



TRIANGLE FASTENER CORPORATION
4661 Hinckley Parkway
Cleveland, OH 44109
Phone: (216) 351-9933
Fax: (216) 351-5008
Website: www.trianglefastener.com

"Specialty Fasteners and Services for Commercial Construction"
FASTENING SYSTEMS DESIGN CENTER

Material Safety Data Sheet (MSDS)

Report #: MSDS082305

Conforms to requirements of OSHA standard 1910.1200
"Hazard Communication" and to various state "Employee Right to Know" laws

Vendor name and address

Triangle Fastener Corporation Corporate Office)
1925 Preble Ave
Pittsburgh, PA 15233
Phone: (412) 321-5000
Fax: (412) 321-7838

SECTION I - PRODUCT IDENTIFICATION

This MSDS supplied for: Ductile Iron – BRACER® Hillside Style Washer

ASTM ALLOY DESIGNATION

SECTION II - HAZARDOUS COMPONENTS

Ingredient	Cas No.	Percent	TLV (mg/m3)
Carbon	7440-44-0	3.0-4.3	N/E
Chromium	7440-47-3	0.02-0.13	
Chromium (11) Compounds as Cr		0.5	N/E
Chromium (111) Compounds as Cr		0.5 0.5	
Chromium Metal as Cr		0.5 1.0	
Chromium VI Insoluble Compounds		0.01	N/E
Chromic Acid and Chromates as CrO3		1.0mg/10m3(C)	
Chromium VI Compounds Water Soluble as Cr	0.05 0.1 (C)		
Iron	1309-37-1	87.7-95.1	
Iron Oxide Fume (Fe2O3)		N/E	10.0
Iron Oxide Dust and Fume (Fe2O3)		5.0	N/E
Magnese (as Mn)	7439-96-5	<1.2	
Fume as Mn		N/E	5.0 (C)
Elemental and Inorganic Compounds as Mn		0.2 5.0 (C)	
Nickel* (as Ni)	7440-02-0	0.01-1.5	
Metal		1.5 1.0	
Insoluble Compounds as Ni		1.0	
Soluble Compounds as Ni		0.1 1.0	
Silicon	7440-21-3	1.8-4.0	
Total Dust			10.0 15.0
Total Respirable Dust		N/E	5.0

N/E = none established. N/A = not applicable.

N/D = no data available.

TLV = American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (8-hour time weighted average).

PEL = OSHA Permissible Exposure Limit.

Mg/m3 = Milligrams per cubic meter of air.

NTP = National Toxicology Program.

C = Ceiling Limit.

STEL = Short Term Exposure Limit.



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SARA Title III Information

*This constituent, a toxic chemical, makes this product subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372. Quantity threshold amounts are 25,000 pounds for manufacturing, importing or processing and 10,000 pounds for otherwise using the listed chemical. Chemicals marked ** are reportable only if in the form of dust or fume. For purposes of SARA Title III Section 313 inventory and reporting, these alloys contain <0.005% lead.

CARCINOGEN CLASSIFICATION

INGREDIENT OSHA NTP IRAC EPA TARGET ORGAN

Carbon:N N N N -

Chromium (Hexavalent):N K 1 A-K Lung

Iron:N N 3 N Lung

Manganese:N N N D Central Nervous System

Nickel N R 2B N Lung, Nasal

Silicon:N N N N

OSHA - U.S. OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION

N = Not Listed as a Human Carcinogen

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)

N = Not Listed as a Human Carcinogen

IRAC - INTERNATIONAL AGENCY FOR RESEARCH ON CANCER

1 = Carcinogen to Humans

2B = Possibly Carcinogenic to Humans

3 = Unclassified as Carcinogenicity in Humans N = Not Listed as a Carcinogen

EPA - U.S. ENVIRONMENTAL PROTECTION AGENCY

A = Human Carcinogen

K = Known Human Carcinogen

D = Not classified as to Human Carcinogenicity. No data available

B1 = Probable Human Carcinogen. Sufficient evidence from Epidemiologic Studies

L = Likely to produce Cancer in Humans

B2 = Probable Human Carcinogen. Sufficient evidence from Animal Studies N = Not Listed as a Human Carcinogen

SECTION III - OVERVIEW

There are no chemical hazards from these castings in solid form.

Dust or fumes generated by machining, grinding, or welding of the casting will put contaminants in the air. Since the casting is over 85% iron, most of the dust or fume will be iron or iron oxide. There is no TLV for iron dust, but available information indicates that the TLV for nuisance dust will serve as a guideline until a TLV is established.

High production dry machining of ductile iron castings usually requires local exhaust ventilation. Flame cutting, are gouging, or welding of the casting generates iron oxide fume. Inhalation of too much iron oxide



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fume over a long time can cause siderosis, sometimes called "iron pigmentation" of the lung. It can be seen on a chest x-ray but causes little or no disability. Also see the MSDS for the welding rod being used.

Welding or flame cutting may convert a fraction of the chromium to the water insoluble hexavalent (carcinogenic) form, but the chromium content of the casting is so low that over-exposure is not likely.

Nickel has been shown to cause cancer in laboratory animals. However, its potential to cause cancer in humans has not been determined. The nickel content of the casting is so low that over-exposure is not likely. Grinding castings that have not been cleaned or that contain embedded silica will generate significant amounts of dust containing free silica, which can cause silicosis.

Good local ventilation is frequently required to prevent over-exposure in this situation. If good ventilation is not available, use an NIOSH-approved dust respirator. IARC has listed crystalline silica as Class 2A, probably can cause lung cancer.

Other toxic metals in the alloy are present in small amounts that will not represent a hazard if iron dust and fume are adequately controlled.

SECTION IV - PHYSICAL DATA

PHYSICAL DESCRIPTION: Solid, silver gray in color, no odor

BOILING POINT: 2750C for iron

VAPOR PRESSURE: N/A

VAPOR DENSITY: N/A

SOLUBILITY IN WATER: N/A

SPECIFIC GRAVITY: 7.86 for iron

PERCENT VOLATILE BY VOLUME: N/A

EVAPORATION RATE: N/A

SECTION V - FIRE AND EXPLOSION DATA

Castings will not burn or explode.

SECTION VI - HEALTH HAZARD DATA

EYES: Metal particles in the eyes may cause irritation if not removed. Contact lenses should be worn with caution in a metalcasting environment. Obey work rules concerning contact lenses.

SKIN: Carbon: Skin irritation; Nickel: Dermatitis; Silicon: Skin irritation.

BREATHING: Prolonged or repeated overexposure to dust or fumes from these castings may cause the following health effects:

Carbon: Respiratory irritation.

Chromium, Hexavalent: Lung cancer.

Iron: Iron pigmentation of the lung, which can be seen in a chest x-ray but causes little or no disability.

Manganese: Central nervous system effects are: sleepiness, weakness in legs, spastic gait, emotional disturbances.

Nickel: Lung and nasal cancer.

Silicon: Eye and nose irritation.

Breathing excessive amounts of silica dust for a long time can cause silicosis. Silicosis causes shortness of breath, reduced capacity to do work, and weakens the defenses against other lung diseases.

INGESTION: Hand, clothing, food and drink contact with metal dust, fume or powder can cause ingestion of particulate during hand to mouth activities such as eating, drinking, smoking, nail biting, etc.

NOISE: Grinding or machining castings is noisy. The OSHA limit for noise averaged over eight hours is 90 decibels (dBA). A hearing conservation program is required if exposure is over 85 dBA. If noise is at or above 90 dBA, you should wear ear muffs or plugs.

FIRST AID



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IF IN EYES: Metal particles should be removed by a trained individual such as a nurse or physician.

IF ON SKIN: Use a mild hand cream if irritation develops.

IF BREATHED: (Fumes from welding): Move to fresh air.

IF INGESTED: Consult local physician.

SECTION VII - REACTIVITY DATA

HAZARDOUS POLYMERIZATION: Will not occur.

STABILITY: Stable

INCOMPATIBILITY: Metal dust can burn or explode and must be protected from ignition sources such as grinding sparks, etc. Under some conditions, metal dust is incompatible with some oxidizers, acids and water and may ignite or explode.

SECTION VIII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

If damaged, return castings to vendor or send to scrap reclaimer.

Collected dust from machining, welding, etc. may be classified as "hazardous waste" depending on circumstances. Consult local authorities regarding disposal.

SECTION IX - PROTECTIVE EQUIPMENT TO BE USED

RESPIRATORY PROTECTION: Wear a NIOSH approved respirator for dusts or fume if concentrations exceed the TLV or PEL.

VENTILATION: Provide general ventilation and/or local exhaust if necessary to maintain concentrations below the TLV's.

PROTECTIVE GLOVES: Work gloves advisable for handling castings.

EYE PROTECTION: Safety glasses with side shields and/or face shields for particles (grinding). Welding goggles or helmet for welding.

OTHER PROTECTIVE EQUIPMENT: Wear a protective apron and gauntlets if arc-air gouging or cutting, or welding castings. Safety shoes may be required during certain operations.

If noise is at or above 90 dBA, you should wear ear muffs or ear plugs.

SECTION X - SPECIAL PRECAUTIONS OR OTHER COMMENTS

STORAGE: Keep dry to reduce rusting.

THE INFORMATION HEREIN IS BASED ON THE VENDOR'S MSDS WITH ADDITIONS AS NECESSARY TO COMPLY WITH CURRENT REGULATIONS. THE INFORMATION IS BELIEVED TO BE ACCURATE BUT UNDER THE CIRCUMSTANCES IS NOT WARRANTED TO BE.

Material Safety Data Sheet (MSDS)

The following hazard information is required for labels under OSHA Standard 1910.1200 and applicable instructions. Other label information may be added.

DUCTILE IRON



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----- CAUTION -----

Grinding, welding, or arc gouging of this casting creates dust or fumes containing substances listed below with corresponding possible health effects after prolonged or repeated overexposure:

Carbon: Respiratory and skin irritation.

Chromium, Hexavalent: Lung cancer.

Iron: Siderosis "iron pigmentation" of the lung, which can be seen in a chest x-ray but causes little or no disability.

Manganese: Central nervous system effects are: sleepiness, weakness in legs, spastic gait, emotional disturbances.

Nickel: Dermatitis, lung and nasal cancer.

Silicon: Skin, eye and nose irritation.

Wear eye protection. Wear approved dust and fume respirator if exposures exceed safe limits. For additional information, see Material Safety Data Sheet SC-000-042 Rev. 7 for this material. GRAY IRON