The Steel Company of Canada

Mill Scale

Safety Data Sheet (SDS)

Section 1 – Identification

1(a) Product Identifier used on Label: Mill Scale

1(b) Other Means of Identification: Scale**,** Roll Scale, Hot Strip Mill Scale, Caster Scale, Continuous Caster Scale, Oily Mill Scale

1(c) Recommended Use of the Chemical and Restrictions on Use: None

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

Stelco Inc.
386 Wilcox Street
Hamilton, ON L8L 8K5
Phone number : (905) 528-2511 (8:00 am to 5:00 pm)

1(e) Emergency Phone Number: 1-888-CAN-UTEC (226-8832) or 613-996-6666

Section 2 – Hazard(s) Identification

2(a) Classification of the Chemical: Mill Scale is considered a hazardous material according to the criteria specified in REACH [REGULATION (EC) No 1907/2006], CLP [REGULATION (EC) No 1272/2008], OSHA 29 CFR 1910.1200 Hazard Communication Standard and the Canadian Hazardous Products Regulations. The categories of Health Hazards as defined in "GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS (GHS), 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)	Precautionary Statement(s)
	Carcinogenicity - 1A Reproductive Toxicity - 2 Single Target Organ Toxicity (STOT) Single Exposure - 3 STOT Repeated Exposure -1	**Danger**	May cause cancer. Suspected of damaging fertility or the unborn child. May cause respiratory irritation. Causes damage to lungs, autoimmune system and kidneys through prolonged or repeated exposure. Causes severe skin burns and serious eye damage. Harmful if swallowed. May cause an allergic skin reaction.	Do not breathe dusts of fumes. Wear protective gloves/protective clothing/eye protection/ face protection. 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. Contaminated work clothing should not be allowed out of the workplace. If exposed, concerned or feel unwell: Get medical advice/attention, call a poison center or doctor/physician. If inhaled: Remove person to fresh air and keep comfortable for breathing. Immediately call a poison center or doctor/physician. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center or doctor/physician. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse. If swallowed: Rinse mouth. Do NOT induce vomiting. Call a poison center or doctor/physician if you feel unwell. Store locked up. Dispose of contents in accordance with federal, provincial, state and local regulations.
	Eye Irritation 1 Skin Irritation - 1B			
	Acute Toxicity-Oral - 4 Skin Sensitization - 1			

2(c) Hazards Not Otherwise Classified: None Known

2(d) Unknown Acute Toxicity Statement (mixture): None Known

Section 3 – Composition/Information on Ingredients

3(a-c) Chemical Name, Common Name (Synonyms), CAS Number and Other Identifiers, and Concentration:

Chemical Name	CAS Number	EC Number	% weight
Iron and Iron Oxides	7439-89-6 1345-25-1 1309-38-2 1309-37-1	231-096-4 215-721-8 215-169-8 215-168-2	70-99
Calcium Oxide	1305-78-8	215-138-9	0-10
Aluminum Oxide	1344-28-1	215-691-6	0-6
Silica, Fused	60676-86-0	262-373-8	0-5
Magnesium Oxide	1309-48-4	215-171-9	0-3
Sodium Oxide	1313-59-3	215-208-9	0-3
Manganese	7469-96-5	231-105-1	0-1.3
Crystalline Silica (as Quartz)	14808-60-7	238-878-4	0-1.1
Nickel	7440-02-0	231-111-4	0-0.1

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

Section 4 – First-aid Measures

4(a) Description of Necessary Measures: If exposed, concerned or feel unwell: Get medical advice/attention, call a poison center or doctor/physician.

- **Inhalation:** Remove person to fresh air and keep comfortable for breathing. Immediately call a poison center or doctor/physician.
- **Eye Contact:** If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center or doctor/physician.
- **Skin Contact:** If on skin (or hair): Take off immediately all contaminated clothing. If irritation or rash occurs: Get medical advice/attention. Rinse skin with water/shower. Wash contaminated clothing before reuse.
- **Ingestion:** If swallowed: Rinse mouth. Do **NOT** induce vomiting. Call a poison center or doctor/physician if you feel unwell.

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 eyes, skin and 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 or sensitization, possibly leading to dermatitis. Skin contact with metallic dusts may cause physical abrasion.
- **Ingestion:** Ingestion of dust may cause nausea and/or vomiting.

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: Incompatibility (materials to avoid), heat and flames. When burned, toxic smoke and vapor may be emitted including, oxides of carbon, metal oxides and other toxic vapors.

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 into 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: 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 and skin. 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, provincial, state, and local regulations.

6(b) Methods and Materials for Containment and Clean Up: Collect material in appropriate, labeled containers for recovery or disposal in accordance with federal, provincial, state, and local regulations. Follow applicable regulations (e.g. 29 CFR 1910.120) and all other pertinent federal, provincial, state, and local requirements.

Section 7 - Handling and Storage

7(a) Precautions for Safe Handling: Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Do not breathe dusts. Wear protective gloves/protective clothing/eye protection/face protection. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid direct contact on skin, eyes or on clothing. Emergency safety showers and eye wash stations should be present.

7(b) Conditions for Safe Storage, Including any Incompatibilities: 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 experienced industrial hygienist to review.

Ingredients	Ontario TWA[1]	ACGIH TLV[2]	OSHA PEL[3]	NIOSH REL[4]	IDLH[5]
Iron and Iron Oxides	5.0 mg/m³ (as iron oxide, respirable fraction[6])	5.0 mg/m³ (as iron oxide, respirable fraction[6])	10 mg/m³ (as iron oxide fume)	5.0 mg/m³ (as iron oxide dust and fume)	2,500 mg Fe/m³
Calcium Oxide	2.0 mg/m³	2.0 mg/m³	5.0 mg/m³	2.0 mg/m³	25 mg/m³
Aluminum Oxide	1.0 mg/m³ (as aluminum, respirable fraction[6])	1.0 mg/m³ (as aluminum, respirable fraction[6])	15 mg/m³ (as total dust, PNOR)[9] 5.0 mg/m³ (as respirable fraction, PNOR)	10 mg/m³ (as total dust,)[9] 5.0 mg/m³ (as respirable fraction)	NE
Silica, Fused	0.1 mg/m³ (as respirable fraction[6])	10 mg/m³ (as inhalable fraction[7], PNOS)[8] 3.0 mg/m³ (as respirable fraction[6], PNOS)	0.05 mg/m³ (respirable fraction[8], all forms) 0.025 mg/m³ AL (respirable fraction[8], all forms)	0.05 mg/m³	NE
Magnesium Oxide	10 mg/m³ (as inhalable fraction[7])	10 mg/m³ (as inhalable fraction[7])	15 mg/m³	NE	750 mg/m³
Sodium Oxide	10 mg/m³ (as inhalable fraction[7], PNOS[8]) 3.0 mg/m³ (as respirable fraction[6], PNOS)	10 mg/m³ (as inhalable fraction, PNOS) 3.0 mg/m³ (as respirable fraction, PNOS)	15 mg/m³ (total dust, PNOR) 5.0 mg/m³ (as respirable fraction, PNOR)	NE	NE
Manganese	0.2 mg/m³	0.02 mg/m³ (as respirable fraction[6]) 0.1 mg/m³ (as inhalable fraction[7])	"C" 5.0 mg/m³ (as Fume & Mn compounds)	1.0 mg/m³ (as Fume & Mn compounds) STEL 3.0 mg/m³	500 mg Mn/m³
Crystalline Silica (as Quartz)	0.10 mg/m³ (as respirable fraction[6])	0.025 mg/m³ (as respirable fraction[6], all forms)	0.05 mg/m³ (respirable fraction[8], all forms) 0.025 mg/m³ AL (respirable fraction[8], all forms)	0.05 mg/m³	50 mg/m³
Nickel	1 mg/m³ (as inhalable fraction Ni metal) 0.1 mg/m³ (as inhalable fraction Ni soluble compounds) 0.2 mg/m³ (as inhalable fraction Ni insoluble compounds)	1.5 mg/m³ (as inhalable fraction Ni metal) 0.2 mg/m³ (as inhalable fraction Ni inorganic only insoluble and soluble compounds)	1.0 mg/m³ (as Ni metal & insoluble compounds)	0.015 mg/m³ (as Ni metal & insoluble and soluble compounds)	10 mg/m³ (as Ni)

NE - None Established

1. Time-Weighted Average (TWA) limits established by the Ontario Ministry of Labour are 8-hour TWA concentrations unless otherwise noted.
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.
3. 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.
4. 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 U.S. 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.
5. 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.

Section 8 - Exposure Controls/Personal Protection (continued)

6. Respirable fraction. The concentration of respirable 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 TLVs® and BEIs® based on the Documentation of the Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices – as cited by Ministry of Labour (MOL) R.R.O. 833/90.
7. Inhalable fraction. The concentration of inhalable particulate for the application of this TLV is to be determined from the fraction passing a size-selector with the characteristics defined in the ACGIH TLVs® and BEIs® based on the Documentation of the Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices – as cited by Ministry of Labour (MOL) R.R.O. 833/90.
8. PNOS. Particles (Insoluble or Poorly Soluble) Not Otherwise Specified defined in the ACGIH TLVs® and BEIs® based on the Documentation of the Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices – as cited by Ministry of Labour (MOL) R.R.O. 833/90.
9. PNOR (Particulates Not Otherwise Regulated). All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name are covered by a limit which is the same as the inert or nuisance dust limit of 15 mg/m^3 for total dust and 5 mg/m^3 for the respirable fraction.

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. Emergency eye wash stations and deluge safety showers should be available in the work area.

8(c) Individual Protection Measures:

- **Respiratory Protection**: Seek professional advice prior to respirator selection and use. In the US, follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, use only a NIOSH-approved respirator. In Ontario, follow CSA Standard Z94.4-11 "Selection Care and Use of Respirators" or the "NIOSH Guide to the Selection and Use of Particulate Respirators (1996)" for additional information. 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 eye protection/face protection. A face shield should be used when appropriate to prevent contact with splashed materials. Chemical goggles, face shields or glasses should be worn to prevent eye contact. Contact lenses should not be worn where industrial exposure to this material is likely.
- **Skin:** Persons handling this product should wear appropriate clothing to prevent skin contact. Take off contaminated clothing and wash before reuse. Contaminated work clothing should 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.): Metallic gray dust, flakes or scale

9(b) Odor: NA

9(c) Odor Threshold: NA

9(d) pH: ND

9(e) Melting Point/Freezing Point: 1300 - 1370°C (2370 - 2500°F)

9(f) Initial Boiling Point and Boiling Range: NA

9(g) Flash Point: NA

9(h) Evaporation Rate: NA

9(i) Flammability (solid, gas): Not flammable

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

9(k) Vapor Pressure: NA

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

9(m) Relative Density: 7.6 - 8.2 SG

9(n) Solubility(ies): Negligible

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

9(p) Auto-ignition Temperature: ND

9(q) Decomposition Temperature: ND

9(r) Viscosity: 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: Mill Scale is stable under normal storage and handling conditions.

10(c) Possibility of Hazardous Reaction: None Known

10(d) Conditions to Avoid: Calcium oxide will react with water to form calcium hydroxide.

10(e) Incompatible Materials: Iron oxide dusts in contact with calcium hypochlorite evolve oxygen and may cause an explosion.

10(f) Hazardous Decomposition Products: Oxides of carbon, metal oxides and toxic vapors may be releases at elevated temperatures.

Section 11 - Toxicological Information

11(a-j) Information on Toxicological Effects: The following toxicity data has been determined for **Mill Scale** by using the information available for its components applied to the guidance on the preparation of an SDS under the GHS requirements of WHMIS, OSHA and the EU CPL:

Hazard Classifications	Hazard Category		Hazard Symbols	Signal Word	Hazard Statement
	EU	OSHA / WHMIS			
Acute Toxicity Hazard (covers Categories 1-4)	4	4[a]		**Warning**	Harmful if swallowed.
Skin Irritation (covers Categories 1A, 1B, 1C, and 2)	1B	1B[b]		**Danger**	Causes severe skin burns and eye damage.
Eye Damage/Irritation (covers Categories 1, 2A, and 2B)	1	1[c]		**Danger**	Causes serious eye damage.
Skin/Dermal Sensitization (covers Category 1)	NA*	1[d]		**Warning**	May cause an allergic skin reaction.
Germ Cell Mutagenicity (covers Categories 1A, 1B and 2)	2	NR*	NA	NA	NA
Carcinogenicity (covers Categories 1A, 1B and 2)	1A	1A[g]		**Danger**	May cause cancer.
Reproductive Toxicity (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)	3	3[i]		**Warning**	May cause respiratory irritation.
STOT Following Repeated Exposure (covers Categories 1 and 2)	1	1[j]		**Danger**	Causes damage to lungs, autoimmune system and kidneys through prolonged or repeated exposure.

* NR Not Rated - Available data does not meet criteria for classification.

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

a. No LC_{50} or LD_{50} has been established for **Mill Scale**. The following data has been determined for the components:

- **Iron Oxide:** LD_{50}= >10,000 mg/kg (Oral/ Rat)
- **Iron:** Rat LD_{50} =1060 mg/kg (IUCLID) (oral)
- **Manganese:** Rat LD_{50} > 2000 mg/kg (REACH)
  Rat LD_{50} > 9000 mg/kg (NLM Toxnet)
- **Silica:** Rat LD_{50} = 500 mg/kg (Oral/ Rat)
- **Nickel:** LD_{50} >9000 mg/kg (Oral/Rat); NOAEC >10.2 mg/l(Inhalation/Rat)

b. No Skin (Dermal) Irritation data available for **Mill Scale** as a mixture. The following Skin (Dermal) Irritation data has been determined for the components:

- **Iron Oxide:** Moderately irritating.
- **Magnesium Dioxide:** Severe skin irritant in human (HSDB).
- **Sodium Oxide:** Severe skin irritant.

c. No Eye Irritation data available for **Mill Scale** as a mixture. The following Eye Irritation information was found for the components:

- **Iron Oxide:** Severely irritating; may cause burns. Human Corrosive (IUCLID).
- **Iron:** Irritating when administered as Iron metal. Rabbit Draize - (IUCLID).
- **Calcium Oxide:** Rabbit Irritating (REACH).
- **Magnesium dioxide**: Severe eye irritant in human (HSDB).
- **Sodium Oxide:** Severe eye irritant.
- **Silicon Dioxide:** Crystalline silica may cause abrasion of the cornea**.**
- **Nickel:** Slight eye irritation from particulate abrasion only.

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

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

e. No Aspiration Hazard data available for **Mill Scale** as a mixture or its individual components.

Section 11 - Toxicological Information (continued)

11(a-j) Information on Toxicological Effects (continued):

f. No Germ Cell Mutagenicity data available for **Mill Scale** as a mixture. The following Germ Cell Mutagenicity information was found for the components:

- **Iron Oxide:** Both positive and negative data.
- **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 **Mill Scale** as carcinogens. The following Carcinogenicity information was found for the components:

- **Iron Oxide:** TLV-A4
- **Crystalline Silica (as Quartz):** Repeated exposure to crystalline silica causes lung cancer in exposed humans. IARC-1, NTP-1, TLV-A2, and OSHA.
- **Nickel and certain nickel compounds** – Group 2B - metallic nickel. Group 1 - nickel compounds ACGIH confirmed human carcinogen. Nickel – EURAR Insufficient evidence to conclude carcinogenic potential in animals or humans; suspect carcinogen classification Category 2 Suspected of causing cancer.

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

- **Nickel:** Effects on fertility.

i. No Specific Target Organ Toxicity (STOT) following a Single Exposure data available for **Mill Scale** as a mixture. The following STOT following a Single Exposure data was found for the components:

- **Iron Oxide:** May cause lung irritation.
- **Iron:** Irritating to Respiratory tract.
- **Calcium Oxide:** Can cause respiratory tract irritation, skin and eye irritation.
- **Sodium Oxide:** Sodium oxide is highly reactive with water to form caustic sodium hydroxide.
- **Crystalline Silica (as Quartz):** Single exposure to very high airborne levels may cause lung irritation in exposed humans.

j. No Specific Target Organ Toxicity (STOT) following Repeated Exposure data was available for **Mill Scale** as a whole. The following STOT following Repeated Exposure data was found for the components:

- **Iron Oxide:** Some pulmonary and lung effects reported.
- **Crystalline Silica (as Quartz):** Repeated exposure to crystalline silica causes silicosis and kidney damage as well as increased incidence of autoimmune disorders in humans.
- **Manganese:** Inhalation of metal fumes - Degenerative changes in human brain; Behavioral: Changes in motor activity and muscle weakness (Whitlock *et al.,* 1966).
- **Nickel:** Rat 4 wk inhalation LOEL 4 mg/m^3 Lung and Lymph node histopathology. Rat 2 yr inhalation LOEL 0.1 mg/ m^3 Pigment in kidney, effects on hematopoiesis spleen and bone marrow and adrenal tumor. Rat 13 Week Inhalation LOAEC 1.0 mg/m^3 Lung weights, and Alveolar histopathology

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:

- **Iron (and Iron Oxide):** 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.
- **Calcium Oxide:** Calcium oxide is an eye and skin irritant.
- **Aluminum Oxide:** Inhalation may cause cough.
- **Amorphous Silica (Silicon Dioxide):** Not Reported/Not Classified
- **Magnesium Oxide:** Not Reported/ Not Classified
- **Sodium Oxide:** Corrosive to skin, eyes and respiratory tract. Serious local effects can result from all routes of administration. Highest possible categories listed for skin and eye irritation and for single dose target organ toxicity were selected based on the material's high reactivity to water to form the caustic compound Sodium Hydroxide.
- **Manganese:** Manganese is harmful if swallowed.
- **Crystalline Silica (as Quartz**): Causes irritation and inflammation of the respiratory tract. May cause abrasion of the cornea. Inhalation may cause cough. A single exposure to very high airborne levels may cause lung irritation in exposed humans.
- **Nickel:** Nickel may cause allergic skin sensitization.

Delayed (chronic) Effects by Component:

- **Iron (and Iron Oxide):** Chronic inhalation of excessive concentrations of iron oxide 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.
- **Calcium Oxide:** Depending on the concentration and duration of exposure, repeated or prolonged inhalation may cause inflammation of the respiratory passages, ulcers of the mucous membranes, and possible perforation of the nasal septum. Repeated or prolonged skin contact may cause dermatitis.
- **Aluminum Oxide:** Considered to be an inert or nuisance dust.

Section 11 - Toxicological Information (continued)

Delayed (chronic) Effects by Component (continued):

- **Amorphous Silica (Silicon Dioxide):** 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.
- **Magnesium Oxide:** Irritation of eyes, nose, and throat. Symptoms may include dryness of nose and mouth, cough, feeling of weakness, tightness of chest, muscular pain, chills, fever, headache, nausea, and vomiting.
- **Sodium Oxide:** Sodium oxide may be damaging to mucosal membranes of the respiratory tract. Sodium oxide may cause irritation and potentially pulmonary edema.
- **Manganese:** 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.
- **Crystalline Silica (as Quartz):** Inhalation of quartz is classified by IARC as a human carcinogen. Chronic exposure can cause silicosis, a form of lung scarring that can cause shortness of breath, reduced lung function, and in severe cases, death. Repeated exposure may cause kidney damage as well as increased incidence of autoimmune disorder.
- **Nickel:** 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 compounds as Group 1 carcinogens (sufficient human data). ACGIH 2017 TLVs® and BEIs® lists insoluble nickel compounds as confirmed human carcinogens. Suspected of damaging the unborn child.

Section 12 - Ecological Information

12(a) Ecotoxicity (aquatic & terrestrial): No data available for the product, **Mill Scale** as a whole. 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:

- **Iron Oxide**: LC_{50}: >1000 mg/L; Fish
- **Calcium Oxide:** LC_{50}: 159 mg/L; invertebrates

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: No Category

Signal Word: No Signal Word

Hazard Symbol: No Hazard Symbol

Hazard Statement: No Hazard Statement

Section 13 - Disposal Considerations

Disposal: Dispose of contents/container in accordance with local/regional/international regulations.

Container Cleaning and Disposal: Follow applicable federal, provincial, state and local regulations. Observe safe handling precautions. European Waste Catalogue 10-02-10 (mill scales), 10-02-11 (wastes from cooling-water treatment containing oil) or 10-02-99 (wastes not otherwise specified).

Please note this information is for Mill Scale in its original form. Any alterations can void this information.

Section 14 - Transport Information

14 (a-g) Transportation Information:

TDG/US Department of Transportation (DOT) under federal TDG and 49 CFR 172.101 does not regulate **Mill Scale** as a hazardous material. All federal, provincial, state, and local laws and regulations that apply to the transport of this type of material must be adhered to.

Shipping Name: 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) Non-bulk:** NA **c) Bulk:** 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

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 **Mill Scale** as a hazardous material.

Section 14 - Transport Information (continued)

Shipping Name: 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

International Air Transport Association (IATA) does not regulate **Mill Scale** as a hazardous material.

Shipping Name: NA **Class/Division:** NA **Hazard Label (s):** NA **UN No.:** NA **Packing 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 **Max Net Qty/Pkg:** NA	**Pkg Inst:** 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: Mill Scale does not have a **Transport Dangerous Goods (TDG)** classification.

Section 15 - Regulatory Information

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

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

Section 313 Supplier Notification: The product, **Mill Scale** contains the following toxic chemicals subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372:

CAS #	Chemical Name	Percent by Weight
7439-96-5	Manganese Oxide (Mn compounds)	2 max
7440-02-0	Nickel	0.1 max

State Regulations: The product, **Mill Scale** as a whole is not listed in any state regulations. However, individual components of the product are listed in various state regulations:

California Prop. 65: Contains elements known to the State of California to cause cancer or reproductive toxicity. This includes Crystalline silica (airborne particles of respirable size only) and nickel.

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

Section 16 - Other Information

Prepared By: Stelco Inc.

Revision History:

06/30/2017 – Update to Stelco
4/14/2015 - Revision
4/21/2014 - Update to OSHA HAZCOM 2012
7/27/2011 – Update of content and format to comply with GHS
5/23/1986 - Original

Additional Information:

Hazardous Material Identification System (HMIS) Classification

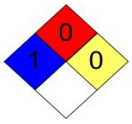
Health Hazard	1
Fire Hazard	0
Physical Hazard	0

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 HAZARDS = **0**, Materials that are normally stable, even under fire conditions, 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 and reactive with water.

Section 16 - Other Information (Continued)

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
$\mu g/m^3$	microgram per cubic meter of air	**SCBA**	Self-contained Breathing Apparatus
mg/m^3	milligram per cubic meter of air	**STEL**	Short-term Exposure Limit
mppcf	million particles per cubic foot	**TLV**	Threshold Limit Value
SDS	Safety Data Sheet	**TWA**	Time-weighted Average
MSHA	Mine Safety and Health Administration	**UEL**	Upper Explosive Limit
MOL	Ontario Ministry of Labour	**WHMIS**	Workplace Hazardous Materials Information System
NFPA	National Fire Protection Association		

Disclaimer: This information is taken from sources or based upon data believed to be reliable. However, Stelco Inc. 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.

The Steel Company of Canada

Mill Scale

Signal Word: DANGER

Symbols:

HAZARD STATEMENTS:

May cause cancer.
Suspected of damaging fertility or the unborn child.
May cause respiratory irritation.
Causes damage to lungs, autoimmune system and kidneys through prolonged or repeated exposures.
Causes severe skin burns and serious eye damage.
Harmful if swallowed.

May cause an allergic skin reaction.

PRECAUTIONARY STATEMENTS

Do not breathe dusts or fumes.
Wear protective gloves/protective clothing/eye protection/face protection.
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. Contaminated work clothing should not be allowed out of the workplace.
If exposed, concerned or feel unwell: Get medical advice/attention, call a poison center or doctor/physician. If inhaled: Remove person to fresh air and keep comfortable for breathing. Immediately call a poison center or doctor/physician.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center or doctor/physician.
If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If irritation or rash occurs: Get medical advice/attention. Wash contaminated clothing before reuse.
If swallowed: Rinse mouth. Do **NOT** induce vomiting. Call a poison center or doctor/physician if you feel unwell.
Store locked up.
Dispose of contents in accordance with federal, provincial, state and local regulations.

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