SAFETY DATA SHEET

1. Identification

Product identifier **1522 - 1566 Steel**

Other means of identification

SDS number WS003

Recommended use Not available.

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer/Supplier The Worthington Steel Company

Address
200 Old Wilson Bridge Road
Columbus, OH 43085
United States

Email: steel@worthingtonindustries.com

Telephone Number: 800-944-3733

CHEMTREC - 24 HOURS: Within US: 800-424-9300 International: +1 703-741-5970 (collect calls accepted)

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards Not classified.

OSHA defined hazards Not classified.

Label elements

Hazard symbol None.

Signal word None.

Hazard statement None.

Precautionary statement

Prevention Observe good industrial hygiene practices.

Response Wash thoroughly after handling.

Storage Store away from incompatible materials.

Disposal Dispose of waste and residues in accordance with local authority requirements.

Hazard(s) not otherwise classified (HNOC) Molten material will produce thermal burns.

3. Composition/information on ingredients

Substances

Chemical name	Common name and synonyms	CAS number	%
Iron		7439-89-6	96-98
Manganese		7439-96-5	0-1.7
Carbon		7440-44-0	0-1.1
Chromium		7440-47-3	0-0.5
Silicon		7440-21-3	0-0.4
Nickel		7440-02-0	0-0.15
Aluminium		7429-90-5	0-0.1

Molybdenum	7439-98-7	0-0.1
Titanium	7440-32-6	0-0.1
Sulfur	7704-34-9	0-0.05
Phosphorus	7723-14-0	0-0.04
Boron	7440-42-8	0-0.02
Vanadium	7440-62-2	0-0.02
Lead	7439-92-1	0-0.01

Composition comments All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

Inhalation Contact with dust or fume: Immediately remove from further exposure. Get immediate medical assistance. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. Give supplemental oxygen, if available. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

Skin contact Wash with soap and water. Get medical attention if irritation develops and persists. Thermal burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Seek medical attention for severe cuts or abrasions.

Eye contact Rinse immediately with plenty of water for at least 15 minutes. Remove any contact lenses. Get medical attention if irritation develops or persists.

Ingestion Contact with dust: Immediately rinse mouth and drink a cupful of water. Never give anything by mouth to a victim who is unconscious or is having convulsions. Only induce vomiting at the instruction of medical personnel. Get medical attention immediately.

Most important symptoms/effects, acute and delayed Dust and fumes may irritate eyes, skin and upper respiratory tract. Contact with molten material may cause thermal burns.

Indication of immediate medical attention and special treatment needed Treat symptomatically. Exposure may aggravate pre-existing respiratory disorders. Symptoms may be delayed.

General information Show this safety data sheet to the doctor in attendance.

5. Fire-fighting measures

Suitable extinguishing media Extinguish with foam, carbon dioxide or dry powder.

Unsuitable extinguishing media Do not use water or halogenated extinguishing media.

Specific hazards arising from the chemical Fire or high temperatures create: Metal oxides.

Special protective equipment and precautions for firefighters Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Fire fighting equipment/instructions Move containers from fire area if you can do it without risk.

General fire hazards Solid metal is not flammable; however, finely divided metallic dust or powder may form an explosive mixture with air.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures Keep unnecessary personnel away. Avoid inhalation of dust from the spilled material. Wear protective clothing as described in Section 8 of this SDS. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

Methods and materials for containment and cleaning up Pick up mechanically. For a dry material spill, use a HEPA (high efficiency particle air) vacuum to collect material and place in a sealable container for disposal. Avoid dust formation. Recover and recycle, if practical. Keep out of water supplies and sewers.

Environmental precautions Prevent further leakage or spillage if safe to do so. Do not contaminate water.
If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).

7. Handling and storage

Precautions for safe handling

Wear appropriate personal protective equipment (See Section 8). Keep formation of airborne dusts to a minimum. Provide appropriate exhaust ventilation at places where dust is formed. Avoid inhalation of dust and fumes. Avoid contact with skin and eyes. Avoid contact with sharp edges and hot surfaces. Do not get this material on clothing. Do not eat, drink or smoke when using the product. Wash thoroughly after handling. Follow the recommendations in ANSI Z49.1, Safety in welding and cutting (ANSI=American National Standard Institute). Steel products are massive and care must be taken to prevent them from falling, rolling or tipping on objects in their path.

Conditions for safe storage, including any incompatibilities

Store away from incompatible materials.

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Components	Type	Value
Lead (CAS 7439-92-1)	TWA	0.05 mg/m3

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value	Form
Aluminium (CAS 7429-90-5)	PEL	5 mg/m3	Respirable dust.
		15 mg/m3	Total dust.
Chromium (CAS 7440-47-3)	PEL	1 mg/m3	
Manganese (CAS 7439-96-5)	Ceiling	5 mg/m3	Fume.
Molybdenum (CAS 7439-98-7)	PEL	15 mg/m3	Total dust.
Nickel (CAS 7440-02-0)	PEL	1 mg/m3	
Phosphorus (CAS 7723-14-0)	PEL	0.1 mg/m3	
Silicon (CAS 7440-21-3)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.

US. OSHA Table Z-3 (29 CFR 1910.1000)

Components	Type	Value	Form
Carbon (CAS 7440-44-0)	TWA	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Aluminium (CAS 7429-90-5)	TWA	1 mg/m3	Respirable fraction.
Carbon (CAS 7440-44-0)	TWA	2 mg/m3	Respirable fraction.
Chromium (CAS 7440-47-3)	TWA	0.5 mg/m3	
Lead (CAS 7439-92-1)	TWA	0.05 mg/m3	
Nickel (CAS 7440-02-0)	TWA	1.5 mg/m3	Inhalable fraction.
Phosphorus (CAS 7723-14-0)	TWA	0.1 mg/m3	

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
Aluminium (CAS 7429-90-5)	TWA	5 mg/m3	Respirable.
		5 mg/m3	Welding fume or pyrophoric powder.
		10 mg/m3	Total
Carbon (CAS 7440-44-0)	TWA	2.5 mg/m3	Respirable.
Chromium (CAS 7440-47-3)	TWA	0.5 mg/m3	
Lead (CAS 7439-92-1)	TWA	0.05 mg/m3	
Manganese (CAS 7439-96-5)	STEL	3 mg/m3	Fume.
	TWA	1 mg/m3	Fume.
Nickel (CAS 7440-02-0)	TWA	0.015 mg/m3	

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
Phosphorus (CAS 7723-14-0)	TWA	0.1 mg/m3	
Silicon (CAS 7440-21-3)	TWA	5 mg/m3	Respirable.
		10 mg/m3	Total
Vanadium (CAS 7440-62-2)	STEL	3 mg/m3	
	TWA	1 mg/m3	

Biological limit values

ACGIH Biological Exposure Indices

Components	Value	Determinant	Specimen	Sampling Time
Lead (CAS 7439-92-1)	300 µg/l	Lead	Blood	*

* - For sampling details, please see the source document.

Exposure guidelines No exposure standards allocated.

Appropriate engineering controls Provide adequate ventilation. Observe Occupational Exposure Limits and minimize the risk of inhalation of dust. Keep melting/soldering temperatures as low as possible to minimize the generation of fume. Shower, hand and eye washing facilities near the workplace are recommended.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles). Wear a face shield when working with molten material.

Skin protection

Hand protection Wear protective gloves (i.e. latex, nitrile, neoprene).

Other Chemical resistant clothing is recommended.

Respiratory protection Use a respirator when local exhaust or ventilation is not adequate to keep exposures below the OEL. In a confined space a supplied respirator may be required. Selection and use of respiratory protective equipment should be in accordance with OSHA General Industry Standard 29 CFR 1910.134; or in Canada with CSA Standard Z94.4. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits.

Thermal hazards Heat resistant/insulated gloves and clothing are recommended when working with molten material.

General hygiene considerations Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance

Physical state Solid.

Form Solid.

Color Gray.

Odor Odorless.

Odor threshold Not available.

pH Not applicable.

Melting point/freezing point 2400 - 2800 °F (1315.56 - 1537.78 °C)

Initial boiling point and boiling range Not applicable.

Flash point Not applicable.

Evaporation rate Not available.

Flammability (solid, gas) Not available.

Upper/lower flammability or explosive limits

Flammability limit - lower (%) Not applicable.

Flammability limit - upper (%) Not applicable.

Explosive limit - lower (%) Not available.

Explosive limit - upper (%) Not available.

Vapor pressure	Not applicable.
Vapor density	Not applicable.
Relative density	7.5 - 8.5
Solubility(ies)	
Solubility (water)	Not soluble in water.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not applicable.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Percent volatile	0

10. Stability and reactivity

Reactivity	The product is non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Contact with incompatible materials. Avoid molten metal contact with water.
Incompatible materials	Acids. Bases. Strong oxidizing agents.
Hazardous decomposition products	Toxic metal oxides are emitted when heated above the melting point.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the mucous membranes and respiratory tract. Lung damage and possible pulmonary edema can result from dust exposure. Inhalation of fumes may cause a flu-like illness called metal fume fever.
Skin contact	Dust may irritate skin. Contact with molten material may cause thermal burns.
Eye contact	Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye.
Ingestion	Ingestion of dusts generated during working operations may cause nausea and vomiting.
Symptoms related to the physical, chemical and toxicological characteristics	Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye, mucous membranes and respiratory tract. Contact with molten material may cause thermal burns.

Information on toxicological effects

Acute toxicity	When heated, the vapors/fumes given off may cause respiratory tract irritation. High concentrations of freshly formed fumes/dusts of metal oxides can produce symptoms of metal fume fever.

Components	Species	Test Results
Aluminium (CAS 7429-90-5)		
Acute		
Inhalation		
LC50	Rat	> 0.888 mg/l, 4 Hours
Oral		
LD50	Rat	9 g/kg
Boron (CAS 7440-42-8)		
Acute		
Oral		
LD50	Rat	650 mg/kg

Components	Species	Test Results
Carbon (CAS 7440-44-0)		
Acute		
Inhalation		
LC50	Rat	> 2000 mg/m3, 4 hours
Iron (CAS 7439-89-6)		
Acute		
Inhalation		
LC50	Rat	> 100 mg/m3, 6 hours
LD50	Rat	> 5 mg/kg
Oral		
LD50	Rat	98.6 g/kg
Manganese (CAS 7439-96-5)		
Acute		
Inhalation		
LC50/LC90	Rat	> 1500 mg/kg
Oral		
LD50	Rat	9000 mg/kg
Nickel (CAS 7440-02-0)		
Acute		
Oral		
LD50	Rat	> 9000 mg/kg
Silicon (CAS 7440-21-3)		
Acute		
Oral		
LD50	Rat	3150 mg/kg
Sulfur (CAS 7704-34-9)		
Acute		
Dermal		
LD50	Rat	> 2000 mg/kg, 24 Hours
Inhalation		
LC50	Rat	> 5.43 g/m3, 4 Hours
Oral		
LD50	Rat	> 2200 mg/kg

Skin corrosion/irritation Dust may irritate skin.

Serious eye damage/eye irritation Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye.

Respiratory or skin sensitization

Respiratory sensitization No sensitizing effects known.

Skin sensitization Prolonged contact with metallic dust or fumes may cause an allergic skin reaction in sensitized individuals.

Germ cell mutagenicity No data available.

Carcinogenicity Suspected of causing cancer. The International Agency for Research on Cancer (IARC). The National Toxicology Program (NTP) and OSHA do not list steel products as carcinogens. Steel products contain alloying elements and/or residual elements that are suspected or confirmed human carcinogens (e.g. chromium, nickel). IARC identifies welding fumes as a group 2B carcinogen, a mixture that is possibly carcinogenic to humans. Welding fumes are difficult to classify because the composition and quantity are dependent upon the alloy being welded, electrodes used, and process.

IARC Monographs. Overall Evaluation of Carcinogenicity

Chromium (CAS 7440-47-3)	3 Not classifiable as to carcinogenicity to humans.
Lead (CAS 7439-92-1)	2B Possibly carcinogenic to humans.
Nickel (CAS 7440-02-0)	2B Possibly carcinogenic to humans.

NTP Report on Carcinogens

Lead (CAS 7439-92-1)	Reasonably Anticipated to be a Human Carcinogen.
Nickel (CAS 7440-02-0)	Reasonably Anticipated to be a Human Carcinogen.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Reproductive toxicity Suspected of damaging fertility or the unborn child.

Specific target organ toxicity - single exposure May cause irritation of respiratory tract.

Specific target organ toxicity - repeated exposure Causes damage to organs () through prolonged or repeated exposure.

Aspiration hazard Not relevant, due to the form of the product.

Chronic effects Prolonged and repeated overexposure to dust can lead to benign pneumoconiosis. Chronic exposure to breathing low levels of manganese dust or fume over a long period of time can result in “manganism,” a disease of the central nervous system similar to Parkinson’s Disease, gait impairment, muscle spasms and behavioral changes.

Further information Steel products may be coated with oil based products to prevent rust. Rust preventive oils are generally applied at customer request and usually contains severely hydrotreated light and heavy naphthenic oils. Prolonged contact with rust preventive oil may cause dermatitis.

12. Ecological information

Ecotoxicity Alloys in massive forms present a limited hazard for the environment.

Components		Species	Test Results
Phosphorus (CAS 7723-14-0)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	0.025 - 0.037 mg/l, 48 hours
Fish	LC50	Bluegill (Lepomis macrochirus)	0.002 - 0.006 mg/l, 96 hours
			0.001 - 0.004 mg/l, 96 hours

Persistence and degradability The product is not biodegradable.

Bioaccumulative potential No data available.

Mobility in soil Alloys in massive forms are not mobile in the environment.

Other adverse effects None expected.

13. Disposal considerations

Disposal instructions Dispose in accordance with all applicable regulations.

Local disposal regulations Dispose of in accordance with local regulations.

Hazardous waste code Not regulated.

Waste from residues / unused products Dispose of in accordance with local regulations. Scrapped material should be sent for refining to recover precious metal content. Solid metal and alloys in the form of particles may be reactive. Its hazardous characteristics, including fire and explosion, should be determined prior to disposal.

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

15. Regulatory information

US federal regulations

This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Lead (CAS 7439-92-1)	Reproductive toxicity Central nervous system Kidney Blood Acute toxicity

CERCLA Hazardous Substance List (40 CFR 302.4)

Chromium (CAS 7440-47-3)	LISTED
Lead (CAS 7439-92-1)	LISTED
Manganese (CAS 7439-96-5)	LISTED
Nickel (CAS 7440-02-0)	LISTED
Phosphorus (CAS 7723-14-0)	LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Chemical name	CAS number	Reportable quantity (pounds)	Threshold planning quantity (pounds)	Threshold planning quantity, lower value (pounds)	Threshold planning quantity, upper value (pounds)
Phosphorus	7723-14-0	1	100		

SARA 311/312 Hazardous chemical

Yes

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Manganese	7439-96-5	0-1.7
Nickel	7440-02-0	0-0.15
Lead	7439-92-1	0-0.01

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Chromium (CAS 7440-47-3)
Lead (CAS 7439-92-1)
Manganese (CAS 7439-96-5)
Nickel (CAS 7440-02-0)
Phosphorus (CAS 7723-14-0)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA)

Not regulated.

US state regulations

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

US. Massachusetts RTK - Substance List

Aluminium (CAS 7429-90-5)
Chromium (CAS 7440-47-3)
Lead (CAS 7439-92-1)
Manganese (CAS 7439-96-5)
Molybdenum (CAS 7439-98-7)
Nickel (CAS 7440-02-0)
Phosphorus (CAS 7723-14-0)
Silicon (CAS 7440-21-3)

Sulfur (CAS 7704-34-9)
Vanadium (CAS 7440-62-2)

US. New Jersey Worker and Community Right-to-Know Act

Aluminium (CAS 7429-90-5)
Boron (CAS 7440-42-8)
Carbon (CAS 7440-44-0)
Chromium (CAS 7440-47-3)
Lead (CAS 7439-92-1)
Manganese (CAS 7439-96-5)
Molybdenum (CAS 7439-98-7)
Nickel (CAS 7440-02-0)
Phosphorus (CAS 7723-14-0)
Silicon (CAS 7440-21-3)
Sulfur (CAS 7704-34-9)
Titanium (CAS 7440-32-6)
Vanadium (CAS 7440-62-2)

US. Pennsylvania Worker and Community Right-to-Know Law

Aluminium (CAS 7429-90-5)
Chromium (CAS 7440-47-3)
Lead (CAS 7439-92-1)
Manganese (CAS 7439-96-5)
Molybdenum (CAS 7439-98-7)
Nickel (CAS 7440-02-0)
Phosphorus (CAS 7723-14-0)
Silicon (CAS 7440-21-3)
Sulfur (CAS 7704-34-9)
Vanadium (CAS 7440-62-2)

US. Rhode Island RTK

Aluminium (CAS 7429-90-5)
Chromium (CAS 7440-47-3)
Lead (CAS 7439-92-1)
Manganese (CAS 7439-96-5)
Nickel (CAS 7440-02-0)
Phosphorus (CAS 7723-14-0)
Vanadium (CAS 7440-62-2)

US. California Proposition 65

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Lead (CAS 7439-92-1)
Nickel (CAS 7440-02-0)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 01-June-2015

Revision date	-
Version #	01
Further information	HMIS® is a registered trade and service mark of the NPCA.
HMIS® ratings	Health: 1* Flammability: 0 Physical hazard: 0
NFPA ratings	
References	ACGIH EPA: AQUIRE database NLM: Hazardous Substances Data Base US. IARC Monographs on Occupational Exposures to Chemical Agents HSDB® - Hazardous Substances Data Bank IARC Monographs. Overall Evaluation of Carcinogenicity National Toxicology Program (NTP) Report on Carcinogens ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices
Disclaimer	All information in this Material Safety Data Sheet is believed to be accurate and reliable. However, no guarantee or warranty of any kind is made with regard to the accuracy of information or the suitability of the recommendations contained herein. It is the user's responsibility to assess the safety and toxicity of this product under their own conditions of use and to comply with all applicable laws and regulations.