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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)

CARBON and ALLOY STEEL CASTINGS

SDS SC-000-009 Rev. 16

DATE ISSUED

10/13

SECTION 1—PRODUCT IDENTIFICATION & COMPANY INFORMATION

PRODUCT NAME

CARBON and ALLOY STEEL CASTINGS

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

ASTM No's.

A27-84
A128/A128M-84
A148/A148M-84

A216/A216M-84
A217/A217M-84
A352/A352M-84
A356/A356M-84
A426-80
A486/A486M-84
A487/A487M-84
A597/A597M-84
A660-79
A732/A732M-84
A757/A757M-84

ACI ALLOY DESIGNATIONS (GRADES)

N-1, N-2, U-60-30, 65-35, 70-36, 70-40
A, B-1, B-2, B-3, B-4, E-1, E-2, F
80-40, 80-50, 90-60, 105-85, 115-95, 135-125, 150-135, 160-145, 165-150, 165-150L, 210-180, 210-180L, 260-210, 260-210L
WCA, WCB, WCC
WC1, WC5
LCA, LCB, LCC, LC1
1, 2, 5
CP1, CP2, CP15
70, 90, 120
1N, 2N, 4N, 6N, A, AN, B, BN, C, CN, DN, 1Q, 2Q, 4Q, 4QA, 6Q, AQ, BQ, CQ
CS-5
WCA, WCB, WCC
1A, 2A, 2Q, 3A, 3Q, 4A, 4Q, 5N, 6N, 13Q, 14Q
A1Q, A2Q

SAE AUTOMOTIVE

J35C

0022, 0025, 0030, 0050A, 0050B, 080, 090, 0105, 0120, 0150, 0175

AAR

M201-81

A, B, C, D, E

FEDERAL

QQ-S-681F

N-1, N-2, U-60-30, 60-30, 65-35, 70-36, 70-40, 80-40, 80-50, 90-60, 105-85, 120-95, 150-125, 175-135

MILITARY STANDARD

MIL-S-15083B (NAVY)
MIL-S-46052A (MR)

CW, B, 65-35, 70-36, 80-40, 80-50, 90-60, 105-85, 120-95, 150-125
180-150, 220-180, 260-210

PRODUCT IDENTIFICATION (Label Identifier)

Carbon and Alloy Steel Castings

MANUFACTURER'S NAME

Modern Investment Casting Company

STREET ADDRESS

850 Oakland Avenue

EMERGENCY TELEPHONE NO.

800-364-6422

MAILING ADDRESS

PO Box 707

TELEPHONE NO.

580-762-6547

CITY, STATE, ZIP CODE, COUNTRY

Ponca City, OK, 74602, USA

FAX NO.

580-762-9357

E-MAIL ADDRESS/WEBSITE

www.emicc.com

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)	0–1.45	7440-44-0
Chromium (Cr)	0–0.90	7440-47-3
Iron (Fe)	Remainder	7439-89-6
Manganese (Mn)	0–14.0	7439-96-5
Molybdenum (Mo)	0–2.1	7439-98-7
Nickel (Ni)	0–1.0	7440-02-0
Silicon (Si)	0–2.25	7440-21-3

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
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

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
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

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/ACGIH (American Conference of Industrial Hygienists)
- PEL = Permissible Exposure Limit/OSHA (Occupational Safety & Health Administration)
- STEL= Short Term Exposure Limit
- mg/m³ = 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/in ³ (7.74 g/cm ³) 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
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

<p>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, iron, manganese, molybdenum, nickel, silicon, and silica. For hexavalent chromium references see 29 CFR 1910.1026.</p>
<p>US-EPA (Toxic Substances Control Act–TSCA) All components of these products are on the TSCA inventory list or are excluded from listing.</p> <p>US-EPA (SARA Title III) Releases to the environment of Chromium, Manganese and Nickel, 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.</p>
<p>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.</p>
<p>CANADA DSL (Domestic Substance List) Inventory Status All components of these products are on the DSL Inventory.</p>
<p>CEPA (Canadian Environmental Protection Act) Chromium and nickel are on the CEPA Priorities Substances Lists</p>
<p>EINECS No. (European Inventory of Existing Commercial Chemical Substances) All components of these products are on the EINECS list.</p>
<p>RoHS (Restriction of Certain Hazardous Substances) Compliance Castings comply with RoHS</p>
<p>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.)</p>
<p>US STATE REGULATORY INFORMATION Some of the components listed in Section 3 may be covered under specific state regulations.</p>

SECTION 16—OTHER INFORMATION

<p>SDS SHEET PREPARED BY American Foundry Society, Inc. Occupational Safety & Health Committee (10-Q)</p>	<p>DATE 10/13</p>
<p>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.</p>	

Addendum: Label Information

<u>PRODUCT IDENTIFIER</u> SC 000-009 Rev. 16 CARBON & ALLOY STEEL CASTINGS	
<u>SUPPLIER IDENTIFICATION</u> Company Name <u>MICC</u> Street Address <u>850 Oakland Avenue</u> Mailing Address: <u>PO Box 707</u> City <u>Ponca City</u> State <u>OK</u> Zip/Postal Code <u>74602</u> Country <u>USA</u> Emergency Phone Number <u>800-364-6422</u> Other Info <u>www.emicc.com</u>	<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.	