



Material Safety Data Sheet

Original Issue Date: October 1st 2011

Revised: October 1st 2011

Section 1 – Product and Company Identification

Product/Chemical Name:	SANITATION (Carbon Steel Welded) Process & Power (Medium Alloy Steel, Low Alloy Steel, High Alloy and Stainless Steel, Carbon Steel) OCTG (Carbon Steel, Stainless Steel, Carbon Steel Welded) MINING (C-Mn Steel Welded) Line Pipe (C – Mn Steel, Stainless Steel, C-Mn Steel Welded) INDUSTRIAL APPLICATIONS (C-Mn Steel Welded, Carbon Steel Welded) Auto (All Bearing Steel Grades)
Common Name:	Seamless steel pipe, welded steel pipes
Manufacturers:	<p>TenarisDalmine, Piazza Caduti 6 Luglio 1944, 1 - 24044 - Dalmine (BG), Italy</p> <p>Siderca, 250 Dr. Simini Street - B2804MHA Campana - Buenos Aires – Argentina</p> <p>Tamsa, Km. 433.7 Carr. México-Veracruz Via Xalapa - 91697Veracruz – Veracruz - México</p> <p>NKK, 2-1 Ikegami, Kawasaki-ku - 210-0855 Kawasaki – Kawasaki – Japan</p> <p>Algoma, 547 Wallace Terrace - ON P6c 1L9 Sault Saint Marie – Ontario – Canada</p> <p>Silcotub, 93, Mihai Viteazu Blvd. – 450131 Zalau - Salaj County – Romania</p> <p>Confab, Av. Dr. Gastão Vidigal Neto 475 - 12414-900 Pindamonhangaba - Cidade Nova - São Paulo – Brazil</p> <p>TubeCaribe, Carrera 13, No. 93B -51, 4to. Piso - Santa Fe de Bogotá – Cudinamarca – Colombia</p> <p>Siat, Guatemala 3400 - B1822AXZ Valentín Alsina - Buenos Aires – Argentina</p> <p>Prudential, 1800, 140 – 4th Ave. S.W. - T2P 3N3 Calgary – Alberta – Canada</p> <p>Hickman, 5000 N County Rd. 967 – 72315 Blytheville – Arkansas – USA</p> <p>Conroe, 699 FM 3083 – 77301 Conroe – Texas – USA</p>
General Information:	<p>Phone: (+39) 035 560 111 – (+54)3489 433 100</p> <p>e-mail: MSDS@tenaris.com</p>

Section 2 – Hazards Identification

This metal product is not classified as hazardous

Steel products, under normal conditions do not represent an inhalation, ingestion, contact health hazard or fire and explosion hazard.

Welding, burning, melting, sawing, brazing, grinding, or other similar operations on steel products may generate potentially hazardous airborne particulate and fumes.

The possible presence of coating should be considered when evaluating potential employee health hazards and exposures during welding or other fume generating activities. Torching and burning may produce emissions that can be irritating to the eyes and respiratory tract.

Avoid inhalation of metal dusts and fumes.

Processes potentially generating airborne particulates should be performed in well ventilated work areas and, when appropriate, respiratory protection and other personal protective equipment should be used.

Particles of iron or iron compounds, which become imbedded in the eye, may cause rust stains unless removed fairly promptly.

See Section 11 for possible symptoms and health effects found to be associated to the exposure to individual elements.

Section 3 – Composition / Information on Ingredients

Ingredient Name	CAS Number	Percentage by weight	OSHA PEL ⁽¹⁾	ACGIH TLV ⁽²⁾
Base Metal				
IRON (Fe)	7439-89-6	BALANCE	10 mg/m ³ – Iron oxide fume	5 mg/m ³ – Iron oxide dust and fume
Alloying Elements				
ALUMINUM (Al)	7429-90-5	MAX: 1.5	15 mg/m ³ – Total dust 5 mg/m ³ – Respirable fraction	1 mg/m ³ - Metal & insol.compounds
CARBON (C)	7440-44-0	MAX: 1.05	15 mg/m ³ – Total dust (PNOR) ⁽³⁾ 5 mg/m ³ – Respirable fraction(PNOR)	10 mg/m ³ – Inhalable fraction ⁽⁴⁾ (PNOS) ⁽⁵⁾ 3 mg/m ³ – Respirable fraction ⁽⁶⁾ (PNOS)
MANGANESE (Mn)	7439-96-5	MAX: 14.5	5 mg/m ³ (C) Fume & Mn compounds	0.2 mg/m ³
SULFUR (S)	7704-34-9	MAX: 0.06	15 mg/m ³ – Total dust (PNOR) 5 mg/m ³ – Respirable fraction (PNOR)	10 mg/m ³ – Inhalable fraction(PNOS) 3 mg/m ³ – Respirable fraction(PNOS)
SILICON (Si)	7440-21-3	MAX: 6.5	15 mg/m ³ – Total dust (PNOR) 5 mg/m ³ – Respirable fraction (PNOR)	10 mg/m ³ – Inhalable fraction(PNOS) 3 mg/m ³ – Respirable fraction(PNOS)
CHROMIUM (Cr)	7440-47-3	MAX: 30	1 mg/m ³ – Chromium metal	0.5 mg/m ³ – Cr metal & Cr III compounds
COPPER (Cu)	7440-50-8	MAX: 2	0.1 mg/m ³ – Fume(as Cu) 1 mg/m ³ – Dusts & mists(as Cu)	0.2 mg/m ³ – Fume 1 mg/m ³ – Dusts & mists(as Cu)
MOLYBDENUM (Mo)	7439-98-7	MAX: 8	15 mg/m ³ – Total dust (as Mo) 5 mg/m ³ – Soluble compounds	10 mg/m ³ – Metal & insol.compounds (inhalable fraction) 3 mg/m ³ – Metal & insol.compounds (respirable fraction) 0.5 mg/m ³ – Soluble compounds
NICKEL (Ni)	7440-02-0	MAX: 36	1 mg/m ³ – Metal & insol.compounds (as Ni)	1.5 mg/m ³ – Elemental Nickel (as Ni) 0.2 mg/m ³ – Insoluble compound(NOS) ⁽⁷⁾
VANADIUM (V)	7440-62-2	MAX: 0.55	0.5 mg/m ³ (C) – Respirable fraction as V ₂ O ₅ 0.1 mg/m ³ (C) – Fume (as V ₂ O ₅)	0.05 mg/m ³ – Dust or fume (as V ₂ O ₅)
COLOMBIUM (NB)	7440-03-1	MAX: 1	15 mg/m ³ – Total dust (PNOR) 5 mg/m ³ – Respirable fraction (PNOR)	10 mg/m ³ – Inhalable fraction (PNOS) 3 mg/m ³ – Respirable fraction (PNOS)
BORON (B)	7440-42-8	MAX: 0.007	5 mg/m ³ – As Boron oxide	10 mg/m ³ – As Boron oxide

CALCIUM (CA)	7440-70-2	MAX: 0.01	5 mg/m ³ – as Calcium oxide	2 mg/m ³ – as Calcium oxide
TITANIUM (TI)	7440-32-6	MAX: 0.1	15 mg/m ³ – Total dust (PNOR) 5 mg/m ³ – Respirable fraction (PNOR)	10 mg/m ³ – Inhalable fraction (PNOS) 3 mg/m ³ – Respirable fraction (PNOS)
TUNGSTEN (W)	7440-33-7	MAX: 2	15 mg/m ³ – Total dust (PNOR) 5 mg/m ³ – Respirable fraction (PNOR)	5 mg/m ³

Notes:

- All the alloying elements listed above are known as of the present date and here reported, with the exception of “trace” elements. The percentage by weight listed above for each element represents the maximum content to cover any kind of grades. Steel products may contain small amounts of other elements not specified in the table above. These small quantities may result from residual elements originated in raw materials used. These other elements may include phosphorous (max 0.05), antimony (max 0.01), arsenic (max 0.05), cobalt (max 0.05), lead (max 0.05), tin (max 0.07) and zirconium (max 0.01).
- Surface treatments/coatings: oil, paint, epoxy resin and varnish may be applied as a protective coat. Thread coatings have lubricant and anticorrosive characteristics given by a solid lubricant applied with a uniform thickness. Refer to the coating manufacturer’s MSDS for hazards associated with each coating (MSDSs may also be requested to Tenaris).

⁽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 Short Term Exposure Limit (STEL) is defined as a 15-minute exposure, which should not be exceeded at any time during a workday.

⁽²⁾ Threshold Limit Value (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH) are 8-hour TWA concentration unless otherwise noted. The published 2009 TLV are reported.

⁽³⁾ 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 mg/m³ for the respirable fraction.

⁽⁴⁾ 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 Appendix C, paragraph A.

⁽⁵⁾ PNOS (Particulates Not Otherwise Specified). Particulates identified under the PNOS heading are “nuisance dusts” containing no asbestos and <1% crystalline silica. A TLV-TWA of 10 mg/m³ for inhalable particulate and 3 mg/m³ for respirable particulate has been recommended.

⁽⁶⁾ Respirable fraction. The concentration of respirable dust for the application of this limit is to be determined from the fraction passing a size-selector with the characteristics defined in the ACGIH TLVs and BEIs Appendix C, paragraph C.

⁽⁷⁾ NOS. Not otherwise specified.

Section 4 – First Aid Measures

Inhalation:	In case of excessive exposure to fumes or particulate, remove exposed person to fresh air, and, if necessary, administer oxygen and seek physician assistance.
Eye Contact:	Flush with large amounts of clean water to remove particles. Seek medical attention if irritation persists.
Skin Contact:	Remove contaminated clothing. Wash affected areas with soap or mild detergent and water. If thermal burn has occurred, flush area with cold water and seek medical attention. If mechanical abrasion has occurred, seek medical attention.
Ingestion:	This is not a probable route of exposure for industrial use. However, in case of ingestion of dusts seek medical attention.

Section 5 – Fire-Fighting Measures	
Flammability Classification:	Non-flammable, non-combustible.
Extinguishing Media:	Not applicable for solid product. Use extinguishers appropriate for surrounding materials. Do not use water on molten metal.
Unusual Fire or Explosion Hazards:	Not applicable for solid product. High concentrations of airborne metallic fines may present an explosion hazard. Molten metal may react violently with water.
Hazardous Combustion products:	At temperatures above the melting point, fumes containing metal oxides and other alloying elements may be generated. If present, surface treatments such as corrosion-inhibiting oils, resins, or coatings on the product may generate noxious gases.
Fire-Fighting Equipment:	Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode and full protective clothing.
Section 6 – Accidental Release Measures	
Spill/Leak Procedures:	Not applicable to steel products in the solid state. For spills involving finely divided particles, clean-up personnel should protect eyes and skin from accidental contact. If material is in a dry state, avoid inhalation of dust. Wet sweeping methods or vacuuming must be applied to prevent spreading of dry and fine dusts. Avoid using compressed air. Do not release collected material into sewers or waterways. Collect material in appropriate, labeled containers for recovery or disposal in accordance with local regulations.
Section 7 – Handling and Storage	
Precautions for safe handling:	Use lifting and work devices in accordance with manufacturer’s instructions when handling these products. Lifting devices and attachments (such as spreader bars, chains, sling hooks, plate clamps, hoists, cranes, forklifts) must be load-rated sufficient for the job. Processes potentially generating high concentrations of airborne particles should be assessed and controlled as needed. Generation of airborne dust and fume must be minimized. Avoid inhalation of metal dust or fumes.
Conditions for safe storage:	Store away from acids and incompatible materials. To avoid steel tubes to roll, slip, slide, or fall over restrain them appropriately while stored. Shelves or racking systems must be suitably designed for the purpose. Large steel pipe should be stored lying flat and chocked, or secured in cradle racks.
Section 8 – Exposure Controls / Personal Protection	
Control parameters	See Section 3 for TLVs and PELs.

Engineering Controls:	Use controls as appropriate to minimize exposure to metal fumes and dusts during handling operations. Exhaust ventilation systems must be provided to minimize airborne concentrations and worker exposure must be kept below applicable exposure limits during welding, brazing, grinding, machining, and other processes which may generate airborne contaminants. Do not use compressed air to clean-up accumulated material or dust.
Respiratory protection measures:	NIOSH / MSHA approved dust and fume respirator should be used to avoid excessive inhalation of particles. Seek professional advice prior to respirator selection and use. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen.
Protective Clothing/Equipment:	For operations which result in the generation of airborne particulates, use protective clothing, gloves and safety glasses to prevent skin and 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. Protective gloves should be worn as required for welding, burning or handling operations. Where the oil coating is applied to the product, wear gloves when handling.

Section 9 – Physical and Chemical Properties

Physical State: Solid Colour: Metallic grey Odour: Odourless Odour Threshold: N/A pH: N/A Melting Point/ Freezing point: N/A Boiling Point: N/A Flash point: N/A Evaporation Rate: N/A	Flammability: N/A Upper Explosive Limit (UEL) – Lower Explosive Limit (LEL): N/A Vapour Pressure: N/A Vapour Density (Air=1): N/A Density: 7.85 Water Solubility: Insoluble Other Solubilities: N/A Auto-ignition temperature: N/A Decomposition Temperature: N/A
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Section 10 – Stability and Reactivity

Chemical stability:	Steel products are stable under normal storage and handling conditions.
Possibility of hazardous reactions:	Molten metal may react violently with water. Metal react with strong acids to form hydrogen. Iron oxide dusts in contact with calcium hypochlorite evolve oxygen and may cause an explosion.
Conditions to avoid:	Avoid use of water in presence of molten metal. Avoid storage with strong acids or calcium hypochlorite.
Incompatible materials:	Strong acids, calcium hypochlorite.
Hazardous Decomposition Products:	Thermal oxidative decomposition of steel products can produce fumes containing iron and manganese oxides as well as other elements. If present, surface treatments and coatings such as oil, paint, resin, varnish may generate noxious gases.

Section 11 – Toxicological Information

No toxicological information is available for the mixture as a whole.
No LC50 or LD50 has been established for the mixture as a whole.

<p>Routes of exposure and symptoms:</p>	<p>Steel products under normal conditions do not represent an inhalation, ingestion or contact health hazard. However, operations such as burning, welding, sawing, brazing, grinding, etc. may result in the following effects if exposure exceeds permissible limits for each component.</p> <p>Inhalation: The inhalation of high concentrations of freshly formed oxide fumes and dusts of manganese, copper and lead can cause an acute reaction known as “metal fume fever”.</p> <p>Eye contact: Excessive exposure to high concentration of dust may cause irritation to the eyes.</p> <p>Skin contact: Skin contact with dusts and with oil residues (only if prolonged and repeated) may cause irritation or sensitization.</p> <p>Ingestion: Ingestion of dust may cause nausea or vomiting.</p>
<p>Health effects:</p>	<p>Long-term inhalation exposure to high concentrations to pneumoconiotic agents may act synergistically with inhalation of oxides, fumes or dusts of this product to cause toxic effects.</p> <p>Individuals with chronic respiratory disorders (i.e., asthma, chronic bronchitis, emphysema, etc.) may be adversely affected by any fume or airborne particulate matter exposure.</p> <p>Health effects of individual elements are described in the following.</p> <p>IRON OXIDE: Lungs may be affected by repeated or prolonged exposure to dust particles , resulting in siderosis, a benign condition.</p> <p>ALUMINUM: Lungs may be affected by repeated or prolonged exposure to dust particles. The substance may have effects on the nervous system , resulting in impaired functions.</p> <p>BORON: Boron oxide irritates the eyes, the skin and the respiratory tract.</p> <p>CHROMIUM: The health hazards associated with exposure to chromium are dependent upon its oxidation state. The dust inhalation of the metal form (chromium as it exists in this product) may cause mechanical irritation to the eyes and the respiratory tract.</p> <p>COLUMBIUM: Can cause eye and skin irritation.</p> <p>COPPER: Inhalation of fumes may cause metal fume fever. Repeated or prolonged contact may cause skin sensitization.</p> <p>MANGANESE: The aerosol is irritating to the respiratory tract. The substance may have effects on the lungs and central nervous system, resulting in increased susceptibility to bronchitis, pneumonitis and neurologic, neuropsychiatric disorders (manganism). Animal tests show that this substance possibly causes toxicity to human reproduction or development.</p> <p>MOLYBDENUM: Burning and welding may generate both insoluble molybdenum compounds and soluble molybdenum compounds. Soluble molybdenum compounds (molybdenum trioxide) is irritant to the respiratory system.</p> <p>NICKEL: Exposure to high concentrations of nickel fumes and dusts may cause mechanical irritation. Inhalation of fumes may cause pneumonitis. Repeated or prolonged contact may cause skin sensitization. Repeated or prolonged inhalation exposure may cause asthma. Lungs may be affected by repeated or prolonged exposure. This substance is possibly carcinogenic to humans.</p> <p>SILICON: May cause mechanical irritation to the eyes and the respiratory tract.</p>

	<p>VANADIUM: Long term or repeated exposures to vanadium compounds, especially the pentoxide, may cause irritation to the respiratory system.</p> <p>CALCIUM: Calcium oxide is corrosive to the eyes, the skin and the respiratory tract. Repeated or prolonged contact with skin may cause dermatitis. Lungs may be affected by repeated or prolonged exposure to dust particles. The substance may cause ulceration and perforation of the nasal septum.</p> <p>TUNGSTEN: May cause mechanical irritation to the eyes, the skin and the respiratory tract.</p>
Acute Toxicity data*:	<p>Iron (III) oxide: inhalation rat lowest published toxic concentration: 0.8 mg/kg;</p> <p>Manganese: oral rat LD50: 9 gm/kg;</p> <p>Sulfur: inhalation mammal (species unspecified) LC50: 1,660 mg/m3;</p> <p>Silicon: oral rat LD50: 3,160 mg/kg;</p> <p>Chromium: unreported route rat LD50: 27,500 µg/kg;</p> <p>Copper: oral human lowest published toxic dose: 0.1 mg/kg;</p> <p>Molybdenum: intratracheal rabbit lowest published lethal dose: 70 mg/kg;</p> <p>Nickel: oral guinea pig lowest published lethal dose: 5 mg/kg;</p> <p>Vanadium pentoxide: inhalation human lowest published toxic concentration: 10 mg/m3;</p> <p>Boron oxide: oral rat LD50: 3,150 mg/kg;</p> <p>Tungsten: intratracheal rat lowest published toxic dose: 200 mg/kg.</p>
<p>* See NIOSH, RTECS (NO7400000), for additional toxicity data on iron oxide, (OO9275000) for manganese, (WS4250000) for sulfur, (WM0400000) for silicon, (GB4200000) for chromium, (GL5325000) for copper, (QA4680000) for molybdenum, (QR5950000) for nickel, (YW2450000) for vanadium pentoxide, (ED7900000) for boron oxide, (YO7175000) for tungsten.</p>	
Section 12 – Ecological Information	
Ecotoxicity:	No data available for the product as a whole. However, individual components of the product have been found to be toxic to the environment.
Persistence and degradability:	No data available.
Bioaccumulative potential:	No data available.
Mobility in soil:	No data available.
Soil Absorption/Mobility:	Metal dusts may migrate into soil and groundwater and be ingested by wildlife. Individual components of the product have been found to be absorbed by plants from soil.
Section 13 – Disposal Considerations	
Disposal:	Steel scrap should be recycled whenever possible.
Container Disposal:	Follow applicable regulations in force at local level.
Section 14 – Transport Information	
Follow applicable regulations in force at local level.	
<p>UN number: not applicable</p> <p>UN proper shipping name: not applicable</p> <p>Transport hazard class: not applicable</p> <p>Packing Group: not applicable</p> <p>Marine Pollutant: N</p>	

Section 15 – Regulatory Information

Follow applicable regulations in force at local level.

Section 16 – Other Information

Disclaimer:

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