

### COMPANY INFORMATION

**COMPANY NAME:** ORTHO SPECIALTIES  
**COMPANY ADDRESS:** 3820 OHIO AVE - SUITE 15  
 ST. CHARLES, IL 60174  
**COMPANY PHONE:** 630-443-0225  
**COMPANY FAX:** 630-443-0224  
**COMPANY WEB ADDRESS:** www.orthospecialties.com

### 316 - BUCCAL TUBE MATERIAL

<b>DOCUMENT NUMBER:</b>	<b>SDS56</b>
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<b>REVISION:</b>	<b>REV. E</b>
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### 1 – PRODUCT IDENTIFICATION

**TRADE NAME:** 316  
**PRODUCT CLASS:** Iron Base Alloy  
**PRODUCT USE:** Orthodontic Wires Buccal Tubes

containing the component elements and breathing those fumes may present potentially significant health hazards. Extended (several years) exposure to iron dust or fume may result in signs of pneumoconiosis (i.e. siderosis). Physical examination of those exposed to iron dust have not indicated any disability.

**Emergency and First Aid Procedures:** If irritation occurs, flush eyes, wash skin, remove to fresh air, as applicable. Contact physician.

### 2–HAZARDOUS INGREDIENTS

Ingredient	CAS #	Nominal Chemistry Percent	TLV Mg/m3	PEL Mg/m3
Fe Iron	1309-37-1	60	5	10
** Cr Chromium	7440-47-3	18	0.5	1
** Ni Nickel	7440-02-0	14	1	1
Mo Molybdenum	7439-98-7	2.25	10	15
Mn Manganese	7439-96-5	2	Dust- 5 Fume- 1	5-ceiling

### 6–REACTIVITY DATA

Cast ingot is stable at ordinary temperatures, however, caution should be taken with acids, bases, and oxidizers. Molten metal will react violently with water.

\*\* Has been recognized as a suspect carcinogen by NTP and IARC. 4 – FIRST AID MEASURES

### 7–SPILL AND LEAK PROCEDURES

Solid ingot material will be recycled. Residue from cutting or grinding should be swept or vacuumed and placed in suitable containers for disposal by local, state, or federal waste disposal regulations.

### 3–PHYSICAL DATA

Boiling Point (oF): N/A  
Vapor Pressure (mm Hg.): N/A  
Vapor Density (Air = 1): N/A  
Solubility in Water: Insoluble  
Appearance and Odor: Metallic gray in color – no odor.  
Specific Gravity (H2O=1): Approx. 8  
Percent Volatile by Volume: N/A  
Evaporation Rate: N/A  
Melting Point (oF): Approx. 2700oF

### 8–SPECIAL PROTECTION INFORMATION

Respiratory Protection: When exposure limits are exceeded, use proper, approved respirator.  
Ventilation: Use a local exhaust when cutting, grinding, welding, or melting.  
Eye Protection and Protective Clothing: Should be used when cutting, grinding, welding, or melting.

### 4–FIRE AND EXPLOSION DATA

Flash Point (oF): N/A  
Flammable Limits: N/A  
Extinguishing Media: Use dry powder extinguishing agent.  
Fire and Explosion Hazard: 1) Metal powder dispersed in air may cause fire and explosion. 2) Molten metals can ignite combustibles. 3) Good house-keeping must be maintained.

### 9–SPECIAL PRECAUTIONS

Use good housekeeping practices to prevent accumulations of dust and to keep airborne dust concentrations at a minimum. Avoid breathing dust or fumes.

PEL/TLV exposures should be kept below recommendations by OSHA and ACGIH to insure proper health protection of worker.

### 5–HEALTH HAZARD DATA

Primary Routes of Entry:  
 Inhalation of dust or fume.  
 Under normal conditions, exposure to cast ingots presents few health hazards in itself. Thermal cutting and melting of ingots may produce fumes

### 10–SARA SECTION 313 SUPPLIERS NOTIFICATION

This product may contain the following chemicals which are subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right to Know Act of 1986 and of 40 CFR 372: Aluminum; Manganese; Chromium; Nickel; Cobalt; Vanadium; Copper.

Refer to the Hazardous Ingredients Section of this MSDS for the appropriate CAS numbers and percent by weight.

### 11–DISCLAIMER A

Although the information and recommendations in this data sheet are to the best of our knowledge correct, it is recommended that you make your own determination of the material's suitability for your purpose before you use it. The information contained in this data sheet has been reproduced from the manufacturer's data; the accuracy of this information is the responsibility of the manufacturer. ODP accepts no responsibility for damage of any nature resulting from the use of, or the reliance upon, this data sheet.

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### 304L & 316L STAINLESS STEEL

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### 1 – PRODUCT IDENTIFICATION

**Product Name:** Stainless Steel Mesh Diffusion-Bonded Woven Wire Mesh and Metal Foil Laminate.  
**Chemical Family:** Metals.  
**Product Form:** Sheets and Strips (0.008-0.031" thick x ass'd with 24" lengths).

### 2–HAZARDOUS INGREDIENTS

Ortho Specialties mesh pads are produced in AISI types 304L and 316L stainless steel. Therefore, the hazards, chemical and physical properties, and exposure limits as listed herein are the same as those of basic austenitic (nickel-bearing AISI 300 Series) stainless steels. The typical composition of these alloys is as follows:

Element	Symbol	CAS #	304L Content	316L Content
Carbon	C	7440-44-0	0.03% max	0.03% max
Chromium	Cr	7440-47-3	18-20% max	16-18%
Iron	Fe	7439-89-5	Balance	Balance
Manganese	Mn	7439-96-5	2% max	2% max
Molybdenum	Mo	7439-98-7	0.25% max	2-3%
Nickel	Ni	7440-02-0	8-10.5%	10-14%
Phosphorus	P	7723-14-0	0.045% max	0.045% max
Silicon	Si	7440-23-3	1% max	1% max
Sulfur	S	7704-34-9	0.03% max	0.03% max

Ortho Specialties mesh base material is composed of 316L stainless steel.

Exposure limits for the above elements, listed below in milligrams per cubic meter, are typically given for the respective elements in pure form, or in particular chemical compounds (cf. "form listed" in table below). Therefore such exposure limits may not necessarily be applicable to stainless steel products in alloy form. (Note: "N/L" indicates that exposure limits for the element are not listed in the applicable regulations.)

Element	OSHA PEL	Form Listed	ACGIH TLV	Form Listed
Carbon	N/L	N/L	N/L	N/L
Chromium	1.0	As Cr	0.5	As Salts
Iron	10	As Fumes	5	As Fumes
Manganese	5	As Mn	5 & 1	Dust & Fumes
Molybdenum	15	Insol. Cmpds.	10	Insol. Cmpds
Nickel	1.0	As Ni	1.0	As Ni
Phosphorus	0.2	As P	0.01	As P
Silicon	N/L	N/L	N/L	N/L
Sulfur	13	As SO2	5 As	SO2

### 3–PHYSICAL DATA

Product is provided in solid state stainless steel. The material is insoluble in water and will not evaporate or sublime at room temperature.

Melting range (solidus/liquidus, oF) is 2550/2650 for 316L stainless. Melting range is approximate and varies from heat to heat. Density 0.29 pounds per cubic inch. Appearance bright silvery color.

### 4–FIRE, EXPLOSION, AND REACTIVITY INFORMATION

Stainless steel products in solid state do not present a fire or explosion hazard.

### 5–HEALTH HAZARD INFORMATION

Stainless steel mesh in its original state does not normally present health hazards by inhalation or contact. There is some medical evidence that certain individuals suffer allergic reactions such as contact dermatitis to nickel and its alloys. Ingestion is hazardous due to the potential for internal tissue damage; in the event of ingestion, seek medical attention immediately.

Operations such as welding, burning, and brazing may produce hazardous metal fumes, and therefore proper safety precautions are required. Operations such as sawing, grinding, stamping, milling, or machining may produce fine metal grit or dust which may pose respiratory risks.

Typical effects of acute overexposure to metallic dusts and fumes include irritation of the eyes, nose, and throat. In addition, exposure to high concentrations of iron oxide dusts, manganese, copper, zinc, or lead fumes can result in "metal fume fever" with symptoms including metallic taste in the mouth, chills and fever, dryness and irritation in the throat. Symptoms usually last 12 to 48 hours. (Metal fume fever is most serious in cases of lead, cadmium, and zinc fumes, none of which is present in stainless steel).

Chronic overexposure to inhalation of high concentrations of metal fumes or dust of the following elements may lead to the condition indicated:

**Cr or Ni:** dermatitis, inflammation/ulceration of upper respiratory tract, possible cancer of nasal passages and lungs.

**Fe or its oxides:** pulmonary effect, siderosis.

**Manganese:** bronchitis, pneumonitis, loss of coordination.

**Molybdenum:** pain in joints, hand, knees and feet; morphological changes in liver, kidneys, and spleen; anemia, diarrhea, coma, deformity.

**Phosphorus:** necrosis of the mandible  
**Sulfur (as dioxide):** edema of the lungs.

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### 304L & 316L STAINLESS STEEL

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### 6 – EMERGENCY & FIRST AID PROCEDURES

In case of inhalation of airborne fumes and particulates, remove to fresh air, get medical attention. In case of eye contact with metal dusts, flush immediately with running water; get medical attention. In case of skin contact, if irritation develops, wash well with soap and water. If skin condition persists, get medical attention.

### 7 – INDUSTRIAL HYGIENE CONTROL & PRECAUTIONARY MEASURES

**Respiratory:** NIOSH approved respirators should be used to avoid excessive inhalation of fumes and particulates in any situation where such exposure might occur. Ventilation should be provided during welding, brazing, burning, sawing or grinding if fumes are likely to be released.

**Eye:** Safety glasses should be used when sawing, burning, welding, grinding, or machining. Additional clothing and protective equipment may be needed depending on the operations being performed on the material. Gloves should be worn when handling the material due to the possibility of sharp edges.

### 8 – ENVIRONMENTAL PROTECTION INFORMATION

Not applicable to stainless steel in the solid state.

### 9 – SPECIAL PRECAUTIONS

Foil mesh is provided in a visually clean condition. However, dust, particulate, oils, or other foreign contaminants may be present in macroscopic or microscopic form. If the foil mesh is to be used in any critical application, including dentistry or orthodonture, medicine, or food and drug processing, the material may require additional cleaning procedures such as ultrasonic cleaning, chemical cleaning, electropolishing, washing, etc.

### 10 – D.O.T SHIPPING REQUIREMENTS

None applicable.

### 11 – DISCLAIMER

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### ALLOY 18-550 - BRAZE FOR BASES

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### 1 – PRODUCT IDENTIFICATION

Product: Alloy 18-550  
Product Code: 18-550  
Chemical Family: Precious metal brazing alloy  
Chemical Formula: Alloy of silver, palladium, copper, and nickel.

**WARNING:** This product contains a chemical(s) known to the State of California to cause cancer.

### 2–HAZARDOUS CHEMICAL COMPONENTS

#### Component – Copper:

CAS Number: 7440-50-8  
OSHA PELs: 0.1 mg/m3 (fume). 1 mg/m3 TWA (dusts and mists)  
Percent of Mixture: 29.0 to 31.0  
ACGIH TLVs: 0.2 mg/m3 TWA (fume); 1 mg/m3 TWA (dusts and mists)

#### Component – Nickel:

CAS Number: 7440-02-0  
OSHA PEL: 1 mg/m3 TWA  
Percent of Mixture: 4.5 to 5.5  
ACGIH TLV: 1 mg/m3 TWA

#### Component – Palladium:

CAS Number: 7440-05-3  
 No OSHA PEL(s) or ACGIH TLV(s)  
Percent of Mixture: 9.0 to 11.0

#### Component: Silver:

CAS Number: 7440-22-4  
OSHA PEL: 0.01 mg/m3 TWA  
Percent of Mixture: 54.0 to 56.0  
ACGIH TLV: 0.1 mg/m3 TWA (metal)

### 3–PHYSICAL DATA

Vapor Pressure: Not applicable  
Vapor Density (Air=1): Not applicable  
Solubility in Water: Insoluble  
Percent Volatiles: Not applicable  
Appearance: Odorless white metal in form of wire, rod, strip, grain, or atomized powder.

### 4–FIRE FIGHTING AND EXPLOSION DATA

#### Fire and Explosion Hazards:

This product may react vigorously or ignite when exposed to incompatible materials (see Section #6). If present in a fire or explosion, it may emit fumes of the constituent metals and/or metal oxides.

Extinguishing Media: Use dry chemical. Do not use water.

#### Special Fire Fighting Instructions:

If fighting a fire in which this product is present, wear a self-contained breathing apparatus with full facepiece operated in pressure-demand or other positive pressure mode.

### 5–EXPOSURE EFFECTS AND FIRST AID

Route of Exposure - Inhalation: Inhalation of the components of this product is not known to present a significant risk to health when used according to instructions and with appropriate protective measures (see Section 8). Inhalation of components has been reported to cause one or more of the following symptoms and/or effects upon excessively high or prolonged exposure:

- SILVER: Chronic exposure may produce argyria, a permanent blue-gray discoloration of the skin, eyes, mucous membranes, and respiratory tract.
- COPPER: Acute exposure may cause respiratory tract irritation, fever, muscle ache, chills, cough, weakness, and a metallic taste. Chronic exposure may damage the liver, kidney, spleen, pancreas, and brain.
- NICKEL: Acute exposure to nickel may cause headache, nausea, vertigo, asthma, and pulmonary edema. Chronic exposure may increase the risk of cancer to the nasopharynx, lungs, prostate, and kidney.
- PALLADIUM: No significant acute or chronic effects are known from inhalation exposure to palladium metal.

First Aid – Inhalation: If signs and symptoms of toxicity are observed, remove subject from area, administer oxygen, and seek medical attention. Keep the subject warm and at rest. Perform artificial respiration if breathing has stopped.

Route of Exposure – Skin: Skin contact with this product, particularly in finely-divided forms, may cause irritation, discoloration, and /or allergic reaction.

First Aid – Skin: Remove contaminated clothing. Wash affected area with large quantities of water for at least five minutes. Seek medical attention if necessary.

Route of Exposure – Eyes: Eye contact with finely-divided forms of the product may produce localized irritation, argyria, and/or conjunctivitis.

First Aid – Eyes: Flush affected areas with water for at least fifteen minutes. Seek medical assistance if necessary.

Route of Exposure – Ingestion: Ingestion of this product in finely-divided forms may cause gastrointestinal irritation, abdominal pain, and cramps. Long-term chronic ingestion may damage the liver, kidneys, and musculoskeletal and central nervous systems.

First Aid – Ingestion: If subject is conscious, induce vomiting. If unconscious or convulsive, seek immediate medical assistance.

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#### Miscellaneous Toxicological Information:

**Carcinogenicity:** Nickel is classified as a potential human carcinogen by the following organizations (with respective subclassifications): (1) IARC (Group 2B); NTP (Group 2B). None of the other components of this product are classified as potential or demonstrated carcinogens by the IARC, NTP, or OSHA.

**Genetic/Reproductive Effects:** Nickel has produced fetotoxic and teratogenic effects in animal studies, and mutagenic responses in mammalian cell cultures.

**Health Conditions Aggravated by Exposure:** Pre-existing pulmonary diseases (e.g., bronchitis, asthma) may be aggravated by inhalation exposure, particularly as fume. Chronic exposure by inhalation and/or ingestion may aggravate pre-existing diseases of the liver, kidneys, gastrointestinal system, and nervous system.

### 6-REACTIVITY AND POLYMERIZATION

**Conditions to Avoid (Stability):** Stable at room temperature. Silver and copper can form unstable acetylides upon contact with acetylene gas.

**Incompatible Materials:** Strong oxidizers; Se; Te; Mg; chlorates; NH<sub>3</sub>; HNO<sub>3</sub>; azides, ethanol; ethylene imine; C<sub>1</sub>F<sub>3</sub>; inorganic and organic peroxides; peroxyformic acid; chlorine and fluorine; permonosulfuric acid; CrO<sub>3</sub>; Mn and Ca chlorides; CS<sub>2</sub>; hydrazine mononitrate; nitrobenzene; Fe(CO)<sub>5</sub>; seleninyl bromide.

**Hazardous Decomposition Products:** Heating to elevated temperatures may liberate metal/metal oxide fume. Hazardous polymerization will not occur.

### 7-SPILL, LEAK, & DISPOSAL PROCEDURES

**Steps to be Taken in the Event of Spills, Leaks, or Release:** If a finely-divided form of product is spilled, clean up spillage so as to minimize dispersion of dust. Wet sweeping or vacuuming using HEPA filtration are recommended.

**Waste Disposal Methods:** Consult the manufacturer for disposition of unused or unusable product.

#### SARA Title III Notifications and Information:

**SARA Title III Hazard Classes:** Acute Health Hazard; Chronic Health Hazard.

**SARA Title III – Section 313 Supplier Notification:** This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372:

CAS#	Chemical Name	Percent of Mixture
7440-50-8	Copper	29.0 - 31.0
7440-02-0	Nickel	4.5 - 5.5
7440-22-4	Silver	54.0 - 56.0

This information must be included on all MSDS that are copied and distributed for this material.

### ALLOY 18-550 - BRAZE FOR BASES

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### 8-SPECIAL PROTECTIVE MEASURES

**Ventilation:** Use appropriate ventilation (e.g., dilution, local exhaust) adequate to maintain concentrations of all components and their decomposition byproducts to within their respective OSHA PELs or other applicable standards.

**Eye Protection:** Wear eye protection (safety glasses, goggles) adequate to prevent eye contact with finely-divided forms of product and eye injury from the hazards of brazing. Plastic-frame spectacles with side shields and filter lenses (shade #3 or #4) are recommended.

**Skin Protection:** Wear appropriate protective gloves and clothing to prevent skin injuries from the hazards of brazing and/or for prolonged or repeated contact with finely-divided forms of product. Avoid flammable fabrics.

**Respiratory Protection:** If an exposure level exceeds an OSHA PEL(s) or other applicable standard, use a NIOSH-approved respirator having a configuration (class, type of facepiece, filter media, assigned protection factor, etc.) appropriate to the concentration of the contaminant(s) generated. For guidance on selection and use of respiratory protection, consult American National Standard Z88.2. (ANSI, New York, NY 10036 USA).

**Work/Hygienic Practices:** To avoid ingestion, wash hands and face before eating, drinking, or using cosmetics or tobacco.

### 9-SPECIAL PRECAUTIONS – STORAGE & HANDLING

**Storage & Handling Conditions:** Do not store in proximity to incompatible materials (see Section #6)

### 10-SHIPPING INFORMATION

**Hazard Class:** Shipment not controlled by USDOT/IATA/ICAO/IMO regulations.

### 11-DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained therein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).