



# United States Steel Corporation

## Zinc Residue CGL Safety Data Sheet (SDS)

USS IHS Number: 81700

Locations: Great Lakes Works

Original: 12/16/2010

Revision: 09/15/2017

Expiration: 09/15/2020

### Section 1 – Identification

1(a) Product Identifier Used on Label: Zinc Residue CGL

1(b) Other Means of Identification: Zinc flake or Zinc material

1(c) Recommended Use of the Chemical and Restrictions on Use: Processing for zinc recovery, no restrictions

1(d) Name, Address, and Telephone Number:

United States Steel Corporation Phone number: (412) 433-6840 (8:00 am to 5:00 pm)  
600 Grant Street, Room 1662 FAX: (412) 433-5019  
Pittsburgh, PA 15219-2800

1(e) Emergency Phone Number: 1-800-262-8200 (CHEMTREC)

### Section 2 – Hazard(s) Identification

2(a) Classification of the Chemical: Zinc Residue CGL is NOT considered a hazardous material according to the criteria specified in REACH [REGULATION (EC) No 1907/2006] and CLP [REGULATION (EC) No 1272/2008] and OSHA 29 CFR 1910.1200 Hazard Communication Standard. 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): Not Applicable (NA)

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	89-100
Iron	7439-89-6	231-096-4	0-6.4

EC- European Community

CAS- Chemical Abstract Service

### Section 4 – First-aid Measures

4(a) Description of Necessary Measures:

- **Inhalation:** If inhaled: Remove person to fresh air and keep comfortable for breathing.
- **Eye Contact:** If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- **Skin Contact:** If on skin: Rinse skin with water/shower.
- **Ingestion:** If swallowed: Rinse mouth. Do NOT induce vomiting.

4(b) Most Important Symptoms/Effects, Acute and Delayed (chronic):

Acute Effects:

- **Inhalation:** Excessive exposure to high concentrations of dust may cause irritation to the mucous membranes of the upper respiratory tract.
- **Eye:** Particles of iron or iron compounds may become imbedded in the eye. Excessive exposure to high concentrations of dust may cause irritation to the eyes.
- **Skin:** Skin contact with dusts may cause irritation, possibly leading to dermatitis. Skin contact with metallic dusts may cause physical abrasion.
- **Ingestion:** Ingestion of dust may cause nausea and/or vomiting.

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### Section 4 – First-aid Measures (continued)

**4(b) Most Important Symptoms/Effects, Acute and Delayed (chronic) (continued):**

**Chronic Effects:**

Individuals with chronic respiratory disorders (i.e., asthma, chronic bronchitis, emphysema, etc.) may be adversely affected by any airborne particulate matter exposure. Persons with pre-existing skin disorders may be more susceptible to dermatitis.

**4(c) Immediate Medical Attention and Special Treatment:** Treat symptomatically.

### Section 5 – Fire-fighting Measures

**5(a) Suitable (and unsuitable) Extinguishing Media:** Use extinguishers appropriate for surrounding materials.

**5(b) Specific Hazards Arising from the Chemical:** When burned, toxic smoke and vapor may be emitted. May form combustible dust concentrations in air

**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:** Use only outdoors or in a well-ventilated area. 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. Personnel should be protected against contact with eyes.

**6(b) Methods and Materials for Containment and Clean Up:** 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. 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:** Wash thoroughly after handling. Avoid breathing dust/fume/spray. Use only outdoors or in well ventilated area. Emergency safety showers and eye wash stations should be present.

**7(b) Conditions for Safe Storage, including Any Incompatibilities:** Store in well ventilated place. Keep container tightly closed. Whenever feasible, store locked up.

### Section 8 - Exposure Controls / Personal Protection

**8(a) Occupational Exposure Limits (OELs):** The following exposure limits are offered as reference, for an experience industrial hygienist to review.

Ingredients	OSHA PEL <sup>1</sup>	ACGIH TLV <sup>2</sup>	NIOSH REL <sup>3</sup>	IDLH <sup>4</sup>
Zinc	5.0 mg/m <sup>3</sup> (as zinc oxide fume) 15 mg/m <sup>3</sup> (as total dust) 5.0 mg/m <sup>3</sup> (as respirable fraction)	2.0 mg/m <sup>3</sup> (as zinc oxide)	10 mg/m <sup>3</sup> (as total dust) 5.0 mg/m <sup>3</sup> (as respirable dust)	NE
Iron	10 mg/m <sup>3</sup> (as iron oxide fume)	5.0 mg/m <sup>3</sup>	5.0 mg/m <sup>3</sup> (as iron oxide dust and fume)	2,500 mg/m <sup>3</sup>

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. 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. 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.
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.

**8(b) Appropriate Engineering Controls:** Local exhaust ventilation should be used to control the emission of air contaminants. General dilution ventilation may assist with the reduction of air contaminant concentrations.

### 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. Use safety glasses with side shields or chemical goggles.
- **Skin:** Persons handling this product should wear appropriate clothing to prevent skin contact. Wear protective gloves.
- **Other protective equipment:** An eyewash fountain and deluge shower should be readily available in the work area.

### Section 9 - Physical and Chemical Properties

<b>9(a) Appearance (physical state, color, etc.):</b> Shiny silver solid pieces	<b>9(j) Upper/lower Flammability or Explosive Limits:</b> NA
<b>9(b) Odor:</b> NA	<b>9(k) Vapor Pressure:</b> NA
<b>9(c) Odor Threshold:</b> NA	<b>9(l) Vapor Density (Air = 1):</b> NA
<b>9(d) pH:</b> NA	<b>9(m) Relative Density:</b> 130 lbs./ft <sup>3</sup> Bulk Density
<b>9(e) Melting Point/Freezing Point:</b> NA	<b>9(n) Solubility(ies):</b> NA
<b>9(f) Initial Boiling Point and Boiling Range:</b> NA	<b>9(o) Partition Coefficient n-octanol/water:</b> NA
<b>9(g) Flash Point:</b> NA	<b>9(p) Auto-ignition Temperature:</b> ND
<b>9(h) Evaporation Rate:</b> NA	<b>9(q) Decomposition Temperature:</b> ND
<b>9(i) Flammability (solid, gas):</b> Not flammable	<b>9(r) Viscosity:</b> ND

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:** Zinc Residue CGL is 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:** Iron oxide dusts in contact with calcium hypochlorite evolve oxygen and may cause an explosion.
- 10(f) Hazardous Decomposition Products:** Toxic fumes and vapors may be released at elevated temperatures.

### Section 11 - Toxicological Information

- 11(a-e) Information on Toxicological Effects:** The toxicological data listed below are presented regardless to classification criteria.
- No LC<sub>50</sub> or LD<sub>50</sub> has been established for **Zinc Residue CGL**. The following data has been determined for the components:
    - **Zinc:** Rat LD<sub>50</sub> > 2000 mg/kg
    - **Iron:** Rat LD<sub>50</sub> = 1,060 mg/kg (IUCLID)
  - No Skin (Dermal) Irritation data available for **Zinc Residue CGL** as a mixture or its individual components.
  - No Eye Irritation data available for **Zinc Residue CGL** as a mixture. The following Eye Irritation information was found for the components:
    - **Iron:** Irritating when administered as Iron metal. Rabbit Draize - irritating (IUCLID).
  - No Skin (Dermal)/Respiratory Sensitization data available for **Zinc Residue CGL** as a mixture or its individual components.
  - No Aspiration Hazard data available for **Zinc Residue CGL** as a mixture or its individual components.
  - No Germ Cell Mutagenicity data available for **Zinc Residue CGL** as a mixture or its individual components.
  - Carcinogenicity: IARC, NTP, and OSHA do not list **Zinc Residue CGL** as a mixture or its individual components as carcinogens.
  - No Toxic Reproduction data available for **Zinc Residue CGL** as a mixture or its individual components.
  - No Specific Target Organ Toxicity (STOT) following a Single Exposure data available for **Zinc Residue CGL** as a mixture. The following STOT following a Single Exposure data was found for the components:
    - **Iron:** Irritating to Respiratory tract.

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## Section 11 - Toxicological Information (continued)

### 11(a-e) Information on Toxicological Effects (continued):

- j. No Specific Target Organ Toxicity (STOT) following Repeated Exposure data was available for **Zinc Residue CGL** as a mixture or its individual components.

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 (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).

The following health hazard information is provided regardless to classification criteria and is based on the individual component(s):

#### Acute Effects by Component:

- **ZINC:** Not Reported/ Not Classified
- **IRON:** 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.

#### Delayed (chronic) Effects by Component:

- **ZINC:** Zinc Residue CGLs are a low health risk by inhalation and should be treated as a nuisance dust. 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.
- **IRON:** Chronic inhalation of excessive concentrations of iron oxide fumes or dusts may result in the development of a benign lung disease, 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).

## Section 12 - Ecological Information

**12(a) Ecotoxicity (aquatic & terrestrial):** No data available for the product, **Zinc Residue CGL** as a mixture. However, individual components of the product have been found to be toxic to the environment. Dusts may migrate into soil and groundwater and be ingested by wildlife as follows:

- **Zinc and Zinc Oxide:** EU RAR lists as Category 1 Very toxic to aquatic life with long lasting effects.
- **Iron Oxide:** LC<sub>50</sub>: >1000 mg/L; Fish.

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

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

**12(d) Mobility (in soil):** No Data Available

**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:** **Zinc Residue CGL** 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):11-05-01 (wastes from hot galvanizing processes, hard zinc).

Please note this information is for **Zinc Residue CGL** 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 **Zinc Residue CGL** 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:** Non-Regulated

**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) **Non-bulk:** NA

c) **Bulk:** NA

#### Quantity Limitations

a) **Passenger Aircraft or Rail:** NA

b) **Cargo Aircraft Only:** NA

**Vessel Stowage Location:** NA

**DOT reportable quantities:** NA



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### Section 16 - Other Information (continued)

**ABBREVIATIONS/ACRONYMS:**

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

**Disclaimer:** This information is taken from sources or based upon data believed to be reliable. However, United States Steel 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.