CARBON STEEL BAR & THREADED FASTENERS

Safety Data Sheet (SDS)

Section 1 – Identification

1(a) Product Identifier used on Label: Carbon Steel Bar & Threaded Fasteners

1(b) Other means of identification: Refer to Section 16 for products covered

1(c) Recommended use of the chemical and restrictions on use: These products are sold to all steel-consuming industries including automotive, heavy machinery, pipes and tubes, construction, packaging and appliances. No restrictions known

1(d) Name, address, and telephone number:

Vulcan Threaded Products (dba Vulcan Steel Products) Phone number: 205-620-5100
10 Crosscreek Trail
Pelham, Al 35124

1(e) Emergency phone number: CHEMTREC (Day or Night): 1-800-424-9300

Section 2 – Hazard(s) Identification

2(a) Classification of the chemical: Carbon Steel Bar & Threaded Fasteners is considered as an article under Reach regulation REACH (REGULATION (EC) No 1907/2006) and is not subject to classification under CLP regulation (REGULATION (EC) No 1272/2008. However, **Carbon Steel Threaded Rod & Bar** is not exempted as an article under OSHA 29 CFR 1910.1200 Hazard Communication Standard due to its downstream use and therefore this product is considered a mixture and a hazardous material. The categories of Health Hazards as defined in "GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS (GHS), Third revised edition ST/SG/AC.10/30/Rev. 3" United Nations, New York and Geneva, 2009 have been evaluated. Refer to Section 3, 8 and 11 for additional information.

2(b) Signal word, hazard statement(s), symbols and precautionary statement(s):

Hazard Symbol	Hazard Classification	Signal Word	Hazard Statement(s)
	Carcinogenicity - 2 Reproductive Toxicity - 2 Single Target Organ Toxicity (STOT) Repeat Exposure - 1	**DANGER**	Suspected of causing cancer. Suspected of damaging fertility or the unborn child. Causes damage to lungs and central nervous system through prolonged or repeated inhalation exposure.
	Acute Toxicity-Oral 4 Skin Sensitization - 1 STOT Single Exposure - 3		Harmful if swallowed. May cause an allergic skin reaction. May cause respiratory irritation.
NA	Eye Irritation-2B		Causes eye irritation.

Precautionary Statement(s)

Prevention	Response	Storage/Disposal
Do not breathe dusts / fume / gas / mist / vapor / spray. Wear protective gloves / protective clothing / eye protection / face protection. Contaminated work clothing must not be allowed out of the workplace. Use only outdoors or in well ventilated areas. Wash thoroughly after handling. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not eat, drink or smoke when using this product.	If inhaled: Remove person to fresh air and keep comfortable for breathing. If exposed, concerned or feel unwell: Get medical advice/attention. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If on skin: Wash with plenty of water. If irritation or rash occurs: Get medical advice/attention. Take off and wash contaminated clothing before reuse. If swallowed: Call a poison center/doctor if you feel unwell. Rinse mouth. Call a poison center/doctor if you feel unwell.	Dispose of contents in accordance with federal, state and local regulations.

2(c) Hazards not otherwise classified: None Known

2(d) Unknown acute toxicity statement (mixture): None Known

Section 3 – Composition/Information on Ingredients

3(a-c) Chemical name, common name (synonyms), CAS number and other identifiers, and concentration:

Chemical Name	CAS Number	EC Number	% weight
Iron	7439-89-6	231-096-4	75 - 99
Manganese	7439-96-5	231-105-1	0.05 - 5.0
Carbon	7440-44-0	231-153-3	0.05 – 1.2
Chromium	7440-47-3	231-157-5	0 - 14
Nickel	7440-02-0	231-111-4	0 – 4.0
Copper	7440-50-8	231-159-6	0 – 1.5

EC - European Community **CAS** - Chemical Abstract Service

Section 3 – Composition/Information on Ingredients (continued)

3(a-c) Chemical name, common name (synonyms), CAS number and other identifiers, and concentration (continued):

Note: Commercial steel products contain small amounts of various constituents in addition to those listed. These small quantities are frequently referred to as "trace" or "residual" constituents that generally originate in the raw materials used. Product surface may be treated with trace amounts of corrosion-inhibiting or rust preventative products depending on product and customer specifications. Contact Vulcan for product surface treatment SDS.

Section 4 – First-aid Measures

4(a) Description of necessary measures:

- **Inhalation: Carbon Steel Bar & Threaded Fasteners** as sold/shipped is not a likely form of exposure. However, during further processing (welding, grinding, burning, etc.), If inhaled: Remove person to fresh air and keep comfortable for breathing. If exposed, concerned or feel unwell: Get medical advice/attention
- **Eye Contact: Carbon Steel Bar & Threaded Fasteners** as sold/shipped is not a likely form of exposure. However, during further processing (welding, grinding, burning, etc.), If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue Rinsing. If eye irritation persists: Get medical advice attention. If exposed, concerned or feel unwell: Get medical advice/attention.
- **Skin Contact:** If on skin: Wash thoroughly after handling. Wash with plenty of water. If irritation or rash occurs: Get medical advice/attention. Take off and wash contaminated clothing before reuse. If exposed, concerned or feel unwell: Get medical advice/attention.
- **Ingestion: Carbon Steel Bar & Threaded Fasteners** as sold/shipped is not a likely form of exposure. However, during further processing (welding, grinding, burning, etc.), If swallowed: Call a poison center/doctor if you feel unwell. Rinse mouth. If exposed, concerned or feel unwell: Get medical advice/attention.

4(b) Most important symptoms/effects, acute and delayed (chronic):

- **Inhalation: Carbon Steel Bar & Threaded Fasteners** as sold/shipped is not likely to present an acute or chronic health effect.
- **Eye: Carbon Steel Bar & Threaded Fasteners** as sold/shipped is not likely to present an acute or chronic health effect.
- **Skin: Carbon Steel Bar & Threaded Fasteners** as sold/shipped is not likely to present an acute or chronic health effect.
- **Ingestion: Carbon Steel Bar & Threaded Fasteners** as sold/shipped is not likely to present an acute or chronic health effect.

However, during further processing (welding, grinding, burning, etc.), individual components may illicit an acute or chronic health effect. Refer to Section 11-Toxicological Information.

4(c) Immediate Medical Attention and Special Treatment: None Known

Section 5 – Fire-fighting Measures

5(a) Suitable (and unsuitable) Extinguishing Media: Not Applicable for **Carbon Steel Bar & Threaded Fasteners** as sold/shipped. Use extinguishers appropriate for surrounding materials.

5(b) Specific Hazards arising from the chemical: Not Applicable for **Carbon Steel Bar & Threaded Fasteners** as sold/shipped. Do not use water on molten metal.

5(c) Special protective equipment and precautions for fire-fighters: Self-contained MSHA/NIOSH approved respiratory protection and full protective clothing should be worn when fumes and/or smoke from fire are present. Heat and flames cause emittance of acrid smoke and fumes. Do not release runoff from fire control methods to sewers or waterways. Firefighters should wear full face-piece self-contained breathing apparatus and chemical protective clothing with thermal protection. Direct water stream will scatter and spread flames and, therefore, should not be used.

Section 6 - Accidental Release Measures

6(a) Personal Precautions, Protective Equipment and Emergency Procedures: Not Applicable for **Carbon Steel Bar & Threaded Fasteners** as sold/shipped. For spills involving finely divided particles, clean-up personnel should be protected against contact with eyes and skin. If material is in a dry state, avoid inhalation of dust. Fine, dry material should be removed by vacuuming or wet sweeping methods to prevent spreading of dust. Avoid using compressed air. Do not release into sewers or waterways. Collect material in appropriate, labeled containers for recovery or disposal in accordance with federal, state, and local regulations.

6(b) Methods and materials for containment and clean up: Not Applicable for **Carbon Steel Bar & Threaded Fasteners** as sold/shipped. Collect material in appropriate, labeled containers for recovery or disposal in accordance with federal, state, and local regulations. Follow applicable OSHA regulations (29 CFR 1910.120) and all other pertinent state and federal requirements.

Section 7 - Handling and Storage

7(a) Precautions for safe handling: Not Applicable for **Carbon Steel Bar & Threaded Fasteners** as sold/shipped, however further processing (welding, burning, grinding, etc.) with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use only outdoors or in well ventilated areas. Practice good housekeeping. Avoid breathing metal fumes and/or dust. Do not eat, drink or smoke when using this product.

7(b) Conditions for safe storage, including any incompatibilities: Store away from acids and incompatible materials. Store in well ventilated place. Keep container tightly closed. If feasible, store locked up.

Section 8 - Exposure Controls / Personal Protection

8(a) Occupational Exposure Limits (OELs): Carbon Steel Bar & Threaded Fasteners as sold/shipped in its physical form does not present an inhalation, ingestion or contact hazard, nor would any of the following exposure data apply. However, operations such as high temperature (burning, welding), sawing, brazing, machining and grinding may produce fumes and/or particulates. The following exposure limits are offered as reference, for an experience industrial hygienist to review.

Ingredients	OSHA PEL [1]	ACGIH TLV [2]	NIOSH REL [3]	IDLH [4]
Iron	10 mg/m³ (iron oxide fume)	5.0 mg/m³ (iron oxide, respirable fraction[5])	5.0 mg/m³ (iron oxide dust and fume)	2,500 mg/m³ (as Fe)
Manganese	"C" 5.0 mg/m³ (as fume & inorganic compounds, as Mn)	0.02 mg/m³ (as fume & inorganic compounds, as Mn, respirable fraction) 0.1 mg/m³ (as fume & inorganic compounds, as Mn, inhalation fraction)	1.0 mg/m³ (as fume & inorganic compounds, as Mn) "STEL" 3.0 mg/m³ (as fume & inorganic compounds, as Mn)	500 mg/m³ (as Mn)
Carbon	15 mg/m³ (as total dust, PNOR[6]) 5.0 mg/m³ (as respirable fraction, PNOR)	10 mg/m³ (as inhalable fraction,[7] PNOS[8]) 3.0 mg/m³ (as respirable fraction, PNOS)	NE	NE
Chromium	0.5 mg/m³ (as Cr II & III, inorganic compounds) 1.0 mg/m³ (as Cr, metal) 0.005 mg/m³ (as Cr VI, inorganic compounds, water soluble & insoluble) "AL" 0.0025 mg/m³ (as Cr VI, inorganic compounds, water soluble & insoluble)	0.003 mg/m³ (as Cr III, inorganic compounds, inhalation fraction) "DSEN & RSEN" "water-soluble" compounds only) 0.5 mg/m³ (as Cr, metal, inhalable fraction) 0.0002 mg/m³ (as Cr VI, inorganic compounds, water insoluble & insoluble) "STEL" 0.0005 mg/m³ (as Cr VI, inorganic compounds, water insoluble & insoluble)	0.5 mg/m³ (as Cr II & III, inorganic compounds & metal) 0.0002 mg/m³ (as Cr VI, inorganic compounds, water insoluble & insoluble)	250 mg/m³ (as Cr II & metal) 25 mg/m³ (as Cr III) 15 mg/m³ (as Cr VI, Ca)
Nickel	1.0 mg/m³ (metal, insoluble & soluble compounds, as Ni)	1.5 mg/m³ (metal, as Ni, as inhalable fraction) 0.2 mg/m³ (insoluble compounds, as Ni, inhalable fraction, inorganic only) 0.1 mg/m³ (soluble compounds, as Ni, inhalable fraction, inorganic only)	0.015 mg/m³ (metal & insoluble and soluble compounds, as Ni)	10 mg/m³ (as Ni)
Copper	0.1 mg/m³ (as fume, Cu) 1.0 mg/m³ (as dusts & mists, Cu)	0.2 mg/m³ (as fume) 1.0 mg/m³ (as dusts & mists, Cu)	0.1 mg/m³ (as fume, Cu) 1.0 mg/m³ (as dusts & mists, Cu)	100 mg Cu/m³

NE - None Established

1. OSHA PELs (Permissible Exposure Limits) are 8-hour TWA (time-weighted average) concentrations unless otherwise noted. A ("C") designation denotes a ceiling limit, which should not be exceeded during any part of the working exposure unless otherwise noted. A Short Term Exposure Limit (STEL) is defined as a 15-minute exposure, which should not be exceeded at any time during a workday. An Action level (AL) is used by OSHA and NIOSH to express a health or physical hazard. They indicate the level of a harmful or toxic substance/activity, which requires medical surveillance, increased industrial hygiene monitoring, or biological monitoring. Action Levels are generally set at one half of the PEL but the actual level may vary from standard to standard. The intent is to identify a level at which the vast majority of randomly sampled exposures will be below the PEL.
2. Threshold Limit Values (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH) are 8-hour TWA concentrations unless otherwise noted. ACGIH TLVs are for guideline purposes only and as such are not legal, regulatory limits for compliance purposes. DSEN – May cause dermal sensitization. This notation is used to indicate the potential for dermal sensitization resulting from the interaction of an absorbed agent and ultraviolet light (i.e. photosensitization). RSEN – May cause respiratory sensitization.
3. The National Institute for Occupational Safety and Health Recommended Exposure Limits (NIOSH-REL)- Compendium of Policy and Statements. NIOSH, Cincinnati, OH (1992). NIOSH is the federal agency designated to conduct research relative to occupational safety and health. As is the case with ACGIH TLVs, NIOSH RELs are for guideline purposes only and as such are not legal, regulatory limits for compliance purposes.
4. The "immediately dangerous to life or health air concentration values (IDLHs)" are used by NIOSH as part of the respirator selection criteria and were first developed in the mid-1970's by NIOSH. The Documentation for Immediately Dangerous to Life or Health Concentrations (IDLHs) is a compilation of the rationale and sources of information used by NIOSH during the original determination of 387 IDLHs and their subsequent review and revision in 1994. Ca is designated as carcinogen.
5. Respirable fraction. The concentration of respirable dust for the application of this limit is to be determined from the fraction passing a size-selector with the characteristics defined in ACGIH 2018 TLVs ® and BEIs ® Appendix D, paragraph C.
6. PNOR (Particulates Not Otherwise Regulated). All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name are covered by a limit which is the same as the inert or nuisance dust limit of 15 mg/m³ for total dust and 5 mg/m³ for the respirable fraction.
7. Inhalable fraction. The concentration of inhalable particulate for the application of this TLV is to be determined from the fraction passing a size-selector with the characteristics defined in the ACGIH 2018 TLVs ® and BEIs ® (Biological Exposure Indices) Appendix D, paragraph A.
8. PNOS (Particulates Not Otherwise Specified). Particulates identified under the PNOS heading are "nuisance dusts" containing no asbestos and <1% crystalline silica.

8(b) Appropriate Engineering Controls: Use controls as appropriate to minimize exposure to metal fumes and dusts during handling operations. Provide general or local exhaust ventilation systems to minimize airborne concentrations. Local exhaust is necessary for use in enclosed or confined spaces. Provide sufficient general/local exhaust ventilation in pattern/volume to control inhalation exposures below current exposure limits.

8(c) Individual Protection Measures:

Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, use only a NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. Concentration in air of the various contaminants determines the extent of respiratory protection needed. Half-face, negative-pressure, air-purifying respirator equipped with P100 filter is acceptable for concentrations up to 10 times the exposure limit. Full-face, negative-pressure, air-purifying respirator equipped with P100 filter is acceptable for concentrations up to 50 times the exposure limit. Protection by air-purifying negative-pressure and powered air respirators is limited. Use a positive-pressure-demand, full-face, supplied air respirator or self-contained breathing apparatus (SCBA) for concentrations above 50 times the exposure limit. If exposure is above the IDLH (Immediately dangerous to life or health) for any of the constituents, or there is a possibility of an uncontrolled release or exposure levels are unknown, then use a positive-demand, full-face, supplied air respirator with escape bottle or SCBA.

Warning! Air-purifying respirators both negative-pressure and powered-air do not protect workers in oxygen-deficient atmospheres.

Section 8 - Exposure Controls / Personal Protection (continued)

8(c) Individual Protection Measures (continued):

- **Eyes**: Wear appropriate eye protection to prevent eye contact. For operations, which result in elevating the temperature of the product to or above its melting point or result in the generation of airborne particulates, use safety glasses to prevent eye contact. Contact lenses should not be worn where industrial exposures to this material are likely. Use safety glasses or goggles as required for welding, burning, sawing, brazing, grinding or machining operations.
- **Skin**: Wear appropriate personal protective clothing to prevent skin contact. Cut resistant gloves and sleeves should be worn when working with steel products. For operations, which result in elevating the temperature of the product to or above its melting point or result in the generation of airborne particulates, use protective clothing, and gloves to prevent skin contact. Protective gloves should be worn as required for welding, burning or handling operations. Contaminated work clothing must not be allowed out of the workplace.
- **Other protective equipment**: An eyewash fountain and deluge shower should be readily available in the work area.

Section 9 - Physical and Chemical Properties

9(a) Appearance (physical state, color, etc.): Solid, Metallic Silver/Gray

9(b) Odor: Odorless

9(c) Odor Threshold: NA

9(d) pH: NA

9(e) Melting Point/Freezing Point: ~2400ºF - 2800ºF

9(f) Initial Boiling Point and Boiling Range: ~5432ºF

9(g) Flash Point: NA

9(h) Evaporation Rate: NA

9(i) Flammability (solid, gas): Non-flammable, non-combustible

9(j) Upper/lower Flammability or Explosive Limits: NA

9(k) Vapor Pressure: NA

9(l) Vapor Density (Air = 1): NA

9(m) Relative Density: 7.6 - 7.85

9(n) Solubility(ies): Water Insoluble

9(o) Partition Coefficient n-octanol/water: ND

9(p) Auto-ignition Temperature: NA

9(q) Decomposition Temperature: ND

9(r) Viscosity: NA

NA - Not Applicable
ND - Not Determined for product as a whole

Section 10 - Stability and Reactivity

10(a) Reactivity: Not Determined (ND) for product in a solid form. Do not use water on molten metal.

10(b) Chemical Stability: Steel products are stable under normal storage and handling conditions.

10(c) Possibility of hazardous reaction: None Known

10(d) Conditions to Avoid: Storage with strong acids or calcium hypochlorite.

10(e) Incompatible Materials: Will react with strong acids to form hydrogen. Iron oxide dusts in contact with calcium hypochlorite evolve oxygen and may cause an explosion.

10(f) Hazardous Decomposition Products: Thermal oxidative decomposition of steel products can produce fumes containing oxides of iron and manganese as well as other alloying elements.

Section 11 - Toxicological Information

11(a-e) Information on toxicological effects: The following toxicity data has been determined for **Carbon Steel Bar & Threaded Fasteners** when further processed using the information available for its components applied to the guidance on the preparation of an SDS under the GHS requirements of OSHA and the EU CPL:

Hazard Classification	Hazard Category		Hazard Symbols	Signal Word	Hazard Statement
	EU	OSHA			
Acute Toxicity Hazard (covers Categories 1-5)	NA*	4[a]		**Warning**	Harmful if swallowed.
Eye Damage/ Irritation (covers Categories 1, 2A and 2B)	NA*	2B[c]	No Pictogram	**Warning**	Causes eye irritation.
Skin/Dermal Sensitization (covers Category 1)	NA*	1[d]		**Warning**	May cause an allergic skin reaction.
Carcinogenicity (covers Categories 1A, 1B and 2)	NA*	2[f]		**Warning**	Suspected of causing cancer.
Toxic Reproduction (covers Categories 1A, 1B and 2)	NA*	2[g]		**Warning**	Suspected of damaging fertility or the unborn child.
Specific Target Organ Toxicity (STOT) Following Single Exposure (covers Categories 1-3)	NA*	3[h]		**Warning**	May cause respiratory irritation.

Section 11 - Toxicological Information (continued)

11(a-e) Information on toxicological effects (continued):

Hazard Classification	Hazard Category		Hazard Symbols	Signal Word	Hazard Statement
	EU	OSHA			
STOT following Repeated Exposure (covers Categories 1 and 2)	NA*	1[i]		**Danger**	Causes damage to lungs and central nervous system through prolonged or repeated inhalation exposure.

* Not Applicable - Steel products are considered articles and as such are not required to have an SDS or Hazard Classifications according to the criteria specified in REACH Regulation (EC) No 1907/2006] and CPL Regulation (EC) No 1272/2008. See above European Health classification of substances.

Toxicological data listed below are presented regardless to classification criteria. Individual hazard classification categories where the toxicological information has met or exceeded a classification criteria threshold are listed above.

a. No LC_{50} or LD_{50} has been established for **Carbon Steel Bar & Threaded Fasteners**. The following data has been determined for the components:

- **Iron:** Rat LD_{50} =98.6 g/kg (REACH)
  Rat LD_{50} =1060 mg/kg (IUCLID)
  Rat LD_{50} =984 mg/kg (IUCLID)
  Rabbit LD_{50} =890 mg/kg (IUCLID)
  Guinea Pig LD_{50} =20 g/kg (TOXNET)
  Human LD_{LO} =77 g/kg (IUCLID)
- **Nickel:** LD_{50} >9000 mg/kg (Oral/Rat); NOAEC >10.2 mg/l (Inhalation/Rat)
- **Carbon :** LD_{50}= >10,000 mg/kg (Oral/ Rat)
- **Copper:** Rat LD_{50} = 481 mg/kg (REACH**)**
  Rat LD_{50} > 2500 mg/kg (REACH)
- **Manganese:** Rat LD_{50} > 2000 mg/kg (REACH)
  Rat LD_{50} > 9000 mg/kg (NLM Toxnet)

b. No Skin (Dermal) Irritation data available for **Carbon Steel Bar & Threaded Fasteners** as a mixture or its components.

c. No Eye Irritation data available for **Carbon Steel Bar & Threaded Fasteners** as a mixture. The following Eye Irritation information was found for the components:

- **Iron:** Causes eye irritation.
- **Nickel:** Slight eye irritation from particulate abrasion only.

d. No Skin (Dermal) Sensitization data available for **Carbon Steel Bar & Threaded Fasteners** as a mixture. The following Skin (Dermal) Sensitization information was found for the components:

- **Nickel:** May cause allergic skin sensitization.

e. No Respiratory Sensitization data available for **Carbon Steel Bar & Threaded Fasteners** as a mixture or its components.

f. No Germ Cell Mutagenicity data available for **Carbon Steel Bar & Threaded Fasteners** as a mixture. The following Mutagenicity and Genotoxicity information was found for the components:

- **Iron:** IUCLID has found some positive and negative findings in vitro.
- **Nickel:** EU RAR has found positive results in vitro and in vivo but insufficient data for classification.

g. Carcinogenicity: IARC, NTP, and OSHA do not list **Carbon Steel Bar & Threaded Fasteners** as carcinogens. The following Carcinogenicity information was found for the components:

- **Welding Fumes -** IARC Group 2B carcinogen, a mixture that is possibly carcinogenic to humans.
- **Chromium (as metal and trivalent chromium compounds)** – IARC Group 3 carcinogens, not classifiable as to their human carcinogenicity.
- **Nickel and certain nickel compounds –** Group 2B - metallic nickel Group 1 - nickel compounds ACGIH confirmed human carcinogen. Nickel – EURAR Insufficient evidence to conclude carcinogenic potential in animals or humans; suspect carcinogen classification Category 2 Suspected of causing cancer.

h. No Toxic Reproduction data available for **Carbon Steel Bar & Threaded Fasteners** as a mixture. The following Toxic Reproductive information was found for the components:

- **Nickel**: Effects on fertility.

i. No Specific Target Organ Toxicity (STOT) following a Single Exposure data available for **Carbon Steel Bar & Threaded Fasteners** as a mixture. The following STOT following a Single Exposure data was found for the components:

- **Iron**: Irritating to Respiratory tract.

j. No Specific Target Organ Toxicity (STOT) following Repeated Exposure data was available for **Carbon Steel Bar & Threaded Fasteners** as a whole. The following STOT following Repeated Exposure data was found for the components:

- **Copper:** Target organs affected - Skin, eyes liver, kidneys and respiratory tract.
- **Nickel**: Rat 4 wk inhalation LOEL 4 mg/m^3 Lung and Lymph node histopathology. Rat 2 yr inhalation LOEL 0.1 mg/ m^3 Pigment in kidney, effects on hematopoiesis spleen and bone marrow and adrenal tumor Rat 13 Week Inhalation LOAEC 1.0 mg/m^3 Lung weights, and Alveolar histopathology.
- **Manganese**: Inhalation of metal fumes - Degenerative changes in human Brain; Behavioral: Changes in motor activity and muscle weakness (Whitlock *et al.*, 1966).

The above toxicity information was determined from available scientific sources to illustrate the prevailing posture of the scientific community. The scientific resources includes: The American Conference of Governmental Industrial Hygienist (ACGIH) Documentation of the Threshold Limit Values (TLVs) and Biological Exposure indices (BEIs) with Other Worldwide Occupational Exposure Values 2018, The International Agency for Research on Cancer (IARC), The National Toxicology Program (NTP) updated documentation, the World Health Organization (WHO) and other available resources, the International Uniform Chemical Information Database (IUCLID), European Union Risk Assessment Report (EU-RAR), Concise International Chemical Assessment Documents (CICAD), European Union Scientific Committee for Occupational Exposure Limits (EU-SCOEL), Agency for Toxic Substances and Disease Registry (ATSDR), Hazardous Substance Data Bank (HSDB), and International Programme on Chemical Safety (IPCS).

Section 11 - Toxicological Information (continued)

The following health hazard information is provided regardless to classification criteria and is based on the individual component(s) and potential resultant components from further processing:

Acute Effects:

- **Inhalation:** Excessive exposure to high concentrations of dust may cause irritation to the eyes, skin and mucous membranes of the upper respiratory tract. Excessive inhalation of fumes of freshly formed metal oxide particles sized below 1.5 microns and usually between 0.02-0.05 microns from many metals can produce an acute reaction known as "metal fume fever". Symptoms consist of chills and fever (very similar to and easily confused with flu symptoms), metallic taste in the mouth, dryness and irritation of the throat followed by weakness and muscle pain. The symptoms come on in a few hours after excessive exposures and usually last from 12 to 48 hours. Long-term effects from metal fume fever have not been noted. Freshly formed oxide fumes of manganese and copper have been associated with causing metal fume fever.
- **Eye:** Excessive exposure to high concentrations of dust may cause irritation to the eyes.
- **Skin:** Skin contact with dusts may cause irritation or sensitization, possibly leading to dermatitis. Skin contact with metallic fumes and dusts may cause physical abrasion.
- **Ingestion:** Ingestion of harmful amounts of this product as distributed is unlikely due to its solid insoluble form. Ingestion of dust may cause nausea or vomiting.

Acute Effects by component:

- **Iron and oxides:** Iron is harmful if swallowed, causes skin irritation, and causes eye irritation. Contact with iron oxide has been reported to cause skin irritation and serious eye damage. Particles of iron or iron compounds, which become imbedded in the eye, may cause rust stains unless removed fairly promptly.
- **Carbon:** Not Reported/ Not Classified
- **Chromium, oxides and hexavalent chrome:** Hexavalent chrome causes damage to gastrointestinal tract, lung, severe skin burns and eye damage, serious eye damage, skin contact may cause an allergic skin reaction. Inhalation may cause allergic or asthmatic symptoms or breathing difficulties.
- **Copper and oxides:** Copper may cause allergic skin reaction. Copper oxide is harmful if swallowed, causes skin and eye irritation, and may cause an allergic skin reaction.
- **Manganese and oxides:** Manganese and Manganese oxide are harmful if swallowed.
- **Nickel and oxides:** Nickel may cause allergic skin sensitization. Nickel oxide may cause an allergic skin.

Delayed (chronic) Effects by component:

- **Iron and oxides**: Chronic inhalation of excessive concentrations of iron oxide fumes or dusts may result in the development of a benign pneumoconiosis, called siderosis, which is observable as an X-ray change. No physical impairment of lung function has been associated with siderosis. Inhalation of excessive concentrations of ferric oxide may enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens. Iron oxide is listed as a Group 3 (not classifiable) carcinogen by the International Agency for Research on Cancer (IARC).
- **Carbon:** Chronic inhalation may lead to decreased pulmonary function.
- **Chromium, oxides and hexavalent chromium:** The health hazards associated with exposure to chromium are dependent upon its oxidation state. The metal form (chromium as it exists in this product) is of very low toxicity. The hexavalent form is very toxic. Repeated or prolonged exposure to hexavalent chromium compounds may cause respiratory irritation, nosebleed, ulceration and perforation of the nasal septum. Industrial exposure to certain forms of hexavalent chromium has been related to an increased incidence of cancer. NTP (The National Toxicology Program) Fourth Annual report on Carcinogens cites "certain Chromium compounds" as human carcinogens. ACGIH has reviewed the toxicity data and concluded that chromium metal is not classifiable as a human carcinogen. Hexavalent chromium may cause genetic defects and is suspected of damaging the unborn child. Developmental toxicity in the mouse, suspected of damaging fertility or the unborn child.
- **Copper and oxides**: Inhalation of high concentrations of freshly formed oxide fumes and dusts of copper can cause metal fume fever. Chronic inhalation of copper dust has caused, in animals, hemolysis of the red blood cells, deposition of hemofuscin in the liver and pancreas, injury to lung cells and gastrointestinal symptoms.
- **Manganese and oxides:** Chronic exposure to high concentrations of manganese fumes and dusts may adversely affect the central nervous system with symptoms including languor, sleepiness, weakness, emotional disturbances, spastic gait, mask-like facial expression and paralysis. Animal studies indicate that manganese exposure may increase susceptibility to bacterial and viral infections. Occupational overexposure (Manganese) is a progressive, disabling neurological syndrome that typically begins with relatively mild symptoms and evolves to include altered gait, fine tremor, and sometimes, psychiatric disturbances. May cause damage to lungs with repeated or prolonged exposure. Neurobehavioral alterations in worker populations exposed to MnO including: speed and coordination of motor function are especially impaired.
- **Nickel and oxides:** Exposure to nickel dusts and fumes can cause sensitization dermatitis, respiratory irritation, asthma, pulmonary fibrosis, edema and may cause nasal or lung cancer in humans. Causes damage to lungs through prolonged or repeated inhalation exposure. IARC lists nickel and certain nickel compounds as Group 2B carcinogens (sufficient animal data). ACGIH 2018 TLVs® and BEIs® lists insoluble nickel compounds as confirmed human carcinogens. Suspected of damaging the unborn child.

Section 12 - Ecological Information

12(a) Ecotoxicity (aquatic & terrestrial): No Data Available for **Carbon Steel Bar & Threaded Fasteners** as sold/shipped. However, individual components of the product when processed have been found to be toxic to the environment. Metal dusts may migrate into soil and groundwater and be ingested by wildlife as follows:

- **Iron Oxide**: LC_{50}: >1000 mg/L; Fish 48 h-EC_{50} > 100 mg/L (Currenta, 2008k); 96 h-$LC_0 \geq$ 50,000 mg/L Test substance: Bayferrox 130 red (95 – 97% Fe_2O_3; < 4% SiO_2 and Al_2O_3) (Bayer, 1989a)
- **Nickel Oxide:** IUCLID found LC_{50} in fish, invertebrates and algae > 100 mg/l.

12(b) Persistence & Degradability: No Data Available for **Carbon Steel Bar & Threaded Fasteners** as sold/shipped or individual components.

12(c) Bioaccumulative Potential: No Data Available for **Carbon Steel Bar & Threaded Fasteners** as sold/shipped or individual components.

Section 12 - Ecological Information (continued)

12(d) Mobility (in soil): No Data Available for **Carbon Steel Bar & Threaded Fasteners** as sold/shipped. However, individual components of the product have been found to be absorbed by plants from soil.

12(e) Other adverse effects: None Known

Additional Information:

Hazard Category: Not Reported **Signal Word:** No Signal Word

Hazard Symbol: No Symbol

Hazard Statement: No Statement

Section 13 - Disposal Considerations

Disposal: Steel scrap should be recycled whenever possible. Product dusts and fumes from processing operations should be recycled or classified by a competent environmental professional and disposed of in accordance with applicable federal, state or local regulations.

Container Cleaning and Disposal: Follow applicable Federal, state and local regulations. Observe safe handling precautions. European Waste Catalogue (EWC): 16-01-17 (ferrous metals), 12-01-99 (wastes not otherwise specified), 16-03-04 (off specification batches and unused products), or 15-01-04 (metallic packaging).

Please note this information is for Carbon Steel Bar & Threaded Fasteners in its original form. Any alterations can void this information.

Section 14 - Transport Information

14 (a-g) Transportation Information:

US Department of Transportation (DOT) under 49 CFR 172.101 **does not** regulate **Carbon Steel Bar & Threaded Fasteners** as a hazardous material. All federal, state, and local laws and regulations that apply to the transport of this type of material must be adhered to.

Shipping Name: Not Applicable (NA)	**Packaging Authorizations**	**Quantity Limitations**
Shipping Symbols: NA	**a) Exceptions:** NA	**a) Passenger, Aircraft, or Railcar:** NA
Hazard Class: NA	**b) Group:** NA	**b) Cargo Aircraft Only:** NA
UN No.: NA	**c) Authorization:** NA	**Vessel Stowage Requirements**
Packing Group: NA		**a) Vessel Stowage:** NA
DOT/ IMO Label: NA		**b) Other:** NA
Special Provisions (172.102): NA		**DOT Reportable Quantities**: NA

International Maritime Dangerous Goods (IMDG) and the Regulations Concerning the International Carriage of Dangerous Goods by Rail (RID) classification, packaging and shipping requirements follow the US DOT Hazardous Materials Regulation.

Regulations Concerning the International Carriage of Dangerous Goods by Road (ADR) does not regulate **Carbon Steel Bar & Threaded Fasteners** as a hazardous material.

Shipping Name: Not Applicable (NA)	**Packaging**	**Portable Tanks & Bulk Containers**
Classification Code: NA	**a) Packing Instructions:** NA	**a) Instructions:** NA
UN No.: NA	**b) Special Packing Provisions:** NA	**b) Special Provisions:** NA
Packing Group: NA	**c) Mixed Packing Provisions:** NA	
ADR Label: NA		
Special Provisions: NA		
Limited Quantities: NA		

International Air Transport Association (IATA) does not regulate **Carbon Steel Bar & Threaded Fasteners** as a hazardous material.

Shipping Name: Not Applicable (NA)	**Passenger & Cargo Aircraft**		**Cargo Aircraft Only:**	**Special Provisions:**
Class/Division: NA	**Limited Quantity (EQ)**		**Pkg Inst:** NA	NA
Hazard Label (s): NA	**Pkg Inst:** NA	**Pkg Inst:** NA		**ERG Code:** NA
UN No.: NA			**Max Net Qty/Pkg:** NA	
Packing Group: NA	**Max Net Qty/Pkg:** NA	**Max Net Qty/Pkg:** NA		
Excepted Quantities (EQ): NA				

Pkg Inst – Packing Instructions Max Net Qty/Pkg – Maximum Net Quantity per Package ERG – Emergency Response Drill Code

Transport Dangerous Goods (TDG) Classification: Carbon Steel Bar & Threaded Fasteners does not have a TDG classification.

Section 15 - Regulatory Information

Regulatory Information: *The following listing of regulations relating to a **Vulcan Threaded Products** product may not be complete and should not be solely relied upon for all regulatory compliance responsibilities.*

This product and/or its constituents are subject to the following regulations:

OSHA Regulations: Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-2, Z-3): The product, **Carbon Steel Bar & Threaded Fasteners** as a whole is not listed. However, individual components of the product are listed: Refer to Section 8, Exposure Controls and Personal Protection

Section 15 - Regulatory Information (continued)

EPA Regulations: The product, **Carbon Steel Bar & Threaded Fasteners** is not listed as a whole. However, individual components of the product are listed:

Components	Regulations
Iron	TSCA, SDWA
Manganese	CERCLA, SARA 313, TSCA
Chromium	CERCLA, SARA 313
Nickel	CERCLA, CWA, SARA 313, TSCA
Copper	CERCLA, CWA, SARA 313, TSCA, SDWA

SARA Potential Hazard Categories: Immediate Acute Health Hazard; Delayed Chronic Health Hazard

Regulations Key:

CAA	Clean Air Act (42 USC Sec. 7412; 40 CFR Part 61 [As of: 8/18/06])
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act (42 USC secs. 9601(14), 9603(a); 40 CFR Sec. 302.4, Table 302.4, Table 302.4 and App. A)
CWA	Clean Water Act (33 USC Secs. 1311; 1314(b), (c), (e), (g); 136(b), (c); 137(b), (c) [as of 8/2/06])
RCRA	Resource Conservation Recovery Act (42 USC Sec. 6921; 40 CFR Part 261 App VIII)
SARA	Superfund Amendments and Reauthorization Act of 1986 Title III Section 302 Extremely Hazardous Substances (42 USC secs. 11023, 13106; 40 CFR sec. 372.65) and Section 313 Toxic Chemicals (42 USC secs. 11023, 13106; 40 CFR sec. 372.65 [as of 6/30/05])
TSCA	Toxic Substance Control Act (15 U.S.C. s/s 2601 et seq. [1976])
SDWA	Safe Drinking Water Act (42 U.S.C. s/s 300f et seq. [1974])

Section 313 Supplier Notification: The product, **Carbon Steel Bar & Threaded Fasteners** contains the following toxic chemicals 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:

CAS #	Chemical Name	Percent by Weight
7439-96-5	Manganese	5.0 max
7440-47-3	Chromium	14 max
7440-02-0	Nickel	4.0 max
7440-50-8	Copper	1.5 max

State Regulations: The product, **Carbon Steel Bar & Threaded Fasteners** as a whole is not listed in any state regulations. However, individual components of the product are listed in various state regulations:

Pennsylvania Right to Know: Contains regulated material in the following categories:

- Hazardous Substances: Manganese, Chromium, Nickel, Copper
- Environmental Hazards: Manganese, Chromium, Nickel, Copper
- Special Hazardous Substance: Chromium, Nickel

California Prop. 65: To the best of Vulcan's knowledge, this product is in compliance with Proposition 65, and reasonably anticipated use of this product will not result in exposure to any Proposition 65 chemicals that would require a Proposition 65 warning. For more information go to www.P65Warnings.ca.gov.

New Jersey: Contains regulated material in the following categories:

- Hazardous Substance: Manganese, Chromium, Nickel, Copper
- Environmental Hazard: Manganese, Chromium, Nickel, Copper
- Special Hazard: Manganese and Chromium

Minnesota: Manganese, Chromium, Nickel

Massachusetts: Manganese compounds, Chromium, Nickel compounds, Copper compounds

Other Regulations:

WHMIS Classification (Canadian): The product, **Carbon Steel Bar & Threaded Fasteners** is not listed as a whole. However individual components are listed.

Ingredients	WHMIS Classification
Iron	Combustible dusts - Category 1
Manganese	Reproductive toxicity - Category 2; Specific target organ toxicity - repeated exposure - Category 1; Combustible dusts
Chromium	Combustible dusts
Nickel	Skin sensitization – Category 1; Carcinogenicity – Category 2; Specific target organ toxicity – repeated exposure - Category 1
Copper	Combustible Dusts - Category 1

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Section 16 - Other Information

Prepared By: Vulcan Threaded Products (dba Vulcan Steel Products)

Original Issue Date: 10/09/18 **Revised Date:** Original

Additional Information:

Section 16 - Other Information (continued)

Hazardous Material Identification System (HMIS) Classification

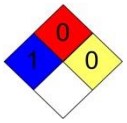
Health Hazard	1
Fire Hazard	0
Physical Hazard	0

HEALTH= **1**, * Denotes possible chronic hazard if airborne dusts or fumes are generated Irritation or minor reversible injury possible.

FIRE= **0**, Materials that will not burn.

PHYSICAL HAZARD= **0**, Materials that are normally stable, even under fire conditions, and will not react with water, polymerize, decompose, condense, or self-react. Non-explosives.

National Fire Protection Association (NFPA)



HEALTH = **1**, Exposure could cause irritation but only minor residual injury even if no treatment is given.

FIRE = **0,** Materials that will not burn.

INSTABILITY = **0**, Normally stable, even under fire exposure conditions, and are not reactive with water.

ABBREVIATIONS/ACRONYMS:

ACGIH	American Conference of Governmental Industrial Hygienists	**NIF**	No Information Found
BEIs	Biological Exposure Indices	**NIOSH**	National Institute for Occupational Safety and Health
CAS	Chemical Abstracts Service	**NTP**	National Toxicology Program
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	**ORC**	Organization Resources Counselors
CFR	Code of Federal Regulations	**OSHA**	Occupational Safety and Health Administration
CNS	Central Nervous System	**PEL**	Permissible Exposure Limit
GI, GIT	Gastro-Intestinal, Gastro-Intestinal Tract	**PNOR**	Particulate Not Otherwise Regulated
HMIS	Hazardous Materials Identification System	**PNOC**	Particulate Not Otherwise Classified
IARC	International Agency for Research on Cancer	**PPE**	Personal Protective Equipment
LC50	Median Lethal Concentration	**ppm**	parts per million
LD50	Median Lethal Dose	**RCRA**	Resource Conservation and Recovery Act
LD $_{Lo}$	Lowest Dose to have killed animals or humans	**RTECS**	Registry of Toxic Effects of Chemical Substances
LEL	Lower Explosive Limit	**SARA**	Superfund Amendment and Reauthorization Act
µg/m^3	microgram per cubic meter of air	**SCBA**	Self-contained Breathing Apparatus
mg/m^3	milligram per cubic meter of air	**STEL**	Short-term Exposure Limit
mppcf	million particles per cubic foot	**TLV**	Threshold Limit Value
MSDS	Material Safety Data Sheet	**TWA**	Time-weighted Average
MSHA	Mine Safety and Health Administration	**UEL**	Upper Explosive Limit
NFPA	National Fire Protection Association		

Disclaimer: This information is taken from sources or based upon data believed to be reliable. Our objective in sending this information is to help you protect the health and safety of your personnel and to comply with the OSHA Hazard Communication Standard and Title III of the Superfund Amendment and Reauthorization Act of 1986. **Vulcan Threaded Products** makes no warranty as to the absolute correctness, completeness, or sufficiency of any of the foregoing, or any additional, or other measures that may not be required under particular conditions. **Vulcan Threaded Products** MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY, OR ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, AND ANY IMPLIED WARRANTIES OTHERWISE ARISING FROM COURSE OF DEALING OR TRADE.

Products covered:
Carbon Steel Bar and Threaded Fasteners