



SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY

1.1. Product Identifier

Product Form: Mixture

Product Name: Titanium Aluminides

Other means of identification: Ti/Al Alloy

1.2. Intended Use of the Product

Use of the Substance/Mixture: Metal alloy for multiple production uses

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

Customer

RTI International Metals, Inc.

1000 Warren Avenue

Niles, Ohio 44446

T 330-544-7633

www.rtiintl.com

1.4. Emergency Telephone Number

Emergency Number : 330-544-7655 or 800-424-9300

For Chemical Emergency, Spill, Leak, Fire, Exposure, or Accident, call CHEMTREC – Day or Night

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the Substance or Mixture

Classification (GHS-US)

Not classified

2.2. Label Elements

GHS-US Labeling

Not applicable

2.3. Other Hazards

Other Hazards Not Contributing to the Classification: This product shipped by RTI International Metals is physiologically inert in its solid form. However, user-generated dust and/or fumes may pose a physiological hazard if inhaled or ingested. Avoid inhalation of metal dusts and fumes. May cause an influenza-like illness. Avoid skin and eye contact with dusts to prevent mechanical irritation. User-generated dust is easily ignited and difficult to extinguish.

2.4. Unknown Acute Toxicity (GHS-US)

No data available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substance

Not applicable

Full text of H-phrases: see section 16

3.2. Mixture

Name	Product identifier	%	Classification (GHS-US)
Titanium	(CAS No) 7440-32-6	50 - 75	Flam. Sol. 1, H228
Aluminum	(CAS No) 7429-90-5	10 - 50	Comb. Dust, H232 Flam. Sol. 1, H228 Water-react. 2, H261 Aquatic Acute 1, H400
Niobium	(CAS No) 7440-03-1	<0.1 - 30	Flam. Sol. 1, H228
Vanadium	(CAS No) 7440-62-2	<0.1 - 5	Not classified
Iron oxide (Fe2O3)	(CAS No) 1309-37-1	<0.1 - 3	Comb. Dust, H232 Aquatic Chronic 2, H411
Molybdenum	(CAS No) 7439-98-7	<0.1 - 2	Not classified

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Name	Product identifier	%	Classification (GHS-US)
Antimony	(CAS No) 7440-36-0	<0.1 - 1	Comb. Dust, H232 Acute Tox. 3 (Oral), H301 Acute Tox. 3 (Inhalation), H331 Aquatic Acute 2, H401 Aquatic Chronic 2, H411

Full text of H-phrases: see section 16

SECTION 4: FIRST AID MEASURES

4.1. Description of First Aid Measures

First-aid Measures General: If medical advice is needed, have product container or label at hand.

First-aid Measures After Inhalation: If inhaled, remove to fresh air and keep at rest in a position comfortable for breathing. Obtain medical attention if breathing difficulty persists.

First-aid Measures After Skin Contact: Wash immediately with plenty of soap and water. Rinse with plenty of water. Remove contaminated clothing. Wash contaminated clothing before reuse. Obtain medical attention if irritation develops or persists.

First-aid Measures After Eye Contact: Immediately rinse with water for a prolonged period (at least 15 minutes) while holding the eyelids wide open. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention if irritation develops or persists.

First-aid Measures After Ingestion: If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/Injuries: None expected under normal conditions of use.

Symptoms/Injuries After Inhalation: May cause respiratory irritation. During welding, the most significant route of exposure is by the inhalation (breathing) of welding fumes. If welding fumes are inhaled, they can cause a condition commonly known as metal fume fever with symptoms which resemble influenza. Symptoms may be delayed 4-12 hours and begin with a sudden onset of thirst, and a sweet, metallic or foul taste in the mouth. Other symptoms may include upper respiratory tract irritation accompanied by coughing and a dryness of the mucous membranes, lassitude and a generalized feeling of malaise. Fever, chills, muscular pain, mild to severe headache, nausea, occasional vomiting, exaggerated mental activity, profuse sweating, excessive urination, diarrhea and prostration may also occur.

Symptoms/Injuries After Skin Contact: Dust may cause irritation in skin folds or by contact in combination with tight clothing. Contact with hot, molten metal will cause thermal burns. Arc rays and sparks can burn skin.

Symptoms/Injuries After Eye Contact: Dust from this product may cause minor eye irritation.

Symptoms/Injuries After Ingestion: If large amounts are ingested: Gastrointestinal irritation.

Chronic Symptoms: Prolonged inhalation of dust may cause respiratory irritation.

Aluminum: Inhalation of finely divided aluminum powder may cause pulmonary fibrosis.

Antimony: Exposure to antimony dusts and fume may result in irritation eyes, skin, nose, throat, mouth; cough; dizziness; headache; nausea, vomiting, diarrhea; stomach cramps; insomnia; anorexia; unable to smell properly.

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

If medical advice is needed, have product container or label at hand.

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing Media

Suitable Extinguishing Media: Cover with sand or earth. metal fire extinction powder.

Unsuitable Extinguishing Media: Reacts with water to release flammable hydrogen gas.

5.2. Special Hazards Arising From the Substance or Mixture

Fire Hazard: Metallic dusts may ignite or explode. Fire may produce irritating and/or toxic gases.

Explosion Hazard: Flammable dust. Dust clouds can be explosive. Avoid dust clouds in combination with static electricity.

Reactivity: Stable at ambient temperature and under normal conditions of use.

5.3. Advice for Firefighters

Firefighting Instructions: Do not breathe fumes from fires or vapours from decomposition. Keep upwind.

Protection During Firefighting: Firefighters must use full bunker gear including NIOSH-approved positive-pressure self-contained breathing apparatus to protect against potential hazardous combustion and decomposition products.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal Precautions, Protective Equipment and Emergency Procedures

6.1.1. For Non-emergency Personnel

Protective Equipment: Wear eye protection.

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Emergency Procedures: Avoid creating or spreading dust. Eliminate ignition sources.

6.1.2. For Emergency Responders

Protective Equipment: Safety glasses.

Emergency Procedures: Ventilate area. Eliminate ignition sources. Evacuate unnecessary personnel.

6.2. Environmental Precautions

Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams.

6.3. Methods and Material for Containment and Cleaning Up

For Containment: Contain and collect as any solid.

Methods for Cleaning Up: Avoid generation of dust during clean-up of spills. Take up mechanically (sweeping, shovelling) and collect in suitable container for disposal. Vacuum must be fitted with HEPA filter to prevent release of particulates during clean-up. Use only non-sparking tools. Use explosion-proof equipment.

6.4. Reference to Other Sections See heading 8, Exposure Controls and Personal Protection.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for Safe Handling

Additional Hazards When Processed: Do not handle until all safety precautions have been read and understood. Fine dust dispersed in air may ignite. Dust deposits should not be allowed to accumulate on surfaces, as these may form an explosive mixture if they are released into the atmosphere in sufficient concentration.

Precautions for Safe Handling: Do not breathe dust. Do not get in eyes, on skin, or on clothing. Avoid creating or spreading dust. Always wash hands after handling the product. Do not eat, drink or smoke when using this product. Ensure there is adequate ventilation. Wear recommended personal protective equipment.

Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures. Always wash your hands immediately after handling this product, and once again before leaving the workplace. Wash contaminated clothing before reuse. Do not eat, drink or smoke in areas where product is used. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

7.2. Conditions for Safe Storage, Including Any Incompatibilities

Storage Conditions: Store in original container. Store in a dry, cool place. Store in a well-ventilated place. Keep container tightly closed.

Incompatible Materials: Avoid contact with: strong acids. Mineral acids. Corrosive substances in contact with metals may produce flammable hydrogen gas.

7.3. Specific End Use(s)

Metal alloy for multiple production uses.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control Parameters

Aluminum (7429-90-5)		
USA ACGIH	ACGIH TWA (mg/m ³)	1 mg/m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	5 mg/m ³
USA OSHA	OSHA PEL (TWA) (mg/m ³)	5 mg/m ³
Vanadium (7440-62-2)		
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	1 mg/m ³
USA NIOSH	NIOSH REL (STEL) (mg/m ³)	3 mg/m ³
USA OSHA	OSHA PEL (Ceiling) (mg/m ³)	0.1 mg/m ³
Molybdenum (7439-98-7)		
USA ACGIH	ACGIH TWA (mg/m ³)	3 mg/m ³
USA IDLH	US IDLH (mg/m ³)	5000 mg/m ³
Antimony (7440-36-0)		
USA ACGIH	ACGIH TWA (mg/m ³)	0.5 mg/m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	0.5 mg/m ³
USA IDLH	US IDLH (mg/m ³)	50 mg/m ³
USA OSHA	OSHA PEL (TWA) (mg/m ³)	0.5 mg/m ³
Iron oxide (Fe ₂ O ₃) (1309-37-1)		
USA ACGIH	ACGIH TWA (mg/m ³)	5 mg/m ³
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	5 mg/m ³
USA IDLH	US IDLH (mg/m ³)	2500 mg/m ³

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USA OSHA	OSHA PEL (TWA) (mg/m ³)	5 mg/m ³
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8.2. Exposure Controls

Appropriate Engineering Controls

: Ensure adequate ventilation, especially in confined areas. Avoid dust production. Take precautionary measures against static discharges. Use explosion-proof equipment.

Personal Protective Equipment

: Safety glasses. Gloves. Protective clothing. Insufficient ventilation: wear respiratory protection.



Hand Protection

: Impermeable protective gloves.

Eye Protection

: Safety glasses.

Skin and Body Protection

: Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

Respiratory Protection

: In case of inadequate ventilation wear respiratory protection.

Environmental Exposure Controls

: Ensure adequate ventilation, especially in confined areas.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on Basic Physical and Chemical Properties

Physical State	: Solid
Appearance	: Metallic. Silver.
Odor	: Odorless.
Odor Threshold	: No data available
pH	: No data available
Relative Evaporation Rate (butylacetate=1)	: No data available
Melting Point	: 1660 °C (3020 °F)
Freezing Point	: No data available
Boiling Point	: 3287 °C (5948.6 °F)
Flash Point	: No data available
Auto-ignition Temperature	: 1200 °C (2192 °F)
Decomposition Temperature	: No data available
Flammability (solid, gas)	: No data available
Vapor Pressure	: No data available
Relative Vapor Density at 20 °C	: No data available
Relative Density	: No data available
Specific Gravity	: 4.5
Solubility	: Water: Insoluble
Log Pow	: No data available
Log Kow	: No data available
Viscosity, Kinematic	: No data available
Viscosity, Dynamic	: No data available
Explosive Properties	: None.
Oxidizing Properties	: None.
Explosive Limits	: No data available

9.2. Other Information

VOC content : 0 %

SECTION 10: STABILITY AND REACTIVITY

1<0.1 Reactivity: Stable at ambient temperature and under normal conditions of use.

10.2 Chemical Stability: Product is stable.

10.3 Possibility of Hazardous Reactions: Hazardous polymerization will not occur.

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10.4 Conditions to Avoid: Dust, chips, or ribbons can be ignited more easily, by an ignition source, by improper machining, or by spontaneous combustion if finely divided and damp.

10.5 Incompatible Materials: Incompatible with: strong acids. Mineral acids. Corrosive substances in contact with metals may produce flammable hydrogen gas.

10.6 Hazardous Decomposition Products: Under conditions of fire this material may produce: Oxides of iron. Oxides of titanium. Vanadium oxides. Oxides of aluminum. Molybdenum oxides. Antimony and its oxides. Oxides of Niobium.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information On Toxicological Effects

Acute Toxicity: Not classified

Antimony (7440-36-0)	
LD50 Oral Rat	100 mg/kg
Iron oxide (Fe2O3) (1309-37-1)	
LD50 Oral Rat	> 10000 mg/kg
Niobium (7440-03-1)	
LD50 Oral Rat	> 10 g/kg

Skin Corrosion/Irritation: Not classified

Serious Eye Damage/Irritation: Not classified

Respiratory or Skin Sensitization: Not classified

Germ Cell Mutagenicity: Not classified

Carcinogenicity: Not classified

Iron oxide (Fe2O3) (1309-37-1)	
IARC group	3

Reproductive Toxicity: Not classified

Specific Target Organ Toxicity (Single Exposure): Not classified

Specific Target Organ Toxicity (Repeated Exposure): Not classified

Aspiration Hazard: Not classified

Symptoms/Injuries After Inhalation: May cause respiratory irritation. During welding, the most significant route of exposure is by the inhalation (breathing) of welding fumes. If welding fumes are inhaled, they can cause a condition commonly known as metal fume fever with symptoms which resemble influenza. Symptoms may be delayed 4-12 hours and begin with a sudden onset of thirst, and a sweet, metallic or foul taste in the mouth. Other symptoms may include upper respiratory tract irritation accompanied by coughing and a dryness of the mucous membranes, lassitude and a generalized feeling of malaise. Fever, chills, muscular pain, mild to severe headache, nausea, occasional vomiting, exaggerated mental activity, profuse sweating, excessive urination, diarrhea and prostration may also occur.

Symptoms/Injuries After Skin Contact: Dust may cause irritation in skin folds or by contact in combination with tight clothing. Contact with hot, molten metal will cause thermal burns. Arc rays and sparks can burn skin.

Symptoms/Injuries After Eye Contact: Dust from this product may cause minor eye irritation.

Symptoms/Injuries After Ingestion: If large amounts are ingested: Gastrointestinal irritation.

Chronic Symptoms: Prolonged inhalation of dust may cause respiratory irritation.

Aluminum: Inhalation of finely divided aluminum powder may cause pulmonary fibrosis.

Antimony: Exposure to antimony dusts and fume may result in irritation eyes, skin, nose, throat, mouth; cough; dizziness; headache; nausea, vomiting, diarrhea; stomach cramps; insomnia; anorexia; unable to smell properly.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity No additional information available

12.2. Persistence and Degradability

Titanium Aluminides	
Persistence and Degradability	Not readily biodegradable.

12.3. Bioaccumulative Potential No additional information available

12.4. Mobility in Soil No additional information available

12.5. Other Adverse Effects

No additional information available

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SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Sewage Disposal Recommendations: Do not empty into drains; dispose of this material and its container in a safe way.

Waste Disposal Recommendations: Dispose of waste material in accordance with all local, regional, national, and international regulations.

SECTION 14: TRANSPORT INFORMATION

14.1 In Accordance with DOT Not regulated for transport

14.2 In Accordance with IMDG Not regulated for transport

14.3 In Accordance with IATA Not regulated for transport

SECTION 15: REGULATORY INFORMATION

15.1 US Federal Regulations

Titanium Aluminides	
SARA Section 311/312 Hazard Classes	Fire hazard
Titanium (7440-32-6)	
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	
Listed on SARA Section 313 (Specific toxic chemical listings)	
SARA Section 313 - Emission Reporting	1.0 % (dust or fume only)
Vanadium (7440-62-2)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
Listed on SARA Section 313 (Specific toxic chemical listings)	
SARA Section 313 - Emission Reporting	1.0 % (except when contained in an alloy)
Molybdenum (7439-98-7)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
Antimony (7440-36-0)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
Listed on SARA Section 313 (Specific toxic chemical listings)	
SARA Section 313 - Emission Reporting	1.0 %
Iron oxide (Fe₂O₃) (1309-37-1)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
Niobium (7440-03-1)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	

15.2 US State Regulations

Titanium Aluminides()	
U.S. - California - Proposition 65 - Carcinogens List	WARNING: This product contains chemicals known to the State of California to cause cancer.
State or local regulations	WARNING! This product contains one or more substances known to the State of California to cause: Cancer
Titanium (7440-32-6)	
U.S. - New Jersey - Right to Know Hazardous Substance List	
Aluminum (7429-90-5)	
U.S. - Massachusetts - Right To Know List	
U.S. - New Jersey - Right to Know Hazardous Substance List	
U.S. - Pennsylvania - RTK (Right to Know) List	
Vanadium (7440-62-2)	
U.S. - Massachusetts - Right To Know List	
U.S. - New Jersey - Right to Know Hazardous Substance List	
U.S. - Pennsylvania - RTK (Right to Know) List	

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Molybdenum (7439-98-7)

U.S. - Massachusetts - Right To Know List
 U.S. - New Jersey - Right to Know Hazardous Substance List
 U.S. - Pennsylvania - RTK (Right to Know) List

Antimony (7440-36-0)

U.S. - Massachusetts - Right To Know List
 U.S. - New Jersey - Right to Know Hazardous Substance List
 U.S. - Pennsylvania - RTK (Right to Know) List

Iron oxide (Fe2O3) (1309-37-1)

U.S. - Massachusetts - Right To Know List
 U.S. - New Jersey - Right to Know Hazardous Substance List
 U.S. - Pennsylvania - RTK (Right to Know) List

SECTION 16: OTHER INFORMATION

Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 191<0.1200.

GHS Full Text Phrases:

Acute Tox. 3 (Inhalation)	Acute toxicity (inhalation) Category 3
Acute Tox. 3 (Oral)	Acute toxicity (oral) Category 3
Aquatic Acute 1	Hazardous to the aquatic environment - Acute Hazard Category 1
Aquatic Acute 2	Hazardous to the aquatic environment - Acute Hazard Category 2
Aquatic Acute Not classified	Hazardous to the aquatic environment - Acute Hazard Not classified
Aquatic Chronic 2	Hazardous to the aquatic environment - Chronic Hazard Category 2
Comb. Dust	Combustible Dust
Flam. Sol. 1	Flammable solids Category 1
Water-react. 2	Substances and mixtures which in contact with water emit flammable gases Category 2
H228	Flammable solid
H232	May form combustible dust concentrations in air
H261	In contact with water releases flammable gases
H301	Toxic if swallowed
H331	Toxic if inhaled
H400	Very toxic to aquatic life
H401	Toxic to aquatic life
H411	Toxic to aquatic life with long lasting effects

NFPA Health Hazard

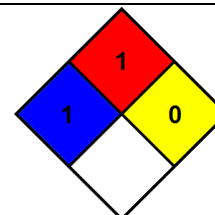
: 1 - Exposure could cause irritation but only minor residual injury even if no treatment is given.

NFPA Fire Hazard

: 1 - Must be preheated before ignition can occur.

NFPA Reactivity

: 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



This information is taken from sources or based upon data believed to be reliable. However, RTI makes no warranty as to the absolute correctness or sufficiency of any of the foregoing or that additional or other measures may not be required under particular conditions.

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