



Section 1 – Identification

- 1(a) Product Identifier used on Label:** Brass Scrap
- 1(b) Other means of identification:** Brass Scrap Products (All Grades), SDS ID: NFE-0107
- 1(c) Recommended use of the chemical and restrictions on use:** Scrap metal use. None Known
- 1(d) Name, address, and telephone number:**
 OmniSource Corporation Phone: (260) 664-4789 (Safety Department)
 7575 West Jefferson Blvd
 Fort Wayne, Indiana 46804
- 1(e) Emergency Phone Number:** (800) 424-9300 (CCN# 221258) CHEMTREC

Section 2 – Hazard(s) Identification

2(a) Classification of the chemical: Brass Scrap is considered 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, Brass Scrap is not exempt as an article under OSHA's Hazard Communication Standard (29 CFR 1910.1200) due to its downstream use, thus this product is considered a mixture and a hazardous material. Therefore, the categories of Health Hazards as defined in "GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELING 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 - 1A Reproductive Toxicity - 1 Germ Cell Mutagenicity - 2 Single Target Organ Toxicity (STOT) Repeat Exposure - 1	DANGER	May cause cancer. May damage fertility or the unborn child. Causes damage to central nervous system, kidneys and lungs through prolonged or repeated exposure. May cause allergic skin reaction.
	Skin Sensitization - 1		

Precautionary Statement(s):

Prevention	Response	Storage/Disposal
Do not breathe dusts or fumes. Wear protective gloves / protective clothing / eye protection / face protection. Contaminated work clothing must not be allowed out of the workplace. 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 exposed, concerned or feel unwell: Get medical advice/attention. 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.	Dispose of contents in accordance with federal, state and local regulations. Store locked up.

- 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
Zinc	7440-66-6	231-175-3	<51
Copper	7440-50-8	231-159-6	>49
Manganese	7439-96-5	231-105-1	<14
Aluminum	7429-90-5	231-072-3	<8
Lead	7439-92-1	231-100-4	<8
Tin	7440-31-5	231-141-8	<7
Silicon	7440-21-3	231-130-8	<6
Iron	7439-89-6	231-096-4	<4
Nickel	7440-02-0	231-111-4	<4
Arsenic	7440-38-2	231-148-6	<1

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):**

Commercial steel products contain small amounts of various elements in addition to those listed. These small quantities are frequently referred to as “trace” or “residual” elements that generally originate in the raw materials used. Steel products may contain the following trace or residual elements including typical percentages for the elements identified: silver (<1), antimony (<1).

Section 4 – First-aid Measures

4(a) Description of necessary measures: If exposed, concerned or feel unwell: Get medical advice/attention.

- **Inhalation: Brass Scrap** as sold/shipped is not a likely form of exposure. If inhaled: Remove person to fresh air and keep comfortable for breathing. If you feel unwell or are experiencing respiratory symptoms: Call a poison center or doctor/physician.
- **Eye Contact: Brass Scrap** as sold/shipped is not a likely form of exposure. 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.
- **Skin Contact:** 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.
- **Ingestion: Brass Scrap** as sold/shipped is not a likely form of exposure. If swallowed: Call a poison center or doctor/physician if you feel unwell. Rinse mouth.

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

- **Inhalation: Brass Scrap** as sold/shipped is not likely to present an acute or chronic health effect.
- **Eye: Brass Scrap** as sold/shipped is not likely to present an acute or chronic health effect.
- **Skin: Brass Scrap** as sold/shipped is not likely to present an acute or chronic health effect.
- **Ingestion: Brass Scrap** 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 **Brass Scrap** as sold/shipped. Use extinguishers appropriate for surrounding materials.

5(b) Specific Hazards arising from the chemical: Not Applicable for **Brass Scrap** as sold/shipped. When burned, toxic smoke, fume 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 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 **Brass Scrap** 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.

6(b) Methods and materials for containment and clean up: Not Applicable for **Brass Scrap** 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 **Brass Scrap** 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. Wear protective gloves / protective clothing / eye protection / face protection. Contaminated work clothing must not be allowed out of the workplace. Wash thoroughly after handling. In case of inadequate ventilation, wear respiratory protection. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Practice good housekeeping. Do not breathe breathing metal fumes and/or dust. Do not eat, drink or smoke when using this product. Cut resistant gloves and sleeves should be worn when working with steel products.

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): Brass Scrap 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 burning, welding (high temperature), sawing, brazing, machining, grinding, etc may produce fumes and/or particulates. The following exposure limits are offered as reference for an experienced industrial hygienist to review:

Ingredients	OSHA PEL ¹	ACGIH TLV ²	NIOSH REL ³	IDLH ⁴
Zinc	5.0 mg/m ³ (as zinc oxide fume) 15 mg/m ³ (as total dust) 5.0 mg/m ³ (as respirable fraction)	2.0 mg/m ³ (as zinc oxide)	10 mg/m ³ (as total dust) 5.0 mg/m ³ (as respirable dust)	NE
Copper	0.1 mg/m ³ (as fume, Cu) 1.0 mg/m ³ (as dusts & mists, Cu)	0.1 mg/m ³ (as fume) 1.0 mg/m ³ (as dusts & mists, Cu)	1.0 mg/m ³ (as dusts & mists)	100 mg Cu/m ³
Manganese	(C) 5.0 mg/m ³ (as Fume & Mn compounds)	0.2 mg/m ³	(C) 5.0 mg/m ³ 1.0 mg/m ³ (as fume) (STEL) 3.0 mg/m ³	500 mg Mn/m ³
Aluminum	15 mg/m ³ (as total dust, PNOR ⁵) 5.0 mg/m ³ (as respirable fraction, PNOR)	10 mg/m ³ (as metal dust) 5.0 mg/m ³ (as welding fume)	10 mg/m ³ (as total dust) 5.0 mg/m ³ (as respirable dust)	NE
Lead	0.05 mg/m ³ ⁶ "AL" 0.03 mg/m ³	0.05 mg/m ³	0.05 mg/m ³ ⁷	100 mg/m ³
Tin	2.0 mg/m ³ (as inorganic compounds, Sn)	2.0 mg/m ³ (as metal and inorganic compounds, Sn)	2.0 mg/m ³ (also applies to other inorganic tin compounds, as Sn except tin oxides)	100 mg/m ³ (as Sn)
Silicon	15 mg/m ³ (total dust, PNOR) 5.0 mg/m ³ (as respirable fraction, PNOR)	10 mg/m ³	10 mg/m ³ (as total dust) 5.0 mg/m ³ (as respirable dust)	NE
Iron	10 mg/m ³ (as iron oxide fume)	5.0 mg/m ³ (as iron oxide dust and fume)	5.0 mg/m ³ (as iron oxide dust and fume)	2,500 mg Fe/m ³
Nickel	1.0 mg/m ³ (as Ni metal & insoluble compounds)	1.5 mg/m ³ (as inhalable fraction ⁸ Ni metal) 0.2 mg/m ³ (as inhalable fraction Ni inorganic only insoluble and soluble compounds)	0.015 mg/m ³ (as Ni metal & insoluble and soluble compounds)	10 mg/m ³ (as Ni)
Arsenic	0.01 mg/m ³ (inorganic compounds) "AL" 5.0 µg/m ³	0.01 mg/m ³	0.002 mg/m ³ (15-minute)	5.0 mg/m ³

NE - None Established

1. OSHA Permissible Exposure Limits (PELs) 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 Peak is defined as the acceptable maximum peak for a maximum duration above the ceiling concentration for an eight-hour shift. A skin notation refers to the potential significant contribution to the overall exposure by the cutaneous route, either by contact with vapors or, of probable greater significance, by direct skin contact with the substance. 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. 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. A "skin" notation refers to the potential significant contribution to the overall exposure by the cutaneous route, either by contact with vapors or, of probable greater significance, by direct skin contact with the substance. ACGIH-TLVs are only recommended guidelines based upon consensus agreement of the membership of the ACGIH. As such, the ACGIH TLVs are for guideline use purposes and are not legal regulatory standards for compliance purposes. The TLVs are designed for use by individuals trained in the discipline of industrial hygiene relative to the evaluation of exposure to various chemical or biological substances and physical agents that may be found in the workplace.
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.
5. PNOR (Particulates Not Otherwise Regulated). All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name are covered by the PNOR limit which is the same as the inert or nuisance dust limit of 15 mg/m³ for total dust and 5.0 mg/m³ for the respirable fraction (containing less than 1% crystalline silica).
6. OSHA considers "Lead" to mean metallic lead, all inorganic lead compounds (lead oxides and lead salts), and a class of organic compounds called soaps; all other lead compounds are excluded from this definition. The OSHA PEL and other OSHA requirements can be found in 29 CFR 1910.1025. The OSHA PEL (8-hour TWA) for lead in "non-ferrous foundries with less than 20 employees" is 0.075 mg/m³.
7. NIOSH considers "Lead" to mean metallic lead, lead oxides, and lead salts (including organic salts such as lead soaps but excluding lead arsenate). The NIOSH REL for lead (10-hour TWA) is 0.05 mg/m³; air concentrations should be maintained so that worker blood lead remains less than 0.060 mg Pb/100 g of whole blood.
8. 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 2017 TLVs[®] and BEIs[®] (Biological Exposure Indices) Appendix D, paragraph A.

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.

Section 8 - Exposure Controls / Personal Protection (continued)

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.

- **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.): Depends upon scrap composition, most often appears as a soft reddish colored metal

9(b) Odor: Odorless

9(c) Odor Threshold: NA

9(d) pH: NA

9(e) Melting Point/Freezing Point: 2000°F (1100°C)

9(f) Initial Boiling Point and Boiling Range: 4700°F (2600°C)

9(g) Flash Point: NA

9(h) Evaporation Rate: NA

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

NA - Not Applicable

ND - Not Determined for product as a whole

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

9(k) Vapor Pressure: ND

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

9(m) Relative Density: 9

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

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 Information on toxicological effects: The following toxicity data has been determined for **Brass Scrap** 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			
Skin/Dermal Sensitization (covers Category 1)	NA*	1 ^d		Warning	May cause an allergic skin reaction.

Section 11 - Toxicological Information (continued)

11 Information on toxicological effects (continued):

Hazard Classification	Hazard Category		Hazard Symbols	Signal Word	Hazard Statement
	EU	OSHA			
Carcinogenicity (covers Categories 1A, 1B and 2)	NA*	1A ⁵		Danger	May cause cancer.
Toxic Reproduction (covers Categories 1A, 1B and 2)	NA*	1 ^h		Danger	May damage fertility or the unborn child.
Specific Target Organ Toxicity (STOT) Following Single Exposure (covers Categories 1-3)	NA*	1 ^j		Danger	Causes damage to lungs and central nervous system through prolonged or repeated inhalation exposure.

* Not Applicable - Semi-formed steel products are considered articles under Reach regulation (REACH REGULATION (EC) No 1907/2006) and are not subject to classification under CLP regulation (REGULATION (EC) No 1272/2008).

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 LC₅₀ or LD₅₀ has been established for **Brass Scrap**. The following data has been determined for the components:

- **Nickel:** LD₅₀ >9000 mg/kg (Oral/Rat)
- **Copper:** Rat LD₅₀ = 481 mg/kg (REACH)
Rat LD₅₀ > 2500 mg/kg (REACH)
- **Carbon:** LD₅₀ = >10,000 mg/kg (Oral/ Rat)
- **Lead Oxide:** Rat LD₅₀ > 2000 mg/kg (REACH) (Oral), Rat LC₅₀ > 5.05 mg/L (REACH) No data (IUCLID)(Inhalation)
- **Arsenic:** LD₅₀ = 145 mg/kg (Oral/ Mouse)
LD₅₀ = 763 mg/kg (Oral/ Rat)
TD₀₁ = 7857 mg/kg (Oral/ Man)
- **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)
- **Silicon:** LD₅₀ = 3160 mg/kg (Oral/Rat)
- **Aluminum:** Rat LD₅₀ > 15.9 g/kg (REACH)
- **Manganese:** Rat LD₅₀ > 2000 mg/kg (REACH)
Rat LD₅₀ > 9000 mg/kg (NLM Toxnet)
- **Zinc Oxide:** Rat LD₅₀ >5000 mg/kg (Oral)

b. No Skin (Dermal) Irritation data available for **Brass Scrap** as a mixture. The following Skin (Dermal) Irritation information was found for the components:

- **Arsenic:** Reported irritant.

c. No Eye Irritation data available for **Brass Scrap** 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.
- **Arsenic:** Reported irritant.

d. No Skin (Dermal)/Respiratory Sensitization data available for **Brass Scrap** as a mixture. The following Skin (Dermal)/Respiratory Sensitization information was found for the components:

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

e. No Respiratory Sensitization data available for **Brass Scrap** as a mixture or its components.

f. No Germ Cell Mutagenicity data available for **Brass Scrap** as a mixture. The following Mutagenicity and Genotoxicity information was found for the components:

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

g. Carcinogenicity: IARC, NTP, and OSHA do not list **Brass Scrap** as carcinogens. The following Carcinogenicity information was found for the components:

- **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.
- **Welding Fumes** - IARC Group 2B carcinogen, a mixture that is possibly carcinogenic to humans.
- **Inorganic Lead Compounds** - IARC 2A, NTP 2
- **Lead:** NTP-R, IARC - 2B, EPA - Probable human carcinogen and ACGIH - A3
- **Arsenic:** NTP-Known, IARC - 1, EPA - Human carcinogen and ACGIH - A1

h. No Toxic Reproduction data available for **Brass Scrap** as a mixture. The following Toxic Reproductive information was found for the components:

- **Nickel:** Effects on fertility.
- **Lead:** Male rats oral 60 day NOEL 250 mg/L. Effects on testes (lowest dose). Mouse Reproduction study effects at 0.5% only dose tested. Rat Teratology study LOEL 0.05% Birth weight, size and effects on testis. Reproductive, endocrine and growth effects have been reported.
- **Lead Oxide:** Developmental tox study in rats Inhalation. Lead levels in blood indicative of lead poisoning.

Section 11 - Toxicological Information (continued)
11 Information on toxicological effects (continued):

- i. No Specific Target Organ Toxicity (STOT) following a Single Exposure data available for **Brass Scrap** as a mixture. The following STOT following a Single Exposure data was found for the components:
- **Iron:** Irritating to Respiratory tract.
 - **Aluminum:** Repeated exposure associated with Asthma, fibrosis in lungs and encephalopathy in humans.
- j. No Specific Target Organ Toxicity (STOT) following Repeated Exposure data was available for **Brass Scrap** as a whole. The following STOT following Repeated Exposure data was found for the components:
- **Nickel:** Rat 4 wk 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 Week Inhalation LOAEC 1.0 mg/m³ Lung weights, and Alveolar histopathology.
 - **Copper:** Target organs affected - Skin, eyes liver, kidneys and respiratory tract.
 - **Manganese:** Inhalation of metal fumes - Degenerative changes in human Brain; Behavioral: Changes in motor activity and muscle weakness (Whitlock *et al.*, 1966).
 - **Aluminum:** Reviews have found chronic exposure to aluminum flake has been reported to cause pneumoconiosis in workers. Repeat oral exposure to aluminum results in decrements in neurobehavioral function and development.
 - **Lead:** Rat Oral 6 mo NOEL 0.0015 mg/kg CNS Testes and Kidney Effects. Rat inhalation – immunosuppression, Dermal – percutaneous absorption
 - **Lead Oxide:** Lead effect include CNS, Reproduction Development.
 - **Beryllium:** Rat Inhalation aerosol 171 days No NOAEL reported at 800 mg/m³ (625 µg Be/animal) Severe effects on lung pneumonitis followed by Fibrosis

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 2017, 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 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).

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 metal 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 micrometer and usually between 0.02-0.05 micrometers 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.
- **Eye:** Excessive exposure to high concentrations of metal dust may cause irritation to the eyes.
- **Skin:** Skin contact with metal 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 metal dust may cause nausea or vomiting.

Acute Effects by component:

- **Zinc and zinc oxides:** Not Reported/ Not Classified
- **Copper and copper 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 manganese oxides:** Manganese and Manganese oxide are harmful if swallowed.
- **Aluminum and aluminum oxides:** Inhalation may cause cough.
- **Lead and lead oxides:** Acute exposure to lead can be manifested as abdominal pain, nausea, constipation, anorexia, or vomiting; and, in severe cases coma or death.
- **Tin:** Not Reported/ Not Classified
- **Silicon and oxides:** May be harmful if swallowed.
- **Iron and iron 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.
- **Nickel and nickel oxides:** Nickel may cause allergic skin sensitization. Nickel oxide may cause an allergic skin.
- **Arsenic:** Eye irritation has been reported in workers exposed to as containing dusts.

Delayed (chronic) Effects by component:

- **Zinc and zinc oxides:** Inhalation of zinc oxide fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count.
- **Copper and copper 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.
- **Aluminum and aluminum oxides:** Considered to be an inert or nuisance dust.

Section 11 - Toxicological Information (continued)

Delayed (chronic) Effects by component (continued):

- **Manganese and manganese 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.
- **Lead and lead oxides:** Lead compounds can be toxic when ingested or inhaled. Lead is a cumulative poison. The predominant effects of excessive exposure are anemia, nervous system disorders, and kidney damage. Nervous system disorders may be displayed as irritability, headaches, insomnia, convulsions, muscular tremors, or palsy of the extremities. Excessive exposure can have adverse effects on human reproduction. Lead interferes with normal function of the adult and developing central nervous system in humans. Lead interferes with different enzyme systems. For this reason, many organs or organ systems are potential targets for lead. Lead can damage fertility or the unborn child.
- **Tin:** No systemic effects have been reported from industrial exposure to tin. Occupational exposures to tin can cause a benign pneumoconiosis termed 'stannosis'. No cases of massive fibrosis from over-exposure to tin have been reported.
- **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.
- **Iron and iron 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).
- **Nickel and nickel 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. Nickel 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 2017 TLVs® and BEIs® lists insoluble nickel compounds as confirmed human carcinogens. Nickel is suspected of damaging the unborn child.
- **Arsenic:** Known Human Carcinogen (skin cancer). Multiple organ tumors observed after inhalation and drinking water exposures.

Section 12 - Ecological Information

12(a) Ecotoxicity (aquatic & terrestrial): No Data Available for **Brass Scrap** 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:

- **Zinc Oxide:** EU RAR lists as Category 1 Very toxic to aquatic life with long lasting effects.
- **Nickel Oxide:** IUCLID found LC₅₀ in fish, invertebrates and algae > 100 mg/l.
- **Iron Oxide:** LC₅₀: >1000 mg/L; Fish 48 h-EC₅₀ > 100 mg/L (Currenta, 2008k); 96 h-LC₀ ≥ 50,000 mg/L Test substance: Bayferrox 130 red (95 – 97% Fe₂O₃; < 4% SiO₂ and Al₂O₃) (Bayer, 1989a).

12(b) Persistence & Degradability: No Data Available for **Brass Scrap** as sold/shipped or individual components.

12(c) Bioaccumulative Potential: No Data Available for **Brass Scrap** as sold/shipped or individual components.

12(d) Mobility (in soil): No data available for **Brass Scrap** 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: Category 1

Signal Word: Warning

Hazard Symbol:



Hazard Statement: Very Toxic to aquatic life with long lasting effects.

Section 13 - Disposal Considerations

Disposal: Steel scrap 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 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 Brass Scrap 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 **Brass Scrap** 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 Packing Group: NA DOT/ IMO Label: NA Special Provisions (172.102): 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 Regulation.

Regulations Concerning the International Carriage of Dangerous Goods by Road (ADR) does not regulate **Brass Scrap** as a hazardous material.

Shipping Name: Not Applicable (NA) Classification Code: NA UN No.: NA Packing 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 **Brass Scrap** as a hazardous material.

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

Max Net Qty/Pkg – Maximum Net Quantity per Package

ERG – Emergency Response Drill Code

Transport Dangerous Goods (TDG) Classification: **Brass Scrap** does not have a TDG classification.

Section 15 - Regulatory Information

Regulatory Information: *The following listing of regulations relating to a OmniSource Corporation 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, **Brass Scrap** as a whole is not listed. However, individual components of the product are listed: Refer to Section 8, Exposure Controls and Personal Protection.

EPA Regulations: The product, **Brass Scrap** is not listed as a mixture. However, individual components of the product are listed:

Components	Regulations
Zinc	CERCLA, CWA, SARA 313, TSCA
Copper	CERCLA, CWA, SARA 313, TSCA, SDWA
Manganese	SARA 313, TSCA
Aluminum	SARA 313, TSCA, SDWA
Lead	CERCLA, CWA, SARA 313, TSCA SDWA
Tin	TSCA
Iron	TSCA, SDWA
Nickel	CERCLA, CWA, SARA 313, TSCA
Arsenic	CERCLA, CWA, SARA 313, TSCA, SDWA

SARA 311/312 Potential Hazard Categories: Immediate Acute Health Hazard; Delayed Chronic Health Hazard

Section 15 - Regulatory Information (continued)

EPA Regulations (continued):

Section 313 Supplier Notification: The product, **Brass Scrap** contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-to-Know Act and 40 CFR part 372:

CAS #	Chemical Name	Percent by Weight
7440-66-6	Zinc	51 max
7440-50-8	Copper	> 49
7439-96-5	Manganese	14 max
7429-90-5	Aluminum	8 max
7439-92-1	Lead	8 max
7440-02-0	Nickel	4 max
7440-38-2	Arsenic	1 max

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])

State Regulations: The product, **Brass Scrap** as a mixture 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: Zinc, Copper, Manganese, Aluminum, Lead, Tin, Silicon, Nickel, Arsenic
- Environmental Hazards: Zinc, Copper, Manganese, Aluminum, Lead, Nickel, Arsenic
- Special Hazardous Substance: Manganese, Nickel, Arsenic

California Prop. 65: Contains elements known to the State of California to cause cancer or reproductive toxicity. This includes Lead, Nickel, Arsenic

New Jersey: Contains regulated material in the following categories:

- Hazardous Substance: Zinc, Copper, Manganese, Aluminum (dust or fume), Lead, Tin, Silicon, Nickel, Arsenic
- Environmental Hazard: Zinc, Copper, Manganese, Lead, Nickel, Arsenic
- Special Hazardous Substance: Manganese, Aluminum (dust or fume), Lead, Silicon, Arsenic

Minnesota: Zinc, Manganese, Lead, Nickel, Arsenic

Massachusetts: Zinc, Copper compounds, Manganese compounds, Aluminum (dust or fume), Lead, Tin, Silicon, Nickel compounds, Arsenic

Other Regulations:

WHMIS Classification (Canadian): The product, **Brass Scrap** is not listed as a mixture. However individual components are listed.

Ingredients	WHMIS Classification
Copper	Combustible Dusts - Category 1
Manganese	Reproductive toxicity - Category 2; Specific target organ toxicity - repeated exposure - Category 1; Combustible dusts
Lead	Carcinogenicity - Category 2; Reproductive toxicity - Category 1; Toxic to the reproductive function Toxic to the development Specific target organ toxicity - repeated exposure - Category 1
Silicon	Flammable solids - Category 2; Combustible dusts
Nickel	Skin sensitization – Category 1; Carcinogenicity – Category 2; Specific target organ toxicity – repeated exposure - Category 1
Arsenic	Carcinogenicity - Category 1A

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: OmniSource Corporation

Revision History:

06/13/2018 - update to comply w/ OSHA 2012 GHS & Canada WHMIS 2015 GHS
 03/21/2013 – ANSI format to OSHA GHS
 11/09/2011 – regulatory update
 1/26/2010 – regulatory update

Expiration Date: 06/13/2021

8/07/2008 – regulatory update
 10/06/2005 – regulatory update
 7/19/2002 – regulatory update
 7/08/1998 – Original

Section 16 - Other Information (continued)

Hazardous Material Identification System (HMIS) Classification

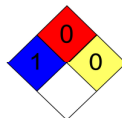
Health Hazard	1
Fire Hazard	0
Physical Hazard	0

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.

FLAMMABILITY = 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
LOEL	Lowest Observed Effect Level	SCBA	Self-contained Breathing Apparatus
LOAEC	Lowest Observable Adverse Effect Concentration	SDS	Safety Data Sheet
µg/m³	microgram per cubic meter of air	STEL	Short-term Exposure Limit
mg/m³	milligram per cubic meter of air	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		

Disclaimer: This information is taken from sources or based upon data believed to be reliable. However, OmniSource Corporation makes no warranty as to the absolute correctness or sufficiency of any of the foregoing or that additional or other measures may not be required under particular conditions.