

I. PRODUCT INFORMATION

Nickel Titanium Wire: 'NITINOL 55"

Chemical Name: Nickel-Base Alloy

Chemical Family: Metal Alloy

Trade Name and Composition: Nitinol. 55% Nickel, balance Titanium Trace Elements <500 ppm

II. HAZARDOUS INGREDIENTS

The terms "hazardous materials" as used within this MSDS should be interpreted as defined by, and in accordance with, the OSHA Hazard Communication Standard (29 CFR Part 2920, 1200) including Appendices, Lists, References, etc., all of which are hereby incorporated by reference.

No permissible exposure limits (PEL) or threshold values (TLV) exist for Nickel base alloys. Values shown are applicable to component elements.

CAS NO.	ELEMENT	PEL (OSHA) Mg/M	TLV (Mg/M)
7440-02-0	NI	1.0	1.0
13463-67-7	TI	15.0	5.0

III. PHYSICAL DATA

Boiling Point: 5000 F

Melting Point: 2390 F

Specific Gravity: .234 lbs/in

Vapor Density: N/A

Appearance and Odor: Bar, rod, wire, sheet. All solid and odorless.

IV. FIRE AND EXPLOSION DATA

Nitinol alloys in the form shipped are not considered combustible. During subsequent processing (cutting, welding, grinding, etc.) the generation of dust in high concentration may present fire and explosion hazards.

V. HEALTH HAZARD INFORMATION

We do not consider nitinol alloys in the form sold to constitute a physical hazard or a health hazard. Subsequent operations such as abrading, melting, welding, cutting or processing in any

other fashion may produce potentially hazardous dust or fumes which can be inhaled, swallowed or come into contact with skin or eyes.

Primary route of entry:

Inhalation
consult physician.
Eye Contact
particulate, get medical attention.
Skin Contact
well with soap and water.
Ingestion
material have been ingested.

Emergency first aid:

Remove to fresh air, if condition continues,
Flush well with running water to remove
Brush off excess dust. Wash area
Seek medical help if large quantities of

Effects of exposure: No toxic effects would be expected from exposure to the solid form of nitinol. Prolonged, repeated exposure to the fumes or dust generated during heating, cutting, abrading, or welding may or may not cause adverse health effects associated with the listed limits established in 20 CFR Subpart Z. (See Section II)

Nickel is listed in the National Toxicology Program's "Annual Report on Carcinogens" and the International Agency for Research on Cancer (IRAC) "monographs" as potentially carcinogenic. However, it should be noted that recent epidemiological study published by IRAC found no increased rates among specialty steel workers.

Allergic Warning: This product should not be used in treating individuals with allergic reactions or sensitivity to Nickel or Chromium.

Exposure Limits: Section II lists specific ingredients and exposure limits. Important: Determine actual exposure by industrial hygiene monitoring.

POSSIBLE SIGNS AND SYMPTOMS OF EXPOSURE TO DUST, WELD FUME AND GAS:

SHORT TERM EXPOSURE: Metallic taste, nausea, tightness of chest, fever, irritation of eyes, nose, throat and skin; loss of consciousness/death due to welding gases or lack of oxygen.

LONG TERM EXPOSURE: There are no adverse effects from the product in its solid form. We believe that there are no reliable scientific studies which show that workers exposed to operations upon nitinol alloys suffer increased incidence of lung cancer or other disease because of their exposure to the form of nickel in our products.

VI. REACTIVITY DATA:

STABILITY:

Nitinol alloys are stable.

CONDITIONS TO AVOID:

Avoid generation of airborne dust which presents moderate fire and explosion hazard.

INCOMPATIBILITY: (Materials to Avoid)

Acids, bases and oxidizer. Hydrogen and poisonous fumes may develop. Molten metal will react violently with water.

VII. SPILL OR LEAK PROCEDURE

Steps to be taken in case material is leaked or spilled: Fine material should be swept or vacuumed. Avoid using compressed air to maneuver spills or leaks of dusty material to avoid eye contamination.

Waste handling and disposal method: Dispose of in accordance with applicable federal, state, and local regulations.

VIII. SPECIAL PROTECTION INFORMATION

Nitinol alloys in the form shipped require no special protection for handling. For specific processing the following should be observed:

VENTILATION REQUIREMENTS: General-Recommended (to keep airborne concentration of dust and fume below ACGIH RLV's) Local: As required. Use in well vented areas for abrasive saw operations.

PERSONAL PROTECTIVE EQUIPMENT:

Respiratory Protection: If fumes, misting or dust condition occurs in TLV as indicated in Section II is exceeded, provide NIOSH approved respirators.

Eye Protection: recommend approved safety glasses for machining operations and face shields for all abrasive saw and grinding operations.

Gloves: Leather, cotton or rubber gloves are recommended when gloves are used.

IX. SPECIAL PRECAUTIONS:

Use good housekeeping practices to prevent accumulation of dust and to keep airborne dust at a minimum.

X. DEFINITIONS

MSDS	Material Safety Data Sheets
OSHA	Occupational Safety and Health Act
PEL	Personal Exposure Limit
TLV	Threshold Limit Value
N/A	Not Applicable
NTP	National Toxicology Program
ACGIH	American Conference of Governmental Industrial Hygienists
NIOSH	National Institute for Occupational Safety and Health

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