SECTION 1: PRODUCT IDENTIFICATION

Product Identifier: **Tri-Cut ® Stainless Steel, Tri-Brite ® Stainless Steel and Stainless Steel**

MANUFACTURER:

Tri Star Metals, LLC
375 Village Drive.
Carol Stream, IL 60188

CONTACT/TELEPHONE NUMBER:

855-874-78277 (non-emergency)

SECTION 2: HAZARDS IDENTIFICATION

Hazard Classification

This product is exempt from classification according to the OSHA Hazard Communication Standard (CFR 1910.1200) since it is an article as sold and used.

Label Elements

Signal Word
Not applicable

Symbols
Not applicable

Pictograms
Not applicable

Hazards Not Otherwise Classified

Dust or fumes generated by machining, grinding, casting, sawing, blasting, polishing, buffing, brazing, soldering, welding or thermal cutting of the product may produce airborne contaminants (see Section 8) that are hazardous.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Substance	CAS #	Weight %
Iron	7439-89-6	25-90
Nickel	7440-02-0	0-30
Chromium	7440-47-3	0-30
Manganese	7439-96-5	0-20
Cobalt	7440-48-4	0-12
Molybdenum	7439-98-7	0-10
Vanadium	7440-62-2	0-10
Copper	7440-50-8	0-5
Tungsten	7440-33-7	0-5
Silicon	7440-21-3	0-4
Titanium	7440-32-6	0-4
Niobium	7440-03-1	0-4

Aluminum	7429-90-5	0-1
Phosphorus	7723-14-0	0-1
Sulfur	7704-34-9	0-1
Selenium	7782-49-2	0-1

SECTION 4: FIRST AID MEASURES

Eye Contact
No need for first aid is anticipated under normal use conditions.

Inhalation
No need for first aid is anticipated under normal use conditions. If symptoms develop following exposure to fumes or dusts released from the processing of the product (e.g. machining, grinding, casting, sawing, blasting, polishing, buffing, brazing, soldering, welding or thermal cutting), immediately remove person from exposure. Seek medical attention if symptoms persist.

Skin
No need for first aid is anticipated under normal use conditions.

Ingestion
No need for first aid is anticipated under normal use conditions.

Most Important Symptoms and Effects, both Acute and Delayed
None expected under normal conditions of use. Dust or fumes generated by machining, grinding, casting, sawing, blasting, polishing, buffing, brazing, soldering, welding or thermal cutting of the product may produce airborne contaminants (see Sections 8 and 11) that are hazardous.

Indication of Immediate Medical Attention and Special Treatment Needs
Not applicable

SECTION 5: FIRE FIGHTING MEASURES

Suitable Extinguishing Media
Use suitable extinguishing methods for surrounding fire

Special Hazards Arising from the Substance
Not applicable

Special Protective Actions for Fire Fighter
Not applicable

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures
No special measures required

Environmental Precautions
Not applicable

Methods and Material for Containment and Clean-up

Not applicable

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling
No special requirements.

Conditions for Safe Storage, Including Any Incompatibilities
No special storage requirements.

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

Occupational Exposure Limits
Dust or fumes generated by machining, grinding, casting, sawing, blasting, polishing, buffing, brazing, soldering, welding or thermal cutting of the product may produce airborne contaminants with the following Occupational Exposure Limits (OELs):

Ingredient	CAS #	OSHA PEL (mg/m^3)	ACGIH TLV® (mg/m^3)
Aluminum **Metal & insoluble compounds**	7429-90-5	15 (TWA) 5 (TWA)(R)	1 (TWA)(R)
Chromium **Metal** **Hexavalent, insoluble***	7440-47-3	 1 (TWA) 0.005 (TWA)	 0.5 (TWA) 0.01 (TWA)
Cobalt	7440-48-4	0.1 (TWA)	0.02 (TWA)
Copper **Dust** **Fume**	7440-50-8	 1 (TWA) 0.1 (TWA)	 1 (TWA) 0.2 (TWA)
Iron	7439-89-6	10 (TWA) (iron oxide fume)	5 (TWA)(R)
Manganese	7439-96-5	5 (C)	0.02 (TWA)(R) 0.1 (TWA)(I)
Molybdenum **Insoluble**	7439-98-7	 15 (TWA)	 10 (I) 3 (R)
Nickel **Elemental** **Insoluble**	7440-02-0	 1 (TWA) 1 (TWA)	 1.5 (TWA)(I) 0.2 (TWA) (I)
Niobium	7440-03-1	NE	NE

Phosphorus	7723-14-0	NE	NE
Sulfur	7704-34-9	NE	NE
Selenium	7782-49-2	NE	0.2 (TWA)
Titanium (as titanium dioxide)	7440-32-6	15 (TWA)	10 (TWA)
Tungsten (elemental and insoluble compounds)	7440-33-7	NE	5 (TWA) 10 (STEL)
Vanadium (as vanadium pentoxide) **Dust** **Fume**	7440-62-2	 NE NE	 0.5 (C)(R) 0.1 (C)

* When chromium is heated to high temperatures such as those that occur in welding arcs, carbon arc gouging or plasma cutting, it may oxidize to form hexavalent chromium. In the product as sold, chromium is in the metallic form.

Exposure Limit Abbreviations

NE= None Established

ACGIH TLV= American Conference of Governmental Industrial Hygienists Threshold Limit Value ®, 2015 Edition

OSHA PEL= Occupational Health and Safety Administration Permissible Exposure Limit

TWA= Time Weighted Average

STEL= Short Term Exposure Limit

C= Ceiling Limit

mg/m^3= milligram of substance per cubic meter of air

R= Respirable fraction of particulate sampled

I= Inhalable fraction of particulate sampled

Appropriate Engineering Controls

In the solid state, no special requirements are necessary. If processes such as machining, grinding, casting, sawing, blasting, polishing, buffing, brazing, soldering, welding or thermal cutting are used on the product, local exhaust ventilation may be required to maintain concentrations of airborne hazardous ingredients below the applicable exposure limits.

Personal Protective Equipment

Eye Protection

Wear safety glasses with side-shields if there is a risk of particles getting in eyes

Skin protection

No chemical protective clothing is required. If material is processed, use appropriate protective clothing and gloves for the application.

Respiratory Protection
In the solid state, no special requirements are necessary. Airborne dust or fumes can be generated by machining, grinding, casting, sawing, blasting, polishing, buffing, brazing, soldering, welding or thermal cutting of the product. Respiratory protection may be necessary if concentrations of these hazardous ingredients exceed the applicable exposure limits. In these cases a NIOSH approved respirator should be selected based on the form and concentration of the contaminant in air.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Solid, gray colored material
Odor	Not applicable
Odor threshold	Not applicable
pH	Not applicable
Melting Point	2500-2800º F (1371-1538º C)
Initial boiling point & boiling range	Not applicable
Flash Point	Not applicable
Evaporation Rate	Not applicable
Flammability	Not applicable
Upper/Lower flammability or explosive limits	Not applicable
Vapor Pressure	Not applicable
Vapor Density	Not applicable
Relative Density	Not applicable
Solubility in Water	Not applicable
Partition Coefficient	Not applicable
Auto-Ignition Temperature	Not applicable
Decomposition Temperature	Not applicable
Viscosity	Not applicable

SECTION 10: STABILITY AND REACTIVITY

Reactivity
Inert, not reactive

Chemical Stability
Stable

Possibility of Hazardous Reactions
Will not occur

Conditions to avoid
None known

Incompatible Materials
None known

Hazardous Decomposition Products
None expected under conditions of normal use.

SECTION 11: TOXICOLOGICAL INFORMATION

This product as sold is an article but processing (e.g. machining, grinding, casting, sawing, blasting, polishing, buffing, brazing, soldering, welding or thermal cutting) of the product may release hazardous substances. Information about these components is supplied.

Acute Toxicity

Copper: Eye and respiratory irritation may occur. High exposure to copper dust may cause gastrointestinal effects due to oral ingestion.

Chromium: Eye and respiratory irritation may occur.

Nickel: One study showed severe lung and kidney damage following exposure to extremely high levels of nickel powder.

Selenium: High brief exposures to fumes may cause irritation of the eyes, nose and throat and headaches

Vanadium pentoxide: Human studies report upper respiratory tract irritation

Skin Corrosion/Irritation

None expected

Serious Eye Damage or Irritation

None expected

Respiratory or Skin Sensitization

Cobalt: May cause allergy or asthma symptoms or breathing difficulties if inhaled. Contact allergic dermatitis may occur.

Nickel: Contact allergic dermatitis may occur.

Germ Cell Mutagenicity

Nickel: Chromosomal aberrations and in vitro and in vivo testing has shown that nickel is genotoxic (ASTDR)

Vanadium: Chromosomal aberrations and in vitro and in vivo testing has shown that vanadium pentoxide is genotoxic.

Carcinogenicity

Aluminum: Not listed by IARC, NTP or OSHA

Cobalt: Listed by IARC (possibly carcinogenic to humans-Group 2B). Not listed by NTP or OSHA.

Copper: Not listed by IARC, NTP or OSHA

Chromium (metal): Not listed by IARC, NTP or OSHA

(When chromium is heated to high temperatures such as those that occur in welding arcs, carbon arc gouging or plasma cutting, it may oxidize to form hexavalent chromium. In the product as sold, chromium is in the metallic form. Hexavalent chromium is listed as a carcinogen by IARC 1 (Carcinogenic to Humans), NTP (Known to be a human carcinogen) and OSHA. It can cause lung cancer).

Iron: Not listed by IARC, NTP or OSHA

Manganese: Not listed by IARC, NTP or OSHA

Molybdenum: Not listed by IARC, NTP or OSHA

Nickel: Listed by IARC (possibly carcinogenic to humans-Group 2BA) and NTP (known to be a human carcinogen). The strongest evidence for carcinogenicity is for sulfidic nickel forms and the evidence for oxidic forms of nickel are the weakest. There is no evidence that metallic nickel is associated with nasal or lung cancer (ASTDR).

Niobium: Not listed by IARC, NTP or OSHA

Selenium: Not listed by IARC, NTP or OSHA

Titanium (metallic): Not listed by IARC, NTP or OSHA

Tungsten: Not listed by IARC, NTP or OSHA

Vanadium: Not listed by IARC, NTP or OSHA. Vanadium pentoxide is listed by IARC (possibly carcinogenic to humans-Group 2BA).

Reproductive Toxicity

None expected

Specific Target Organ Toxicity-Single Exposure

Nickel: One study showed severe lung and kidney damage following exposure to extremely high levels of nickel powder.

Specific Target Organ Toxicity-Repeated Exposure

Aluminum: There is some evidence that aluminum may accumulate in eh body with long-term exposure. Lung changes have been reported in workers exposed to high levels of aluminum dust. Some studies have indicated that there may be subtle neurological effects following long –term exposure to aluminum.

Cobalt: Animal studies have shown respiratory effects following inhalation exposure (lung edema, decreased pulmonary function). Transient myocardial changes have also been reported. Studies have shown asthma and pulmonary function changes in workers in the cemented tungsten carbide industry and cobalt is thought to play a significant role in these effects.

Copper: A few studies have shown copper to cause metal fume fever, , a condition characterized by chills, fever, muscular pain, nausea, and vomiting but these are limited in number and details. Studies have reported upper respiratory tract irritation, metallic taste sensation and nausea.

Iron: Prolonged exposure may lead result in iron deposits in the lung, a condition known as siderosis.

Manganese: Inflammatory changes in the lung were found in monkeys exposed to manganese dioxide via inhalation for 10 months. At high exposure levels (greater than 5 mg/m^3), manganism (chronic manganese poisoning) has been reported in workers. Symptoms of manganism include sleepiness, weakness in the legs, a mask-like facial appearance, emotional disturbances and a spastic gait. High levels of pneumonia have also been reported in workers inhaling large amounts of manganese dust and fume. In some studies, manganese has been associated with longer reaction times, hand steadiness and eye-hand coordination. Effects appear to be more pronounced with exposures to respirable sized particles.

Nickel (elemental and nickel oxide): Animal studies have shown lung changes and inflammation.

Selenium: Human studies have shown humans exposed to selenium may develop a garlic odor of the breath

Tungsten: Studies have shown asthma and pulmonary function changes in workers in the cemented tungsten carbide industry but cobalt is thought to play a more significant role in these effects than tungsten.

Vanadium pentoxide: Inflammatory changes in the lung and nasal cavity and decreased pulmonary function have been reported in animal studies. Human studies report inflammatory changes in nasal mucosa.

Aspiration Hazard

Based on the physical form, the product is not expected to be an aspiration hazard.

SECTION 12: ECOLOGICAL INFORMATION

Toxicity

Ecotoxicity is expected to be minimal since the product c is a solid with low water solubility.

Persistence and Degradation

Not applicable

Bioaccumulation

Not applicable

Mobility in Soil

Not applicable

Environmental Fate

Not applicable

SECTION 13: DISPOSAL INFORMATION

This product is not considered to be hazardous waste according to US RCRA and Canadian regulations. Recover or recycle if possible. Dispose of according to federal, state and local regulations. Dust collected from product processing

operations (e.g. machining, grinding, casting, sawing, blasting, polishing, buffing, brazing, soldering, welding or thermal cutting) may be classified as a hazardous waste. Consult federal, state and local regulations.

SECTION 14: TRANSPORTATION INFORMATION

U.S. Department of Transportation (DOT)
Product is not regulated

International Maritime Dangerous Goods (IMDG)
Product is not regulated

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Product is not regulated

International Civil Aviation Org. / International Air Transport Assoc. (ICAO/IATA)
Product is not regulated

SECTION 15: REGULATORY INFORMATION

If this product is further processed, the regulatory status of the components listed in the composition section of this sheet may be altered. The following regulatory information may not be complete and should not be relied upon as the sole source of information regarding regulatory responsibilities.

Occupational Health and Safety Administration
This product is an article as sold. Dust or fumes generated by machining, grinding, casting, sawing, blasting, polishing, buffing, brazing, soldering, welding or thermal cutting of the product may produce airborne contaminants that are regulated by OSHA.

TSCA Chemical Inventories
This product is an article as defined by TSCA regulations, and is exempt from TSCA Inventory listing requirements

Other Regulatory Information

Chemical	CAS #	EINECS	CERCLA RQ (lbs)	Section 313	NPRI Threshold Category	California Prop 65
Aluminum (fume or dust)	7429-90-5	231-072-3		313	1A	
Chromium	7440-47-3	231-157-5	5,000	313	1A	
Cobalt	7440-48-4	231-158-0		313	1A	Carcinogen
Copper	7440-50-8	231-159-6	5,000	313	1A	
Iron	7439-89-6	231-096-4				
Manganese	7439-96-5	231-105-1		313	1A	
Molybdenum	7439-98-7	231-107-2				
Nickel	7440-02-0	231-111-4	100	313	1A	Carcinogen
Niobium	7440-03-1	231-113-5				
Selenium	7782-49-2	231-957-4	100	313		
Titanium	7440-32-6	231-142-3				
Tungsten	7440-33-7	231-143-9				
Vanadium (except when contained in an alloy)	7440-62-2	231-171-1		313	1A	

CAS- Chemical Abstract Service- Registry Number

EINECS - European Inventory of Existing Commercial Chemical Substances

CERCLA RQ (reportable quantity)-- if a value is listed then releases of particles, ≤ 100 μm in size, to the environment may require reporting under CERCLA Sections 102-103 (40 CFR Part 302)

Section 313 - if '313' is listed then may be subject to the reporting requirements found under EPCRA Section 313 (40 CFR Part 372)

NPRI (National Pollutant Release Inventory) Threshold Category - if 1A or 1B is listed, may be subject to reporting under the Canadian Environmental Protection Act, 1999

California Prop 65 - if listed WARNING: This product contains chemicals known to the State of California to cause cancer.

These products are not believed to contain any substances that meet the notification requirements found under EPCRA Sections 302 or 304 (40 CFR Part 355) nor subject to the accidental release prevention requirements under CAA 112(r) (40 CFR Part 68).

SECTION 16: OTHER INFORMATION

DATE PREPARED: August 18, 2015 (Rev. 1)

PREPARER: Kay Rowntree, CIH
Industrial Hygiene Sciences, LLC

This SDS is intended to be used as a guide to the appropriate handling, storage, and use of this product by an adequately trained person. TriStar Metals, LLC and Industrial Hygiene Sciences, LLC are not responsible for the misuse, mishandling or improper storage of this material by the user. TRI STAR METALS, LLC. AND INDUSTRIAL HYGIENE SCIENCES, LLC NEITHER MAKES, NOR OFFERS NOR SHALL BE HELD LIABLE FOR ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING ANY WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE USE OF THE INFORMATION PROVIDED.