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Dear Educator,

This file contains the Safety Data Sheets (SDS) for FOSS PLANTS & ANIMALS, 2nd Edition as of July 24, 2017

Because kit contents can sometimes be replaced, we recommend searching our online portal of SDS for current sheets as you need them. To make that searching easier, we have provided a listing below of the items with SDS in this kit.

Portal: <http://www.schoolspecialty.com/sds>

Part Number to Search	Item Description
021-0704	Battery-AAA
077399	Marking pen, permanent
192-8955	Metal bars, aluminum
192-8944	Metal bars, steel
190-0183-0	Rock salt
201-127-0	Thermometer

Note: The part numbers to search for in the portal are often not the same part numbers used to order replacements. To order replacements, please visit www.deltaeducation.com/refillcenter

If you have any questions, please contact Customer Care at 800-258-1302 for assistance.

PRODUCT SAFETY DATA SHEET

PRODUCT NAME: Eveready / Energizer Battery

Type No.: **Volts:**

TRADE NAMES: ENERGIZER, ENERGIZER e², INDUSTRIAL ZMA, HERCULES, EVEREADY, WONDER

Approximate Weight:

CHEMICAL SYSTEM: Alkaline Manganese Dioxide-Zinc

Designed for Recharge: No

Energizer has prepared copyrighted Product Safety Datasheets to provide information on the different Eveready/Energizer battery systems. Batteries are articles as defined under the GHS and exempt from GHS classification criteria (Section 1.3.2.1.1 of the GHS). The information and recommendations set forth herein are made in good faith, for information only, and are believed to be accurate as of the date of preparation. However, ENERGIZER BATTERY MANUFACTURING, INC. MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO THIS INFORMATION AND DISCLAIMS ALL LIABILITY FROM REFERENCE ON IT.

SECTION 1 - MANUFACTURER INFORMATION

Energizer Battery Manufacturing, Inc.
25225 Detroit Rd.
Westlake, OH 44145

Telephone Number for Information:
800-383-7323 (USA / CANADA)

Date Prepared: March 2015

SECTION 2 – HAZARDS IDENTIFICATION

GHS classification: N/A

Signal Word: N/A

Hazard Classification: N/A

Under normal conditions of use, the battery is hermetically sealed.

Ingestion: Swallowing a battery can be harmful. Contents of an open battery can cause serious chemical burns of mouth, esophagus, and gastrointestinal tract.

Inhalation: Contents of an open battery can cause respiratory irritation.

Skin Contact: Contents of an open battery can cause skin irritation and/or chemical burns.

Eye Contact: Contents of an open battery can cause severe irritation and chemical burns.

SECTION 3 - INGREDIENTS

IMPORTANT NOTE: The battery should not be opened or burned. Exposure to the ingredients contained within or their combustion products could be harmful.

MATERIAL OR INGREDIENT	PEL (OSHA)	TLV (ACGIH)	%/wt.
Graphite (CAS# 7782-42-5)	15 mg/m ³ TWA (total dust) 5 mg/m ³ TWA (respirable fraction)	2 mg/m ³ TWA (respirable fraction)	2-6
Manganese Dioxide (CAS# 1313-13-9)	5 mg/m ³ Ceiling (as Mn)	0.2 mg/m ³ TWA (as Mn)	30-45
Potassium Hydroxide (CAS# 1310-58-3)	None established	2 mg/m ³ Ceiling	4-8
Zinc (CAS# 7440-66-6)	15 mg/m ³ TWA PNOR* (total dust) 5 mg/m ³ TWA PNOR* (respirable fraction)	10 mg/m ³ TWA PNOC** (inhalable particulate) 3 mg/m ³ TWA PNOC** (respirable particulate)	12-25

Non-Hazardous Components			
Steel (iron CAS# 65997-19-5)	None established	None established	18-22
Water, Paper, Plastic and Other	None established	None established	Balance

* PNOR: Particulates not otherwise regulated

**PNOC: Particulates not otherwise classified

SECTION 4 – FIRST AID MEASURES

Ingestion: Do not induce vomiting or give food or drink. Seek medical attention immediately. CALL NATIONAL BATTERY INGESTION HOTLINE for advice and follow-up (202-625-3333) collect day or night.

Inhalation: Provide fresh air and seek medical attention.

Skin Contact: Remove contaminated clothing and wash skin with soap and water. If a chemical burn occurs or if irritation persists, seek medical attention.

Eye Contact: Immediately flush eyes thoroughly with water for at least 15 minutes, lifting upper and lower lids, until no evidence of the chemical remains. Seek medical attention.

SECTION 5 - FIRE FIGHTING MEASURES

In case of fire, it is permissible to use any class of extinguishing medium on these batteries or their packing material. Cool exterior of batteries if exposed to fire to prevent rupture.

Fire fighters should wear self-contained breathing apparatus.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

To cleanup leaking batteries:

Ventilation Requirements: Room ventilation may be required in areas where there are open or leaking batteries.

Eye Protection: Wear safety glasses with side shields if handling an open or leaking battery.

Gloves: Use neoprene or natural rubber gloves if handling an open or leaking battery.

Battery materials should be collected in a leak-proof container.

SECTION 7 - HANDLING AND STORAGE

Storage: Store in a cool, well ventilated area. Elevated temperatures can result in shortened battery life.

Mechanical Containment: If potting or sealing the battery in an airtight or watertight container is required, consult your Energizer Battery Manufacturing, Inc. representative for precautionary suggestions. Batteries normally evolve hydrogen which, when combined with oxygen from the air, can produce a combustible or explosive mixture unless vented. If such a mixture is present, short circuits, high temperature, or static sparks can cause an ignition.

Do not obstruct safety release vents on batteries. Encapsulation (potting) of batteries will not allow cell venting and can cause high pressure rupture.

Handling: Accidental short circuit for a few seconds will not seriously affect the battery. Prolonged short circuit will cause the battery to lose energy, and can cause the safety release vent to open. Sources of short circuits include jumbled batteries in bulk containers, metal jewelry, metal covered tables or metal belts used for assembly of batteries into devices.

If soldering or welding to the battery is required, consult your Energizer Battery Manufacturing, Inc. representative for proper precautions to prevent seal damage or short circuit.

Charging: This battery is manufactured in a charged state. It is not designed for recharging. Recharging can cause battery leakage or, in some cases, high pressure rupture. Inadvertent charging can occur if a battery is installed backwards.

Labeling: If the Eveready / Energizer Battery label or package warnings are not visible, it is important to provide a package and/or device label stating:

WARNING: do not install backwards, charge, put in fire, or mix with other battery types. May explode or leak causing injury.

Replace all batteries at the same time.

Where accidental ingestion of small batteries is possible, the label should include:

Keep away from small children. If swallowed, promptly see doctor; have doctor phone (202) 625-3333 collect.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Ventilation Requirements: Not necessary under normal conditions.

Respiratory Protection: Not necessary under normal conditions.

Eye Protection: Not necessary under normal conditions.

Gloves: Not necessary under normal conditions.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance (physical state, color, etc.):	Solid object
Upper Explosive Limits:	Not applicable for an Article
Lower Explosive Limits	Not applicable for an Article
Odor	No odor
Vapor Pressure (mm Hg @ 25°C)	Not applicable for an Article
Odor Threshold	No odor
Vapor Density (Air = 1)	Not applicable for an Article
pH	Not applicable for an Article
Density (g/cm ³)	2.0 – 3.0
Melting point/Freezing Point	Not applicable for an Article
Solubility in Water (% by weight)	Not applicable for an Article
Boiling Point @ 760 mm Hg (°C)	Not applicable for an Article
Flash Point	Not applicable for an Article
Evaporation Rate (Butyl Acetate = 1)	Not applicable for an Article
Flammability	Not applicable for an Article
Partition Coefficient	Not applicable for an Article
Auto-ignition Temperature	Not applicable for an Article
Decomposition Temperature	Not applicable for an Article
Viscosity	Not applicable for an Article

SECTION 10 – STABILITY AND REACTIVITY

Alkaline batteries do not meet any of the criteria established in 40 CFR 261.2 for reactivity.

SECTION 11 – TOXICOLOGICAL INFORMATION

Under normal conditions of use, alkaline batteries are non-toxic.

SECTION 12 – ECOLOGICAL INFORMATION

Issues such as ecotoxicity, persistence and bioaccumulation are not applicable for articles.

SECTION 13 – DISPOSAL CONSIDERATIONS

Dispose of in accordance with all applicable federal, state and local regulations. Appropriate disposal technologies include incineration and land filling.

SECTION 14 – TRANSPORT INFORMATION

In general, all batteries in all forms of transportation (ground, air, or ocean) must be packaged in a safe and responsible manner. Regulatory concerns from all agencies for safe packaging require that batteries be packaged in a manner that prevents short circuits and be contained in "strong outer packaging" that prevents spillage of contents. All original packaging for Energizer alkaline batteries has been designed to be compliant with these regulatory concerns.

Alkaline batteries (sometimes referred to as "Dry cell" batteries) are not listed as dangerous goods under the ADR European Agreement Concerning the International Carriage of Dangerous Goods by Road, the IMDG International Maritime Dangerous Goods Code, UN Dangerous Good Regulations, IATA Dangerous Goods Regulations, ICAO Technical Instructions and the U.S. hazardous materials regulations (49 CFR). These batteries are not subject to the dangerous goods regulations provided they meet the requirements contained in the following special provisions.

Regulatory Body	Special Provisions
ADR	Not regulated
IMDG	Not regulated
UN	Not regulated
US DOT	49 CFR 172.102 Provision 130
IATA	A123
ICAO	Not regulated

All Energizer alkaline batteries are packed in such a way to prevent short circuits or the generation dangerous quantities of heat and meet the special provisions listed above. In addition, the IATA Dangerous Goods Regulations and ICAO Technical Instructions require the words "not restricted" and the Special Provision number A123 be provided on the air waybill, when an air waybill is issued.

SECTION 15 - REGULATORY INFORMATION

Batteries marketed by Energizer Battery Manufacturing, Inc. are not classified as dangerous goods by the US Department of Transportation or the major international regulatory bodies and are therefore not regulated.

SARA/TITLE III - As an article, this battery and its contents are not subject to the requirements of the Emergency Planning and Community Right-To-Know Act.

SECTION 16 - OTHER INFORMATION

None.



Office Products Group

MATERIAL SAFETY DATA SHEET

MSDS # 3000

Section One: Identification

Newell Rubbermaid, Inc. (Sanford L.P.)
2707 Butterfield Road
Oak Brook, IL 60523 USA
800-323-0749 or 630-481-2000

EMERGENCY MEDICAL NUMBER:

888-786-0972

Product Name: Sharpie Fine Point Marker, Sharpie Ultra Fine Point Marker, Sharpie Extra Fine Marker, Sharpie Chisel Tip Marker, Sharpie Twin Tip Marker, Super Sharpie Marker, Super Sharpie Twin Tip Marker, Sharpie Mini Fine Point Marker, Sharpie Micro Marker, Sharpie Grip Marker, Sharpie Retractable Fine Point Marker, Sharpie Magnum Marker, Sharpie King Size Marker, Sharpie Liquid Tip Marker.

Colors: All Colors

NewellRubbermaid, Inc (Sanford L.P.) is a member of The Art and Creative Materials Institute, Inc. This product is certified by the Institute to be labeled in accordance with the voluntary chronic hazard labeling standard ASTM D-4236 and is labeled with the AP Non Toxic Seal. Products bearing the AP Approved Product Seal of The Art and Creative Materials Institute, Inc. are certified in a program of toxicological evaluation by a medical expert, subject to review by the Institute Toxicology Advisory Board, to contain no materials in sufficient quantities to be toxic or injurious to humans, or to cause acute toxicity or chronic health problems.

Section Two: Hazard Identification

Not Hazardous under normal use conditions. Not for use on skin. Do not ingest. Contact with eyes may cause irritation.

Section Three: Composition

Dyes

Pigments

Solvent Mixture: Butanol (71-36-3), Propanol (71-23-8), Diacetone Alcohol (123-42-2), Ethanol (64-17-5)

Section Four: First Aid Measures

Inhalation: Remove source of irritation. If symptoms persist seek medical attention
Skin Contact: Wash with soap and water. If irritation persists seek medical attention.
Eye Contact: Rinse eyes with water, if irritation persists seek medical attention.
Ingestion: If symptoms occur seek medical attention.

Section Five: Fire Fighting Measures

Flash Point: N/A
Extinguishing Media: As appropriate for surrounding area.
Special Fire Fighting Measures: N/A
Hazardous combustion products: N/A

Section Six: Accidental Release Measures

In Case of Spill or Accidental Release: Wipe up with absorbent material.

Section Seven: Handling and Storage

Handling: Do not shake marker.
Storage: Keep cap on marker when not in use.

Section Eight: Exposure Controls and Personal Protection

Eye Protection: None under normal use conditions.
Clothing: None under normal use conditions.
Respirator: None under normal use conditions.

MATERIAL SAFETY DATA SHEET

MSDS # 3000

Section Nine: Physical and Chemical Properties

Boiling Point: N/A
 Specific Gravity: N/A
 Vapor Pressure: N/A
 Solubility in Water: N/A
 Evaporation Rate: N/A
 Appearance/Odor: Marker/Alcohol (ink)

Section Ten: Stability and Reactivity

Stability: N/A
 Conditions to Avoid: Avoid exposure to heat, flame or other sources of ignition.
 Chemical Incompatibility: N/A
 Hazardous Polymerization: N/A

Section Eleven: Toxicological Information

See Section Two: Hazard Identification for any hazards

Section Twelve: Ecological Information

Not available

Section Thirteen: Disposal Considerations

Dispose of in accordance with all Federal, State, and Local Regulations.

Section Fourteen: Transport Information

DOT: Not available
 IATA: Not available
 IMO: Not available

Section Fifteen: Regulatory Information

United States: All components in this product are listed on or exempt from reporting under the Federal Toxic Substances Control Act (TSCA).

Section Sixteen: Other Information

HMIS Code	
Health	N/A
Flammability	N/A
Reactivity	N/A
Personal Protection	N/A

0=Minimal / 4 = Severe

NewellRubbermaid, Inc has been advised by Counsel that the OSHA Hazard Communication Standard and the Health Canada Workplace Hazardous Materials Information Standard do not apply to the Sanford Product described in this Material Safety Data Sheet. The reasons for the exemptions are contained in 29 CFR 1910.1200(b)(6)(ix) as amended Sept 14, 2009 per the Code of Federal Regulations and also Canadian Hazardous Products Act part 12 section (f) as amended June 1, 2009. The information contained in this MSDS is forwarded to you for your information, but is not meant to imply that the product is covered by nor is this MSDS meant to comply with all requirements of the hazard communication standards.

Hazard Communication Compliance Declaration

Newell-Rubbermaid (NWL) writing instruments comply with U.S. OSHA GHS Hazard Communication Standard of 29 CFR section 1910.1200 (OSHA HazCom 2012) by virtue of exemption as 'articles' and as 'consumer products' per 29 CFR section 1910.1200(b)(6)(v) and (ix). Therefore, GHS Safety Data Sheets are not required for our writing instruments.

An 'article' is defined in Section 1910.1200(c) "as a manufactured item other than a fluid or particle:

- Which is formed to a specific shape or design during manufacture;
- Which has end use function(s) dependent in whole or in part on its shape or design during end use; and
- Which, under normal conditions of use, does not release other than very small (minute or trace) amounts of a hazardous chemical and does not pose a physical hazard or health risk to employees."

The 'consumer product' exemption in 29 C.F.R. section 1910.1200(b)(6)(ix) states that:

- Any consumer product or hazardous substance, as those terms are defined in the Consumer Product Safety Act (15 U.S.C. 2051 et seq.) and Federal Hazardous Substances Act (15 U.S.C. 1261 et seq.) respectively, where the employer can show that it is used in the workplace for the purpose intended by the chemical manufacturer or importer of the product, and the use results in a duration and frequency of exposure which is not greater than the range of exposures that could reasonably be experienced by consumers when used for the purpose intended.

OSHA has consistently taken the position, in various rulemaking documents and interpretation letters, "most office products (such as pens, pencils, adhesive tape) to be exempt under the provisions of the rule, either as articles or as consumer products." Markers also fall into these exempted categories. This position is cited currently on [OSHA's website](#) in a letter from OSHA Assistant Secretary John A. Pendergrass to U.S. Congressman Jim Bunning. These examples are cited again in OSHA's FAQs on the [Hazard Communication Standard](#) which further reinforces that Newell-Rubbermaid writing products are exempt from Hazard Communication requirements, specifically GHS Safety Data Sheet documentation.

A non-exhaustive list is provided below of Newell-Rubbermaid writing instruments that qualify as 'articles' and 'consumer products' that are exempt from GHS Safety Data Sheet requirements:

- Prismacolor Premier Colored Pencils and Sharpeners
- Prismacolor Nupastels and Art Stix and Erasers
- Sharpie Permanent Markers
- Sharpie Pens
- Sharpie Highlighters (Clearview, Accent, etc)
- Paper Mate Pens (InkJoy, FlexGrip, Replay, etc)
- Paper Mate Mechanical Pencils
- Paper Mate Flair Pens
- Paper Mate Pearl Erasers
- Paper Mate Replay Premium Erasable Pens
- Expo Dry Erase Markers
- Expo Whiteboard Cleaner Wipes
- Expo Learning Boards
- Liquid Paper Correction Pens
- Liquid Paper Dryline Correction Tape
- Parker Fountain Pens
- Waterman Fountain Pens
- Rotring Tikky Ballpoint Pens
- Woodcase Pencils (Mongol, Mirado, etc)
- uni-ball pens



SAFETY DATA SHEET

1. Identification

Product identifier	ALUMINIUM SHEET COIL AND FOIL - BARE AND COATED
Other means of identification	
SDS number	1352
Version #	04
Revision date	May 31, 2015.
Other means of identification	
Synonyms	Alloys 0333, 1050, 1100, 1350, 3003, 3004, 3005, 3105, 5005, 5042,5050,5052, 5082, 5083, 5086, 5182, 5454, 5754, 6061, 8011
Recommended use	Various fabricated aluminum parts and products
Recommended restrictions	None known.
Manufacturer/Importer/Supplier/Distributor information	
Manufacturer	Alcoa Inc. 201 Isabella Street Pittsburgh, PA 15212-5858 USA Health and Safety Tel: 1-412-553-4649 Health and Safety Fax: 1-412-553-4822 Health and Safety Email: accmsds@alcoa.com
Emergency Information	CHEMTREC: +1-703-527-3887 +1-800-424-9300 (24 Hour Emergency Telephone, multiple languages spoken); ALCOA: +1-412-553-4001 (24 Hour Emergency Telephone, only English spoken)
Website	For a current Safety Data Sheet, refer to Alcoa websites: www.alcoa.com or internally at my.alcoa.com EHS Community

2. Hazard(s) identification

Classification

When used as intended, this product is an article and should not pose any health hazard.

Potential health effects

The following statements summarize the health effects generally expected in cases of overexposures. User specific situations should be assessed by a qualified individual. Additional health information can be found in Section 11.

The health effects listed below are not likely to occur unless processing of this product generates dusts or fumes.

Physical hazards	Not classified.
Health hazards	Not classified.
Environmental hazards	Not classified.
Authority defined hazards	Combustible dust

Label elements

Hazard symbol	None.
Signal word	Warning
Hazard statement	The mixture does not meet the criteria for classification. May form combustible dust concentrations in air.

Precautionary statement

Prevention	Not applicable.
Response	Not applicable.
Storage	Keep dry.
Disposal	Reuse or recycle material whenever possible.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information None.

Specific hazards

Non-combustible as supplied. Small chips, fine turnings, and dust from processing may be readily ignitable.

Explosion/fire hazards may be present when:

- Dust or fines are dispersed in air.
- Chips, dust or fines are in contact with water.
- Dust and fines are in contact with certain metal oxides (e.g., rust, copper oxide).
- Molten metal in contact with water/moisture or certain metal oxides (e.g., rust, copper oxide).

Dust and fumes from processing: Can cause irritation of the eyes, skin and upper respiratory tract.

3. Composition/information on ingredients**Composition comments**

Complete composition is provided below and may include some components classified as non-hazardous.

Mixtures

Chemical name	Common name and synonyms	CAS number	%
Aluminum (Aluminum Alloys)		7429-90-5	>82
Magnesium (Aluminum Alloys)		7439-95-4	<5.0
Manganese (Aluminum Alloys)		7439-96-5	<1.5
Iron (Aluminum Alloys)		7439-89-6	<1.0
Silicon (Aluminum Alloys)		7440-21-3	<1.0
Chromium (Aluminum Alloys)		7440-47-3	<0.35
Coatings† (Coatings)		Various	0 - 30

Additional Information

† Coatings include: vinyl, epoxy, polyester, siliconized polyester, acrylic, fluorocarbons, polyurethane, resins, petroleum, chromium conversion and titanium conversion. Additional compounds which may be formed during processing are listed in Section 8.

4. First-aid measures**Eye contact**

Dust and fumes from processing: Rinse eyes with plenty of water or saline for at least 15 minutes. Consult a physician.

Skin contact

If molten material gets on skin, cool rapidly with cold water. Get medical treatment for thermal burn.
 Dust and fumes from processing: Wash with soap and water for at least 15 minutes. Get medical attention if irritation develops or persists.

Inhalation

Dust and fumes from processing: Remove to fresh air. Check for clear airway, breathing, and presence of pulse. If breathing is difficult, provide oxygen. Loosen any tight clothing on neck or chest. Provide cardiopulmonary resuscitation for persons without pulse or respirations. Consult a physician.

Ingestion

Not relevant, due to the form of the product.

Most important symptoms/effects, acute and delayed

Dust and fumes from processing: Can cause irritation of the eyes, skin and upper respiratory tract. See Section 11 of the SDS for additional information on health hazards.

Medical conditions aggravated by exposure

Dust and fume from processing: Asthma, chronic lung disease, and skin rashes.

Indication of immediate medical attention and special treatment needed

In case of shortness of breath, give oxygen. Symptoms may be delayed.

General information

If exposed or concerned: get medical attention/advice.

5. Fire-fighting measures**Suitable extinguishing media**

Use Class D extinguishing agents on fines, dust or molten metal.
 Use coarse water spray on chips and turnings.

Unsuitable extinguishing media

DO NOT USE water in fighting fires around molten metal.
 DO NOT USE halogenated extinguishing agents on small chips/fines.
 These fire extinguishing agents will react with the burning material.

Specific hazards arising from the chemical	<p>May be a potential hazard under the following conditions:</p> <ul style="list-style-type: none"> • Dust clouds may be explosive. Even a minor dust cloud can explode violently. Dust accumulation on the floor, ledges and beams can present a risk of ignition, flame propagation and secondary explosions. • Chips, fines and dust in contact with water can generate flammable/explosive hydrogen gas. These gases could present an explosion hazard in confined or poorly ventilated spaces. • Dust and fines in contact with certain metal oxides (e.g., rust, copper oxide). A thermite reaction, with considerable heat generation, can be initiated by a weak ignition source. <p>• Molten metal in contact with water/moisture or certain metal oxides (e.g., rust, copper oxide). Moisture entrapped by molten metal can be explosive. Contact of molten aluminum with certain metal oxides can initiate a thermite reaction. Finely divided metals (e.g., powders or wire) may have enough surface oxide to produce thermite reactions/explosions.</p>
Special protective equipment and precautions for firefighters	Firefighters should wear NIOSH approved, positive pressure, self-contained breathing apparatus and full protective clothing when appropriate.
Fire fighting equipment/instructions	Apply extinguishing media carefully to avoid creating airborne dust. Use gentle surface application of Class D extinguishing agent or dry inert granular material (e.g., sand) to cover and ring the burning material. If impossible to extinguish, protect surroundings and allow fire to burn itself out.
General fire hazards	Non-combustible as supplied. Small chips, fine turnings, and dust from processing may be readily ignitable.
Explosion data	
Sensitivity to mechanical impact	Not sensitive.
Sensitivity to static discharge	Take precautionary measures against static discharges when there is a risk of dust explosion.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures Avoid contact with sharp edges or heated metal. Avoid inhalation of fumes from molten product. Molten, heated and cold aluminum look alike; do not touch unless you know it is cold. Avoid contact even after material solidifies. Use personal protection recommended in Section 8 of the SDS.

Personal precautions, protective equipment and emergency procedures
For emergency responders Avoid contact with sharp edges or heated metal. Avoid inhalation of fumes from molten product. Molten, heated and cold aluminum look alike; do not touch unless you know it is cold. Avoid contact even after material solidifies. Use personal protection recommended in Section 8 of the SDS.

Evacuation procedures Molten metal: Persons not wearing appropriate protective equipment should be excluded from area of spill until clean-up has been completed.

Methods and materials for containment and cleaning up Collect scrap for recycling. If molten: Use dry sand to contain the flow of material. All tooling (e.g., shovels or hand tools) and containers which come in contact with molten metal must be preheated or specially coated, rust free and approved for such use. Allow the spill to cool before remelting as scrap.

7. Handling and storage

Handling Keep material dry. Avoid generating dust. Avoid contact with sharp edges or heated metal. Hot and cold aluminum are not visually different. Hot aluminum does not necessarily glow red. Use personal protection recommended in Section 8 of the SDS.

Storage Store in a dry place. Protect from water run-on including precipitation.

Requirements for Processes Which Generate Dusts or Fines

If processing of this product generates dust or if extremely fine particulate is generated, obtain and follow the safety procedures and equipment guides contained in Aluminum Association Bulletin F-1 and National Fire Protection Association (NFPA) standards listed in Section 16.

Use non-sparking handling equipment, tools and natural bristle brush. Cover and reseal partially empty containers. Provide grounding and bonding where necessary to prevent accumulation of static charges during metal dust handling and transfer operations (See Section 15).

Local ventilation and vacuum systems must be designed to handle explosive dusts. Dry vacuums and electrostatic precipitators must not be used, unless specifically approved for use with flammable/explosive dusts. Dust collection systems must be dedicated to aluminum dust only and should be clearly labeled as such. Do not co-mingle fines of aluminum with fines of iron, iron oxide (rust) or other metal oxides.

Do not allow chips, fines or dust to contact water, particularly in enclosed areas.

Avoid all ignition sources. Good housekeeping practices must be maintained. Do not use compressed air to remove settled material from floors, beams or equipment.

Requirements for Remelting of Scrap Material or Ingot

Molten metal and water can be an explosive combination. The risk is greatest when there is sufficient molten metal to entrap or seal off the water. Water and other forms of contamination on or contained in scrap or remelt ingot are known to have caused explosions in melting operations. While the products may have minimal surface roughness and internal voids, there remains the possibility of moisture contamination or entrapment. If confined, even a few drops of water can lead to violent explosions.

All tooling, containers, molds and ladles which come in contact with molten metal must be preheated or specially coated, rust free and approved for such use. Any surfaces that may contact molten metal (e.g., concrete) should be specially coated.

Drops of molten metal in water (e.g. from plasma arc cutting), while not normally an explosion hazard, can generate enough flammable hydrogen gas to present an explosion hazard. Vigorous circulation of the water and removal of the particles minimize the hazards.

During melting operations, the following minimum guidelines should be observed:

- Inspect all materials prior to furnace charging and completely remove surface contamination such as water, ice, snow, deposits of grease and oil or other surface contamination resulting from weather exposure, shipment, or storage.
- Store materials in dry, heated areas with any cracks or cavities pointed downwards.
- Preheat and dry large items adequately before charging into a furnace containing molten metal. This is typically done by use of a drying oven or homogenizing furnace. The drying cycle should bring the metal temperature of the coldest item of the batch to 400°F (200°C) and then hold at that temperature for 6 hours.

Thermite explosions have been reported when aluminum alloys were melted in furnaces used for alloying with lead, bismuth or other metals with low melting temperatures. These metals, when added as high purity ingots, can seep through cracks in furnace liners and become oxidized. During subsequent melts in the furnace, molten aluminum can contact these metal oxides resulting in a thermite explosion.

8. Exposure controls/personal protection

Occupational exposure limits

U.S. - OSHA

Components

	Type	Value	Form
Aluminum (CAS 7429-90-5)	TWA	5 mg/m ³ 15 mg/m ³	Respirable fraction Total dust
Chromium (CAS 7440-47-3)	TWA	1 mg/m ³	
Manganese (CAS 7439-96-5)	Ceiling	5 mg/m ³	Fume
Silicon (CAS 7440-21-3)	TWA	5 mg/m ³ 15 mg/m ³	Respirable fraction. Total dust

Additional components

	Type	Value	Form
Aluminum oxide (non-fibrous) (CAS 1344-28-1)	TWA	5 mg/m ³ 15 mg/m ³	Respirable fraction. Total dust.
Chromium (II) compounds	TWA	0.5 mg/m ³	(as Cr)

U.S. - OSHA

Additional components	Type	Value	Form
Chromium (III) compounds	TWA	0.5 mg/m3	(as Cr)
Chromium (VI) compounds, certain water insoluble forms	TWA	0.0025 mg/m3	Action Level as Cr(VI))
Chromium (VI) compounds (CAS 18540-29-9)	TWA	0.0025 mg/m3	Action Level as Cr(VI)
Hydrogen fluoride (CAS 7664-39-3)	TWA	3 ppm	(as F)
Iron oxide (CAS 1309-37-1)	TWA	10 mg/m3	Fume.
Manganese compounds, inorganic	Ceiling	5 mg/m3	(as Mn) Fume
Ozone (CAS 10028-15-6)	TWA	0.2 mg/m3	
		0.1 ppm	

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Additional components	Type	Value	Form
Chromium (VI) compounds, certain water insoluble forms	TWA	0.005 mg/m3	as Cr(VI)
Chromium (VI) compounds, water soluble forms	TWA	0.005 mg/m3	
Chromium (VI) compounds (CAS 18540-29-9)	TWA	0.005 mg/m3	as Cr(VI)

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Additional components	Type	Value	Form
Hydrogen chloride (CAS 7647-01-0)	Ceiling	7 mg/m3	
		5 ppm	
Magnesium oxide (CAS 1309-48-4)	PEL	15 mg/m3	Total particulate.

ACGIH

Components	Type	Value	Form
Manganese (CAS 7439-96-5)	TWA (inhalable fraction)	0.2 mg/m3	(inhalable fraction)
	TWA (respirable fraction)	0.02 mg/m3	(respirable fraction)

Additional components	Type	Value	Form
Aluminum oxide (non-fibrous) (CAS 1344-28-1)	TWA	1 mg/m3	Respirable fraction, as Al
Chromium (VI) compounds, water soluble forms	TWA	0.05 mg/m3	(as Cr)
Chromium (VI) compounds (CAS 18540-29-9)	TWA	0.05 mg/m3	Soluble compounds as Cr
Ozone (CAS 10028-15-6)	TWA	0.2 ppm	(Heavy, moderate or light workloads (≤2 hours))

US ACGIH Threshold Limit Values: Ceiling Limit Value: mg/m3 & ppm

Additional components	Type	Value	Form
Hydrogen chloride (CAS 7647-01-0)	Ceiling	2 ppm	

US ACGIH Threshold Limit Values: Time Weighted Average (TWA): mg/m3, non-standard units

Components	Type	Value	Form
Aluminum (CAS 7429-90-5)	TWA	1 mg/m3	Respirable fraction.
Chromium (CAS 7440-47-3)	TWA	0.5 mg/m3	

US ACGIH Threshold Limit Values: Time Weighted Average (TWA): mg/m3, non-standard units

Additional components	Type	Value	Form
Chromium (III) compounds	TWA	0.5 mg/m3	
Chromium (VI) compounds, certain water insoluble forms	TWA	0.01 mg/m3	(as Cr)
Chromium (VI) compounds (CAS 18540-29-9)	TWA	0.01 mg/m3	Insoluble compounds as Cr
Iron oxide (CAS 1309-37-1)	TWA	5 mg/m3	Respirable fraction.
Magnesium oxide (CAS 1309-48-4)	TWA	10 mg/m3	Inhalable fraction.
Manganese compounds, inorganic	TWA	0.1 mg/m3	Inhalable fraction.
		0.02 mg/m3	Respirable fraction.

Alcoa

Components	Type	Value	Form
Aluminum (CAS 7429-90-5)	TWA	3 mg/m3	Respirable fraction
		10 mg/m3	Total dust
Manganese (CAS 7439-96-5)	TWA	0.05 mg/m3	Total dust.
		0.02 mg/m3	Respirable fraction.

Additional components	Type	Value	Form
Aluminum oxide (non-fibrous) (CAS 1344-28-1)	TWA	3 mg/m3	Respirable fraction.
		10 mg/m3	Total dust.
Chromium (VI) compounds (CAS 18540-29-9)	TWA	0.25 µg/m3	
Hydrogen fluoride (CAS 7664-39-3)	STEL	1.64 mg/m3	Peak (as F) (Skin)
		2 ppm	Peak (as F) (Skin)
Manganese compounds, inorganic	TWA	0.5 mg/m3	(as F) (Skin)
	TWA	0.05 mg/m3	Total dust, as Mn.
		0.02 mg/m3	Respirable fraction, as Mn.

Exposure guidelines**US ACGIH Threshold Limit Values: Skin designation**

Hydrogen fluoride (CAS 7664-39-3) Can be absorbed through the skin.

US. California Code of Regulations, Title 8, Section 5155. Airborne Contaminants

HYDROGEN FLUORIDE, AS F (CAS 7664-39-3) Can be absorbed through the skin.

General

Personnel who handle and work with molten metal should utilize primary protective clothing like polycarbonate face shields, fire resistant tapper's jackets, neck shades (snoods), leggings, spats and similar equipment to prevent burn injuries. In addition to primary protection, secondary or day-to-day work clothing that is fire resistant and sheds metal splash is recommended for use with molten metal. Synthetic materials should never be worn even as secondary clothing (undergarments).

Appropriate engineering controls

Dust and fumes from processing: Use with adequate explosion-proof ventilation designed to handle particulates to meet the limits listed in Section 8, Exposure Guidelines.

Individual protection measures, such as personal protective equipment**Eye/face protection**

Wear safety glasses with side shields. Wear a face shield when working with molten material.

Skin protection**Hand protection**

Wear impervious gloves to avoid direct skin contact. When handling hot material, use heat resistant gloves. The need for personal protective equipment (gloves) should be based upon a hazard assessment and recommendations from health / safety professionals. The most suitable glove must be chosen in consultation with the gloves supplier, who can inform about the breakthrough time of the glove material.

Other

The need for personal protective equipment should be based upon a hazard assessment and recommendations from health / safety professionals.

Respiratory protection	Dust and fumes from processing: Use NIOSH-approved respiratory protection as specified by an Industrial Hygienist or other qualified professional if concentrations exceed the limits listed in Section 8. Suggested respiratory protection: N95, Acid gas cartridges for Hydrogen chloride, Acid gas cartridge for Hydrogen fluoride gas.
Thermal hazards	Contact with molten material can cause thermal burns. Hot aluminum does not necessarily glow red. When material is heated, wear gloves to protect against thermal burns. Wear appropriate thermal protective clothing, when necessary. Flame retardant protective clothing is recommended. Molten metal: Full Face Shield.
General hygiene considerations	Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and immediately after handling the product. When using, do not eat, drink or smoke.
Control parameters	Follow standard monitoring procedures.

9. Physical and chemical properties

Form	Bare or coated coil/sheet.
Color	Various colors.
Odor	Odorless
Odor threshold	Not Applicable
pH	Not applicable
Density	2.63 - 3.12 g/cm ³
Melting point/freezing point	900 - 1200 °F (482.22 - 648.89 °C)
Initial boiling point and boiling range	Not Applicable
Flash point	Not applicable
Evaporation rate	Not applicable.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - upper (%)	Not applicable
Flammability limit - lower (%)	Not applicable
Explosive properties	Dust clouds may be explosive under certain conditions.
Dust explosion properties	
St class	Very strong explosion.
Vapor pressure	Not applicable
Vapor density	Not applicable
Relative density	Not determined.
Solubility(ies)	Insoluble
Partition coefficient (n-octanol/water)	Not applicable
Auto-ignition temperature	Not Applicable
Decomposition temperature	Not applicable.
Viscosity	Not applicable.

10. Stability and reactivity

Reactivity	Thermite explosions have been reported when aluminum alloys were melted in furnaces used for alloying with lead, bismuth or other metals with low melting temperatures. These metals, when added as high purity ingots, can seep through cracks in furnace liners and become oxidized. During subsequent melts in the furnace, molten aluminum can contact these metal oxides resulting in a thermite explosion. Thermite reactions can occur with oxides of lead, copper, iron, bismuth and certain other metals.
Chemical stability	Stable under normal conditions of use, storage, and transportation as shipped.
Possibility of hazardous reactions	Hazardous polymerization does not occur.

Conditions to avoid

Explosions can occur with coils of foil that have been submerged or partially submerged in water for an extended period of time. Water can penetrate between the layers of foil, react with the aluminum surface and generate heat and hydrogen gas. When the coils are removed from the cooling effects of the water, rapid temperature increases can occur causing steam explosions which result in the rupture of the coils and discharge of debris.

Coils of foil may be a potential hazard under the following conditions:

- Coil has been annealed (annealing removes residual oil that could prevent penetration of water)
- Foil is very thin gauge (5-9 µm thickness which increases surface area)
- Coil has been immersed for an extended period of time (several hours or more)
- Wetted coil has recently been removed from the cooling effects of the water

In such situations, the coils should be isolated (30 meters from any personnel) for at least 72 hours as soon as possible after removal from the water. Coils making crackling sounds or emitting steam should not be approached or transported in commerce. Wetted coils should not be charged into a furnace for remelting until completely dry.

Chips, fines, dust and molten metal are considerably more reactive with the following:

- Water: Slowly generates flammable/explosive hydrogen gas and heat. Generation rate is greatly increased with smaller particles (e.g., fines and dusts). Molten metal can react violently/explosively with water or moisture, particularly when the water is entrapped.
- Heat: Oxidizes at a rate dependent upon temperature and particle size.

Grinding, sanding, buffing and polishing operations may generate potentially explosive aluminum dust, fines or particulate that must not be co-mingled with dust, fines or particulate of steel, iron, iron oxide (rust) or other metal oxides. Vacuum and dust collection systems utilized for processing aluminum must be placarded as follows:

WARNING – Aluminum Metal Only – Fire or Explosion Can Result with Other Metals.

Incompatible materials

Chips, fines, dust and molten metal are considerably more reactive with the following:

- Strong oxidizers: Violent reaction with considerable heat generation. Can react explosively with nitrates (e.g., ammonium nitrate and fertilizers containing nitrate) when heated or molten.
- Acids and alkalis: Reacts to generate flammable/explosive hydrogen gas. Generation rate is greatly increased with smaller particles (e.g., fines and dusts).
- Halogenated compounds: Many halogenated hydrocarbons, including halogenated fire extinguishing agents, can react violently with finely divided or molten aluminum.
- Iron oxide (rust) and other metal oxides (e.g., copper and lead oxides): A violent thermite reaction generating considerable heat can occur. Reaction with aluminum fines and dusts requires only very weak ignition sources for initiation. Molten aluminum can react violently with iron oxide without external ignition source.
- Iron powder and water: Explosive reaction forming hydrogen gas when heated above 1470°F (800°C).

Hazardous decomposition products

Combustion of the coatings can generate Carbon monoxide, Carbon dioxide, Hydrogen chloride, Chlorinated hydrocarbons, Hydrogen fluoride and partially oxidized hydrocarbons.

11. Toxicological information

Health effects associated with ingredients

Aluminum dust/fines and fumes: Low health risk by inhalation. Generally considered to be biologically inert (milling, cutting, grinding).

Silicon (inert dusts): Chronic overexposures: Can cause chronic bronchitis and narrowing of airways.

Chromium dust and fumes: Can cause irritation of eye, skin and respiratory tract. Metallic chromium and trivalent chromium: Not classifiable as to their carcinogenicity to humans by IARC.

Health effects associated with compounds formed during processing

(The following could be expected if welded, remelted or otherwise processed at elevated temperatures)

Alumina (aluminum oxide): Low health risk by inhalation. Generally considered to be biologically inert.

Magnesium oxide fumes: Can cause irritation of the eyes and respiratory tract. Acute overexposures: Can cause metal fume fever (nausea, fever, chills, shortness of breath and malaise).

Manganese oxide fumes: Can cause irritation of the eyes, skin, and respiratory tract. Acute overexposures: Can cause metal fume fever (nausea, fever, chills, shortness of breath and malaise).

Manganese compounds: Chronic overexposures: Can cause inflammation of the lung tissues, scarring of the lungs (pulmonary fibrosis), central nervous system damage, Secondary Parkinson's Disease and reproductive harm in males.

Iron oxide: Chronic overexposures: Can cause benign lung disease (siderosis). Ingestion: Can cause irritation of gastrointestinal tract, bleeding, changes in the pH of the body fluids (metabolic acidosis) and liver damage.

Silica, amorphous: Acute overexposures: Can cause dryness of eyes, nose and upper respiratory tract.

Hexavalent chromium compounds (Chromium VI): Can cause irritation of eye, skin and respiratory tract. Skin contact: Can cause irritant dermatitis, allergic reactions and skin ulcers. Chronic overexposures: Can cause perforation of the nasal septum, respiratory sensitization, asthma, the accumulation of fluid in the lungs (pulmonary edema), lung damage, kidney damage, lung cancer, nasal cancer and cancer of the gastrointestinal tract. IARC/NTP: Listed as "known to be a human carcinogen" by the NTP. Listed as carcinogenic to humans by IARC (Group 1).

Welding, plasma arc cutting, and arc spray metalizing can generate ozone.

Ozone: Can cause irritation of eyes, nose and upper respiratory tract. Acute overexposures: Can cause shortness of breath, tightness of chest, headache, cough, nausea and narrowing of airways. Effects are reversible on cessation of exposure. Acute overexposures (high concentrations): Can cause respiratory distress, respiratory tract damage, bleeding and the accumulation of fluid in the lungs (pulmonary edema). Effects can be delayed up to 1-2 hours. Additional information: Studies (inhalation) with experimental animals have found genetic damage, reproductive harm, blood cell damage, lung damage and death.

Welding fumes: IARC/NTP: Listed as possibly carcinogenic to humans by IARC (Group 2B). Additional information: In one study, occupational asthma was associated with exposures to fumes from aluminum welding.

Combustion of the coatings can generate Hydrogen chloride or Hydrogen fluoride. Hydrogen chloride gas: Can cause severe irritation and corrosive burns of eyes, skin and upper respiratory tract. Acute overexposures: Can cause the accumulation of fluid in the lungs (pulmonary edema).

Hydrogen fluoride: Can cause severe irritation of the eyes, mucous membranes, skin and respiratory tract. Acute overexposures: Can cause cough, shock, the accumulation of fluid in the lungs (pulmonary edema) and death. Effects can be delayed up to 24 hours.

Information on likely routes of exposure

Eye contact Dust and fumes from processing: Can cause irritation.

Skin contact Dust and fumes from processing: Can cause irritation.

Inhalation Dust and fumes from processing: Can cause irritation of the upper respiratory tract.
Additional health effects from mechanical processing (e.g., cutting, grinding): None known.

Additional health effects from elevated temperature processing (e.g., welding, melting): Acute overexposure: Can cause metal fume fever (nausea, fever, chills, shortness of breath malaise) and the accumulation of fluid in the lungs (pulmonary edema). Chronic overexposures: Can cause asthma, benign lung disease (siderosis) scarring of the lungs (pulmonary fibrosis), respiratory sensitization, central nervous system damage, secondary Parkinson's disease, reproductive harm and lung cancer.

Combustion of the coatings can generate Hydrogen chloride and Hydrogen fluoride. Acute overexposures: Can cause severe irritation of the respiratory tract and the accumulation of fluid in the lungs (pulmonary edema). Effects can be delayed up to 24 hours.

Ingestion Not relevant, due to the form of the product.

Symptoms related to the physical, chemical and toxicological characteristics Dust and fumes from processing: Can cause irritation of the eyes, skin and upper respiratory tract.

Information on toxicological effects

Components	Species	Test Results
Aluminum (CAS 7429-90-5)		
Acute		
Inhalation		
LC50	Rat	> 2.3 mg/l 7.6 mg/l
Oral		
LD50	Rat	> 2000 mg/kg
Additional components	Species	Test Results
Aluminum oxide (non-fibrous) (CAS 1344-28-1)		
Acute		
Inhalation		
LC50	Rat	> 2.3 mg/l 7.6 mg/l
Oral		
LD50	Rat	> 5000 mg/kg
Hydrogen chloride (CAS 7647-01-0)		
Acute		
Dermal		
LD50	Mouse	1449 mg/kg
Inhalation		
LC50	Mouse	1108 ppm, 1 Hours
	Rat	3124 ppm, 1 Hours
Oral		
LD50	Rabbit	900 mg/kg
Hydrogen fluoride (CAS 7664-39-3)		
Acute		
Inhalation		
LC50	Guinea pig	4327 ppm, 15 Minutes 3.54 mg/l, 15 Minutes
	Monkey	1780 ppm, 1 Hours
	Mouse	500 ppm, 1 Hours
	Rat	4970 ppm, 5 Minutes 2689 ppm, 15 Minutes 2042 ppm, 30 Minutes 1278 ppm, 1 Hours
Iron oxide (CAS 1309-37-1)		
Acute		
Oral		
LD50	Rat	> 10000 mg/kg
Silica, amorphous (CAS 69012-64-2)		
Acute		
Oral		
LD50	Mouse	> 15000 mg/kg
	Rat	> 22500 mg/kg
Acute toxicity	Not classified. Based on available data, the classification criteria are not met.	
Skin corrosion/irritation	Not classified. Based on available data, the classification criteria are not met.	
Serious eye damage/eye irritation	May cause temporary eye irritation. Dust in the eyes will cause irritation.	

Respiratory or skin sensitization	Product as shipped: Not a skin sensitizer. Not classified. Based on available data, the classification criteria are not met.
Respiratory sensitization	Product as shipped: Not classified. Based on available data, the classification criteria are not met. Additional health effects from elevated temperature processing (e.g., welding, plasma cutting, melting): Contains chromium. May produce an allergic reaction. May cause sensitization by inhalation.
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. Contains no ingredient listed as a mutagen.
Neurological effects	Product as shipped: Not classified. Based on available data, the classification criteria are not met.
Pre-existing conditions aggravated by exposure	Dust and fume from processing: Asthma, chronic lung disease, and skin rashes.
Carcinogenicity	Product as shipped: Does not present any cancer hazards. Health effects from elevated temperature processing (e.g., welding, melting): Can present a cancer hazard (Hexavalent chromium compounds, Welding fumes).

IARC Monographs. Overall Evaluation of Carcinogenicity

Chromium (CAS 7440-47-3)	3 Not classifiable as to carcinogenicity to humans.
Chromium (III) compounds (CAS CAS No. Not available)	3 Not classifiable as to carcinogenicity to humans.
Chromium (VI) compounds (CAS 18540-29-9)	1 Carcinogenic to humans.
Chromium (VI) compounds, certain water insoluble forms (CAS CAS No. Not available)	1 Carcinogenic to humans.
Chromium (VI) compounds, water soluble forms (CAS CAS No. Not available)	1 Carcinogenic to humans.
Hydrogen chloride (CAS 7647-01-0)	3 Not classifiable as to carcinogenicity to humans.
Hydrogen fluoride (CAS 7664-39-3)	3 Not classifiable as to carcinogenicity to humans.
Iron oxide (CAS 1309-37-1)	3 Not classifiable as to carcinogenicity to humans.
Silica, amorphous (CAS 69012-64-2)	3 Not classifiable as to carcinogenicity to humans.

US. National Toxicology Program (NTP) Report on Carcinogens

Chromium (VI) compounds (CAS 18540-29-9)	Known To Be Human Carcinogen.
Chromium (VI) compounds, certain water insoluble forms (CAS CAS No. Not available)	Known To Be Human Carcinogen.
Chromium (VI) compounds, water soluble forms (CAS CAS No. Not available)	Known To Be Human Carcinogen.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Chromium (VI) compounds (CAS 18540-29-9)	Cancer
Chromium (VI) compounds, certain water insoluble forms (CAS CAS No. Not available)	Cancer
Chromium (VI) compounds, water soluble forms (CAS CAS No. Not available)	Cancer

Reproductive toxicity	Product as shipped: Does not present any reproductive hazards. Additional health effects from elevated temperature processing (e.g., welding, melting): Can present a reproductive hazard for males (Manganese compounds).
Routes of exposure	Dust and fume from processing: Inhalation. Skin contact. Eye contact.
Specific target organ toxicity - single exposure	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.
Aspiration hazard	Not an aspiration hazard.

12. Ecological information

Ecotoxicity Not expected to be harmful to aquatic organisms.

Components	Species		Test Results
Chromium (CAS 7440-47-3)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	0.01 - 0.7 mg/l, 48 hours
Fish	LC50	Carp (Cyprinus carpio)	14.3 mg/l, 96 hours

Components	Species		Test Results
Iron (CAS 7439-89-6)			
Aquatic			
Crustacea	LC50	Cockle (Cerastoderma edule)	100 - 330 mg/l, 48 hours
		Common shrimp, sand shrimp (Crangon crangon)	33 - 100 mg/l, 48 hours
Fish	LC50	Channel catfish (Ictalurus punctatus)	> 500 mg/l, 96 hours
Manganese (CAS 7439-96-5)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	40 mg/l, 48 hours
Additional components	Species		Test Results
Hydrogen chloride (CAS 7647-01-0)			
Aquatic			
Fish	LC50	Western mosquitofish (Gambusia affinis)	282 mg/l, 96 hours
Hydrogen fluoride (CAS 7664-39-3)			
Aquatic			
Fish	LC50	Brown trout (Salmo trutta)	125 mg/l, 48 hours
Ozone (CAS 10028-15-6)			
Aquatic			
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	0.0081 - 0.0106 mg/l, 96 hours

Persistence and degradability The product contains inorganic compounds which are not biodegradable.

Bioaccumulative potential No data available on bioaccumulation.

Mobility in soil No data available.

Mobility in general Not considered mobile.

Other adverse effects None known.

13. Disposal considerations

Disposal instructions Reuse or recycle material whenever possible. If reuse or recycling is not possible, disposal must be made according to local or governmental regulations.

Waste codes RCRA Status: Not federally regulated in the U.S. if disposed of "as is."
RCRA waste codes other than described here may apply depending on use of the product. Status must be determined at the point of waste generation. Refer to 40 CFR 261 or state equivalent in the U.S. D007: Waste Chromium

US RCRA Hazardous Waste U List: Reference

Hydrogen fluoride (CAS 7664-39-3) U134

Waste from residues / unused products If reuse or recycling is not possible, disposal must be made according to local or governmental regulations.

Contaminated packaging Dispose of in accordance with local regulations.

14. Transport information

General Shipping Information

Basic Shipping Information

ID number -
Proper shipping name Not regulated
Hazard class -
Packing group -

General Shipping Notes

- When "Not regulated", enter the proper freight classification, SDS Number and Product Name onto the shipping paperwork.

Disclaimer

This section provides basic classification information and, where relevant, information with respect to specific modal regulations, environmental hazards and special precautions. Otherwise, it is presumed that the information is not available/not relevant

15. Regulatory information

US federal regulations

In reference to Title VI of the Clean Air Act of 1990, this material does not contain nor was it manufactured using ozone-depleting chemicals.

All electrical equipment must be suitable for use in hazardous atmospheres involving aluminum powder in accordance with 29 CFR 1910.307. The National Electrical Code, NFPA 70, contains guidelines for determining the type and design of equipment and installation which will meet this requirement.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Chromium (VI) compounds, certain water insoluble forms 0.1 % Annual Export Notification required.
(CAS CAS No. Not available)

CERCLA Hazardous Substance List (40 CFR 302.4)

Chromium (CAS 7440-47-3) Listed.
Manganese (CAS 7439-96-5) Listed.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Chromium (VI) compounds (CAS 18540-29-9) Cancer
Chromium (VI) compounds, certain water insoluble forms (CAS CAS No. Not available) Cancer
Chromium (VI) compounds, water soluble forms (CAS CAS No. Not available) Cancer
Chromium (VI) compounds (CAS 18540-29-9) Eye irritation
Chromium (VI) compounds, certain water insoluble forms (CAS CAS No. Not available) Eye irritation
Chromium (VI) compounds, water soluble forms (CAS CAS No. Not available) Eye irritation
Chromium (VI) compounds (CAS 18540-29-9) Skin sensitization
Chromium (VI) compounds, certain water insoluble forms (CAS CAS No. Not available) Skin sensitization
Chromium (VI) compounds, water soluble forms (CAS CAS No. Not available) Skin sensitization

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Section 311/312 hazard categories
Immediate Hazard - Yes If particulates/fumes generated during processing.
Delayed Hazard - Yes If particulates/fumes generated during processing.
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - Yes If molten

SARA 302 Extremely hazardous substance

Chemical name	CAS number	Reportable quantity	Threshold planning quantity	Threshold planning quantity, lower value	Threshold planning quantity, upper value
Ozone	10028-15-6	100	100 lbs		
Hydrogen chloride	7647-01-0	5000	500 lbs		
Hydrogen fluoride	7664-39-3	100	100 lbs		

SARA 311/312 Hazardous chemical Yes

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Aluminum	7429-90-5	>82
Manganese	7439-96-5	<1.5
Manganese compounds, inorganic	CAS No. Not available	1
Chromium (II) compounds	CAS No. Not available	1
Chromium (III) compounds	CAS No. Not available	1
Chromium (VI) compounds	18540-29-9	1
Chromium (VI) compounds, certain water insoluble forms	CAS No. Not available	1
Chromium (VI) compounds, water soluble forms	CAS No. Not available	1
Ozone	10028-15-6	1
Hydrogen chloride	7647-01-0	1
Hydrogen fluoride	7664-39-3	1

US state regulations

US. California Proposition 65

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

Chromium (VI) compounds (CAS 18540-29-9) Listed: February 27, 1987
Chromium (VI) compounds, certain water insoluble forms (CAS CAS No. Not available) Listed: February 27, 1987
Chromium (VI) compounds, water soluble forms (CAS CAS No. Not available) Listed: February 27, 1987

US - California Proposition 65 - CRT: Listed date/Developmental toxin

Chromium (VI) compounds (CAS 18540-29-9) Listed: December 19, 2008
Chromium (VI) compounds, certain water insoluble forms (CAS CAS No. Not available) Listed: December 19, 2008
Chromium (VI) compounds, water soluble forms (CAS CAS No. Not available) Listed: December 19, 2008

US - California Proposition 65 - CRT: Listed date/Female reproductive toxin

Chromium (VI) compounds (CAS 18540-29-9) Listed: December 19, 2008
Chromium (VI) compounds, certain water insoluble forms (CAS CAS No. Not available) Listed: December 19, 2008
Chromium (VI) compounds, water soluble forms (CAS CAS No. Not available) Listed: December 19, 2008

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

Chromium (VI) compounds (CAS 18540-29-9) Listed: December 19, 2008
Chromium (VI) compounds, certain water insoluble forms (CAS CAS No. Not available) Listed: December 19, 2008
Chromium (VI) compounds, water soluble forms (CAS CAS No. Not available) Listed: December 19, 2008

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

SDS Status	May 31, 2015: New format. October 12, 2012: Change(s) in Section: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 and 15. June 16, 2009: New format. Origination date: August 19, 2005 Hazardous Materials Control Committee Preparer: Jim Perriello, +1-865-977-2051. SDS System Number: 170975
Revision date	May 31, 2015.
Version #	04

Revision Information

Product and Company Identification: Product and Company Identification
Composition / Information on Ingredients: Ingredients
Physical & Chemical Properties: Multiple Properties
Transport Information: Agency Name, Packaging Type, and Transport Mode Selection
Regulatory Information: Safety Phrases
HazReg Data: North America
GHS: Qualifiers

Disclaimer

The information in the sheet was written based on the best knowledge and experience currently available.

Other information

- Aluminum Association's Bulletin F-1, "Guidelines for Handling Aluminum Fines Generated During Various Aluminum Fabricating Operations." The Aluminum Association, 1525 Wilson Boulevard, Suite 600, Arlington, Virginia 22209, www.aluminum.org.
- Aluminum Association, "Guidelines for Handling Molten Aluminum, The Aluminum Association, 1525 Wilson Boulevard, Suite 600, Arlington, Virginia 22209, www.aluminum.org.
- NFPA 484, Standard for Combustible Metals (NFPA phone: 800-344-3555)
- NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids
- NFPA 70, Standard for National Electrical Code (Electrical Equipment, Grounding and Bonding)
- NFPA 77, Standard for Static Electricity
- Guide to Occupational Exposure Values 2015, Compiled by the American Conference of Governmental Industrial Hygienists (ACGIH).
- NIOSH Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services, September 2005.
- expub, Expert Publishing, LLC., www.expub.com,
- Ariel, 3E Company, www.3Ecompany.com

Key/Legend:

ACGIH American Conference of Governmental Industrial Hygienists
AICS Australian Inventory of Chemical Substances
CAS Chemical Abstract Services
CERCLA Comprehensive Environmental Response, Compensation, and Liability Act
CFR Code of Federal Regulations
CPR Cardio-pulmonary Resuscitation
DOT Department of Transportation
DSL Domestic Substances List (Canada)
EC Effective Concentration
ED Effective Dose
EINECS European Inventory of Existing Commercial Chemical Substances
ENCS Japan - Existing and New Chemical Substances
EWC European Waste Catalogue
EPA Environmental Protective Agency
IARC International Agency for Research on Cancer
LC Lethal Concentration
LD Lethal Dose
MAK Maximum Workplace Concentration (Germany) "maximale Arbeitsplatz-Konzentration"
NDSL Non-Domestic Substances List (Canada)
NIOSH National Institute for Occupational Safety and Health
NTP National Toxicology Program
OEL Occupational Exposure Limit
OSHA Occupational Safety and Health Administration
PIN Product Identification Number
PMCC Pensky Marten Closed Cup
RCRA Resource Conservation and Recovery Act
SARA Superfund Amendments and Reauthorization Act
SIMDUT Système d'Information sur les Matières Dangereuses Utilisées au Travail
STEL Short Term Exposure Limit
TCLP Toxic Chemicals Leachate Program
TDG Transportation of Dangerous Goods
TLV Threshold Limit Value
TSCA Toxic Substances Control Act
TWA Time Weighted Average
WHMIS Workplace Hazardous Materials Information System
m meter, cm centimeter, mm millimeter, in inch,
g gram, kg kilogram, lb pound, µg microgram,
ppm parts per million, ft feet

*** End of SDS ***

Safety Data Sheet (SDS)

Section 1 – Identification

1(a) Product Identifier used on Label: Metal Coated Steel Sheet

1(b) Other means of identification: Refer to Section 16 for product synonyms.

1(c) Recommended use of the chemical and restrictions on use: These products are sold to all steel-consuming industries including automotive, heavy machinery, pipes and tubes, construction, packaging and appliances. The main markets for these products are construction and mechanical engineering, as well as energy and automotive applications.

1(d) Name, address, and telephone number:

ArcelorMittal USA LLC
1 South Dearborn Street
Chicago, IL 60603-9888



Phone number : 219-787-4901 or
email at: msdssupport@arcelormittal.com

1(e) Emergency phone number: 1-760-476-3962 (3E Company Code: 333211) or CHEMTREC (Day or Night): 1-800-424-9300

Section 2 – Hazard(s) Identification

2(a) Classification of the chemical: Metal Coated Steel Sheet is considered an article under Reach regulation (REACH REGULATION (EC) No 1907/2006) and is not subject to classification under CLP regulation (REGULATION (EC) No 1272/2008). However, **Metal Coated Steel Sheet** is not exempt as an article under OSHA's Hazard Communication Standard (29 CFR 1910.1200) due to its downstream use, thus this product is considered a mixture and a hazardous material. Therefore, the categories of Health Hazards as defined in "GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS (GHS), Third revised edition ST/SG/AC.10/30/Rev. 3" United Nations, New York and Geneva, 2009 have been evaluated. Refer to Section 3, 8 and 11 for additional information.

2(b) Signal word, hazard statement(s), symbols and precautionary statement(s):

Hazard Symbol	Hazard Classification	Signal Word	Hazard Statement(s)
	Carcinogenicity - 2 Reproductive Toxicity - 2 Single Target Organ Toxicity (STOT) Repeat Exposure - 1	Danger	Suspected of causing cancer. Suspected of damaging fertility or the unborn child. Causes damage to lungs and central nervous system through prolonged or repeated inhalation exposure. May cause an allergic skin reaction. May cause respiratory irritation. Causes eye irritation.
	Skin Sensitization - 1 STOT Single Exposure - 3		
NA	Eye Irritation-2B		

Precautionary Statement(s):

Prevention	Response	Storage/Disposal
Do not breathe dusts / fume / gas / mist / vapor / spray. Wear protective gloves / protective clothing / eye protection / face protection. Contaminated work clothing must not be allowed out of the workplace. Use only outdoors or in well ventilated areas. Wash thoroughly after handling. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not eat, drink or smoke when using this product.	If inhaled: Remove person to fresh air and keep comfortable for breathing. If exposed, concerned or feel unwell: Get medical advice/attention. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue Rinsing. If on skin: Wash with plenty of water. If irritation or rash occurs: Get medical advice/attention. Take off and wash contaminated clothing before reuse. Call a poison center/doctor if you feel unwell.	Dispose of contents in accordance with federal, state and local regulations.

2(c) Hazards not otherwise classified: None Known

2(d) Unknown acute toxicity statement (mixture): None Known

Section 3 – Composition/Information on Ingredients

3(a-c) Chemical name, common name (synonyms), CAS number and other identifiers, and concentration:

Chemical Name	CAS Number	EC Number	% weight
Iron	7439-89-6	231-096-4	95-99.9
Manganese	7439-96-5	231-105-1	0.05-2.45
Nickel	7440-02-0	231-111-4	0.01-0.42

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Section 3 – Composition/Information on Ingredients (continued)

3(a-c) Chemical name, common name (synonyms), CAS number and other identifiers, and concentration (continued):

Chemical Name	CAS Number	EC Number	% weight
Silicon	7440-21-3	231-130-8	0.01-3.04
Aluminum	7429-90-5	231-072-3	0.01-1.60

EC - European Community

CAS - Chemical Abstract Service

- Product surfaces may be treated with small amounts of corrosion-inhibiting oil that may contain mineral oil or petroleum distillates, or paints, epoxies, laminates, etc., generally applied at the customer's request. Refer to the coating manufacturer's SDS for hazards associated with coatings. Refer to the following table for additional information.

Metallic Coating (if applicable) ¹

Chemical Name	CAS Number	EC Number	% weight ²
Aluminum	7429-90-5	231-072-3	0 - 86
Nickel (Ni) ZnNi EG	7440-02-0	231-111-4	10 - 30
Galvalume ³	Mixture	Mixture	98 min
Zinc Galvanize (GI) Galvanneal (GA) ZnNi EG	7440-66-6	231-175-3	(GI) 99 min. (GA) 85 min. ⁴ (ZnNi) 70-90
Zincroplex Coating ⁵	Mixture	Mixture	0.5 - 4.9
Zincrometal®SL ⁶	Mixture	Mixture	0.5 - 4.9

Metallic Coating (if applicable) ¹ <0.8% total

Chemical Name	CAS Number	EC Number	% weight ²
Barium Chromate	10294-40-3	231-157-5	10
Chem Phos 2007	Varies ⁷	Varies	0.004 - 0.017 ⁸
Chem Treat - Chrome	7440-47-3	231-157-5	0.3-12 mg/ft ²
Epoxy Resin	Varies	Varies	40 - 60
Phosphate Treat	7664-38-2	231-633-2	100-200 mg/ft ²
Silicates	Varies	Varies	3 -30
Zinc Potassium Chromate	11103-86-9	234-329-8	1

- Refer to product specifications for coating applicability.
- Percentages are expressed as typical ranges or maximum concentrations of trace elements in the coating, for the purpose of communicating the potential hazards of the finished product. Consult product specifications for specific composition information.
- Galvalume coated steel is steel that is plated on one or both sides with a 55% Aluminum, min. 40% Zinc Alloy coating. The balance is a mixture of silicon and potentially the trace elements found in steel products. See Section 2 Notes.
- In addition to trace elements, as stated in Section 2 Notes, the balance of the Galvanneal coating is alloyed Iron from the base metal.
- Zincroplex® coated steel is steel that is plated on one or both sides with a zinc or zinc alloy coating (such as electrogalvanized, hot dip galvanized, or galvanealed steel), followed by the application (on one side) of coatings of Dacromet® III (an inorganic zinc dust/chromic oxide coating) and Zincromet® SPX (an organic coating containing zinc dust). For more information on Zincroplex® coating, see product SDS: Zincroplex® Manufacturer: Metal Coatings International.
- Zincrometal® coated steel is steel that is coated with Zincrometal® SL (an inorganic zinc dust/chromic oxide coating followed by an organic coating containing zinc dust). For more information on coating, see product SDS: Zincrometal®SL. Manufacturer: Metal Coatings International.
- The coating consists of a mixture of crystalline and amorphous forms of Phosphophyllite and Hopeite.

Section 4 – First-aid Measures

4(a) Description of necessary measures:

- Inhalation: Metal Coated Steel Sheet** as sold/shipped is not a likely form of exposure. However during further processing (welding, grinding, burning, etc.), if inhaled: Remove person to fresh air and keep comfortable for breathing. If exposed, concerned or feel unwell: Get medical advice/attention.
- Eye Contact: Metal Coated Steel Sheet** as sold/shipped is not a likely form of exposure. However during further processing (welding, grinding, burning, etc.), if in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue Rinsing. If eye irritation persists: Get medical advice attention. If exposed, concerned or feel unwell: Get medical advice/attention.
- Skin Contact:** If on skin: Wash thoroughly after handling. Wash with plenty of water. If irritation or rash occurs: Get medical advice/attention. Take off and wash contaminated clothing before reuse. If exposed, concerned or feel unwell: Get medical advice/attention.
- Ingestion: Metal Coated Steel Sheet** as sold/shipped is not a likely form of exposure. However during further processing (welding, grinding, burning, etc.), if exposed, concerned or feel unwell: Get medical advice/attention.

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Section 4 – First-aid Measures (continued)

4(b) Most important symptoms/effects, acute and delayed (chronic):

- **Inhalation: Metal Coated Steel Sheet** as sold/shipped is not likely to present an acute or chronic health effect.
- **Eye: Metal Coated Steel Sheet** as sold/shipped is not likely to present an acute or chronic health effect.
- **Skin: Metal Coated Steel Sheet** as sold/shipped is not likely to present an acute or chronic health effect.
- **Ingestion: Metal Coated Steel Sheet** as sold/shipped is not likely to present an acute or chronic health effect.

However during further processing (welding, grinding, burning, etc.) individual components may illicit an acute or chronic health effect. Refer to Section 11-Toxicological Information.

4(c) **Immediate Medical Attention and Special Treatment:** None Known

Section 5 – Fire-fighting Measures

5(a) **Suitable (and unsuitable) Extinguishing Media:** Not Applicable for **Metal Coated Steel Sheet** as sold/shipped. Use extinguishers appropriate for surrounding materials.

5(b) **Specific Hazards arising from the chemical:** Not Applicable for **Metal Coated Steel Sheet** as sold/shipped. When burned, toxic smoke, fume and vapor may be emitted.

5(c) **Special protective equipment and precautions for fire-fighters:** Self-contained NIOSH approved respiratory protection and full protective clothing should be worn when fumes and/or smoke from fire are present. Heat and flames cause emittance of acrid smoke and fumes. Do not release runoff from fire control methods to sewers or waterways. Firefighters should wear full face-piece self-contained breathing apparatus and chemical protective clothing with thermal protection. Direct water stream will scatter and spread flames and, therefore, should not be used.

Section 6 - Accidental Release Measures

6(a) **Personal Precautions, Protective Equipment and Emergency Procedures:** Not Applicable for **Metal Coated Steel Sheet** as sold/shipped. For spills involving finely divided particles, clean-up personnel should be protected against contact with eyes and skin. If material is in a dry state, avoid inhalation of dust.

6(b) **Methods and materials for containment and clean up:** Not Applicable for **Metal Coated Steel Sheet** as sold/shipped. Collect material in appropriate, labeled containers for recovery or disposal in accordance with federal, state, and local regulations. Follow applicable OSHA regulations (29 CFR 1910.120) and all other pertinent state and federal requirements.

Section 7 - Handling and Storage

7(a) **Precautions for safe handling:** Not Applicable for **Metal Coated Steel Sheet** as sold/shipped, however further processing (welding, burning, grinding, etc.) with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use only outdoors or in well ventilated areas. Practice good housekeeping. Avoid breathing metal fumes and/or dust. Do not eat, drink or smoke when using this product. Cut resistant gloves and sleeves should be worn when working with steel products.

7(b) **Conditions for safe storage, including any incompatibilities:** Store away from acids and incompatible materials.

Section 8 - Exposure Controls / Personal Protection

8(a) **Occupational Exposure Limits (OELs):** **Metal Coated Steel Sheet** as sold/shipped in its physical form does not present an inhalation, ingestion or contact hazard, nor would any of the following exposure data apply. However, operations such as burning, welding (high temperature), sawing, brazing, machining, grinding, etc. may produce fumes and/or particulates. The following exposure limits are offered as reference for an experienced industrial hygienist to review.

Ingredients	OSHA PEL ¹	ACGIH TLV ²	NIOSH REL ³	IDLH ⁴
Iron	10 mg/m ³ (as iron oxide fume)	5.0 mg/m ³ (as iron oxide dust and fume)	5.0 mg/m ³ (as iron oxide dust and fume)	2,500 mg Fe/m ³
Manganese	(C) 5.0 mg/m ³ (as Fume & Mn compounds)	0.2 mg/m ³	(C) 5.0 mg/m ³ 1.0 mg/m ³ (as fume) (STEL) 3.0 mg/m ³	500 mg Mn/m ³
Nickel	1.0 mg/m ³ (as Ni metal & insoluble compounds)	1.5 mg/m ³ (as inhalable fraction ⁵ Ni metal) 0.2 mg/m ³ (as inhalable fraction Ni inorganic only insoluble and soluble compounds)	0.015 mg/m ³ (as Ni metal & insoluble and soluble compounds)	10 mg/m ³ (as Ni)
Silicon	15 mg/m ³ (total dust, PNOR ⁶) 5.0 mg/m ³ (as respirable fraction, PNOR)	10 mg/m ³	10 mg/m ³ (as total dust) 5.0 mg/m ³ (as respirable dust)	NE
Aluminum	15 mg/m ³ (total dust, PNOR) 5.0 mg/m ³ (as respirable fraction, PNOR)	1.0 mg/m ³	10 mg/m ³ (as total dust) 5.0 mg/m ³ (as respirable dust)	NE

NE - None Established

Section 8 - Exposure Controls / Personal Protection**8(a) Occupational Exposure Limits (OELs) (continued):**

1. OSHA Permissible Exposure Limits (PELs) are 8-hour TWA (time-weighted average) concentrations unless otherwise noted. A (C) designation denotes a ceiling limit, which should not be exceeded during any part of the working exposure unless otherwise noted. A Peak is defined as the acceptable maximum peak for a maximum duration above the ceiling concentration for an eight-hour shift. A skin notation refers to the potential significant contribution to the overall exposure by the cutaneous route, either by contact with vapors or, of probable greater significance, by direct skin contact with the substance. A Short Term Exposure Limit (STEL) is defined as a 15-minute exposure, which should not be exceeded at any time during a workday. An Action level (AL) is used by OSHA and NIOSH to express a health or physical hazard. They indicate the level of a harmful or toxic substance/activity, which requires medical surveillance, increased industrial hygiene monitoring, or biological monitoring. Action Levels are generally set at one half of the PEL but the actual level may vary from standard to standard. The intent is to identify a level at which the vast majority of randomly sampled exposures will be below the PEL.
2. Threshold Limit Values (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH) are 8-hour TWA concentrations unless otherwise noted. A Short Term Exposure Limit (STEL) is defined as the maximum concentration to which workers can be exposed for a short period of time (15 minutes) for only four times throughout the day with at least one hour between exposures. A "skin" notation refers to the potential significant contribution to the overall exposure by the cutaneous route, either by contact with vapors or, of probable greater significance, by direct skin contact with the substance. ACGIH-TLVs are only recommended guidelines based upon consensus agreement of the membership of the ACGIH. As such, the ACGIH TLVs are for guideline use purposes and are not legal regulatory standards for compliance purposes. The TLVs are designed for use by individuals trained in the discipline of industrial hygiene relative to the evaluation of exposure to various chemical or biological substances and physical agents that may be found in the workplace.
3. The National Institute for Occupational Safety and Health Recommended Exposure Limits (NIOSH-REL) Compendium of Policy and Statements. NIOSH, Cincinnati, OH (1992). NIOSH is the federal agency designated to conduct research relative to occupational safety and health. As is the case with ACGIH TLVs, NIOSH RELs are for guideline purposes only and as such are not legal, regulatory limits for compliance purposes.
4. The "immediately dangerous to life or health air concentration values (IDLHs)" are used by NIOSH as part of the respirator selection criteria and were first developed in the mid-1970's by NIOSH. The Documentation for Immediately Dangerous to Life or Health Concentrations (IDLHs) is a compilation of the rationale and sources of information used by NIOSH during the original determination of 387 IDLHs and their subsequent review and revision in 1994.
5. Inhalable fraction. The concentration of inhalable particulate for the application of this TLV is to be determined from the fraction passing a size-selector with the characteristics defined in the ACGIH 2015 TLVs[®] and BEIs[®] (Biological Exposure Indices) Appendix D, paragraph A.
6. PNOR (Particulates Not Otherwise Regulated). All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name are covered by a limit which is the same as the inert or nuisance dust limit of 15 mg/m³ for total dust and 5 mg/m³ for the respirable fraction.

8(b) Appropriate Engineering Controls: Use controls as appropriate to minimize exposure to metal fumes and dusts during handling operations. Provide general or local exhaust ventilation systems to minimize airborne concentrations. Local exhaust is necessary for use in enclosed or confined spaces. Provide sufficient general/local exhaust ventilation in pattern/volume to control inhalation exposures below current exposure limits.

- **Respiratory Protection:** Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, use only a NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. Concentration in air of the various contaminants determines the extent of respiratory protection needed. Half-face, negative-pressure, air-purifying respirator equipped with P100 filter is acceptable for concentrations up to 10 times the exposure limit. Full-face, negative-pressure, air-purifying respirator equipped with P100 filter is acceptable for concentrations up to 50 times the exposure limit. Protection by air-purifying negative-pressure and powered air respirators is limited. Use a positive-pressure-demand, full-face, supplied air respirator or self-contained breathing apparatus (SCBA) for concentrations above 50 times the exposure limit. If exposure is above the IDLH (Immediately dangerous to life or health) for any of the constituents, or there is a possibility of an uncontrolled release or exposure levels are unknown, then use a positive-demand, full-face, supplied air respirator with escape bottle or SCBA.

Warning! Air-purifying respirators both negative-pressure, and powered-air do not protect workers in oxygen-deficient atmospheres.

- **Eyes:** Wear appropriate eye protection to prevent eye contact. For operations which result in elevating the temperature of the product to or above its melting point or result in the generation of airborne particulates, use safety glasses to prevent eye contact. Contact lenses should not be worn where industrial exposures to this material are likely. Use safety glasses or goggles as required for welding, burning, sawing, brazing, grinding or machining operations.
- **Skin:** Wear appropriate personal protective clothing to prevent skin contact. Cut resistant gloves and sleeves should be worn when working with steel products. For operations which result in elevating the temperature of the product to or above its melting point or result in the generation of airborne particulates, use protective clothing, and gloves to prevent skin contact. Protective gloves should be worn as required for welding, burning or handling operations. Contaminated work clothing must not be allowed out of the workplace.
- **Other protective equipment:** An eyewash fountain and deluge shower should be readily available in the work area.

Section 9 - Physical and Chemical Properties

9(a) Appearance (physical state, color, etc.): Solid, Metallic Gray

9(b) Odor: Odorless

9(c) Odor Threshold: NA

9(d) pH: NA

9(e) Melting Point/Freezing Point: ~2750 °F (~1510 C)

9(f) Initial Boiling Point and Boiling Range: ND

9(g) Flash Point: NA

9(h) Evaporation Rate: NA

9(i) Flammability (solid, gas): Non-flammable, non-combustible

NA - Not Applicable

ND - Not Determined for product as a whole

9(j) Upper/lower Flammability or Explosive Limits: NA

9(k) Vapor Pressure: NA

9(l) Vapor Density (Air = 1): NA

9(m) Relative Density: 7.85

9(n) Solubility(ies): Insoluble

9(o) Partition Coefficient n-octanol/water: ND

9(p) Auto-ignition Temperature: NA

9(q) Decomposition Temperature: ND

9(r) Viscosity: NA

Section 10 - Stability and Reactivity

10(a) Reactivity: Not Determined (ND) for product in a solid form. Do not use water on molten metal.

10(b) Chemical Stability: Steel products are stable under normal storage and handling conditions.

10(c) Possibility of hazardous reaction: None Known






10(d) Conditions to Avoid: Storage with strong acids or calcium hypochlorite.

10(e) Incompatible Materials: Will react with strong acids to form hydrogen. Iron oxide dusts in contact with calcium hypochlorite evolve oxygen and may cause an explosion.

10(f) Hazardous Decomposition Products: Thermal oxidative decomposition of steel products can produce fumes containing oxides of iron and manganese as well as other alloying elements.

Section 11 - Toxicological Information

11 Information on toxicological effects: The following toxicity data has been determined for **Metal Coated Steel Sheet** when further processed using the information available for its components applied to the guidance on the preparation of an SDS under the GHS requirements of OSHA and the EU CPL:

Hazard Classification	Hazard Category		Hazard Symbols	Signal Word	Hazard Statement
	EU	OSHA			
Eye Damage/Irritation (covers Categories 1, 2A and 2B)	NA*	2B ^c	No Pictogram	Warning	Causes eye irritation - Rating due to iron particulate generated from further processing (welding, grinding, burning, etc.).
Skin/Dermal Sensitization (covers Category 1)	NA*	1 ^d		Warning	May cause an allergic skin reaction. - Nickel is a skin sensitizer.
Carcinogenicity (covers Categories 1A, 1B and 2)	NA*	2 ^e		Warning	Suspected of causing cancer. - Rating due to nickel particulate or fume that can enter the body generated when further processed (welding, grinding, burning, etc.).
Toxic Reproduction (covers Categories 1A, 1B and 2)	NA*	2 ^h		Warning	Suspected of damaging fertility or the unborn child. - Rating due to nickel particulate or fume that can enter the body generated when further processed (welding, grinding, burning, etc.).
Specific Target Organ Toxicity (STOT) Following Single Exposure (covers Categories 1-3)	NA*	3 ⁱ		Warning	May cause respiratory irritation. - Rating due to iron particulate or fume that can enter the body generated when further processed (welding, grinding, burning, etc.).
STOT following Repeated Exposure (covers Categories 1 and 2)	NA*	1 ^j		Danger	Causes damage to lungs and central nervous system through prolonged or repeated inhalation exposure. - Rating due to nickel or manganese particulate or fume that can enter the body generated when further processed (welding, grinding, burning, etc.).

* Not Applicable - Semi-formed steel products are considered articles under Reach regulation (REACH REGULATION (EC) No 1907/2006) and are not subject to classification under CLP regulation (REGULATION (EC) No 1272/2008).

Toxicological data listed below are presented regardless to classification criteria. Individual hazard classification categories where the toxicological information has met or exceeded a classification criteria threshold are listed above.

a. No LC₅₀ or LD₅₀ has been established for **Metal Coated Steel Sheet**. The following data has been determined for the components:

- **Iron:** Rat LD₅₀ =98.6 g/kg (REACH)
Rat LD₅₀ =1060 mg/kg (IUCLID)
Rat LD₅₀ =984 mg/kg (IUCLID)
Rabbit LD₅₀ =890 mg/kg (IUCLID)
Guinea Pig LD₅₀ =20 g/kg (TOXNET)
- **Nickel:** LD₅₀ >9000 mg/kg (Oral/Rat)
- **Silicon:** LD₅₀ = 3160 mg/kg (Oral/Rat)
- **Manganese:** Rat LD₅₀ > 2000 mg/kg (REACH)
Rat LD₅₀ > 9000 mg/kg (NLM Toxnet)
- **Aluminum:** Rat LD₅₀ > 15.9 g/kg (REACH)

b. No Skin (Dermal) Irritation data available for **Metal Coated Steel Sheet** as a mixture or its components.

c. No Eye Irritation data available for **Metal Coated Steel Sheet** as a mixture. The following Eye Irritation information was found for the components:

- **Iron:** Causes eye irritation.
- **Nickel:** Slight eye irritation from particulate abrasion only.
- **Silicon:** Slight eye irritation in rabbit protocol.

d. No Skin (Dermal) Sensitization data available for **Metal Coated Steel Sheet** as a mixture. The following Skin (Dermal) Sensitization information was found for the components:

- **Nickel:** May cause allergic skin sensitization.

e. No Respiratory Sensitization data available for **Metal Coated Steel Sheet** as a mixture or its components.

f. No Germ Cell Mutagenicity data available for **Metal Coated Steel Sheet** as a mixture. The following Mutagenicity and Genotoxicity information was found for the components:

- **Iron:** IUCLID has found some positive and negative findings in vitro.
- **Nickel:** EU RAR has found positive results in vitro and in vivo but insufficient data for classification.
- **Aluminum:** IUCLID; ATSDR have found this ingredient is not mutagenic *in vitro*; but has marginal effects *in vivo*.

Section 11 - Toxicological Information (continued)

11 Information on toxicological effects (continued):

- g. Carcinogenicity: IARC, NTP, and OSHA do not list **Metal Coated Steel Sheet** as carcinogens. The following Carcinogenicity information was found for the components:
- **Welding Fumes** - IARC Group 2B carcinogen, a mixture that is possibly carcinogenic to humans.
 - **Nickel and certain nickel compounds** – Group 2B - metallic nickel Group 1 - nickel compounds ACGIH confirmed human carcinogen. Nickel – EURAR Insufficient evidence to conclude carcinogenic potential in animals or humans; suspect carcinogen classification Category 2 Suspected of causing cancer.
- h. No Toxic Reproduction data available for **Metal Coated Steel Sheet** as a mixture. The following Toxic Reproductive information was found for the components:
- **Nickel**: Effects on fertility.
- i. No Specific Target Organ Toxicity (STOT) following a Single Exposure data available for **Metal Coated Steel Sheet** as a mixture. The following STOT following a Single Exposure data was found for the components:
- **Iron**: Irritating to Respiratory tract.
- j. No Specific Target Organ Toxicity (STOT) following Repeated Exposure data was available for **Metal Coated Steel Sheet** as a whole. The following STOT following Repeated Exposure data was found for the components:
- **Manganese**: Inhalation of metal fumes - Degenerative changes in human Brain; Behavioral: Changes in motor activity and muscle weakness (Whitlock *et al.*, 1966).
 - **Nickel**: Rat 4 wk inhalation LOEL 4 mg/m³ Lung and Lymph node histopathology. Rat 2 yr inhalation LOEL 0.1 mg/ m³ Pigment in kidney, effects on hematopoiesis spleen and bone marrow and adrenal tumor. Rat 13 Week Inhalation LOAEC 1.0 mg/m³ Lung weights, and Alveolar histopathology.
 - **Aluminum**: Repeated exposure associated with Asthma, fibrosis in lungs and encephalopathy in humans. Reviews have found chronic exposure to aluminum flake has been reported to cause pneumoconiosis in workers. Repeat oral exposure to aluminum results in decrements in neurobehavioral function and development.

The above toxicity information was determined from available scientific sources to illustrate the prevailing posture of the scientific community. The scientific resources includes: The American Conference of Governmental Industrial Hygienist (ACGIH) Documentation of the Threshold Limit Values (TLVs) and Biological Exposure indices (BEIs) with Other Worldwide Occupational Exposure Values 2009, The International Agency for Research on Cancer (IARC), The National Toxicology Program (NTP) updated documentation, the World Health Organization (WHO) and other available resources, the International Uniform Chemical Information Database (IUCLID), European Union Risk Assessment Report (EU-RAR), Concise International Chemical Assessment Documents (CICAD), European Union Scientific Committee for Occupational Exposure Limits (EU-SCOEL), Agency for Toxic Substances and Disease Registry (ATSDR), Hazardous Substance Data Bank (HSDB), and International Programme on Chemical Safety (IPCS), European Union Classification, Labeling and Packaging. (EU CPL), Regulation on Registration, Evaluation, Authorization and Restriction of Chemicals (REACH), International Uniform Chemical Information Database (IUCLID), TOXicology Data NETwork (TOXNET), European Risk Assessment Reports (EU RAR).

The following health hazard information is provided regardless to classification criteria and is based on the individual component(s) and potential resultant components from further processing:

Acute Effects:

- **Inhalation**: Excessive exposure to high concentrations of metal dust may cause irritation to the eyes, skin and mucous membranes of the upper respiratory tract. Excessive inhalation of fumes of freshly formed metal oxide particles sized below 1.5 micrometer and usually between 0.02-0.05 micrometers from many metals can produce an acute reaction known as “metal fume fever”. Symptoms consist of chills and fever (very similar to and easily confused with flu symptoms), metallic taste in the mouth, dryness and irritation of the throat followed by weakness and muscle pain. The symptoms come on in a few hours after excessive exposures and usually last from 12 to 48 hours. Long-term effects from metal fume fever have not been noted. Freshly formed oxide fumes of manganese have been associated with causing metal fume fever.
- **Eye**: Excessive exposure to high concentrations of metal dust may cause irritation to the eyes.
- **Skin**: Skin contact with metal dusts may cause irritation or sensitization, possibly leading to dermatitis. Skin contact with metallic fumes and dusts may cause physical abrasion.
- **Ingestion**: Ingestion of harmful amounts of this product as distributed is unlikely due to its solid insoluble form. Ingestion of metal dust may cause nausea or vomiting.

Acute Effects by component:

- **Iron and iron oxides**: Iron is harmful if swallowed, causes skin irritation, and causes eye irritation. Contact with iron oxide has been reported to cause skin irritation and serious eye damage. Particles of iron or iron compounds, which become imbedded in the eye, may cause rust stains unless removed fairly promptly.
- **Manganese and manganese oxides**: Manganese and Manganese oxide are harmful if swallowed.
- **Nickel and nickel oxides**: Nickel may cause allergic skin sensitization. Nickel oxide may cause an allergic skin.
- **Silicon and silicon oxides**: May be harmful if swallowed.
- **Aluminum and aluminum oxides** : Not Reported/ Not Classified

Delayed (chronic) Effects by component:

- **Iron and iron oxides**: Chronic inhalation of excessive concentrations of iron oxide fumes or dusts may result in the development of a benign pneumoconiosis, called siderosis, which is observable as an X-ray change. No physical impairment of lung function has been associated with siderosis. Inhalation of excessive concentrations of ferric oxide may enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens. Iron oxide is listed as a Group 3 (not classifiable) carcinogen by the International Agency for Research on Cancer (IARC).
- **Silicon and silicon oxides**: Silicon dusts are a low health risk by inhalation and should be treated as a nuisance dust. Eye contact with pure material can cause particulate irritation. Skin contact with silicon dusts may cause physical abrasion.



Section 11 - Toxicological Information (continued)

Delayed (chronic) Effects by component: (continued)

- **Manganese and manganese oxides:** Chronic exposure to high concentrations of manganese fumes and dusts may adversely affect the central nervous system with symptoms including languor, sleepiness, weakness, emotional disturbances, spastic gait, mask-like facial expression and paralysis. Animal studies indicate that manganese exposure may increase susceptibility to bacterial and viral infections. Occupational overexposure (manganese) is a progressive, disabling neurological syndrome that typically begins with relatively mild symptoms and evolves to include altered gait, fine tremor, and sometimes, psychiatric disturbances. May cause damage to lungs with repeated or prolonged exposure. Neurobehavioral alterations in worker populations exposed to manganese oxides include: speed and coordination of motor function are especially impaired.
- **Nickel and nickel oxides:** Exposure to nickel dusts and fumes can cause sensitization dermatitis, respiratory irritation, asthma, pulmonary fibrosis, edema, and may cause nasal or lung cancer in humans. Nickel causes damage to lungs through prolonged or repeated inhalation exposure. IARC lists nickel and certain nickel compounds as Group 2B carcinogens (sufficient animal data). ACGIH 2014 TLVs® and BEIs® lists insoluble nickel compounds as confirmed human carcinogens. Nickel is suspected of damaging the unborn child.
- **Aluminum and Aluminum oxides:** Chronic inhalation of finely divided powder has been reported to cause pulmonary fibrosis and emphysema. Repeated skin contact has been associated with bleeding into the tissue, delayed hypersensitivity and granulomas. Chronic exposure to aluminum flake has been reported to cause pneumoconiosis in workers. Repeat oral exposure to aluminum results in decrements in neurobehavioral function and development.

Section 12 - Ecological Information

12(a) Ecotoxicity (aquatic & terrestrial): No Data Available for **Metal Coated Steel Sheet** as sold/shipped. However, individual components of the product when processed have been found to be toxic to the environment. Metal dusts may migrate into soil and groundwater and be ingested by wildlife as follows:

- **Iron Oxide:** LC₅₀: >1000 mg/L; Fish 48 h-EC₅₀ > 100 mg/L (Currenta, 2008k); 96 h-LC₀ ≥ 50,000 mg/L. Test substance: Bayferrox 130 red (95 – 97% Fe₂O₃; < 4% SiO₂ and Al₂O₃) (Bayer, 1989a).
- **Hexavalent Chrome:** EU RAR listed as category 1, found acute EC₅₀ and LD₅₀ to algae and invertebrates < 1 mg.
- **Nickel Oxide:** IUCLID found LC₅₀ in fish, invertebrates and algae > 100 mg/l.

12(b) Persistence & Degradability: No Data Available for **Metal Coated Steel Sheet** as sold/shipped or individual components.

12(c) Bioaccumulative Potential: No Data Available for **Metal Coated Steel Sheet** as sold/shipped or individual components.

12(d) Mobility (in soil): No data available for **Metal Coated Steel Sheet** as sold/shipped. However, individual components of the product have been found to be absorbed by plants from soil.

12(e) Other adverse effects: None Known

Additional Information:

Hazard Category: Not Reported

Signal Word: No Signal Word

Hazard Symbol: No Symbol

Hazard Statement: No Statement

Section 13 - Disposal Considerations

Disposal: Steel scrap should be recycled whenever possible. Product dusts and fumes from processing operations should also be recycled, or classified by a competent environmental professional and disposed of in accordance with applicable federal, state or local regulations.

Container Cleaning and Disposal: Follow applicable federal, state and local regulations. Observe safe handling precautions. European Waste Catalogue (EWC): 16-01-17 (ferrous metals), 12-01-99 (wastes not otherwise specified), 16-03-04 (off specification batches and unused products), or 15-01-04 (metallic packaging).

Please note this information is for Metal Coated Steel Sheet in its original form. Any alterations can void this information.

Section 14 - Transport Information

14 (a-g) Transportation Information:

US Department of Transportation (DOT) under 49 CFR 172.101 does not regulate **Metal Coated Steel Sheet** as a hazardous material. All federal, state, and local laws and regulations that apply to the transport of this type of material must be adhered to.

<p>Shipping Name: Not Applicable (NA) Shipping Symbols: NA Hazard Class: NA UN No.: NA Packing Group: NA DOT/IMO Label: NA Special Provisions (172.102): NA</p>	<p>Packaging Authorizations a) Exceptions: NA b) Group: NA c) Authorization: NA</p>	<p>Quantity Limitations a) Passenger, Aircraft, or Railcar: NA b) Cargo Aircraft Only: NA Vessel Stowage Requirements a) Vessel Stowage: NA b) Other: NA DOT Reportable Quantities: NA</p>
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International Maritime Dangerous Goods (IMDG) and the Regulations Concerning the International Carriage of Dangerous Goods by Rail (RID) classification, packaging and shipping requirements follow the US DOT Hazardous Materials Regulation.

Metal Coated Steel Sheet



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Section 14 - Transport Information (continued)

Regulations Concerning the International Carriage of Dangerous Goods by Road (ADR) does not regulate Metal Coated Steel Sheet as a hazardous material.

<p>Shipping Name: Not Applicable (NA) Classification Code: NA UN No.: NA Packing Group: NA ADR Label: NA Special Provisions: NA Limited Quantities: NA</p>	<p>Packaging a) Packing Instructions: NA b) Special Packing Provisions: NA c) Mixed Packing Provisions: NA</p>	<p>Portable Tanks & Bulk Containers a) Instructions: NA b) Special Provisions: NA</p>
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International Air Transport Association (IATA) does not regulate Metal Coated Steel Sheet as a hazardous material.

<p>Shipping Name: Not Applicable (NA) Class/Division: NA Hazard Label (s): NA UN No.: NA Packing Group: NA Excepted Quantities (EQ): NA</p>	<p>Passenger & Cargo Aircraft Limited Quantity (EQ) Pkg Inst: NA Max Net Qty/Pkg: NA</p>	<p>Cargo Aircraft Only Pkg Inst: NA Max Net Qty/Pkg: NA</p>	<p>Special Provisions: NA ERG Code: NA</p>
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Pkg Inst – Packing Instructions

Max Net Qty/Pkg – Maximum Net Quantity per Package

ERG – Emergency Response Drill Code

Transport Dangerous Goods (TDG) Classification: Metal Coated Steel Sheet does not have a TDG classification.

Section 15 - Regulatory Information

Regulatory Information: The following listing of regulations relating to an ArcelorMittal product may not be complete and should not be solely relied upon for all regulatory compliance responsibilities.

This product and/or its constituents are subject to the following regulations:

OSHA Regulations: Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-2, Z-3): The product, **Metal Coated Steel Sheet** as a whole is not listed. However, individual components of the product are listed: Refer to Section 8, Exposure Controls and Personal Protection.

EPA Regulations: The product, **Metal Coated Steel Sheet** is not listed as a whole. However, individual components of the product are listed:

Components	Regulations
Manganese	CAA, SARA 313, SDWA
Nickel	CAA, CERCLA, CWA, SARA 313
Aluminum	SARA 313

SARA 311/312 Potential Hazard Categories: Immediate Acute Health Hazard; Delayed Chronic Health Hazard.

Section 313 Supplier Notification: The product, **Metal Coated Steel Sheet** contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-to-Know Act and 40 CFR part 372:

CAS #	Chemical Name	Percent by Weight
7439-96-5	Manganese	2.5 max
7440-02-0	Nickel	1.8 max
7429-90-5	Aluminum	1.60

Regulations Key:

- CAA Clean Air Act (42 USC Sec. 7412; 40 CFR Part 61 [As of: 8/18/06])
- CERCLA Comprehensive Environmental Response, Compensation and Liability Act (42 USC Secs. 9601(14), 9603(a); 40 CFR Sec. 302.4, Table 302.4, Table 302.4 and App. A)
- CWA Clean Water Act (33 USC Secs. 1311; 1314(b), (c), (e), (g); 136(b), (c); 137(b), (c) [as of 8/2/06])
- RCRA Resource Conservation Recovery Act (42 USC Sec. 6921; 40 CFR Part 261 App VIII)
- SARA Superfund Amendments and Reauthorization Act of 1986 Title III Section 302 Extremely Hazardous Substances (42 USC Secs. 11023, 13106; 40 CFR sec. 372.65) and Section 313 Toxic Chemicals (42 USC Secs. 11023, 13106; 40 CFR Sec. 372.65 [as of 6/30/05])
- TSCA Toxic Substance Control Act (15 U.S.C. s/s 2601 et seq. [1976])
- SDWA Safe Drinking Water Act (42 U.S.C. s/s 300f et seq. [1974])

State Regulations: The product, **Metal Coated Steel Sheet** as a whole is not listed in any state regulations. However, individual components of the product are listed in various state regulations:

Pennsylvania Right to Know: Contains regulated material in the following categories:

- Hazardous Substances: Aluminum, Manganese, Nickel and Silicon
- Environmental Hazards: Aluminum, Manganese and Nickel
- Special Hazardous Substance: Nickel

California Prop. 65: Contains elements known to the State of California to cause cancer or reproductive toxicity. This includes Nickel.

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Section 15 - Regulatory Information (continued)

State Regulations (continued):

New Jersey: Contains regulated material in the following categories:

- Hazardous Substance: Aluminum, Manganese, Silicon, and Nickel
- Environmental Hazards: Manganese and Nickel
- Special Hazardous Substance: Aluminum, Manganese and Silicon

Minnesota: Manganese, and Nickel

Massachusetts: Aluminum, Manganese, Silicon and Nickel

Other Regulations:

WHMIS Classification (Canadian): The product, **Metal Coated Steel Sheet** is not listed as a whole. However individual components are listed.

Ingredients	WHMIS Classification
Manganese	Reproductive toxicity - Category 2, Specific target organ toxicity - repeated exposure - Category 1, Combustible dusts
Nickel	Skin sensitization – Category 1, Carcinogenicity – Category 2, Specific target organ toxicity – repeated exposure - Category 1
Silicon	Flammable solids - Category 2, Combustible dusts

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.

Section 16 - Other Information

Prepared By: ArcelorMittal USA LLC

Original Issue Date: 8/26/2002

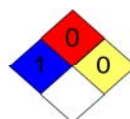
Revised Date: 01/01/2016

Additional Information:

Hazardous Material Identification System (HMIS) Classification

Health Hazard	1
Fire Hazard	0
Physical Hazard	0

National Fire Protection Association (NFPA)



HEALTH= 1, Denotes possible chronic hazard if airborne dusts or fumes are generated Irritation or minor reversible injury possible.

FIRE= 0, Materials that will not burn.

PHYSICAL HAZARD= 0, Materials that are normally stable, even under fire conditions, and will not react with water, polymerize, decompose, condense, or self-react. Non-explosives.

HEALTH = 1, Exposure could cause irritation but only minor residual injury even if no treatment is given.

FLAMMABILITY = 0, Materials that will not burn.

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

ABBREVIATIONS/ACRONYMS:

ACGIH	American Conference of Governmental Industrial Hygienists
BEIs	Biological Exposure Indices
CAS	Chemical Abstracts Service
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLP	Classification, Labelling and Packaging
CFR	Code of Federal Regulations
CNS	Central Nervous System
GI, GIT	Gastro-Intestinal, Gastro-Intestinal Tract
HMIS	Hazardous Materials Identification System
IARC	International Agency for Research on Cancer
LC50	Median Lethal Concentration
LD50	Median Lethal Dose
LD_{Lo}	Lowest Dose to have killed animals or humans
LEL	Lower Explosive Limit
LOEL	Lowest Observed Effect Level
LOAEC	Lowest Observable Adverse Effect Concentration
µg/m³	microgram per cubic meter of air
mg/m³	milligram per cubic meter of air
mppcf	million particles per cubic foot
MSHA	Mine Safety and Health Administration
NFPA	National Fire Protection Association

NIF	No Information Found
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
ORC	Organization Resources Counselors
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PNOR	Particulate Not Otherwise Regulated
PNOC	Particulate Not Otherwise Classified
PPE	Personal Protective Equipment
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
REACH	Regulation on Registration, Evaluation, Authorization and Restriction of Chemicals
RTECS	Registry of Toxic Effects of Chemical Substances
SARA	Superfund Amendment and Reauthorization Act
SCBA	Self-contained Breathing Apparatus
SDS	Safety Data Sheet
STEL	Short-term Exposure Limit
TLV	Threshold Limit Value
TWA	Time-weighted Average
UEL	Upper Explosive Limit

Metal Coated Steel Sheet



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Section 16 - Other Information (continued)

Disclaimer: This information is taken from sources or based upon data believed to be reliable. Our objective in sending this information is to help you protect the health and safety of your personnel and to comply with the OSHA Hazard Communication Standard and Title III of the Emergency Planning and Community Right-to-Know Act. ArcelorMittal USA LLC makes no warranty as to the absolute correctness, completeness, or sufficiency of any of the foregoing, or any additional, or other measures that may not be required under particular conditions.

THIS ARCELORMITTAL USA LLC SDS MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY, OR ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, AND ANY IMPLIED WARRANTIES OTHERWISE ARISING FROM COURSE OF DEALING OR TRADE.

Products covered for Metal Coated Steel Sheet:

Aluminized Steel	Aluminized Usibor™
Galvanized Steel	GALVALUME Steel™
Galvanized Culvert Sheet	Electrosite™
Galvannealed Steel	Aluminized Ductibor™
Electrogalvanized Steel	Nickel Flash

Metal Coated Steel Sheet

Signal Word: **DANGER**

Symbols:



HAZARD STATEMENTS:

Causes eye irritation.
May cause an allergic skin reaction.
Suspected of causing cancer.
Suspected of damaging fertility or the unborn child.
May cause respiratory irritation.
Causes damage to lungs and central nervous system through prolonged or repeated inhalation exposure.

PRECAUTIONARY STATEMENTS

Do not breathe dusts / fume / gas / mist / vapor / spray.
Wear protective gloves / protective clothing / eye protection / face protection.
Contaminated work clothing must not be allowed out of the workplace.
Use only outdoors or in well ventilated areas.
Wash thoroughly after handling.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not eat, drink or smoke when using this product.
If inhaled: Remove person to fresh air and keep comfortable for breathing.
If exposed, concerned or feel unwell: Get medical advice/attention.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.
Continue Rinsing.
If on skin: Wash with plenty of water. If irritation or rash occurs: Get medical advice/attention. Take off and wash contaminated clothing before reuse.
Call a poison center/doctor if you feel unwell.
Dispose of contents in accordance with federal, state and local regulations.

SDS ID No.: AM USA - 002

ArcelorMittal USA LLC
1 South Dearborn Street
Chicago, IL 60603-9888

General Information: Phone: 219-787-4901 or email at: msdssupport@arcelormittal.com

CHEMTREC (Day or Night): 1-800-424-9300

Emergency Contact: 1-760-476-3962, (3E Company Code: 333211)

Original Issue Date: 08/26/2002

Revised: 01/01/2016

Safety Data Sheet



Section 1: Identification of the Substance/Mixture and of the Company/Undertaking

1.1 Product identifier

Product Name

- **Common Salt without Additives**

Synonyms

- All Purpose Natural Sea Salt; All Purpose Purex Salt; Bunny Spool (Plain Salt); California Pure Coarse Sea Salt; California Pure Fine Sea Salt; California Pure Medium Sea Salt; Canning & Pickling Salt; Commercial Grade, Water Softening Pellets; Culinox 999 Chemical Grade Salt; Culinox 999 Fine Salt; Culinox 999 Food Grade Salt; Evaporated Granulated Salt; Evaporated Salt Pellets; Feed Mixing Salt, Northern Rock, F & R; Fine Mixing Salt; H.G. Blending Salt; Hay & Stock Salt, F&R; Industrial Crude Solar Salt; KD Crude Solar Salt; Kleer Fine Salt; Kleer Granulated Salt; Mill Run Salt; Natural Coarse Sea Salt; Northern Fine +20 Rock Salt; Plain Salt Block; Plain Salt Brick; Pool Salt; Professional's Choice Pool Salt; Purex Salt; Purex Select Salt; Reagent Grade Sodium Chloride; Refined Sea Salt; Rock Pretzel Salt; Rock Salt for Making Ice Cream; Safe-T-Salt (bagged w/o YPS); Sea Salt Grinder; Sea Salt Grinder Reill; Select Extra Coarse Rock Salt; Service Pack Salt (all); Ship n' Shore Rock Salt; Solar Salt Water Softening Crystals; Stock Salt; USP Sodium Chloride; Valu-Soft Solar Salt; Water Softening Salt (Undried) Coarse; Water Softening Salt (Undried) Extra Coarse; White Crystal Brine Block (50 lb); White Crystal Rock Salt (all); White Crystal Solar Salt (all); White Crystal Water Softening Solar Salt (all); White Pretzel Salt; Dried Coarse Salt

CAS Number

- 7647-14-5

Product Code

- MSDS Code: 100

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified use(s)

- Food, Chemical and Drug Processing; Pharmaceuticals; Water Conditioning; Ice Control; Chemical Feedstock – see product data sheets for more information

1.3 Details of the supplier of the safety data sheet

Manufacturer

- Morton Salt, Inc.
123 N. Wacker Drive
Chicago, IL 60606
United States

saltinfo@mortonsalt.com

Telephone (General) • 312-807-2000

1.4 Emergency telephone number

Manufacturer

- 312-807-2000

Section 2: Hazards Identification

EU/EEC

According to EU Directive 1272/2008 (CLP)/REACH 1907/2006 [amended by 453/2010]
According to EU Directive 67/548/EEC (DSD) or 1999/45/EC (DPD)

2.1 Classification of the substance or mixture

- CLP
 - Classification criteria not met
- DSD/DPD
 - Classification criteria not met

2.2 Label Elements

- CLP
 - Hazard statements**
 - No label element(s) specifically required
- DSD/DPD
 - Risk phrases**
 - No label element(s) specifically required

2.3 Other Hazards

- CLP
 - According to Regulation (EC) No. 1272/2008 (CLP) this material is not considered hazardous.
 - DSD/DPD
 - This product is not considered dangerous under the European Directive 67/548/EEC
-

United States (US)

According to OSHA 29 CFR 1910.1200 HCS

2.1 Classification of the substance or mixture

- OSHA HCS 2012
 - Classification criteria not met

2.2 Label elements

- OSHA HCS 2012
 - Hazard statements**
 - No label element(s) specifically required

2.3 Other hazards

- OSHA HCS 2012
 - This product is not considered hazardous under the U.S. OSHA 29 CFR 1910.1200 Hazard Communication Standard.
-

Canada

According to WHMIS

2.1 Classification of the substance or mixture

- WHMIS
 - Classification criteria not met

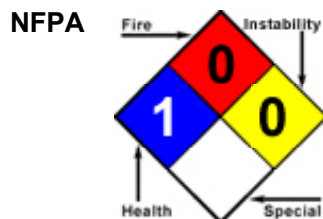
2.2 Label elements

- WHMIS
 - No label element(s) specifically required

2.3 Other hazards

- WHMIS
 - In Canada, the product mentioned above is not considered hazardous under the Workplace Hazardous Materials Information System (WHMIS).
-

2.4 Other information



See Section 12 for Ecological Information.

Section 3 - Composition/Information on Ingredients

3.1 Substances

Non-Hazardous Components					
Chemical Name	Identifiers	%(weight)	LD50/LC50	Classifications According to Regulation/Directive	Comments
Sodium chloride	CAS:7647-14-5 EC Number:231-598-3	> 99%	Ingestion/Oral-Rat LD50 • 3000 mg/kg	EU DSD/DPD: Not Classified - Criteria not met EU CLP: Not Classified - Criteria not met OSHA HCS 2012: Not Classified - Criteria not met	May contain small quantities of naturally occurring calcium and magnesium salts

3.2 Mixtures

- Material does not meet the criteria of a mixture in accordance with Regulation (EC) No 1272/2008.

See Section 11 for Toxicological Information.

Section 4 - First Aid Measures

4.1 Description of first aid measures

- Inhalation**
- Move victim to fresh air. Administer oxygen if breathing is difficult. Give artificial respiration if victim is not breathing.
- Skin**
- IF ON SKIN: Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention.
- Eye**
- In case of contact with substance, immediately flush eyes with running water for at least 20 minutes. If eye irritation persists: Get medical advice/attention.
- Ingestion**
- If large quantities are swallowed, call a physician immediately.

4.2 Most important symptoms and effects, both acute and delayed

- Refer to Section 11 - Toxicological Information.

4.3 Indication of any immediate medical attention and special treatment needed

- Notes to Physician**
- All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

Section 5 - Firefighting Measures

5.1 Extinguishing media

- Suitable Extinguishing Media**
- Material is non-combustible. In case of fire use media as appropriate for surrounding fire.
- Unsuitable Extinguishing Media**
- No data available.

5.2 Special hazards arising from the substance or mixture

- Unusual Fire and Explosion Hazards**
- No unusual fire or explosion hazards known.
- Hazardous Combustion Products**
- No data available

5.3 Advice for firefighters

- Structural firefighters' protective clothing will only provide limited protection. Wear positive pressure self-contained breathing apparatus (SCBA).

Section 6 - Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal Precautions

- Wear suitable protective clothing, gloves, and eye/face protection.

Emergency Procedures

- Stop leak if you can do it without risk. Keep unauthorized personnel away. Use normal clean up procedures.

6.2 Environmental precautions

- None expected to be necessary if material is used under ordinary conditions and as recommended.

6.3 Methods and material for containment and cleaning up

Containment/Clean-up Measures

- Carefully shovel or sweep up spilled material and place in suitable container.

6.4 Reference to other sections

- Refer to Section 8 - Exposure Controls/Personal Protection and Section 13 - Disposal Considerations.

Section 7 - Handling and Storage

7.1 Precautions for safe handling

Handling

- Use good safety and industrial hygiene practices. Wash thoroughly after handling. Keep out of reach of children.

7.2 Conditions for safe storage, including any incompatibilities

Storage

- Avoid storage with strong acids and strong oxidizing agents.

Incompatible Materials or Ignition Sources

- Strong oxidizing agents, strong acids.

7.3 Specific end use(s)

- Refer to Section 1.2 - Relevant identified uses.

Section 8 - Exposure Controls/Personal Protection

8.1 Control parameters

Exposure Limits/Guidelines

- No applicable exposure limits available for product or components.

8.2 Exposure controls

Engineering Measures/Controls

- Adequate ventilation systems as needed to control concentrations of airborne contaminants below applicable threshold limit values.

Personal Protective Equipment

Pictograms



Respiratory

- In case of insufficient ventilation, wear suitable respiratory equipment.

Eye/Face

- Wear safety glasses.

Skin/Body	<ul style="list-style-type: none"> Wear appropriate gloves.
General Industrial Hygiene Considerations	<ul style="list-style-type: none"> Do not get in eyes or on skin or clothing. Handle in accordance with good industrial hygiene and safety practice.
Environmental Exposure Controls	<ul style="list-style-type: none"> Follow best practice for site management and disposal of waste.

Section 9 - Physical and Chemical Properties

9.1 Information on Physical and Chemical Properties

Material Description			
Physical Form	Solid	Appearance/Description	Colorless to white crystalline or compressed block/pellet.
Color	Colorless to White.	Odor	Odorless
Particulate Type	Dust Crystalline	Particulate Size	Variable
Odor Threshold	Data lacking		
General Properties			
Boiling Point	1413 to 1461 C(2575.4 to 2661.8 F)	Melting Point	801 C(1473.8 F)
Decomposition Temperature	Data lacking	pH	7 Approximately
Specific Gravity/Relative Density	2.165 Water=1	Bulk Density	Variable
Water Solubility	Soluble 0.36 g/cc @ 20 C(68 F)	Viscosity	Not relevant
Explosive Properties	Not relevant.	Oxidizing Properties:	Not relevant.
Volatility			
Vapor Pressure	Not relevant	Vapor Density	Not relevant
Evaporation Rate	Not relevant		
Flammability			
Flash Point	Not relevant	UEL	Not relevant
LEL	Not relevant	Autoignition	Not relevant
Flammability (solid, gas)	Not flammable.		
Environmental			
Octanol/Water Partition coefficient	Not relevant		

9.2 Other Information

- No additional physical and chemical parameters noted.

Section 10: Stability and Reactivity

10.1 Reactivity

- No dangerous reaction known under conditions of normal use.

10.2 Chemical stability

- Stable

10.3 Possibility of hazardous reactions

- Hazardous polymerization will not occur.

10.4 Conditions to avoid

- Incompatible materials.

10.5 Incompatible materials

- Strong oxidizing agents, strong acids.

10.6 Hazardous decomposition products

- Will react with strong acids to generate hydrogen chloride and with strong oxidizing agents to generate chlorine gas.

Section 11 - Toxicological Information

11.1 Information on toxicological effects

Component Name	CAS	Data
Sodium chloride (> 99%)	7647-14-5	Acute Toxicity: orl-rat LD50:3000 mg/kg
GHS Properties		Classification
Acute toxicity		EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Aspiration Hazard		EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Carcinogenicity		EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Germ Cell Mutagenicity		EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Skin corrosion/Irritation		EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Skin sensitization		EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
STOT-RE		EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
STOT-SE		EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Toxicity for Reproduction		EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Respiratory sensitization		EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met
Serious eye damage/Irritation		EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met

Potential Health Effects

Inhalation

Acute (Immediate)

- Under normal conditions of use, no health effects are expected. Inhalation of dust may cause mild irritation to mucous membranes, nose and throat. Symptoms may include coughing, dryness and sore throat.

Chronic (Delayed)

- No data available.

Skin

Acute (Immediate)

- Under normal conditions of use, no health effects are expected.

Chronic (Delayed)

- No data available.

Eye**Acute (Immediate)**

- Based upon practical use and experience using this product eye irritation is not expected to occur.

Chronic (Delayed)

- No data available.

Ingestion**Acute (Immediate)**

- Ingestion may cause the following symptoms - diarrhea.

Chronic (Delayed)

- No data available.

Key to abbreviations

LD = Lethal Dose

Section 12 - Ecological Information**12.1 Toxicity**

- Material data lacking.

12.2 Persistence and degradability

- Material data lacking.

12.3 Bioaccumulative potential

- Material data lacking.

12.4 Mobility in Soil

- Material data lacking.

12.5 Results of PBT and vPvB assessment

- No PBT and vPvB assessment has been conducted.

12.6 Other adverse effects

- No studies have been found.

Section 13 - Disposal Considerations**13.1 Waste treatment methods****Product waste**

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

Packaging waste

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

Section 14 - Transport Information

	14.1 UN number	14.2 UN proper shipping name	14.3 Transport hazard class(es)	14.4 Packing group	14.5 Environmental hazards
DOT	NDA	Not regulated	NDA	NDA	NDA
TDG	NDA	Not regulated	NDA	NDA	NDA
IMO/IMDG	NDA	Not regulated	NDA	NDA	NDA

IATA/ICAO	NDA	Not regulated	NDA	NDA	NDA
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14.6 Special precautions for user • None known.

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code • Not relevant.

Section 15 - Regulatory Information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

SARA Hazard Classifications • None

State Right To Know				
Component	CAS	MA	NJ	PA
Sodium chloride	7647-14-5	No	No	No

Inventory						
Component	CAS	Canada DSL	Canada NDSL	China	EU EINECS	EU ELNICS
Sodium chloride	7647-14-5	Yes	No	Yes	Yes	No

Inventory (Con't.)				
Component	CAS	Japan ENCS	Korea KECL	TSCA
Sodium chloride	7647-14-5	Yes	Yes	Yes

Canada

Labor

Canada - WHMIS - Classifications of Substances

- Sodium chloride 7647-14-5 > 99% Uncontrolled product according to WHMIS classification criteria

Canada - WHMIS - Ingredient Disclosure List

- Sodium chloride 7647-14-5 > 99% Not Listed

Environment

Canada - CEPA - Priority Substances List

- Sodium chloride 7647-14-5 > 99% Not Listed

Europe

Other

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Classification

- Sodium chloride 7647-14-5 > 99% Not Listed

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Concentration Limits

- Sodium chloride 7647-14-5 > 99% Not Listed

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Labelling

- Sodium chloride 7647-14-5 > 99% Not Listed

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Notes - Substances and Preparations

- Sodium chloride 7647-14-5 > 99% Not Listed

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Safety Phrases

- Sodium chloride 7647-14-5 > 99% Not Listed

Mexico

Other

Mexico - Hazard Classifications

- Sodium chloride 7647-14-5 > 99% Not Listed

Mexico - Regulated Substances

- Sodium chloride 7647-14-5 > 99% Not Listed

United States

Labor

U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals

- Sodium chloride 7647-14-5 > 99% Not Listed

U.S. - OSHA - Specifically Regulated Chemicals

- Sodium chloride 7647-14-5 > 99% Not Listed

Environment

U.S. - CAA (Clean Air Act) - 1990 Hazardous Air Pollutants

- Sodium chloride 7647-14-5 > 99% Not Listed

U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities

- Sodium chloride 7647-14-5 > 99% Not Listed

U.S. - CERCLA/SARA - Radionuclides and Their Reportable Quantities

- Sodium chloride 7647-14-5 > 99% Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs

- Sodium chloride 7647-14-5 > 99% Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs

- Sodium chloride 7647-14-5 > 99% Not Listed

U.S. - CERCLA/SARA - Section 313 - Emission Reporting

- Sodium chloride 7647-14-5 > 99% Not Listed

U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing

- Sodium chloride 7647-14-5 > 99% Not Listed

United States - California

Environment

U.S. - California - Proposition 65 - Carcinogens List

- Sodium chloride 7647-14-5 > 99% Not Listed

U.S. - California - Proposition 65 - Developmental Toxicity

- Sodium chloride 7647-14-5 > 99% Not Listed

U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)

- Sodium chloride 7647-14-5 > 99% Not Listed

U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)

- Sodium chloride 7647-14-5 > 99% Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Female

- Sodium chloride 7647-14-5 > 99% Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Male

- Sodium chloride 7647-14-5 > 99% Not Listed

United States - Pennsylvania

Labor

U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List

- Sodium chloride 7647-14-5 > 99% Not Listed

U.S. - Pennsylvania - RTK (Right to Know) - Special Hazardous Substances

- Sodium chloride 7647-14-5 > 99% Not Listed

United States - Rhode Island

Labor

U.S. - Rhode Island - Hazardous Substance List

- Sodium chloride 7647-14-5 > 99% Not Listed

15.2 Chemical Safety Assessment

- No Chemical Safety Assessment has been carried out.

Section 16 - Other Information

Last Revision Date ● 18/February 2014

Preparation Date ● 09/August/2012

Disclaimer/Statement of Liability

- The responsibility to provide a safe workplace remains with the user. The user should consider the health hazards and safety information contained herein as a guide and should take those precautions required in an individual operation to instruct employees and develop work practice procedures for a safe work environment. The information contained herein is, to the best of our knowledge and belief, accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations. Nothing contained herein is to be construed as a recommendation for use in violation of any patents or of applicable laws or regulations.

Key to abbreviations

NDA = No data available

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1. Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product Identity	Isoamyl Benzoate for Synthesis
Alternate Names	Isoamyl Benzoate for Synthesis

1.2. Relevant identified uses of the substance or mixture and uses advised against

Intended use	Chemical for synthesis
Application Method	See Technical Data Sheet.

1.3. Details of the supplier of the safety data sheet

Company Name	Thermco Products, Inc. 10 Millpond Drive, Unit #10 Lafayette, NJ 07848
---------------------	---

Emergency

Customer Service: Thermco Products, Inc.	973.300.9100
---	--------------

2. Hazard identification of the product

2.1. Classification of the substance or mixture

Combustible Liquid;H227 Combustible Liquid.

2.2. Label elements

Using the Toxicity Data listed in section 11 and 12 the product is labeled as follows.
H227 Combustible liquid.

[Prevention]:

P210 Keep away from heat / sparks / open flames / hot surfaces - No smoking.
P280 Wear protective gloves / eye protection / face protection.

[Response]:

No GHS response statements

[Storage]:

P403+235 Store in a well ventilated place. Keep cool.

[Disposal]:

P501 Dispose of contents / container in accordance with local / national regulations.

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3. Composition/information on ingredients

This product contains the following substances that present a hazard within the meaning of the relevant State and Federal Hazardous Substances regulations.

Ingredient/Chemical Designations	Weight %	GHS Classification	Notes
ISOPENTYL BENZOATE CAS Number: 0000094-46-2	100	Not classified	[1]

[1] Substance classified with a health or environmental hazard.

[2] Substance with a workplace exposure limit.

[3] PBT-substance or vPvB-substance.

*The full texts of the phrases are shown in Section 16.

4. First aid measures

4.1. Description of first aid measures

General	In all cases of doubt, or when symptoms persist, seek medical attention. Never give anything by mouth to an unconscious person.
Inhalation	Remove to fresh air, keep patient warm and at rest. If breathing is irregular or stopped, give artificial respiration. If unconscious place in the recovery position and obtain immediate medical attention. Give nothing by mouth.
Eyes	Irrigate copiously with clean water for at least 15 minutes, holding the eyelids apart and seek medical attention.
Skin	Remove contaminated clothing. Wash skin thoroughly with soap and water or use a recognized skin cleanser.
Ingestion	If swallowed obtain immediate medical attention. Keep at rest. Do NOT induce vomiting.

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

Overview	No specific symptom data available. See section 2 for further details.
-----------------	---

5. Fire-fighting measures

5.1. Extinguishing media

Recommended extinguishing media; alcohol resistant foam, CO₂, powder, water spray.
Do not use; water jet.

5.2. Special hazards arising from the substance or mixture

Do not inhale vapors/aerosols. Ensure supply of fresh air in enclosed rooms.

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Hazardous decomposition: No hazardous decomposition data available.

Keep away from heat / sparks / open flames / hot surfaces - No smoking.

5.3. Advice for fire-fighters

Special risks:

Combustible. Vapors heavier than air.

Forms explosive mixtures with air on intense heating.

Development of hazardous combustion gases or vapors possible in the event of fire.

Special protective equipment for fire fighting:

Do not stay in dangerous zone without self-contained breathing apparatus.

Do not allow run off water and contaminants from fire fighting to enter drains or water ways.

ERG Guide No. ----

6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Put on appropriate personal protective equipment (see section 8).

Do not inhale vapors/aerosols. Ensure supply of fresh air in enclosed rooms.

6.2. Environmental precautions

Do not allow spills to enter drains or waterways.

Use good personal hygiene practices. Wash hands before eating, drinking, smoking or using toilet. Promptly remove soiled clothing and wash thoroughly before reuse.

6.3. Methods and material for containment and cleaning up

Do not inhale vapors/aerosols. Ensure supply of fresh air in enclosed rooms.

Take up with liquid-absorbent material (e.g. Chemizorb). Forward for disposal. Clean up affected area.

7. Handling and storage

7.1. Precautions for safe handling

Store in accordance with the National Fire Protection Association's publication NFPA 30, Flammable and Combustible Liquids Code. 29 CFR 1910.106 applies to the handling, storage, and use of flammable and combustible liquids.

See section 2 for further details. - [Prevention]:

7.2. Conditions for safe storage, including any incompatibilities

Handle containers carefully to prevent damage and spillage.

Store in a cool dry area, away from heat, sparks and open flame. Keep containers sealed when not in use. Store out of direct sunlight.

Incompatible materials: Strong oxidizing agents

Tightly closed. At +15C to +25C.

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See section 2 for further details. - [Storage]:

7.3. Specific end use(s)

No data available.

8. Exposure controls and personal protection

8.1. Control parameters

Exposure

CAS No.	Ingredient	Source	Value
0000094-46-2	ISOPENTYL BENZOATE	OSHA	No Established Limit
		ACGIH	No Established Limit
		NIOSH	No Established Limit
		Supplier	No Established Limit

Carcinogen Data

CAS No.	Ingredient	Source	Value
0000094-46-2	ISOPENTYL BENZOATE	OSHA	Select Carcinogen: No
		NTP	Known: No; Suspected: No
		IARC	Group 1: No; Group 2a: No; Group 2b: No; Group 3: No; Group 4: No;

8.2. Exposure controls

Respiratory

If workers are exposed to concentrations above the exposure limit they must use the appropriate, certified respirators.

Eyes

Protective safety glasses required

Skin

Butyl rubber gloves
Layer thickness: 0.7 mm
Breakthrough time: >240 min

Engineering Controls

Provide adequate ventilation. Where reasonably practicable this should be achieved by the use of local exhaust ventilation and good general extraction. If these are not sufficient to maintain concentrations of particulates and any vapor below occupational exposure limits suitable respiratory protection must be worn.

Other Work Practices

Use good personal hygiene practices. Wash hands before eating, drinking, smoking or using toilet. Promptly remove soiled clothing and wash thoroughly before reuse.

See section 2 for further details. - [Prevention]:

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9. Physical and chemical properties

Appearance	Colorless Liquid
Odor	Almost Odorless
Odor threshold	Not Measured
pH	NA
Melting point / freezing point	NA
Initial boiling point and boiling range	260 C
Flash Point	89 C
Evaporation rate (Ether = 1)	NA
Flammability (solid, gas)	Not Applicable
Upper/lower flammability or explosive limits	Lower Explosive Limit: NA Upper Explosive Limit: NA
Vapor pressure (Pa)	NA
Vapor Density	NA
Density	0.99 g/cm ³ (@20C)
Solubility in Water	Insoluble
Partition coefficient n-octanol/water (Log Kow)	Not Measured
Auto-ignition temperature	NA
Decomposition temperature	NA
Viscosity (cSt)	NA
VOC %	NA
Log Pow	4.15 (experimental) (Lit.)

9.2. Other information

No other relevant information.

10. Stability and reactivity

10.1. Reactivity

Hazardous Polymerization will not occur.

10.2. Chemical stability

Stable under normal circumstances.

10.3. Possibility of hazardous reactions

No data available.

10.4. Conditions to avoid

Forms explosive mixtures with air on intense heating.

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10.5. Incompatible materials

Strong Oxidizing agents.

10.6. Hazardous decomposition products

No hazardous decomposition data available.

11. Toxicological information

Acute toxicity

Ingredient	Oral LD50, mg/kg	Skin LD50, mg/kg	Inhalation Vapor LD50, mg/L/4hr	Inhalation Dust/Mist LD50, mg/L/4hr	Inhalation Gas LD50, ppm
ISOPENTYL BENZOATE - (94-46-2)	6330.00, Rat - Category: NA	No data available	No data available	No data available	No data available

Note: When no route specific LD50 data is available for an acute toxin, the converted acute toxicity point estimate was used in the calculation of the product's ATE (Acute Toxicity Estimate).

Classification	Category	Hazard Description
Acute toxicity (oral)	---	Not Applicable
Acute toxicity (dermal)	---	Not Applicable
Acute toxicity (inhalation)	---	Not Applicable
Skin corrosion/irritation	---	Not Applicable
Serious eye damage/irritation	---	Not Applicable
Respiratory sensitization	---	Not Applicable
Skin sensitization	---	Not Applicable
Germ cell mutagenicity	---	Not Applicable
Carcinogenicity	---	Not Applicable
Reproductive toxicity	---	Not Applicable
STOT-single exposure	---	Not Applicable
STOT-repeated exposure	---	Not Applicable
Aspiration hazard	---	Not Applicable

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12. Ecological information

12.1. Toxicity

Do not allow product to enter water, wastewater or soil! See Section 3 for chemical specific data.

Aquatic Ecotoxicity

Ingredient	96 hr LC50 fish, mg/l	48 hr EC50 crustacea, mg/l	ErC50 algae, mg/l
ISOPENTYL BENZOATE - (94-46-2)	Not Available	Not Available	Not Available

12.2. Persistence and degradability

There is no data available on the preparation itself.

12.3. Bioaccumulative potential

An appreciable bioaccumulation potential is to be expected (log Po/w >3)

12.4. Mobility in soil

No data available.

12.5. Results of PBT and vPvB assessment

This product contains no PBT/vPvB chemicals.

12.6. Other adverse effects

No data available.

13. Disposal considerations

13.1. Waste treatment methods

Observe all federal, state and local regulations when disposing of this substance.

14. Transport information

	DOT (Domestic Surface Transportation)	IMO / IMDG (Ocean Transportation)	ICAO/IATA
14.1. UN number	Not Applicable	Not Regulated	Not Regulated
14.2. UN proper shipping name	Not Regulated	Not Regulated	Not Regulated
14.3. Transport hazard class(es)	DOT Hazard Class: Not Applicable DOT Label: ---	IMDG: Not Applicable Sub Class: Not Applicable	Air Class: Not Applicable
14.4. Packing group	Not Applicable	Not Applicable	Not Applicable

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14.5. Environmental hazards

IMDG Marine Pollutant: No

14.6. Special precautions for user

No further information

15. Regulatory information

Regulatory Overview The regulatory data in Section 15 is not intended to be all-inclusive, only selected regulations are represented.

Toxic Substance Control Act (TSCA) All components of this material are either listed or exempt from listing on the TSCA Inventory.

WHMIS Classification B3

US EPA Tier II Hazards

Fire: Yes

Sudden Release of Pressure: No

Reactive: No

Immediate (Acute): No

Delayed (Chronic): No

EPCRA 311/312 Chemicals and RQs:
(No Product Ingredients Listed)

EPCRA 302 Extremely Hazardous :
(No Product Ingredients Listed)

EPCRA 313 Toxic Chemicals:
(No Product Ingredients Listed)

Proposition 65 - Carcinogens (>0.0%):
(No Product Ingredients Listed)

Proposition 65 - Developmental Toxins (>0.0%):
(No Product Ingredients Listed)

Proposition 65 - Female Repro Toxins (>0.0%):
(No Product Ingredients Listed)

Proposition 65 - Male Repro Toxins (>0.0%):
(No Product Ingredients Listed)

N.J. RTK Substances (>1%) :
(No Product Ingredients Listed)

Penn RTK Substances (>1%) :
(No Product Ingredients Listed)

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16. Other information

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind, expressed or implied, is made with respect to the information contained herein. We accept no responsibility and disclaim all liability for any harmful effects which may be caused by exposure to our products. Customers/users of this product must comply with all applicable health and safety laws, regulations, and orders.

The full text of the phrases appearing in section 3 is: not applicable

This is the first version in the GHS SDS format. Listings of changes from previous versions in other formats are not applicable.

Disclaimer: This information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

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