



This Safety Data Sheet complies with EC Directives 91/155 and 1272/2008

SECTION 1. IDENTIFICATION OF THE SUBSTANCE AND THE COMPANY

Product name	Gallium
Chemical formula	Ga
Synonym	None
EC # (European Chemical Substance)	231-163-8
CAS # (Chemical Abstracts Service)	7440-55-3
Use of the substance	Electronic and semiconductor application
Supplier/manufacturer	Firebird Technologies Inc., a division of 5N Plus Inc. 9200 Industrial Road Trail, British-Columbia Canada V1R 4X7
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SECTION 2. HAZARDS IDENTIFICATION

Physical state	Solid
Colour	Silver grey
Risk status	Slightly hazardous. May cause eye and skin irritation.
Emergency overview	Slightly hazardous. Highly corrosive towards light alloys and metals, especially aluminum alloys.
Routes of entry	Ingestion, inhalation
Potential acute health effects	
Eyes	Exposure to particulates may cause irritation
Skin	Exposure to particulates may cause skin irritation and may produce dermatitis
Inhalation	Inhalation of particulates may cause respiratory tract irritation.
Ingestion	May cause gastrointestinal irritation with nausea, vomiting and diarrhea.
Potential chronic health effects	Administration of gallium to humans has caused metallic taste, skin rashes and bone marrow depression.

For toxicological information, see Section 11

SECTION 3. COMPOSITION OF/INFORMATION REGARDING CONSTITUENTS

Name	Symbol	CAS #	EC #	IUPAC Name	Percentage (%)	Classification
Gallium	Ga	7440-55-3	231-163-8	Name	100	H290

SECTION 4. FIRST AID

Eye contact	Check for and remove any contact lenses. In the event of contact with eyes, rinse immediately with plenty of water. Get medical attention.
Skin contact	In case of contact, wash affected area with soap and large amounts of water. Remove and wash any contaminated clothing. Dust may provoke skin irritation.
Inhalation	If inhaled, move to fresh air. Get immediate medical attention.
Ingestion	Rare in industry. If the person is unconscious, do not give anything to drink or induce vomiting. Get immediate medical attention.
Note to attending physician	There is no specific antidote. Please contact poison center.

SECTION 5. FIRE FIGHTING MEASURES

Flammability of the product	Flammable in the form of dust when exposed to heat or flame.
Products of combustion	May evolve metal oxides fumes above melting point
Extinguishing media	
Suitable	Extinguish fire using agent suitable for type of surrounding fire
Not suitable	None known
Special exposure hazards	Metal oxides fumes can form in the event of fire.
Special protective equipment for firefighters	Firefighters should wear self-contained breathing apparatus (SCBA).

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions Safety glasses and impervious gloves. Wear at least a P2 type particle filter respirator if the airborne concentrations are above the exposure limit. If the airborne concentrations are unknown, wear approved self-contained breathing apparatus.

Environmental precautions Avoid dispersal of spilled material. Prevent runoff and contact with soil, waterways, drains or sewers.

Methods for cleaning-up Allow molten metal to cool and harden before cleanup. Once solidified vacuum the spilled material with an appropriate Class H Vacuum and place in an appropriate container for disposal in a safe place. Avoid creating dusty conditions and prevent wind dispersal.

SECTION 7. HANDLING AND STORAGE

Handling Avoid contact with skin. Wear protective eyewear and, in the event of insufficient ventilation, a suitable breathing apparatus. Do not eat, drink, or smoke during work. Wash hands, forearms and face thoroughly after handling this product and before eating, smoking or using the lavatory.

Storage Keep in tightly closed containers. Keep in a dry and well ventilated area away from strong oxidants, strong acids and sulfur.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limits values		
Product Name	8-hour total weight average (TWA) permissible exposure limit (PEL)	Short Term Exposure Limits (STELs)
	CANADA-QUEBEC: 10 mg/m ³ (PNOC) USA - OSHA : 15 mg/m ³ for total dust (PNOC) 5 mg/m ³ for respirable dust (PNOR) USA - ACGIH : 10 mg/m ³ for inhalable particles 3 mg/m ³ for respirable dust	N/A

Occupational exposure controls

Environmental exposure controls Use only in well ventilated areas. If handling generates dust, fumes, gases, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Eye protection Safety glasses

Skin protection The choice of skin protection gear will depend on the nature of the work to perform.

Respiratory protection If there is a risk of exceeding exposure limits, use at least a P2 type particle filter respirator.

Hand protection Natural rubber (latex)

Personal safety equipment pictograms



SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance Grayish metal

Odor Odorless

Color Possesses a greenish-blue reflection

Molecular weight 69.72

Molecular formula Ga

Melting point 29.78 °C

pH Not applicable

Boiling point 2400°C

Flash point Not applicable

Flammability Not flammable

Oxidizing properties Not applicable

Vapor pressure < 1 mm/Hg @ 25°C

Relative density 5.91 g/cm³

Solubility

- Water solubility** Insoluble
- Fat solubility** Insoluble

Partition coefficient Not applicable

Viscosity 1.819 cP

SECTION 10. STABILITY AND REACTIVITY

Conditions to avoid	Exposure to other metals, exposure to moist air or water. Gallium is stable in dry air but slowly oxidizes in moist air or water. Gallium is highly corrosive towards light metals and alloys, especially aluminum alloys.
Materials to avoid	Hydrogen peroxide, hydrochloric acid, phosphorous, sulphur, alkalies, oxygen, metal and oxidizing agents.
Hazardous decomposition products	May evolve metal oxides fumes.

SECTION 11. TOXICOLOGICAL INFORMATION

Toxicological data

Product/ingredient name	Test	Result	Route/Species
Gallium	N/A	N/A	N/A

Acute effects

Eyes	Exposure to particulates may cause irritation
Skin	Exposure to particulates may cause skin irritation and may produce dermatitis
Ingestion	Inhalation of particulates may cause respiratory tract irritation.
Inhalation	May cause gastrointestinal irritation with nausea, vomiting and diarrhea.

Potential chronic health effects

Carcinogenicity	Not applicable
Mutagenicity	Not applicable
Teratogenic effects	Not applicable

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity data


Product/ingredient name	Species	Period	Test (LC50)
Gallium	Hyalella azteca	7 days	> 1 mg/L

Environmental precautions	Observe environmental regulations in place.
Breakdown products	This product is insoluble in water
Toxicity of biodegradation products	Not available

SECTION 13. DISPOSAL CONSIDERATIONS

Waste disposal	The generation of waste should be avoided or minimized wherever possible. Avoid dispersal of spilled material and prevent runoff and contact with soil, waterways, drains or sewers. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional and local authority requirements.
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SECTION 14. TRANSPORTATION INFORMATION

Informations réglementaires	Proper shipping name	Class	UN Number	PG	Labeling
IATA Class	Gallium	8	2803	III	
UN/IMDG	Not classified	Not classified	Not classified	Not classified	Not classified
ADR/RID Class	Not classified	Not classified	Not classified	Not classified	Not classified
GGVSE	Not classified	Not classified	Not classified	Not classified	Not classified

SECTION 15. REGULATORY INFORMATION

EU Regulation *This chemical substance is classified as follow according to the criteria of the EC Directive 1272/2008*

Hazard Statements H290 May be corrosive to metals

Warning!



SECTION 16. OTHER INFORMATION

References
 Directive 91/155/EEC
 European Commission's Joint Research Centre Databases
 EPA Ecotox Databases

Glossary **LC50:** Indicates the concentration of the chemical that is lethal to 50% of the exposed animals.

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