Product Name: Hot Dip Galvanized	MSDS Number: 25 – Steel for stamping
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Section 01: Product and Company identification

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Product *(#3)*

Product	*Reference Norm*	*Commercial Name*
Plates and steel reels with zinc or with zinc-iron alloy coating by hot dip continuous process	ABNT NBR 7008:2003	USIGAL-GI-CF USIGAL-GI-ST USIGAL-GA-CF USIGAL-GA-ST
High resistance steel plates and reels for cold rolling, with zinc or zinc-iron alloy by hot dip continuous process (BH steel).	ABNT NBR 15272:2005	USIGAL-GI-BH USIGAL-GA-BH

Section 02: Hazards identification

Steel is a solid metal having little or no immediate health hazard or fire risk. However, when steel is subjected to welding, burning, melting, sawing, brazing, grinding, or other similar processes, potentially hazardous particulate and fumes may be generated. Inhalation of such metallic particulates and fumes must be avoided. Operations that may generate particulate material must be performed in well ventilated areas and if necessary, respiratory protection equipment must be used as well as other personnel protective equipment may also be used. Iron or steel foreign material that may hurt the eyes, mainly the cornea, may produce traumas unless they are totally and immediately removed.

The International Agency of Research on Cancer (IARC), the National Toxicology Program (NTP) and OSHA do not describe steel products as carcinogenic.

Section 03: Composition and Information on Ingredients

Ingredient Name	CAS Number	Mass Percentage	OSHA PEL Limits #1	ACGIH TLV Limits #2
Metal Base				
Iron	7439-89-6	Remaining	10 mg/m3 (iron oxide fumes)	5 mg/m3 (iron oxide dust and fumes)
Alloy Elements				
Max. Aluminum	7429-90-5	0,10	15 mg/m3 (total dust) 5 mg/m3 (breathing fraction)	10 mg/m3 (metallic dust) 5 mg/m3 (welding fume)
Max. Boron	7440-42-8	0,006	15 mg/m3 (total dust) as boron oxide	10 mg/m3 (as boron oxide)
Max. Carbon	7440-44-0	0,10	15 mg/m3 (total dust) 5 mg/m3 (breathing fraction)	10 mg/m3 (inhalation fraction) 3 mg/m3 (breathing fraction)
Max. Copper	7440-50-8	0,20	0,1 mg/m3 (copper fumes) 1,0 mg/m3 (copper fumes dust)	0,2 mg/m3 (copper fumes) 1,0 mg/m3 (copper fumes dust)
Max. Sulphur	7704-34-9	0,04	15 mg/m3 (total dust) 5 mg/m3 (breathing fraction)	10 mg/m3 (inhalation fraction) 3 mg/m3 (breathing fraction)
Max. Phosphorus	7723-14-0	0,12	15 mg/m3 (total dust) 5 mg/m3 (breathing fraction)	10 mg/m3 (inhalation fraction) 3 mg/m3 (breathing fraction)
Max. Manganese	7439-96-5	1,60	5 mg/m3 (Mn compounds fume)	0,2 mg/m3
Max. Niobium	7440-03-1	0,05	15 mg/m3 (total dust) 5 mg/m3 (breathing fraction)	10 mg/m3 (inhalation fraction) 3 mg/m3 (breathing fraction)
Max. Nickel	7440-02-0	0,20	1 mg/m3 (metal and insoluble compounds)	1,5 mg/m3 (elementary nickel) 0,2 mg/m3 (insoluble compounds)
Max. Silicon	7440-21-3	0,50	15 mg/m3 (total dust) 5 mg/m3 (breathing fraction)	10 mg/m3
Max. Silicon	7440-21-3	0,50	15 mg/m3 (total dust) 5 mg/m3 (breathing fraction)	10 mg/m3
Max. Titanium	7440-32-6	0,10	15 mg/m3 (total dust) 5 mg/m3 (breathing fraction)	10 mg/m3 (titanium dioxide)
Pure ZN Metallic Coating (GI) or Zn-Fe alloy (GA)				
Aluminum	7429-90-5	0,055	15 mg/m3 (total dust) 5 mg/m3 (breathing fraction)	10 mg/m3 (metallic dust) 5 mg/m3 (welding fume)
Antimony	7440-36-0	0,011	0,5 mg/m3	0,5 mg/m3
Lead	7439-92-1	0,004	0,05 mg/m3	0,05 mg/m3
Max. Iron	7439-89-6	0,8	10 mg/m3 (iron oxide fumes)	5 mg/m3 (iron oxide dust and fumes)
Zinc	7440-66-6	0,15~9,1	5 mg/m3 (fumes) 15 mg/m3 (total dust) 5 mg/m3 (breathing fraction)	5 mg/m3 (fumes) 10 mg/m3 (dust and fume short periods exposed limits)

Chemical Treatment Layer (#3)
Hexavalent Chromate (mg/m2)
Max. 50

#1 *OSHA Permissible Exposure Limits (PELs) are average concentrations within 8 hours period*

#2 *Threshold Limit Values (TLV) established by the American Conference of Governmental Industrial Hygienists*

(ACGIH) are average concentrations within 8 hours period.

#3 *The hexavalent chromium is in compliance with European Directives requirements ROHS & ELV*

#4 *Galvanized plates usually receive a protective oil layer (max. 0.05%)*

Section 04: First Aid Measures

Inhalation: For over-exposure to fumes and particulate material remove the person to a well ventilated area. If breathing is difficult or has stopped provide artificial breathing or oxygen as necessary. Look for medical assistance immediately. Fever due to metallic fume exposition must be treated by bed rest and also providing appropriate medication for pain and fever relief.

Eye Contact: Wash with a large flux of clean water to remove particles. Look for medical assistance if irritation persists.

Skin contact: Take off contaminated clothes. Wash the affected area with soap or mild detergent and water. If thermal burn has occurred, wash the affected area with plenty cold water and immediately look for medical assistance. If mechanical abrasion has occurred look for medical assistance.

Ingestion: Ingestion of particulate material during industrial exposure is not common. However, in case of ingestion, immediately look for medical assistance.

Section 05: Fire-Fighting Measures

Flash Point: Not applicable

Flammability Rating: Not flammable, non-combustible

Autoignition Temperature: Not applicable

Extinguishing Media: Not applicable for solid product

Hazardous Combustion Products: At temperatures above the melting point, fumes containing metal oxides and other alloying elements may be released.

Section 06: Accidental Release Measures

Not applicable to steel in solid state.

Section 07: Handling and Storage

Handling Precautions: Operations with the potential for generating high concentrations of particulate materials must be evaluated and controlled as necessary. Good housekeeping practices must be constantly observed. Avoid breathing metallic fumes and/or dusts.
Storage: Do not store steel next to acids and incompatible material.

Section 08: Exposure Controls / Personal Protection

Use appropriate engineering resources to minimize the exposition to metallic fumes and to metallic dust during steel handling operations.
Ventilation: Provide an adequate ventilation system with exhaustion to minimize particulate material concentration in the air. A local Ventilation system with exhaustion is highly recommended because it avoids locally generated contaminants spreading in the working area.
Management Controls: Do not allow the use of compressed air for cleaning products spilled on the floor.
Respiratory Protection: Look for technical support to select the most adequate respiratory mask for the workplace, considering particulate material concentration in the air as well as if there is enough oxygen.
Protection Equipment: For operations resulting in product temperature rising up to or above the melting point or that result in particulate material generation, wear protective clothing, gloves and safety glasses to avoid skin and/or eye contact. During welding operations, gas cut, or saw cuts or product grinding, involved personnel must wear adequate protection equipment including safety glasses and gloves. When any type of surface protective coating is applied, involved personnel must wear adequate gloves. Do not wear oil contaminated gloves or clothes. In case of skin contact with oil, wash with soap and water or with water-free products specific for hand cleaning. People involved in the above described operations must not wear eye contact lenses.

Section 09: Physical and Chemical Properties

Physical State: Solid
pH: not applicable
Boiling Point: not applicable
Flammability: not applicable
Vapour pressure: not applicable
Solubility: not applicable
Autoignition Temperature: not applicable
Decomposition Temperature: not applicable
Odor: not applicable
***Melting point:** 1510°C
Flash Point: not applicable
Explosivity: not applicable
Density: 7800 kg/m^3
Partition Coefficient: not applicable
Viscosity: not applicable

*The melting point may vary according to the amount of each alloy element.

Section 10: Stability and Reactivity

Chemical Stability: The product is stable under normal handling and storage conditions.
Reactivity: The product reacts with strong acids generating hydrogen. The different types of powder iron oxides react with calcium hypochlorite forming oxygen that may cause explosions.
Conditions to be avoided: Store steel with strong acids or calcium hypochlorite.
Decomposition Hazardous Products: Steel thermal decomposition in oxidant environments may produce fumes with iron oxides, manganese oxide and also other metal oxides.

Section 11: Toxicological Information

Information according to different exposition ways.
There is no available information for the product as a mix. The possible presence of protective oil in the product must be considered when evaluation the potential health effects of the associates exposed to fumes during product handling and welding.
Specific Effects
Eyes: Contact with particulate material may cause eye irritation.
Skin: Skin contact with dust or particulate material may cause rashes, dermatitis and skin sensitiveness.
Chronic Inhalation: Metallic components inhalation may cause several respiratory hazards.
Chronic Effect by Ingestion: No available data.
Chronic Effect: Metal fumes and dust inhalation is associated to the following conditions:

Iron Oxide: Excessive inhalation of iron oxide fumes and dust concentration may result in pneumoconiosis called siderosis that may be identified by X-rays. No physical capacity decrease of the lungs is associated to siderosis.

Aluminum: Aluminum fines and dust are low risk when inhalated and must be treated as disturbing dust.

Carbon: Excessive inhalation of high carbon concentrations may cause lungs disorders.

Medical conditions compounded by continuous exposition: People with respiratory chronic diseases including asthma, bronchitis and emphysema may be severely affected by any kind of continuous exposition to fumes and particulate material.

Section 12: Environmental Information

Environmental Effects, Product Behavior and Impacts.

Ecotoxicity: No available information for the product as a whole. However, product individual compounds are considered toxic to the environment. Metallic dust may migrate to the soil and underground and may be eaten by wild animals.

Environmental Disposition: No available information.

Environmental Degradation: No available information.

Movement/Soil Absorption: No available information for the product as a whole. However, individual compounds of the product may be absorbed by plants.

Section 13: Disposal considerations

Disposal: Steel waste must be recycled whenever possible. Fume and dust resulting from the operational process may also be recycled or rated and disposed according to federal, state and local regulations.

Disposal in containers: Follow federal, state and local regulations considering safe handling precautions.

Section 14: Transport Information

Steel product is not listed as a hazard substance for any of the means of transportation: Land, Water or Air transportation.

Section 15: Regulatory Information

ABNT NBR-14725-4:2009

Section 16: Other Information

Material storage areas must be kept under adequate conditions to avoid accidents. Work and safety equipment must also be kept under appropriate conditions.

Steel may be protected with several coatings including protective oil and paints. In these cases, special care must be taken during handling operations, including saw cuts or gas cuts and welding that may generate fumes, dust and particulate materials.

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