



Mid-West Mfg. LLC

**Carbon, Alloy, and Low Alloy Steel Tube & Pipe
Safety Data Sheet (SDS)**

SECTION 1: IDENTIFICATION (Chemical & Company)

1(a) Product Identifier: Carbon, Low Alloy, or Alloy Steel Tubing or Pipe
1(b) Other Means of Identification:
1(c) Recommended Use of the Chemical and Restrictions on Use: Product is used for general mechanical and fabrication purposes and for conveyance of fluids. Product should not be used to convey corrosive materials that are corrosive to steel and steel alloys, nor used in corrosive environments.
1(d) Name, Address, and Telephone Number:
 Mid-West Mfg. LLC
 475 East 16th Street
 Chicago Heights, IL 60411
 708-757-4747
1(e) Emergency Telephone Number (24-hour contact):
 Professional Emergency Resource Services
 1-800-633-8253 (U.S. and Canada)
 1-801-629-0667 (outside U.S. and Canada)

SECTION 2: HAZARD IDENTIFICATION

2(a) Classification of the Chemical: As sold, this product, carbon/low alloy/alloy steel tubing or pipe, is not hazardous according to the criteria specified in REACH [Regulation (EC) No 1907/2006] and CLP [Regulation (EC) No 1272/2008]. Under 29 CFR 1910.1200 Hazard Communication Standard, steel products are considered mixtures, which due to further processing may produce dusts and/or fumes. The categories of Health Hazards as defined in “Globally Harmonized Systems of Classification and Labelling of Chemicals (GHS), Third revised addition 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. Precautionary Statement/Emergency Overview: This formed solid metal product poses little or no immediate health or fire hazard. When product is subjected to welding, burning, melting, sawing, brazing, grinding, or other similar processes, potentially hazardous airborne particulate and fumes may be generated.

2(b) Signal Word, Hazard Statement(s), Symbols and Precautionary Statement(s):

Hazard Symbol	Hazard Classification	Signal Word	Hazard Statement(s)
	Carcinogenicity – 2 Toxic to Reproduction – 2 Single Target Organ Toxicity (STOT) Repeat Exposure – 1	Danger	H351: Suspected of causing cancer H361: Suspected of damaging fertility or the unborn child H372: Causes damage to lungs through prolonged or repeated inhalation exposure
	Acute Toxicity – Oral 4 Skin Sensitization – 1 STOT Single Exposure -3		H302: Harmful if swallowed H317: May cause an allergic skin reaction H335: May cause respiratory irritation
NA	Eye Irritation 2B		H320: Causes eye irritation

Precautionary Statement(s):

P201: Obtain special instructions before use
 P202: Do not handle until all safety precautions have been read and understood
 P260: Do not breath dusts/fumes/gas/mists/vapors/spray
 P264: Wash...thoroughly after handling

P270: Do not eat, drink, or smoke when using this product
P271: Use only outdoors or in well ventilated areas
P272: Contaminated work clothing should not be allowed out of the workplace
P280: Wear protective gloves/protective clothing/eye protection/face protection
P302+P350: IF ON SKIN: Gently wash with soap and water
P304: IF INHALED: Remove person to fresh air and keep comfortable for breathing
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do - continue rinsing
P308+P313: If exposed or concerned: Get medical attention/advice
P333+P313: If skin irritation or rash occurs: Get medical attention/advice
P362: Take off contaminated clothing and wash before reuse
P501: 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 #	EC #	CARBON STEEL (%WT.)	LOW ALLOY STEEL (%WT.)	ALLOY STEEL (%WT.)
<u>BASE METAL</u>					
Iron (Fe)	7439-89-6	231-096-4	BALANCE	BALANCE	BALANCE
<u>ELEMENTS</u>					
Aluminum (Al) *	7429-90-5	231-072-3	0.1 (MAX)	0.1 (MAX)	0.1 (MAX)
Carbon (C)	7440-44-0	231-153-3	0.45 (MAX)	0.45 (MAX)	1.2 (MAX)
Chromium (Cr) *	7440-47-3	231-157-5	0.2 (MAX)	0.5 – 1.6	20.0 (MAX)
Copper (Cu) *	7440-50-8	231-159-6	0.35 (MAX)	0.6 (MAX)	0.65 (MAX)
Manganese (Mn) *	7439-96-5	231-105-1	0.2 – 1.7	0.2 – 1.7	0.2 – 1.7
Molybdenum (Mo)	7439-98-7	231-107-2	0.1 (MAX)	0.65 (MAX)	3.5 (MAX)
Nickel (Ni) *	7440-02-0	231-111-4	0.25 (MAX)	0.7 (MAX)	14.0 (MAX)
Phosphorous (P) *	7723-14-0	918-594-3	0.035 (MAX)	0.04 (MAX)	0.04 (MAX)
Silicon (Si)	7440-21-3	231-130-8	1.0 (MAX)	1.0 (MAX)	1.0 (MAX)
Sulfur (S)	7446-09-5	231-195-2	0.05 (MAX)	0.05 (MAX)	0.05 (MAX)
Tin (Sn)	7440-31-5	231-141-8	0.03 (MAX)	0.03 (MAX)	0.03 (MAX)
Vanadium (V)	7440-62-1	231-171-1	0.15 (MAX)	0.15 (MAX)	0.25 (MAX)
<u>COATINGS</u>					

Optional – Light surface coating of rust preventative or UV-cured copolymer coating may be used. SDSes for coatings available upon request.

Notes: * = SARA Title 313 Chemical

SECTION 4: FIRST AID MEASURES

4(a) **Description of Necessary Measures:**

- **Inhalation:** Not a likely route of exposure to product as sold/shipped. However, inhalable dusts or fumes may be generated during further processing (welding, cutting, 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:** Not a likely route of exposure to product as sold/shipped. However, dusts or fumes may be generated

during further processing (welding, cutting, 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: Gently wash with soap and water after handling. Wash with plenty of water. If irritation or rash occurs: Get medical advice/attention. Take off and wash contaminated clothing before reuse.
- **Ingestion:** Not a likely route of exposure to product as sold/shipped. However, ingestible dusts or fumes may be generated during further processing (welding, cutting, 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:** This product as sold/shipped is not likely to present an acute or chronic health affect.
- **Eye:** This product as sold/shipped is not likely to present an acute or chronic health affect.
- **Skin:** This product as sold/shipped is not likely to present an acute or chronic health affect.
- **Ingestion:** This product as sold/shipped is not likely to present an acute or chronic health affect.

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/low alloy/alloy steel tubing or pipe as shipped/sold. Use extinguishers appropriate for the surrounding materials.

5(b) Specific Hazards Arising from the Chemical: Not applicable for this product as sold/shipped. When burned, toxic smoke and vapor may be emitted.

5(c) Special Protective Equipment and Precautions for Fire Fighters: Self-contained NIOSH approved respiratory protection and full protective clothing

SECTION 6: ACCIDENTAL RELEASE MEASURES

6(a) Personal Precautions, Protective Equipment, and Emergency Procedures: Not applicable for carbon/low alloy/alloy steel tubing or pipe as sold/shipped. For spills involving finely divided particles, clean-up personnel should be protected from inhalable dusts or fumes, and against contact with eyes and skin.

6(b) Methods and Materials for Containment and Clean-Up: Not applicable for this product as sold/shipped. If material is in a fine dry state, avoid inhalation of dust. Fine, dry material should be removed by vacuuming or wet sweeping methods to prevent spreading of dusts. 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. Follow applicable OSHA regulations (29 CFR 1910.1200) and all other pertinent state and federal requirements.

SECTION 7: HANDLING AND STORAGE

7(a) Precautions for Safe Handling: Not applicable for carbon/low alloy/alloy steel tubing or pipe 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. 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.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8(a) Occupational Exposure Limits (OELs): Carbon/low alloy/alloy steel tubing or pipe 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 experienced industrial hygienist to review.

Chemical Name	8(a) OSHA PEL ² (mg/m ³)	ACGIH TLV ³ (mg/m ³)	NIOSH REL ⁴ (mg/m ³)	IDLH ⁵
Iron (Fe)	10 (as iron oxide fume)	5.0 (as iron oxide fume or dust)	5.0 (as iron oxide fume or dust)	2,500 mg Fe/m ³
Aluminum (Al)	5.0 R 15 (total dust)	5.0 (as welding fume) 10 (dust)	5.0 R	Not Determined

Carbon (C)	Not Established	Not Established	Not Established	Not Determined
Chromium (Cr)	1.0 (as Cr metal) 0.5 (as Cr II&III, inorganic compounds) 0.005 (as Cr VI, inorganic, & certain water-insoluble)	0.5 (metal & Cr III compound) .05 (as Cr VI, inorganic) .01 (insoluble, inorganic, & Cr VI)	0.5	250 mg/m ³ (as Cr II & metal) 25 mg/m ³ (as Cr III) 15 mg/m ³ (as Cr VI)
Copper (Cu)	1 (dust/mist) 0.1 (fume)	0.2 (fume) 1.0 (dust/mist)	1.0 (dust/mist) 0.1 (fume)	100 mg/m ³
Manganese (Mn)	5.0 C	0.2	1.0	500 mg/m ³
Molybdenum (Mo)	15	0.5 R (soluble compounds) 10 I (metal/insoluble) 3.0 R (metal/insoluble)	Not Established	5,000 mg/m ³
Nickel (Ni)	1.0	1.5 I (elemental) 0.1 I (soluble) 0.2 I (insoluble)	.015	10 mg/m ³
Phosphorous (P)	0.1	0.1	0.1	5 mg/m ³
Silicon (Si)	15 T 5.0 R	10	10 T 5.0 R	Not Determined
Sulfur (S)	13	Not Established	5.0	100 ppm
Tin (Sn)	2.0	2.0 (metal) 2.0 (oxides&inorganic) 0.1 (organic)	2.0	100 mg/m ³
Vanadium (V)	0.5 (dust) 0.1 (fume)	Not Established	.05 C (dust/fume)	35 mg/m ³

Notes:

- (1) The above listing is a summary of elements commonly found in applicable steel grades. Various grades of steel may contain different combinations of these elements. Other trace elements, in minute quantities, may also be present.
- (2) OSHA permissible exposure limits (PELs) are 8-hr time weighted average concentrations unless otherwise noted. A (“C”) designation denotes ceiling limit, which should not be exceeded during any part of the working exposure unless otherwise noted.
- (3) Threshold limit values (TLVs) established by the American Conference of Governmental Hygienists (ACGIH) are 8-hr time weighted average concentrations unless otherwise noted. A short term exposure limit (STEL) is defined as the maximum concentration to which workers can be exposed for a short period of time (15-minutes) for only four times throughout the day with at least one hour between exposures.
- (4) Recommended exposure limits (RELs) established by the National Institute for Occupational Safety and Health (NIOSH).
- (5) The immediately dangerous to life or health (IDLH) air concentration values are used by NIOSH as part of the respirator selection criteria.
- (6) (T) denotes total; (R) denotes respirable fraction; (I) denotes inhalable fraction.

8(b) Appropriate Engineering Controls: Use controls as appropriate to minimize exposure to metal fumes and dusts during processing 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 significant oxygen. Concentrations in air of the various contaminants determine 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.

- **Eyes:** Wear appropriate eye protection to prevent eye contact. For operations, which result in elevating 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 work areas.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

<p>9(a) Appearance (physical state,color,etc.): Metallic Gray</p> <p>9(b) Odor: Odorless</p> <p>9(c) Odor Threshold: NA</p> <p>9(d) pH: NA</p> <p>9(e) Melting/Freezing Point: ~2750°F (~1510°C)</p> <p>9(f) Initial Boiling Point & Boiling Range: ND</p> <p>9(g) Flash Point: NA</p> <p>9(h) Evaporation Rate: NA</p> <p>9(i) Flammability (solid, gas): Non-flammable, non-combustible</p>	<p>9(j) Upper/lower Flammability or Explosive Limit: NA</p> <p>9(k) Vapor Pressure: NA</p> <p>9(l) Vapor Density (Air=1): NA</p> <p>9(m) Relative Density: 7.85 g/cc</p> <p>9(n) Solubility(ies): Insoluble</p> <p>9(o) Partition Coefficient n-octanol/water: NA</p> <p>9(p) Auto-ignition Temperature: NA</p> <p>9(q) Decomposition Temperature: NA</p> <p>9(r) Viscosity: NA</p>
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NA – Not applicable


ND – Not determined for product as a whole






SECTION 10 – STABILITY AND REACTIVITY

- 10(a) **Reactivity:** Not Determined (ND)
- 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 – TOXICOLOGY INFORMATION

11(a-e) **Information on Toxicology Effects:** The following toxicity data has been determined for Carbon/low alloy/alloy steel tubing or pipe as a mixture 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 CLP:

Hazard Classification	Hazard Category		Hazard Symbol	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, & 2B)	NA*	2B ^c	No Pictogram	Warning	Causes eye irritation

Skin/Dermal Sensitization (covers category 1)	NA*	1 ^d		Warning	May cause allergic skin reaction.
Carcinogenicity (covers categories 1A, 1B, & 2)	NA*	2 ^e		Warning	Suspected of causing cancer.
Toxic to Reproduction (covers categories 1A, 1B, & 2)	NA*	2 ^h		Warning	Suspected of damaging fertility or the unborn child.
Specific Target Organ Toxicity (STOT) Following Single Exposure (covers categories 1-3)	NA*	3 ⁱ		Warning	May cause respiratory irritation.
STOT Following Repeated Exposure (covers categories 1 & 2)	NA*	1 ^j		Danger	Causes damage to lungs through prolonged or repeated inhalation exposure.

*Not Applicable

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

a. No LC₅₀ or LD₅₀ has been established for Carbon/low alloy/alloy steel tubing or pipe as a mixture. The following data has been determined for the components:

- **Iron:** Rat LD₅₀ = 98.6 g/kg (REACH)
Rat LD₅₀ = 1060 mg/kg (IUCLID)
Rat LD₅₀ = 984 mg/kg (IUCLID)
Rabbit LD₅₀ = 890 mg/kg (IUCLID)
Guinea Pig LD₅₀ = 20 g/kg (TOXNET)
Human LD₁₀ = 77 g/kg (IUCLID)
- **Carbon:** Rat LC₅₀ > 2000
- **Copper:** Rat LD₅₀ = 481 mg/kg (REACH)
Rat LD₅₀ > 2500 mg/kg (REACH)
- **Nickel:** LD₅₀ > 9000 mg/kg (Oral/Rat); NOAEC > 10.2 mg/l (Inhalation/Rat)
- **Silicon:** LD₅₀ = 3160 mg/kg (Oral/Rat)
- **Manganese:** Rat LD₅₀ > 2000 mg/kg (REACH)
Rat LD₅₀ > 9000 mg/kg (NLM Toxnet)

b. No Skin (Dermal) Irritation data available for Carbon/low alloy/alloy steel tubing or pipe as a mixture. The following Skin (Dermal) information was found for the components:

- **Molybdenum:** May cause skin irritation.

c. No Eye Irritation data available for Carbon/low alloy/alloy steel tubing or pipe as a mixture. The following Eye Irritation information was found for the components:

- **Iron and Molybdenum:** Causes eye irritation.
- **Silicon:** Slight eye irritation in rabbit protocol.
- **Nickel:** Slight eye irritation from particulate abrasion only.

d. No Skin (Dermal) sensitization data available for Carbon/low alloy/alloy steel tubing or pipe 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/low alloy/alloy steel tubing or pipe as a mixture or its components.

f. No Germ Cell Mutagenicity data available for Carbon/low alloy/alloy steel tubing or pipe as a mixture. The following Germ Cell Mutagenicity 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/low alloy/alloy steel tubing or pipe 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 compounds):** IARC Group 3 carcinogen, 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 to Reproduction data available for Carbon/low alloy/alloy steel tubing or pipe as a mixture. The following Toxic to Reproductive information was found for the components.

- **Nickel:** Effects of fertility.

i. No Specific Target Organ Toxicity (STOT) following a single exposure data available for Carbon/low alloy/alloy steel tubing or pipe as a mixture. The following STOT following a single exposure data was found for the components:

- **Iron and Molybdenum:** Irritating to respiratory tract.

j. No Specific Target Organ Toxicity (STOT) following repeated exposure data was available for Carbon/low alloy/alloy steel tubing or pipe as a mixture. 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 4wk inhalation LOEL 4 mg/m³ Lung and Lymph node histopathology. Rat 2 yr. inhalation LOEL 0.1 mg/m³ Pigment in kidney, effects on hematopoiesis spleen and bone marrow and adrenal tumor. Rat 13 wk. Inhalation LOAEC 1.0 mg/m³ 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 2013, 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 (IUCRID), European Risk Assessment Report (EU-RAR), Concise International Chemical Assessment Documents (CICAD), European Union Scientific Data 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).

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 by Component(s):

- **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.
- **Chromium, Oxides, and Hexavalent Chrome:** Hexavalent chrome causes damage to the 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.
- **Molybdenum and Oxides:** Molybdenum causes skin and eye irritation. Molybdenum oxide is toxic if swallowed, and causes eye irritation.
- **Nickel and Oxides:** Nickel may cause allergic skin sensitization. Nickel oxide may cause an allergic skin reaction.
- **Silicon and Oxides:** May be harmful if swallowed.

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).
- **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.
- **Molybdenum and Oxides:** Certain handling operations, such as burning and welding, may generate both insoluble molybdenum compounds (metal and molybdenum dioxide) and soluble molybdenum compounds (molybdenum trioxide). Molybdenum compounds generally exhibit a low order of toxicity with the trioxide the more toxic. However, some reports indicate that the dust of the molybdenum metal, molybdenum dioxide and molybdenum trioxide may cause eye, skin, nose and throat irritation in animals. Also has been reported to cause induction of tumors in experimental animals, suspected of causing cancer. Molybdenum oxide is suspected of causing cancer in humans.
- **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 2013 TLVs® and BEIs® lists insoluble nickel compounds as confirmed human carcinogens. Suspected of damaging the unborn child.
- **Silicon and Oxides:** Silicon dusts are a low health risk by inhalation and should be treated as a nuisance dust. Eye contact with pure material can cause particulate irritation. Skin contact with silicon dusts may cause physical abrasion.

SECTION 12 – ECOLOGICAL INFORMATION

12(a) Ecotoxicity (aquatic & terrestrial): No data available for Carbon/low alloy/alloy steel tubing or pipe 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:** LC₅₀ :> 1000 mg/L; Fish 48-h-EC₅₀>100 mg/L (Furrenta, 2008k); 96 h-LC₀≥50,000 mg/L. Test substance: Bayferrox 130 red (95-97% Fe₂O₃; <4% SiO₂ and Al₂O₃) (Bayer, 1989a).
- **Hexavalent Chrome:** EU RAR listed category 1, found acute EC₅₀ and LD₅₀ to algae and invertebrates < 1mg.

- **Nickel Oxide:** IUCLID found LC₅₀ in fish, invertebrates and algae > 100mg/L

12(b) **Persistence & Degradability:** No Data Available

12(c) **Bioaccumulative Potential:** No Data Available

12(d) **Mobility (in soil):** No data available for Carbon/low alloy/alloy steel tubing or pipe 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: Carbon/low alloy/alloy steel tubing or pipe should be recycled whenever possible. Product dusts and fumes from processing operations should also be recycled, or classified by a competent environmental professional and disposed of in accordance with applicable federal, state, and 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 (waste not otherwise specified), 16-03 (off specification batches and unused products), or 15-01-04 (metallic packaging).

Please note this information is for carbon/low alloy/alloy steel tubing or pipe 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/low alloy/alloy steel tubing or pipe 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) Shipping Symbols: NA Hazard Class: NA UN No.: NA Packaging Group: NA DOT/IMO Label: NA Special Provisions (172.101): NA	Packaging Authorizations a. Exceptions: NA b. Group: NA c. Authorization: NA	Quantity Limitations a. Passenger, Aircraft, or Railcar: NA b. Cargo Aircraft Only: NA Vessel Stowage Requirements a. Vessel Stowage: NA b. Other: NA DOT Reportable Quantities: NA
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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 Regulations.

Regulations Concerning the International Carriage of Dangerous Goods by Road (ADR) does not regulate Carbon/low alloy/alloy steel tubing or pipe as a hazardous material.

Shipping Name: Not Applicable (NA) Classification Code: NA UN No.: NA Packaging Group: NA ADR Label: NA Special Provisions: NA Limited Quantities: NA	Packaging a) Packing Instructions: NA b) Special Packing Provisions: NA c) Mixed Packing Provisions: NA	Portable Tanks & Bulk Containers a) Instructions: NA b) Special Provisions: NA
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International Air Transport Association (IATA) does not regulate Carbon/low alloy/alloy steel tubing or pipe as a hazardous material.

Shipping Name: Not Applicable (NA) Class/Division: NA Hazard Label(s): NA UN No.: NA Packaging Group: NA Excepted Quantities (EQ): NA	Passenger & Cargo Aircraft Limited Quantity (EQ)		Cargo Aircraft Only: Pkg Inst. =: NA Max Net Qty/Pkg: NA	Special Provisions: NA ERG Code: NA
	Pkg Inst: NA	Pkg Inst: NA		
	Max Net Qty/Pkg: NA	Max Net Qty/Pkg: 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/low alloy/alloy steel tubing or pipe does not have a TDG classification.

SECTION 15 – REGULATORY INFORMATION

Regulatory Information: *The following listing of regulations relating to a PTC Alliance Product may not be complete and should not be solely relied upon for all regulatory compliance responsibilities.* This product and/or constituents are subject to the following regulations:

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

Section 313 Supplier Notification: The product, Carbon/low alloy/alloy steel tubing or pipe contains the following toxic chemicals listed under 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
7429-90-5	Aluminum	0.1% max
7440-47-3	Chromium	20.0% max
7440-50-8	Copper	0.65% max
7439-96-5	Manganese	1.7% max
7440-02-0	Nickel	14.0% max
7723-14-0	Phosphorous	0.04% max

Other Regulations:

WHMIS Classification (Canada): The product, Carbon/low alloy/alloy steel tubing or pipe is not listed as a whole. However individual components are listed.

Ingredient	WHMIS Classification
Aluminum	B6, D2B
Copper	D2B, B4
Manganese	B4, D2A
Molybdenum	B4, D2B
Nickel	D2B
Silicon	B4
Sulfur	B4
Tin	D2B

This product has been classified in accordance with the hazard criteria of the controlled products regulations and the SDS contains all the information required by the controlled products regulations.

SECTION 16 – OTHER INFORMATION

Prepared By: PTC Alliance Corporation
Revision History: 5/7/2015 Update to Globally Harmonized System

Additional Information:

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
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
LOEL	Lowest Observed Effect Level	SCBA	Self-contained Breathing Apparatus
LOAEC	Lowest Observable Adverse Effect Concentration	SDS	Safety Data Sheet
ug/m³	Microgram per cubic meter	STEL	Short-Term Exposure Limit
mg/m³	Milligrams per cubic meter	TLV	Threshold Limit Value
mppcf	Million particles per cubic foot	TWA	Time Weighted Average
MSHA	Mine Safety and Health Administration	UEL	Upper Explosive Limit
NFPA	National Fire Protection Association		