smoking. Avoid generating dust. Avoid breathing dust. Remove ignition sources. Use only non-sparking tools. Avoid prolonged contact with eyes, skin and clothing.

6.1.1. For Non-Emergency Personnel

Protective Equipment: Use appropriate personal protective equipment (PPE).

Emergency Procedures: Evacuate unnecessary personnel.

6.1.2. For Emergency Personnel

Protective Equipment: Equip cleanup crew with proper protection.

Emergency Procedures: Eliminate ignition sources first, then ventilate the area. Upon arrival at the scene, a first responder is expected to recognize the presence of dangerous goods, protect oneself and the public, secure the area, and call for the assistance of trained personnel as soon as conditions permit.

6.2. Environmental Precautions

Prevent entry to sewers and public waters.

6.3. Methods and Materials for Containment and Cleaning Up

For Containment: Contain solid spills with appropriate barriers and prevent migration and entry into sewers or streams. Use only non-sparking tools. Avoid generation of dust during clean-up of spills.

Methods for Cleaning Up: Clean up spills immediately and dispose of waste safely. Use only non-sparking tools. For small areas, tape or putty may be used for cleanup. Vacuum clean-up is preferred. Only use explosion proof vacuum with appropriate filter. If sweeping is required use a dust suppressant. Do not mix with other materials. If liquid cleanup is required, use glycerin or propylene glycol to collect most of the particulates, then use water plus a cleaning agent as a final step. Contact competent authorities after a large spill.

6.4. Reference to Other Sections

See Section 8 for exposure controls and personal protection and Section 13 for disposal considerations.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for Safe Handling

Additional Hazards When Processed: Accumulation and dispersion of dust with an ignition source can cause a combustible dust explosion. Keep dust levels to a minimum and follow applicable regulations.

Precautions for Safe Handling: Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Handle under inert gas when in machinery. Avoid prolonged contact with eyes, skin and clothing. Avoid breathing dust. Protect from moisture. Keep away from heat, sparks, open flames, hot surfaces. – No smoking. Avoid creating or spreading dust. Keep away from heat, sparks, open flames, and hot surfaces. No smoking.

Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures.

7.2. Conditions for Safe Storage, Including Any Incompatibilities

Technical Measures: Comply with applicable regulations. Proper grounding procedures to avoid static electricity should be followed. Avoid creating or spreading dust. Use explosion-proof electrical, ventilating, lighting equipment.

Storage Conditions: Store in a cool, dry place. Keep away from moisture, extremely high or low temperatures, ignition sources, and incompatible materials. Keep container tightly closed.

Incompatible Materials: Strong acids, strong bases, strong oxidizers, water, humidity.

7.3. Specific End Use(s)

Additive Manufacturing. Research and Development. Industrial Uses.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control Parameters

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For substances listed in section 3 that are not listed here, there are no established exposure limits from the manufacturer, supplier, importer, or the appropriate advisory agency including: ACGIH (TLV), AIHA (WEEL), NIOSH (REL), OSHA (PEL), or Canadian provincial governments.

Zirconium (7440-67-7)		
USA ACGIH	ACGIH OEL TWA	5 mg/m ³
USA ACGIH	ACGIH OEL STEL	10 mg/m ³
USA ACGIH	ACGIH chemical category	Not Classifiable as a Human Carcinogen
USA NIOSH	NIOSH REL (TWA)	5 mg/m ³
USA NIOSH	NIOSH REL (STEL)	10 mg/m ³
USA IDLH	IDLH	50 mg/m ³
Alberta	OEL STEL	10 mg/m ³
Alberta	OEL TWA	5 mg/m ³
British Columbia	OEL STEL	10 mg/m ³
British Columbia	OEL TWA	5 mg/m ³
Manitoba	OEL STEL	10 mg/m ³
Manitoba	OEL TWA	5 mg/m ³
New Brunswick	OEL STEL	10 mg/m ³
New Brunswick	OEL TWA	5 mg/m ³
Newfoundland & Labrador	OEL STEL	10 mg/m ³
Newfoundland & Labrador	OEL TWA	5 mg/m ³
Nova Scotia	OEL STEL	10 mg/m ³
Nova Scotia	OEL TWA	5 mg/m ³
Nunavut	OEL STEL	10 mg/m ³
Nunavut	OEL TWA	5 mg/m ³
Northwest Territories	OEL STEL	10 mg/m ³
Northwest Territories	OEL TWA	5 mg/m ³
Ontario	OEL STEL	10 mg/m ³
Ontario	OEL TWA	5 mg/m ³
Prince Edward Island	OEL STEL	10 mg/m ³
Prince Edward Island	OEL TWA	5 mg/m ³
Québec	VECD (OEL STEL)	10 mg/m ³
Québec	VEMP (OEL TWA)	5 mg/m ³
Saskatchewan	OEL STEL	10 mg/m ³
Saskatchewan	OEL TWA	5 mg/m ³
Aluminum (7429-90-5)		
USA ACGIH	ACGIH OEL TWA	1 mg/m ³ (respirable particulate matter)
USA ACGIH	ACGIH chemical category	Not Classifiable as a Human Carcinogen
USA OSHA	OSHA PEL (TWA) [1]	15 mg/m ³ (total dust) 5 mg/m ³ (respirable fraction)
USA NIOSH	NIOSH REL (TWA)	10 mg/m ³ (total dust) 5 mg/m ³ (respirable dust)
Alberta	OEL TWA	10 mg/m ³ (dust)
British Columbia	OEL TWA	1 mg/m ³ (respirable)
Manitoba	OEL TWA	1 mg/m ³ (respirable particulate matter)
New Brunswick	OEL TWA	10 mg/m ³ (metal dust)
Newfoundland & Labrador	OEL TWA	1 mg/m ³ (respirable particulate matter)
Nova Scotia	OEL TWA	1 mg/m ³ (respirable particulate matter)
Nunavut	OEL STEL	20 mg/m ³ (metal-dust)
Nunavut	OEL TWA	10 mg/m ³ (metal-dust)
Northwest Territories	OEL STEL	20 mg/m ³ (metal-dust)
Northwest Territories	OEL TWA	10 mg/m ³ (metal-dust)
Ontario	OEL TWA	1 mg/m ³ (respirable particulate matter)

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Prince Edward Island	OEL TWA	1 mg/m ³ (respirable particulate matter)
Québec	VEMP (OEL TWA)	10 mg/m ³
Saskatchewan	OEL STEL	20 mg/m ³ (dust)
Saskatchewan	OEL TWA	10 mg/m ³ (dust)

8.2. Exposure Controls

Appropriate Engineering Controls: Suitable eye/body wash equipment should be available in the vicinity of any potential exposure. Ensure adequate ventilation, especially in confined areas. Ensure all national/local regulations are observed. Proper grounding procedures to avoid static electricity should be followed. Use explosion-proof equipment. Use local exhaust or general dilution ventilation or other suppression methods to maintain dust levels below exposure limits. Power equipment should be equipped with proper dust collection devices. It is recommended that all dust control equipment such as local exhaust ventilation and material transport systems involved in handling of this product contain explosion relief vents or an explosion suppression system or an oxygen-deficient environment.

Personal Protective Equipment: Gloves. Protective clothing. Protective goggles. Insufficient ventilation: wear respiratory protection.



Materials for Protective Clothing: Chemically resistant materials and fabrics. Wear fire/flammable resistant/retardant clothing.

Hand Protection: When needed, wear protective gloves to protect against thermal and/or mechanical hazards. . Wear protective gloves.

Eye and Face Protection: Chemical safety goggles. In case of fire: Opaque eye protection must be worn.

Skin and Body Protection: Wear suitable protective clothing.

Respiratory Protection: If exposure limits are exceeded or irritation is experienced, approved respiratory protection should be worn. In case of inadequate ventilation, oxygen deficient atmosphere, or where exposure levels are not known wear approved respiratory protection.

Thermal Hazard Protection: If material is hot, wear thermally resistant protective gloves.

Environmental Exposure Controls: Avoid unnecessary release into the environment.

Other Information: When using, do not eat, drink or smoke.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on Basic Physical and Chemical Properties

Physical State	: Solid
Appearance	: Light grey
Odor	: Odorless
Odor Threshold	: Not available
pH	: Not available
Evaporation Rate	: Not available
Melting Point	: 850 °C (1562 °F)
Freezing Point	: Not available
Boiling Point	: Not available
Flash Point	: Not available
Auto-ignition Temperature	: Not available
Decomposition Temperature	: Not available
Flammability (solid, gas)	: Not available
Lower Flammable Limit	: Not available
Upper Flammable Limit	: Not available
Vapor Pressure	: Not available
Relative Vapor Density at 20°C	: Not available
Relative Density	: Not available
Density	: 2.7 g/cm ³
Specific Gravity	: Not available

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Solubility	: Reacts with water.
Partition Coefficient: N-Octanol/Water	: Not available
Viscosity	: Not available

SECTION 10: STABILITY AND REACTIVITY

- 10.1. Reactivity:** Reacts slowly with water liberating highly flammable gases.
- 10.2. Chemical Stability:** Stable under recommended handling and storage conditions (see section 7).
- 10.3. Possibility of Hazardous Reactions:** In contact with water releases flammable gas.
- 10.4. Conditions to Avoid:** Keep away from moisture, water, ignition sources, direct sunlight, extremely high or low temperatures, incompatible materials. Sparks, heat, open flame and other sources of ignition. Dust accumulation (to minimize explosion hazard).
- 10.5. Incompatible Materials:** Strong acids, strong bases, strong oxidizers. Water, humidity.
- 10.6. Hazardous Decomposition Products:** Thermal decomposition may produce: Metallic oxides.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on Toxicological Effects - Product

Acute Toxicity (Oral): Not classified (Based on available data, the classification criteria are not met)

Acute Toxicity (Dermal): Not classified (Based on available data, the classification criteria are not met)

Acute Toxicity (Inhalation): Not classified (Based on available data, the classification criteria are not met)

LD50 and LC50 Data: Not available

Skin Corrosion/Irritation: Not classified (Based on available data, the classification criteria are not met)

Eye Damage/Irritation: Not classified (Based on available data, the classification criteria are not met)

Respiratory or Skin Sensitization: Not classified (Based on available data, the classification criteria are not met)

Germ Cell Mutagenicity: Not classified (Based on available data, the classification criteria are not met)

Carcinogenicity: Not classified (Based on available data, the classification criteria are not met)

Specific Target Organ Toxicity (Repeated Exposure): Not classified (Based on available data, the classification criteria are not met)

Reproductive Toxicity: Not classified (Based on available data, the classification criteria are not met)

Specific Target Organ Toxicity (Single Exposure): Not classified (Based on available data, the classification criteria are not met)

Aspiration Hazard: Not classified (Based on available data, the classification criteria are not met)

Symptoms/Injuries After Inhalation: Dust may be harmful or cause irritation.

Symptoms/Injuries After Skin Contact: Contact with hot, molten metal will cause thermal burns. Prolonged exposure may cause skin irritation.

Symptoms/Injuries After Eye Contact: Contact may cause irritation due to mechanical abrasion. May cause slight irritation to eyes.

Symptoms/Injuries After Ingestion: Ingestion may cause adverse effects.

Chronic Symptoms: None expected under normal conditions of use.

11.2. Information on Toxicological Effects - Ingredient(s)

LD50 and LC50 Data: Not available

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

Ecology - General: Reacts with water.

12.2. Persistence and Degradability

Addalloy® 5T	
Persistence and Degradability	Inorganic product which cannot be eliminated from water by biological purification processes.

12.3. Bioaccumulative Potential

Addalloy® 5T	
Bioaccumulative Potential	Not established.

12.4. Mobility in Soil

Addalloy® 5T	
Ecology - Soil	Adsorption to solid soil phase is not expected.

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12.5. Other Adverse Effects

Other Adverse Effects: None known.

Other Information: Avoid release to the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Regional Legislation (Waste): Disposal must be done according to official regulations.

Waste Treatment Methods: Material should be recycled if possible.

Sewage Disposal Recommendations: Do not dispose of waste into sewer.

Waste Disposal Recommendations: Dispose of contents/container in accordance with local, regional, national, territorial, provincial, and international regulations.

Ecology - Waste Materials: Avoid release to the environment.

SECTION 14: TRANSPORT INFORMATION

The shipping description(s) stated herein were prepared in accordance with certain assumptions at the time the SDS was authored, and can vary based on a number of variables that may or may not have been known at the time the SDS was issued.

14.1. In Accordance with DOT

Proper Shipping Name : WATER-REACTIVE SOLID, N.O.S.(ALUMINUM, MAGNESIUM)

Hazard Class : 4.3

Identification Number : UN2813

Label Codes : 4.3

Packing Group : III

ERG Number : 138



14.2. In Accordance with IMDG

Proper Shipping Name : WATER-REACTIVE SOLID, N.O.S.(ALUMINUM POWDER, MAGNESIUM POWDER)

Hazard Class : 4.3

Identification Number : UN2813

Label Codes : 4.3

Packing Group : III

EmS-No. (Fire) : F-G

EmS-No. (Spillage) : S-N



14.3. In Accordance with IATA

Proper Shipping Name : WATER-REACTIVE SOLID, N.O.S.(ALUMINUM POWDER, MAGNESIUM POWDER)

Hazard Class : 4.3

Identification Number : UN2813

Label Codes : 4.3

Packing Group : III

ERG Code (IATA) : 4W



14.4. In Accordance with TDG

Proper Shipping Name : WATER-REACTIVE SOLID, N.O.S.(ALUMINUM, MAGNESIUM)

Hazard Class : 4.3

Identification Number : UN2813

Label Codes : 4.3

Packing Group : III



SECTION 15: REGULATORY INFORMATION

15.1. US Federal Regulations

Addalloy® 5T	
SARA Section 311/312 Hazard Classes	Physical hazard - In contact with water emits flammable gas Physical hazard - Combustible dust
Magnesium (7439-95-4)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
Zirconium (7440-67-7)	

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Listed on the United States TSCA (Toxic Substances Control Act) inventory	
Aluminum (7429-90-5)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Subject to reporting requirements of United States SARA Section 313	
SARA Section 313 - Emission Reporting	1 % (dust or fume only)

15.2. US State Regulations

Magnesium (7439-95-4)
U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List U.S. - Massachusetts - Right To Know List
Zirconium (7440-67-7)
U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List U.S. - Massachusetts - Right To Know List
Aluminum (7429-90-5)
U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List U.S. - Massachusetts - Right To Know List U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List

15.3. Canadian Regulations

Magnesium (7439-95-4)
Listed on the Canadian DSL (Domestic Substances List)
Zirconium (7440-67-7)
Listed on the Canadian DSL (Domestic Substances List)
Aluminum (7429-90-5)
Listed on the Canadian DSL (Domestic Substances List)

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

Date of Preparation or Latest : 04/05/2021

Revision

Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200 and Canada's Hazardous Products Regulations (HPR) SOR/2015-17.

GHS Full Text Phrases:

Comb. Dust	Combustible Dust
Flam. Sol. 1	Flammable solids Category 1
Self-heat. 1	Self-heating substances and mixtures Category 1
Water-react. 2	Substances and mixtures which in contact with water emit flammable gases Category 2
Water-react. 3	Substances and mixtures which in contact with water emit flammable gases Category 3
H228	Flammable solid
H251	Self-heating; may catch fire
H261	In contact with water releases flammable gas

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

NA GHS SDS 2015 (Can, US)