



SAFETY DATA SHEET

Complies with OSHA Standard 29 CFR 910.1200

Nitinol
Nickel Titanium
Alloy Archwires,
Coil Springs,
and Separators

1. Product and Company Identification

Product Name: Nitinol Alloy Archwire and Spring Products
Manufacturer Name: Phoenix Orthodontics
Manufacturer Address: 3250 Palladian Village Drive
Marietta, GA 30066
Business Phone: 770-643-8896
Emergency Phone: 770-643-8896
Revision Date: December 22, 2019

2. Hazards Identification

GHS (Globally Harmonized System) Classification: In its present form, the material is not classified and is not considered hazardous according to the OSHA Hazard Communication Standard 2012 (29 CFR 1910.1200). Metal products are generally classified as "articles" and do not constitute hazardous materials in solid form.

3. Composition/Information on Ingredients

CHEMICAL	CAS/EC NUMBER	WT%
Nickel, Ni	7440-02-0 231-111-4	45-57
Titanium, Ti	7440-32-6 231-142-3	42-55

Components may be regulated, have exposure limits, and/or other regulatory requirements.

4. First Aid Measures

Eye Contact: Gently flush particulate with copious amounts of water for 15 minutes to ensure that no articles remain in eye. Avoid rubbing that might scratch the eye. Seek medical attention if irritation persists.

Skin Contact: If irritation develops, wash skin thoroughly with soap and water. Seek medical attention if necessary.

Ingestion: If significant amounts of dust are ingested, consult a physician. Do not induce vomiting.

Most Important Symptoms/Effects (acute and delayed): Can cause allergic skin reactions. Can cause gastrointestinal effects if swallowed. During processing (cutting, milling, grinding, melting, or welding), emitted byproducts can cause irritations, difficulty in breathing, coughing, and wheezing.

Indication of Immediate Medical Attention and Special Treatment: Notes to physician: May cause sensitization by skin contact or inhalation. Treat symptomatically.

5. Fire Fighting Measures

Not flammable in the product form as distributed, but processing can create dust and/or finely divided particles that are flammable.

Suitable Extinguishing Media: Treat as a Class D Combustible metal fire or smother with sodium chloride salt. Do not use water on molten metals as an explosive characteristic is caused by the hydrogen and steam generated by the reaction of water with the burning material.

Specific Hazards Arising From the Material: Intense heat. Very fine, high surface area material resulting from grinding, buffing, polishing, or similar processes of this product may ignite spontaneously at room temperature and/or form combustible dust-air mixtures. Keep particles away from all ignition sources, including heat, sparks, and flames. Prevent dust accumulations to minimize combustible dust hazard. See "Section 2. Hazards Identification."

Hazardous Combustion Products: Toxic metal and metallic oxide fumes may be evolved from fires involving finely divided alloy. Particle size and dispersion in air determine reactivity.

Special Firefighting Instructions: Firefighters should wear self-contained MSHA/NIOSH-approved (or equivalent) breathing apparatus and full protective gear.

6. Accidental Release

Environmental Precautions: Prevent entry of material into soil, waterways, drains, and sewers. Prevent exposure of material to weather (snow, rain) to avoid leaching dissolved metals and/or residuals into the environment. See "Section 12. Ecological Information" for additional information.

Cleanup: Collect by vacuuming, by sweeping or by wet mopping to prevent spreading of dust. Avoid inhalation of dusts. Do not allow entry to sewers.

7. Handling and Storage

Handling: Handle in accordance with good industrial hygiene and safety practice. Do not get in eyes. Avoid contact with skin and clothing for long periods of time. See "Section 8. Exposure Controls/Personal Protection" for recommended personal protective equipment. Wash and rinse after handling and before eating, drinking, chewing gum, or using tobacco. Remove and wash contaminated clothing before reuse, particularly after processing.

8. Exposure Controls/Personal Protection

CHEMICAL	CAS NUMBER	OSHA PEL 8hr TWA (mg/m ³)	NIOSH (mg/m ³)	
			REL 8hr TWA	IDLH
Nickel, Ni & Ni inorganic compounds	7440-02-0	Metal & Insoluble = 1 Soluble = 0.1 (proposed)	0.015	10
Titanium, Ti	7440-32-6	—	—	—

Exposure Guidelines: Follow all applicable exposure limits. Keep formation of airborne particulate and fumes to a minimum. Exposure controls and personal protection can vary depending on process and/or application.

Engineering Controls: Local and/or general exhaust ventilation should be used to keep worker exposure below applicable exposure limits during welding, burning, grinding, melting, sawing, brazing, buffing, polishing, or other similar heat-generating processes which may generate airborne contaminants. Prevent accumulation of small particulate that might ignite. Collect chips and grinds for recycling where feasible.

Personal Protective Equipment: Processes performed on material should be evaluated (risk assessment) to establish need for suitable equipment to protect worker from exposure to hazards above stated limits.

Skin & Body Protection: Suitable for protection against physical injury and skin contact during handling and processing. For example, fire resistant clothing may be appropriate during hot work with product. Cut-resistant gloves and/or protective clothing may be appropriate when sharp surfaces are present. Chemical-resistant, impervious gloves may be appropriate if material is wet.

Eye/Face Protection: Safety glasses or goggles should be worn when there is a probability of airborne particles and/or elevated levels of dust or fume.

Respiratory Protection: Use NIOSH/MSHA approved respirators when particulates, fumes, and/or gasses are generated and if exposure limits are exceeded or irritation is experienced.

9. Physical and Chemical Properties

Physical State:	Solid
Color:	Metallic gray or silver gray
Appearance:	Various product forms (wire, billet, rod, cores, ingot, etc.)
Odor:	Odorless
Solubility in Water:	Not water soluble.
pH:	Not applicable.
Flash Point:	Not applicable
Boiling Point: *(°C @ 760 mm Hg):	Not applicable
Melting Point (varies with composition)	1310°C (2390°F) for binary nitinol
Decomposition Temp (°C):	Not applicable
Evaporation Rate:	Not applicable
Vapor Density (air=1, @20°C):	Not applicable
Vapor Pressure (mmHG @20°C):	Not applicable
Density (varies with composition):	6.449 g/cm ³ for binary nitinol
Percent Volatile Organic Compound (VOC):	None

10. Stability and Reactivity

Stability: Stable under ordinary conditions of storage and transport.

Conditions to Avoid: Dust formation and dust accumulation during various processing.

Hazardous Decomposition Products: Reacts with mineral acid, inorganic acids and oxidizers to form hydrogen gas (flammable) and to form dissolved metal ions that are to be prohibited from waterways. Melting and/or burning can produce toxic metal fumes.

Hazardous Polymerization: Will not occur.

Incompatible Materials: May react with acids like hydrofluoric acid and oxidizers. Reaction will vary with specific alloy composition when in the presence of chlorine, bromine, halocarbons, carbon tetrachloride, and Freon when heated above 200-deg.

11. Toxicological Information

Likely Routes of Exposure:

Eyes: High Concentration
Skin: Prolonged skin contact with dust may cause skin irritation to sensitive individuals.
Inhalation: Inhalation of metal particulate or elemental oxide fumes generated during welding, burning, grinding, machining, melting, sawing, brazing, buffing, polishing, or sweeping may pose acute or chronic health effects.

Specific Health Effects and Other Hazards of Individual Components

Nickel (Ni) & Nickel Compounds: Short-term exposure may cause mechanical irritation, and the inhalation of fumes may cause pneumonitis. Long-term exposure may cause skin sensitization, asthma, and/or affect lungs. Nickel oxide fumes form at high temperatures and exposure can cause symptoms of asthma after a few hours have passed and physical effort initiated. Nickel compounds produce a variety of toxic effects. Soluble nickel salts cause contact dermatitis in sensitized individuals and eye irritation. Asthmatic lung disease has been reported among nickel-plating workers. Relatively short durations cause pathological changes in the lungs of experimental animals. Nickel and nickel compounds are potential carcinogens. Nickel refining and specific compounds are considered respiratory carcinogens to humans. The American Conference on Governmental Industrial Hygienists recommends that nickel compounds be differentiated according to solubility for their carcinogenic effects.

Titanium (Ti): A mild pulmonary irritant generally regarded as a nuisance dust.

12. Ecological Information

Environmental Ecotoxicity: No data available on this material in its solid state, however, individual components of the material have been found to be toxic to the environment.

Physical: No information found.

Persistence and Degradability: No data available

Bio accumulative Potential: No data available

Mobility in Soil: No data available

Other Adverse Effects: Dissolved metals can be dangerous to drinking water aquifer even in small quantities.

Ecotoxicity Effects listed below by individual component.

CHEMICAL	AQUATIC PLANTS	FISH	MICRO ORGANISMS	OTHER (Crustacea, Water Flea)
Nickel, Ni	EC50 96 h: 0.174-0.311 mg/L (Pseudokirchneriella subcapitata) EC50 72 h: = .018 mg/L (Pseudokirchneriella subcapitata) NOEC/EC10 values range from 12.3µg/l for Scenedesmus accuminatus to 425 µg/l for Pseudokirchneriella subcapitata.	LC50 96 h: = 0.56 mg/L semi-static (Cyprinus carpio) LC50 96 h: = 13.6 mg/L (Morone saxatilis) The 96th LC50s values range from 0.5 mg Ni/L for Pimephales promelas to 320 mg Ni/L for Brachydanio rerio.	- The 30 min EC50 of nickel for activated sludge was 33mg Ni/L. EC50 Freshwater Algae 72hr- 0.18mg/l	C50 48 h: =1 mg/L Static (Daphnia magna) EC50 48 h: > 100 mg/L (Daphnia magna) The 48h LC50s values range from 0.013 mg Ni/L for Ceriodaphnia dubia to 4970 mg Ni/L for Daphnia magna.
Titanium	The 72 h EC50 of titanium dioxide to Pseudokirchneriella subcapitata was 61 mg of TiO2/L.	The 96 h LC50 of titanium dioxide to Cyprinodon variegatus >10,000 mg of TiO2/L. The 96 h LC50 of titanium dioxide to Pimephales promelas > 1000 mg of TiO2/L.	The 3 h EC50 of titanium dioxide for activated sludge > 1000 mg/L.	The 48 h EC50 of titanium dioxide to Daphnia Magna > 1000 mg of TiO2/L.

13. Disposal Considerations

Waste Disposal Methods: Recycle when possible. When disposed of as a waste, it would be considered hazardous waste when chromium constituent is present. Wastes must be tested using methods described in 40 CFR Part 261. It is the generator's responsibility to determine if the waste meets applicable definitions of hazardous wastes. Dispose of waste material according to Local, State, Federal and Provincial Environmental Regulations.

Packaging Disposal: Dispose of containers in compliance with local, state, and federal regulations. When possible, use metal containers and recycle along with metal material.

14. Transport Information

SHIPPING INFORMATION	AS MATERIAL PRODUCT OR RECYCLABLE	AS DISPOSED WASTE, IT COULD BECOME (when chromium present):
Regulated	Not regulated by DOT or RCRA	Regulated by DOT and RCRA

15. Regulatory Information

SARA Section 313: This product 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 (Toxic Chemical Release Reporting): None.

SARA 311/312 Hazard Categories

Acute Health Hazard	No
Chronic Health Hazard	No
Fire Hazard	Yes
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

CWA (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): None.

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): None.

The information provided in this safety data sheet 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 guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered 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 materials or in any process, unless specified in the text.