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Meets the Requirements of OSHA Standard 29 CFR 1910.1200 Hazard Communication and EPA Supplier Notification Requirements under Section 313 of the Emergency Planning and Community Right-to-Know Act.

SAFETY DATA SHEET (SDS)

CHROMIUM-BASED STEEL CASTINGS

SDS SC-000-029 Rev. 10

DATE ISSUED

10/13

SECTION 1—PRODUCT IDENTIFICATION & COMPANY INFORMATION

PRODUCT NAME

CHROMIUM-BASED STEEL CASTINGS

OTHER DESIGNATIONS: ASTM (American Society for Testing & Materials) Specification No's., (ACI (Alloy Casting Institute) Alloy Designations—Grades)

ASTM No's.

A217/A217M-84
 A297/A297M-84
 A351/A351M-84
 A352/A352M-84
 A356/A356M-84
 A426-80
 A487/A487M-84
 A597/A597M-84
 A608-79
 A743/A743M-84
 A744/A744M-84
 A747/A747M-84
 A757/A757M84
 MIL-S-16993A

ACI ALLOY DESIGNATIONS (GRADES)

CA-15
 HC, HD
 CF10SMnN
 CA6NM
 CA6NM
 CPCA15
 CA6NM, CA15M, CA, 15a, CA15
 CD-2, CD-5
 HC30, HD50
 CA-15, CA-15M, CB-30, CC-50, CA-40, CF10SMnN, CA-NM, CD-2MCu, CA-6N, CA-28MWV
 CD-4MCu
 CB7Cu-1, CB7Cu-2
 E3N

PRODUCT IDENTIFICATION (Label Identifier)

MANUFACTURER'S NAME

STREET ADDRESS

EMERGENCY TELEPHONE NO.

MAILING ADDRESS

TELEPHONE NO.

CITY, STATE, ZIP CODE, COUNTRY

FAX NO.

E-MAIL ADDRESS/WEBSITE

RECOMMENDED USE OF CHEMICAL AND RESTRICTIONS ON USE

Solid casting; no restrictions

SECTION 2—HAZARD IDENTIFICATION

CLASSIFICATION

Castings are metallic articles that do not present hazards in their original form.

OTHER INFORMATION

1. Grinding castings that have not been cleaned or that contain embedded sand may generate significant amounts of dust containing crystalline silica.
2. Fumes from hot processes may contain other compounds with different exposure limits. Dust or fumes generated by machining, grinding, welding or thermal cutting of the casting may produce airborne contaminants. Consult Sections 3 & 8 for further information.

SECTION 3—COMPOSITION / INFORMATION ON INGREDIENTS

CHEMICAL NAME/COMMON NAME/SYNONYM	Wt %	CAS NUMBER
Carbon (C)	0.06–1.60	7440-44-0
Chromium (Cr)	11.5–30.0	7440-47-3
Cobalt (Co)	0–3.50	7440-48-4
Copper (Cu)	0–3.25	7440-50-8
Iron (Fe)	Remainder	7439-89-6
Manganese (Mn)	0.70–9.0	7439-96-5
Molybdenum (Mo)	0–2.25	7439-98-7
Nickel (Ni)	0–9.0	7440-02-0
Silicon (Si)	0.65–4.5	7440-21-3
Tungsten (W)	0–1.25	7440-33-7
Vanadium (V)	0–1.0	1314-62-1

SECTION 4—FIRST AID MEASURES**EYE CONTACT:** Not applicable**SKIN CONTACT:** No special requirements**INGESTION:** Not applicable**INHALATION:** Not applicable**SECTION 5—FIREFIGHTING MEASURES****FLAMMABLE PROPERTIES:** Not applicable**EXTINGUISHING MEDIA:** Not applicable**PROTECTION OF FIREFIGHTERS:** Not applicable**SECTION 6—ACCIDENTAL RELEASE MEASURES**

Not applicable

SECTION 7—HANDLING & STORAGE**RECOMMENDED STORAGE**

No special requirements

PROCEDURES FOR HANDLING

Proper hand and foot protection is recommended.

SECTION 8—EXPOSURE CONTROLS/ PERSONAL PROTECTION**ENGINEERING CONTROLS**

None Required. There are no health hazards from castings in solid form.

SUBSTANCE	ACGIH TLV mg/m ³	OSHA PEL mg/m ³
Carbon (C)	N/E	N/E
Chromium (Cr)	0.5	1
Cobalt (Co)	0.02	N/E
Copper (Cu)	1	1
Iron (Fe)	N/E	N/E
Manganese (Mn)	0.02 (R); 0.1 (I)	5 (C)
Molybdenum (Mo)	N/E	N/E
Nickel (Ni)	1.5 (I)	1

Silicon (Si)		
Total dust	N/E	15
Respirable dust	N/E	5
Tungsten (W)	5; 10 (STEL)	N/E
Vanadium (V)	N/E	N/E

SUPPLEMENTAL INFORMATION

Grinding castings that have not been cleaned or that contain embedded sand may generate significant amounts of dust containing crystalline silica.

Fumes from hot processes may contain other compounds with different exposure limits than those listed above.

Dust or fumes generated by machining, grinding, welding or thermal cutting of the casting may produce airborne contaminants. Exposure limits for the most common contaminants are offered as reference. Please consult a competent person for guidance on exposure assessment and controls. **In particular, Hexavalent Chromium is an OSHA Expanded Health Standard; refer to OSHA 29 CFR 1910.1026-Chromium (VI) for complete requirements.**

SUBSTANCE	ACGIH TLV mg/m ³	OSHA PEL mg/m ³
Chromium Compounds (as Cr)		
Chromium (II) inorganic compounds	N/E	0.5
Chromium (III) inorganic compounds	0.5	0.5
Chromium (VI) inorganic compounds, certain water insoluble	0.01	0.005
Chromium (VI) inorganic compounds, water soluble	0.05	0.005
Chromium (VI) all forms and compounds	N/E	0.005
Copper Compounds		
Fume, as Cu	0.2	0.1
Dusts and mists, as Cu	1	1
Iron Compounds		
Iron oxide (Fe ₂ O ₃) fume	N/E	10
Iron oxide (Fe ₂ O ₃)	5 (R)	N/E
Molybdenum Compounds (as Mo)		
Insoluble compounds (as Mo)	10 (I); 3 (R)	N/E
Soluble compounds (as Mo)	0.5 (R)	5
Total Dust	N/E	15
Nickel Compounds (as Ni)		
Insoluble, inorganic compounds	0.2(I)	1
Soluble, inorganic compounds	0.1(I)	1
Nickel oxide	0.2(I)	1
Tungsten compounds (as W)		
Metal and insoluble compounds, as W	5; 10 (STEL)	N/E
Soluble compounds, as W	1; 3 (STEL)	N/E
Vanadium		
Respirable dust (as V205)	0.05 (I)	0.05 (C)
Fume (as V205)	N/E	0.1 (C)
Vanadium and inorganic compounds	N/E	N/E

TERMS

All exposure limits referenced above are 8 hour time weighted averages (TWA) unless otherwise noted.

N/E =	None Established
C =	Ceiling
I =	Inhalable fraction
R =	Respirable fraction
TLV =	Threshold Limit Value/American Conference of Industrial Hygienists (ACGIH)
PEL =	Permissible Exposure Limit / OSHA
STEL	Short term exposure limit
mg/m ³ =	milligrams per cubic meter

PERSONAL PROTECTION

Proper hand and foot protection is recommended.

SECTION 9—PHYSICAL & CHEMICAL PROPERTIES**APPEARANCE /PHYSICAL STATE**

Solid, silver gray in color

ODOR/ODOR THRESHOLD

None

VAPOR DENSITY

Not applicable

MELTING POINT/FREEZING POINT

2744-3199°F (1504-1704°C)

SPECIFIC GRAVITY (relative density)

0.28 lb/in³ (7.74 g/cm³) for cast alloy steels

BOILING POINT

5000°F (2750°C) for iron

VAPOR PRESSURE

Not applicable

FLASH POINT

Not applicable for solid castings

EVAPORATION RATE

Not applicable

FLAMMABILITY

Not flammable

SOLUBILITY IN WATER

Insoluble

UPPER AND LOWER FLAMMABILITY LIMITS

Not applicable for solid castings

pH

Not applicable

AUTO IGNITION TEMPERATURE

Not applicable

VISCOSITY

Not applicable

DECOMPOSITION TEMPERATURE

Not applicable

PARTITION COEFFICIENT

Not applicable

SECTION 10—STABILITY & REACTIVITY**CHEMICAL STABILITY**

Stable

CONDITIONS TO AVOID

None

REACTIVITY

Not reactive

INCOMPATIBLE MATERIALS

None

HAZARDOUS DECOMPOSITION PRODUCTS

None

POSSIBILITY OF HAZARDOUS REACTIONS

Not applicable

SECTION 11—TOXICOLOGICAL INFORMATION**POTENTIAL HEALTH EFFECTS**

EYE CONTACT: None

SKIN: None

INGESTION: None

INHALATION: None

Carcinogen Classification of Ingredients				
INGREDIENT	OSHA	NTP	IARC	TARGET ORGAN
Cobalt	NL	NL	2B	Lung
Nickel (metal)	NL	K	2B	Lung, Nose
TERMS OSHA—Occupational Safety & Health Administration Y = Listed as a Human Carcinogen NTP—National Toxicology Program K = Known to be a Human Carcinogen R = Reasonably Anticipated to be a Human Carcinogen (RAHC) IARC—International Agency for Research on Cancer 1 = Carcinogen to Humans 2A = Probably Carcinogenic to Humans 2B = Possibly Carcinogenic to Humans 3 = Unclassifiable as to Carcinogenicity in Humans 4 = Probably not Carcinogenic to Humans Other NL = Not Listed				
SECTION 12—ECOLOGICAL INFORMATION				
ECOTOXICITY Not applicable		PERSISTENCE AND DEGRADABILITY Not applicable		
BIOACCUMULATION POTENTIAL Not applicable		MOBILITY IN SOIL Not applicable		
OTHER ADVERSE EFFECTS Not applicable				
SECTION 13—DISPOSAL CONSIDERATIONS				
Recover or recycle if possible. Dispose of according to federal, state and local regulations. Dust collected from machining, welding, etc. may be classified as a hazardous waste. Consult federal, state and local regulations.				
SECTION 14—TRANSPORT INFORMATION				
US DEPARTMENT OF TRANSPORTATION (DOT)-HMR (Hazardous Materials Registration) Not Regulated		CANADIAN TRANSPORTATION OF DANGEROUS GOODS (TDG) Not regulated		
UN SHIPPING NAME Not regulated		UN NUMBER Not regulated		
TRANSPORT HAZARD CLASS Not regulated		PACKING GROUP Not regulated		
ENVIRONMENTAL HAZARDS None		LABEL(S) REQUIRED? No		
TRANSPORT IN BULK Not applicable		SPECIAL SHIPPING INFORMATION Not applicable		
SECTION 15—REGULATORY INFORMATION				
US-OSHA (Hazard Communication Standard) Reference 29 CFR 1910.1200 and 1910.1000. A finished casting is an article as defined in the OSHA Hazard Communication Standard 29CFR 1910.1200 (c). Dust or fumes generated by cleaning, machining, grinding, or welding of the casting may produce airborne contaminants, such as chromium, cobalt, copper, iron, manganese, molybdenum, nickel, silicon, vanadium and silica. For hexavalent chromium references see 29 CFR 1910.1026.				

US-EPA (Toxic Substances Control Act–TSCA)

All components of these products are on the TSCA inventory list or are excluded from listing.

US-EPA (SARA Title III)

Releases to the environment of **Chromium, Cobalt, Copper, Manganese, Nickel and Vanadium** may be subject to reporting under Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 72.

CANADA-WHMIS (Workplace Hazardous Materials Information System)

This SDS has been prepared according to the hazard criteria of the Controlled Product Regulations (CPR) and the SDS contains the information required by the CPR.

CANADA DSL (Domestic Substance List) Inventory Status

All components of these products are on the DSL Inventory.

CEPA (Canadian Environmental Protection Act)

Chromium and nickel are on the CEPA Priorities Substances Lists

EINECS No. (European Inventory of Existing Commercial Chemical Substances)

All components of these products are on the EINECS list.

RoHS (Restriction of Certain Hazardous Substances) Compliance

Castings comply with RoHS

CALIFORNIA PROPOSITION 65 Compliance

WARNING: This product contains or produces chemicals known to the State of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code 25248.5 et seq.)

US STATE REGULATORY INFORMATION

Some of the components listed in Section 3 may be covered under specific state regulations.

SECTION 16—OTHER INFORMATION**SDS SHEET PREPARED BY**

American Foundry Society, Inc.
Occupational Safety & Health Committee (10-Q)

DATE

10/13

NOTE:

This data and label information is offered in good faith as typical values and not as a product specification. No warranty either expressed or implied is hereby made. The recommended industrial hygiene and safe handling procedures are believed to be generally applicable. However, each user should review the recommendations in specific context of the intended use and determine if they are appropriate.

Addendum: Label Information

<u>PRODUCT IDENTIFIER</u> SC-000-029 Rev. 10 CHROMIUM-BASED STEEL CASTINGS	
<u>SUPPLIER IDENTIFICATION</u> Company Name _____ Street Address _____ Mailing Address _____ City _____ State ____ Zip/Postal Code _____ Country _____ Emergency Phone Number _____ Other Info _____	<u>HAZARD PICTOGRAMS</u> None* <u>SIGNAL WORD</u> None*
<u>PRECAUTIONARY STATEMENTS</u> None*	<u>HAZARD STATEMENTS</u> None*
<p>*Castings do not present hazards in their original form.</p> <p>OTHER INFORMATION</p> <ol style="list-style-type: none">1. Grinding castings that have not been cleaned or that contain embedded sand may generate significant amounts of dust containing crystalline silica.2. Fumes from hot processes may contain other compounds with different exposure limits. Dust or fumes generated by machining, grinding, welding or thermal cutting of the casting may produce airborne contaminants. Consult Sections 3 & 8 of the SDS for further information.	