



SAFETY DATA SHEET

Issuing Date 09-Jun-2015

Revision Date 09-Jun-2015

Revision Number 0

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

GHS product identifier

Product Name High-Nickel Alloyed Stainless Steel grades and Nickel Base Alloys

Other means of identification

Synonyms 330, 353 MA, and Alloy 20. This includes all listed grades with letter prefixes and suffixes as well as PRODEC® suffix.

Recommended use of the chemical and restrictions on use

Recommended Use Solid stainless steel products, various forms, and uses

Uses advised against No information available

Supplier's details

| | | |
|--|--|--|
| Outokumpu Stainless Plate, LLC 549 W. St. Rd. 38 New Castle, IN 47362 Tel: 1-800-349-0023; 1-765-529-0120 | Outokumpu Stainless Pipe, LLC 241 West Clarke Street Wildwood, FL 34785 Tel: 1-800-731-7473; 1-352-748-1313 | Outokumpu Mexinox S.A de C.V Av. Industrias No.4100, Zona Industrial 1a. Sección, 78395, San Luis Potosí, México Tel: +52+444+826-5100 |
| Outokumpu Stainless Bar, LLC 3043 Crenshaw Parkway Richburg, SC 29729 Tel: 1-888-458-4600; 1-803-789-5383 | Outokumpu Stainless USA, LLC One ThyssenKrupp Dr. P.O. Box 13000 Calvert, AL 36513-13000 Tel: 1-251-829-3600 | Additional Information Contact: Tel: 1-800-349-0023 Web site: www.outokumpu.com |

Emergency telephone number

Emergency Telephone Number 765-529-0120

2. HAZARDS IDENTIFICATION

Classification

This chemical is not considered hazardous according to the OSHA Hazard Communication Standard 2012 (29 CFR 1910.1200). Solid metallic products are generally classified as "articles" and do not constitute hazardous materials in solid form. However, downstream use of the article could result in some hazardous elements contained in these products to be emitted under certain processing conditions such as but not limited to: burning, melting, cutting, sawing, brazing, grinding, machining, milling, and welding.

GHS Label elements, including precautionary statements

No labeling applicable

Hazard Not Otherwise Classified (HNOC)

Not applicable

Other information

No information available.

3. COMPOSITION/INFORMATION ON INGREDIENTS**Synonyms**

330, 353 MA, and Alloy 20. This includes all listed grades with letter prefixes and suffixes as well as PRODEC® suffix.

| Chemical Name | CAS-No | Weight % | Trade secret |
|---------------|-----------|----------|--------------|
| Iron | 7439-89-6 | Balance | * |
| Nickel | 7440-02-0 | 32-38 | * |
| Chromium | 7440-47-3 | 17-26 | * |
| Molybdenum | 7439-98-7 | 0-3 | * |
| Silicon | 7440-21-3 | 0.5-2 | * |
| Manganese | 7439-96-5 | 0-2 | * |
| Copper | 7440-50-8 | 0-0.6 | * |
| Cobalt | 7440-48-4 | 0-0.6 | * |
| Titanium | 7440-32-6 | 0-0.5 | * |

**The exact percentage (concentration) of composition has been withheld as a trade secret.*

4. FIRST AID MEASURES**Description of necessary first-aid measures****General Advice**

In its solid form stainless steel does not present an inhalation, absorption, or ingestion hazard. Grinding, polishing, abrasive blasting, hot rolling, hot forging, thermal cutting, or welding may produce stainless steel dust or fumes containing complex or mixed oxides (spinel) of its components. Metal dust particles may cause eye, skin and/or respiratory system irritation. The below information is for these instances.

Eye Contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

Skin Contact

Wash off immediately with soap and plenty of water. In the case of skin irritation or allergic reactions see a physician.

Inhalation

Move to fresh air. If breathing is difficult, give oxygen. Consult a physician.

Ingestion

Not an expected route of exposure. If swallowed: Get medical attention.

Most important symptoms/effects, acute and delayed**Most Important Symptoms/Effects**

During processing: Coughing and/ or wheezing. Difficulty in breathing. Irritation. May cause allergic skin reaction.

Indication of immediate medical attention and special treatment needed, if necessary**Notes to Physician**

May cause sensitization by inhalation and skin contact. Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media None

Specific Hazards Arising from the Chemical

Avoid dust formation. Dust can form an explosive mixture in air. May cause sensitization by inhalation and skin contact.

Explosion Data

Sensitivity to Mechanical Impact

None.

Sensitivity to Static Discharge

None

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal Precautions

Avoid dust formation. Avoid inhalation of dust. Ensure adequate ventilation. In case of insufficient ventilation wear suitable respiratory equipment. Use personal protective equipment. Avoid contact with skin, eyes and clothing.

Environmental Precautions

Environmental Precautions

Not applicable to steel in solid state. Follow applicable federal, state and local regulations

Methods and materials for containment and cleaning up

Methods for Containment

Prevent further leakage or spillage if safe to do so. Cover dust spill with plastic sheet or tarp to minimize spreading.

Methods for Cleaning Up

Take up mechanically and collect in suitable container for disposal. Avoid dust formation. Clean contaminated surface thoroughly.

7. HANDLING AND STORAGE

Precautions for safe handling

Handling

Handle in accordance with good industrial hygiene and safety practice. Avoid dust formation. Avoid breathing dust. Avoid contact with skin, eyes and clothing. Wear personal protective equipment. Do not eat, drink or smoke when using this product.

Conditions for safe storage, including any incompatibilities

Storage

Store in accordance with local regulations.

Incompatible Products

May react in contact with strong acids to release gaseous acid decomposition products, e.g. hydrogen, oxides of nitrogen. Use of strong oxidizers (high pH) on stainless steel may cause Cr(VI) compounds to form at ambient temperatures. Decomposition: Fumes generated during welding, brazing, or thermal cutting may contain: chromium compounds, including hexavalent chromium Cr(VI); nickel; manganese; iron; molybdenum; and silicon compounds.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

Exposure Guidelines

There are no occupational exposure limits for stainless steels. Occupational exposure limits apply to some components resulting from grinding, polishing, abrasive blasting, hot rolling, hot forging, thermal cutting, or welding which may produce stainless steel dust or fumes.

| Chemical Name | ACGIH TLV | OSHA PEL | NIOSH IDLH |
|-------------------------|--|--|--|
| Nickel 7440-02-0 | TWA: 1.5 mg/m ³ | TWA: 1 mg/m ³ (vacated) TWA: 1 mg/m ³ | IDLH: 10 mg/m ³ TWA: 0.015 mg/m ³ |
| Molybdenum 7439-98-7 | TWA: 10 mg/m ³ inhalable fraction TWA: 3 mg/m ³ respirable fraction | (vacated) TWA: 10 mg/m ³ | IDLH: 5000 mg/m ³ |
| Silicon 7440-21-3 | - | TWA: 15 mg/m ³ total dust TWA: 5 mg/m ³ respirable fraction (vacated) TWA: 10 mg/m ³ total dust (vacated) TWA: 5 mg/m ³ respirable fraction | TWA: 10 mg/m ³ total dust TWA: 5 mg/m ³ respirable dust |
| Manganese 7439-96-5 | TWA: 0.2 mg/m ³ | (vacated) TWA: 1 mg/m ³ fume (vacated) STEL: 3 mg/m ³ fume (vacated) Ceiling: 5 mg/m ³ fume Ceiling: 5 mg/m ³ fume | IDLH: 500 mg/m ³ TWA: 1 mg/m ³ fume STEL: 3 mg/m ³ |
| Copper 7440-50-8 | TWA: 0.2 mg/m ³ fume | TWA: 0.1 mg/m ³ fume TWA: 1 mg/m ³ dust and mist (vacated) TWA: 0.1 mg/m ³ Cu dust, fume, mist | IDLH: 100 mg/m ³ dust, fume and mist TWA: 1 mg/m ³ dust and mist TWA: 0.1 mg/m ³ fume |
| Cobalt 7440-48-4 | TWA: 0.02 mg/m ³ | TWA: 0.1 mg/m ³ dust and fume (vacated) TWA: 0.05 mg/m ³ dust and fume | IDLH: 20 mg/m ³ dust and fume TWA: 0.05 mg/m ³ dust and fume |

Appropriate engineering controls

Engineering Measures

Ensure adequate ventilation, especially in confined area (i.e. showers, eyewash stations, etc.).

Individual protection measures, such as personal protective equipment

Eye/Face Protection

When processing the metal alloy wear: Tightly fitting safety goggles.

Skin and Body Protection

When processing the metal alloy: Wear protective gloves/clothing.

Respiratory Protection

If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

| | | | |
|----------------|----------|----------------|---|
| Physical State | Solid | Appearance | Varying from dull very light grey, to shiny metallic light grey to bright mirror-finish |
| Odor | Odorless | Odor Threshold | No information available |

| Property | Values | Remarks/ - Method |
|-----------------------------|-----------------------------|-------------------|
| pH | No data available | None known |
| Melting Point/Range | 1370-1520 °C / 2498-2768 °F | None known |
| Boiling Point/Boiling Range | No data available | None known |
| Flash Point | No data available | None known |
| Evaporation rate | No data available | None known |

| | | |
|--|--------------------|------------|
| Flammability (solid, gas) | No data available | None known |
| Flammability Limits in Air | | |
| upper flammability limit | No data available | |
| lower flammability limit | No data available | |
| Vapor Pressure | No data available | None known |
| Vapor Density | No data available | None known |
| Relative Density | No data available | None known |
| Specific Gravity | No data available. | None known |
| Water Solubility | No data available | None known |
| Solubility in other solvents | No data available | None known |
| Partition coefficient: n-octanol/water | No data available | None known |
| Autoignition Temperature | No data available | None known |
| Decomposition Temperature | No data available | None known |
| Viscosity | No data available | None known |
| Flammable Properties | Not flammable | |
| Explosive Properties | No data available | |
| Oxidizing Properties | No data available | |

Other information

VOC Content (%) No data available

10. STABILITY AND REACTIVITY**Reactivity**

No data available.

Chemical stability

Stable under recommended storage conditions.

Possibility of hazardous reactions

None under normal processing.

Conditions to avoid

Dust formation.

Incompatible materials

May react in contact with strong acids to release gaseous acid decomposition products, e.g. hydrogen, oxides of nitrogen. Use of strong oxidizers (high pH) on stainless steel may cause Cr(VI) compounds to form at ambient temperatures. Decomposition: Fumes generated during welding, brazing, or thermal cutting may contain: chromium compounds, including hexavalent chromium Cr(VI); nickel; manganese; iron; molybdenum; and silicon compounds.

Hazardous decomposition products

None known based on information supplied.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information

In its solid form stainless steel does not present an inhalation, absorption, or ingestion hazard. Grinding, polishing, abrasive blasting, hot rolling, hot forging, thermal cutting, or welding may produce stainless steel dust or fumes containing complex or mixed oxides (spinels) of its components. Metal dust particles may cause eye, skin and/or respiratory system irritation. The below information is for these instances.

Inhalation

May cause irritation of respiratory tract. Inhalation of 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. May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Eye Contact

Contact with eyes may cause irritation.

Skin Contact

Contact with dust can cause mechanical irritation or drying of the skin. Repeated or prolonged skin contact may cause allergic reactions with susceptible persons.

Ingestion

May cause irritation

| Chemical Name | LD50 Oral | LD50 Dermal | LC50 Inhalation |
|---------------|----------------------|-------------|-----------------------|
| Iron | = 984 mg/kg (Rat) | - | - |
| Nickel | > 9000 mg/kg (Rat) | - | - |
| Silicon | = 3160 mg/kg (Rat) | - | - |
| Manganese | = 9 g/kg (Rat) | - | - |
| Cobalt | = 6170 mg/kg (Rat) | - | > 10 mg/L (Rat) 1 h |

Symptoms related to the physical, chemical and toxicological characteristics

Symptoms

No information available.

Delayed and immediate effects and also chronic effects from short and long term exposure

Sensitization

During processing: May cause sensitization by inhalation and skin contact

Mutagenic Effects

No information available.

Carcinogenicity

The table below indicates whether each agency has listed any ingredient as a carcinogen.

| Chemical Name | ACGIH | IARC | NTP | OSHA |
|---------------|-------|----------------------|------------------------|------|
| Nickel | | Group 2B Group 1 | Reasonably Anticipated | X |
| Chromium | | Group 3 | | |
| Cobalt | A3 | Group 2A Group 2B | | X |

Reproductive Toxicity

No information available.

STOT - single exposure

No information available.

STOT - repeated exposure

No information available.

Chronic Toxicity

Elevated temperature processing such as welding and plasma arc cutting may release hazardous fumes. Overexposure to metal fumes may cause pulmonary edema (fluid in the lungs) and methemoglobinemia. May also cause pulmonary fibrosis and lung cancer. Chronic exposure to manganese may cause impairment to the central nervous system including sluggishness, sleepiness, muscle weakness, loss of facial muscle control, edema, emotional disturbances, spastic gait, and falling.

Target Organ Effects

Respiratory system. Skin.

Aspiration Hazard

No information available.

Numerical measures of toxicity • - Product

The following values are calculated based on chapter 3.1 of the GHS document:

LD50 Oral 495 mg/kg; Acute toxicity estimate 7500

12. ECOLOGICAL INFORMATION

Ecotoxicity

The environmental impact of this product has not been fully investigated.

| Chemical Name | Toxicity to Algae | Toxicity to Fish | Toxicity to Microorganisms | Daphnia Magna (Water Flea) |
|---------------|--|--|----------------------------|--|
| Iron | - | LC50 96 h: = 0.56 mg/L semi-static (Cyprinus carpio) LC50 96 h: = 13.6 mg/L static (Morone saxatilis) | - | - |
| Nickel | EC50 96 h: 0.174 - 0.311 mg/L static (Pseudokirchneriella subcapitata) EC50 72 h: = 0.18 mg/L (Pseudokirchneriella subcapitata) | LC50 96 h: = 1.3 mg/L semi-static (Cyprinus carpio) LC50 96 h: = 10.4 mg/L static (Cyprinus carpio) LC50 96 h: > 100 mg/L (Brachydanio rerio) | - | EC50 48 h: = 1 mg/L Static (Daphnia magna) EC50 48 h: > 100 mg/L (Daphnia magna) |
| Cobalt | - | LC50 96 h: > 100 mg/L static (Brachydanio rerio) | - | - |
| Copper | EC50 96 h: 0.031 - 0.054 mg/L static (Pseudokirchneriella subcapitata) EC50 72 h: 0.0426 - 0.0535 mg/L static (Pseudokirchneriella subcapitata) | LC50 96 h: 0.0068 - 0.0156 mg/L (Pimephales promelas) LC50 96 h: < 0.3 mg/L static (Pimephales promelas) LC50 96 h: = 0.052 mg/L flow-through (Oncorhynchus mykiss) LC50 96 h: = 0.112 mg/L flow-through (Poecilia reticulata) LC50 96 h: = 0.2 mg/L flow-through (Pimephales promelas) LC50 96 h: = 0.3 mg/L semi-static (Cyprinus carpio) LC50 96 h: = 0.8 mg/L static (Cyprinus carpio) LC50 96 h: = 1.25 mg/L static (Lepomis macrochirus) | - | EC50 48 h: = 0.03 mg/L Static (Daphnia magna) |

Persistence and Degradability

No information available.

Bioaccumulation

No information available.

Other Adverse Effects

No information available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods

Recover or recycle if possible. Dispose of in accordance with federal, state, and local regulations

Contaminated Packaging

Dispose of in accordance with federal, state, and local regulations.

| Chemical Name | RCRA | RCRA - Basis for Listing | RCRA - D Series Wastes | RCRA - U Series Wastes |
|----------------------|---|---|---------------------------|------------------------|
| Nickel - 7440-02-0 | (hazardous constituent - no waste number) | Included in waste streams: F006, F039 | | |
| Chromium - 7440-47-3 | | Included in waste streams: F032, F034, F035, F037, F038, F039 | 5.0 mg/L regulatory level | |
| Chemical Name | | California Hazardous Waste | | |
| Nickel | | Toxic powder Ignitable powder | | |
| Chromium | | Toxic Corrosive Ignitable | | |
| Molybdenum | | Ignitable powder | | |

| | |
|-----------|----------------------------------|
| Manganese | Ignitable powder |
| Copper | Toxic |
| Cobalt | Toxic powder Ignitable powder |
| Titanium | Ignitable powder |

14. TRANSPORT INFORMATION

DOT Not regulated

15. REGULATORY INFORMATION

International Inventories

TSCA Complies
DSL Complies

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDL - Canadian Domestic Substances List/Non-Domestic Substances List

U.S. Federal Regulations

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372:

| Chemical Name | CAS-No | Weight % | SARA 313 - Threshold Values % |
|---------------|-----------|----------|-------------------------------|
| Nickel | 7440-02-0 | 32-38 | 0.1 |
| Chromium | 7440-47-3 | 17-26 | 1.0 |
| Manganese | 7439-96-5 | 0-2 | 1.0 |
| Cobalt | 7440-48-4 | 0-0.6 | 0.1 |

SARA 311/312 Hazard Categories

| | |
|-----------------------------------|----|
| Acute Health Hazard | No |
| Chronic Health Hazard | No |
| Fire Hazard | No |
| Sudden Release of Pressure Hazard | No |
| Reactive Hazard | No |

Clean Water Act

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42):

| Chemical Name | CWA - Reportable Quantities | CWA - Toxic Pollutants | CWA - Priority Pollutants | CWA - Hazardous Substances |
|---------------|-----------------------------|------------------------|---------------------------|----------------------------|
| Nickel | | X | X | |
| Copper | | X | X | |

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302):

| Chemical Name | Hazardous Substances RQs | Extremely Hazardous Substances RQs | RQ |
|---------------|--------------------------|------------------------------------|--|
| Nickel | 100 lb | | RQ 100 lb final RQ RQ 45.4 kg final RQ |
| Chromium | | | RQ 5000 lb final RQ RQ 2270 kg final RQ |
| Copper | 5000 lb | | RQ 5000 lb final RQ RQ 2270 kg final RQ |

U.S. State Regulations

California Proposition 65

This product contains the following Proposition 65 chemicals:

| Chemical Name | CAS-No | California Prop. 65 |
|---------------|-----------|---------------------|
| Nickel | 7440-02-0 | Carcinogen |
| Cobalt | 7440-48-4 | Carcinogen |

U.S. State Right-to-Know Regulations

| Chemical Name | New Jersey | Massachusetts | Pennsylvania | Illinois | Rhode Island |
|---------------|------------|---------------|--------------|----------|--------------|
| Nickel | X | X | X | X | X |
| Chromium | | X | | | X |
| Molybdenum | X | X | X | | X |
| Silicon | X | X | X | | X |
| Manganese | X | X | X | X | X |
| Cobalt | X | X | X | X | X |
| Titanium | X | | | | |

U.S. EPA Label Information

EPA Pesticide Registration Number Not applicable

16. OTHER INFORMATION

| | | | | |
|-------------|-----------------|----------------|-------------------|---------------------------------|
| NFPA | Health Hazard 0 | Flammability 0 | Instability 0 | Physical and Chemical Hazards - |
| HMIS | Health Hazard 0 | Flammability 0 | Physical Hazard 0 | Personal Protection X |

Prepared ByProduct Stewardship
23 British American Blvd.
Latham, NY 12110
1-800-572-6501**Issuing Date**

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Revision Note

Initial Release.

General Disclaimer

The information provided on this SDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of Safety Data Sheet