

## MATERIAL SAFETY DATA SHEET

### SECTION 1 – PRODUCT IDENTIFICATION

Product Name: **Nickel-Chromium-Aluminum Alloy (77/18/5) Powder**  
 Product Item: 2572243  
 Product Code: HA 7243  
  
 Supplier: **HAI Advanced Material Specialists, Inc.**  
**1688 Sierra Madre Circle**  
**Placentia, CA 92870**  
**(714)-414-0575**  
  
 Emergency Contact: 888-255-3924  
 Chemical Family: Metal Alloy  
 Formula: Ni-Cr-Al  
 Molecular Weight:

### SECTION 2 – HAZARDOUS INGREDIENTS

IMPORTANT! This section covers the material from which these products are manufactured. Dust and gases produced when spraying with normal use of these products are covered in Section 5.

Material or Component	CAS #	Concentration	OSHA PEL	ACGIH TLV	Other Limits *
Nickel	7440-02-0	50.0-80.0%	1.0 mg/m <sup>3</sup>	.05 mg/m <sup>3</sup>	NE
Chromium	7440-47-3	30.0 -50.0 %	1 mg/m <sup>3</sup>	0.5 mg/m <sup>3</sup>	NE
Aluminum	7429-90-5	0.0-5.0%	10 mg/m <sup>3</sup>	15 mg/m <sup>3</sup>	5 mg/m <sup>3</sup> resp
Material or Component	RTECS #	OSHA STEL	OSHA CEIL	ACGIH STEL	ACGIH CEIL
Nickel	QR5950000	No data	No data	No data	No data
Chromium	GB4200000	No data	No data	No data	No data
Aluminum	BD0330000	No data	No data	No data	No data

#### US EPA SARA TITLE III

Material or Component	CAS Number	Sec. 302 (EHS)	Sec. 304 RQ	Sec. 313 (TRI)
Nickel	7440-02-0	No	Yes 100 LB	Yes
Chromium	7440-47-3	No	Yes 5000 LB	Yes
Aluminum	7429-90-5	No	No	Yes

### SECTION 3 – PHYSICAL/CHEMICAL CHARACTERISTICS

Physical States:  Gas  Liquid  Solid  
 Melting Point: 1,500 – 2,000°C  
 Boiling Point: No data

<u>Specific gravity (water=1):</u>	8.91
<u>Vapor pressure (mmHg):</u>	Heavier than air
<u>Vapor Density (Air=1):</u>	No data
<u>Evaporation rate (Butylacetate=1):</u>	No data
<u>Solubility in water:</u>	Insoluble
<u>Percent volatile (vol.):</u>	No data
<u>Corrosion Rate:</u>	No data
<u>Appearance and odor:</u>	Fine metallic powder, grey color, no odor.
<u>Other:</u>	None

#### SECTION 4 – FIRE AND EXPLOSION HAZARD DATA

<u>Flash point:</u>	N/A	Method Used: Unknown
<u>Auto ignition temp.:</u>	N/A	
<u>Flammable limits:</u>	N/A	
<u>Explosive Limits:</u>	LEL: N/A	UEL: N/A
<u>Extinguishing Media:</u>	Carbon Dioxide, Foam, Type D. Use suitable extinguishing medias for surrounding materials and type of fire.	
<u>Special fire fighting procedures:</u>	Firefighters should wear full face, self-contained breathing apparatus with full protective clothing. Avoid contact with skin and eyes, or inhalation as fumes from fire are hazardous. To extinguish fire gently cover with extinguishing agent, allow to cool and gradually burn itself out.	
<u>Unusual fire and explosion hazards:</u>	<p><u>Nickel:</u> Nickel reacts with strong acids and can form flammable and explosive hydrogen gas. If nickel is in contact with sulfur there may be an evolution of heat. Nickel reacts violently with the following: fluorine, ammonium nitrate, hydrazine, ammonia, (H<sub>2</sub>+dioxane), performic acid, phosphorus, selenium, sulfur and (Ti+KClO<sub>3</sub>). Powders may ignite spontaneously in air</p> <p><u>Chromium:</u> Ignites and is potentially explosive in atmospheres of carbon dioxide. Chromium reacts violently or explosively when heated with ammonium nitrate and bromine pentafluoride. Chromium has an incandescent reaction with nitrogen oxide or sulfur dioxide.</p> <p><u>Aluminum:</u> Dust is moderately flammable/explosive by heat, flame or chemical reaction with powerful oxidizers. May ignite on contact with vapors of AsCl<sub>3</sub>, SCl<sub>2</sub>, Se<sub>2</sub>Cl<sub>2</sub>, PCl<sub>5</sub>; heating with barium peroxide; contact with O<sub>2</sub> mixtures with picric acid+water after a delayed period; exothermic reaction with water+iron powder which emits hydrogen gas; and spontaneously ignites in CS<sub>2</sub> vapors. May ignite and react violently with mixtures of sodium peroxide and O<sub>2</sub>+H<sub>2</sub>O; on contact with halogens and interhalogens. May react violently with hydrochloric acid, hydrogen chloride gas and disulfur dibromide; non-metals phosphorus, sulfur and selenium; with sulfur, Sb or As when heated; and potential violent reaction with sodium, acetylid. May have a violent or explosive reaction when heated with metal oxides, oxosalts, some halocarbons, sulfide or hot copper oxide worked with an iron or steel wool. May have an explosive reaction with sodium sulfate above 800C in a powdered form with KClO<sub>4</sub>+Ba(NO<sub>3</sub>)<sub>2</sub>+KNO<sub>3</sub>+H<sub>2</sub>O and Ba(NO<sub>3</sub>)<sub>2</sub>+KNO<sub>3</sub>+sulfur+vegetable adhesives+H<sub>2</sub>O after delayed period; powder forms sensitive explosive mixture with oxidants; mixtures with powdered AgCl, NH<sub>4</sub>, NO<sub>3</sub>, or NH<sub>4</sub>NO<sub>3</sub>+Ca(NO<sub>3</sub>)<sub>2</sub>+formahide+H<sub>2</sub>O; mixtures with ammonium peroxodisulfate+water; and potential explosive reaction with CCl<sub>4</sub> during ball milling operations.</p>	

#### SECTION 5 – REACTIVITY DATA

<u>Stability:</u>	Unstable [ ]	Stable [ X ]
<u>Conditions to avoid - Instability:</u>	N/A	

Incompatibility – Materials to avoid:

Nickel: Oxidizing agents, sulfur compounds, hydrogen and oxygen, magnesium silicate, methanol, organic solvents, aluminum, aluminum chloride, ethylene, p-dioxane, strong acids, wood and other combustibles.

Chromium: Strong oxidizing agents, ammonium nitrite, bromine pentafluoride and carbon dioxide.

Aluminum: Water, oxidizing agents, acids, acid chlorines, harsh alkalis and halogenated compounds.

Hazardous decomposition products:

Nickel: Nickel carbonyl, oxides of nitrogen, hydrogen gas.

Aluminum: Hydrogen gas.

Hazardous polymerization:

Will occur [ ] Will not occur [ X ]

Conditions to avoid – Hazardous polymerization:

None

Product corrosive:

Yes [ ] No [ X ]

## SECTION 6 – HEALTH HAZARD DATA

### Health Hazards (Acute and Chronic)

To the best of our knowledge the chemical, physical and toxicological properties of nickel-chromium-aluminum alloy have not been thoroughly investigated and recorded.

**NICKEL:** Confirmed carcinogen with experimental carcinogenic, neoplastic, tumorigenic and teratogenic data. Poison by ingestion, intratracheal, intraperitoneal, subcutaneous and intravenous routes. An experimental teratogenic. Ingestion of soluble salts causes nausea, vomiting and diarrhea. Hypersensitivity to nickel is common and can cause allergic contact dermatitis, pulmonary asthma, conjunctivitis and inflammatory reactions around nickel containing medical implants and prosthesis. (Sax, Dangerous Properties of industrial Materials, eight edition)

**CHROMIUM:** Confirmed human carcinogen with experimental tumorigenic data. Human poison by ingestion with gastrointestinal effects. (Sax, Dangerous Properties of Industrial Materials)

**ALUMINUM:** Aluminum compounds have many commercial uses and are commonly found in industry. Many of these materials are active chemically and thus exhibit dangerous toxic reactive properties. Inhalation of fine aluminum oxide particles is associated with Shriver's disease. (Sax, Dangerous Properties of industrial Materials, eight edition)

Inhalation: Acute: Nickel may cause irritation to the nose throat and respiratory tract. May also cause pulmonary asthma. Pulmonary fibrosis has also been known to occur as a result of inhaling finely divided aluminum powder.

Chronic: Nickel may cause interstitial pneumonitis, hair and skin discoloration, bronchitis, lung damage, or laryngitis. Chromium may cause histologic fibrosis of lungs, nasal and/or lung cancer.

Ingestion: Acute: Ingestion of Nickel is poisonous. Ingesting large doses of Nickel may cause intestinal disorders, convulsions and asphyxia. Chromium may cause gastrointestinal effects.

Chronic: May cause nickel toxicity.

Skin: Acute: Nickel may cause irritation of skin.

Chronic: Nickel may cause skin to develop allergic dermatitis, and/or eczematous dermatitis, or to become sensitive.

Eye: Acute: May cause irritation of the eye.

Chronic: Nickel may cause conjunctivitis.

Target Organs: Nickel may target the skin, lungs, and nasal cavities. Chromium may affect the respiratory system.

Carcinogenicity: NTP? [ X ] ARC Monographs? [ X ] OSHA Regulated? [ X ]

### Carcinogenicity / other Information:

#### Nickel Other Toxicity Data

otr-ham:kdy 400 mg/L orl-rat TDLo: 158 mg/kg (MGN):TER

otr-ham:emb 5 umol/L acu-rat TDLo: 3000 mg/kg/6W-I:ETA

ims-rat TDLo: 56 mg/kg:CAR par-rat TDLo: 40 mg/kg/52W-I:ETA

imp-rat TDLo: 250 mg/kg:CAR ims-mus TDLo: 200mg/kg:NEO  
imp-rbt TDLo: 165 mg/kg/2Y-I:NEO,TER orl-rat LDLo: 5 g/kg  
itr-rat LDLo: 12mg/kg ivn-mus LDLo: 50 mg/kg  
ivn-dog LDLo: 10mg/kg scu-rat LDLo: 12500 ug/kg  
ipr-rbt LDLo: 7 mg/kg scu-rbt LDLo: 7500 ug/kg  
orl-gpg LDLo: 5mg/kg

**Chromium other Toxicity Data**

ivn-rat TDLo: 2160 ug/kg/6W-I:ETA  
imp-rat TDLo: 1200 ug/kg/6WI TFX:ETA  
orl-hmn LDLo: 71 mg/kg:GIT  
imp-rbt TDLo: 75 mg/kg: ETA

**Aluminum Other Toxicity Data**

None recorded

**Recommended Exposure Limits** See "Section II"

**LD 50 / LC 50** See "Carcinogenicity / other Information"

**Signs and Symptoms of Exposure**

Inhalation: May cause red, dry or sore nose and throat. Coughing and shortness of breath may also occur.  
Ingestion: May cause gastritis, convulsions, asphyxia, giddiness, nausea, diarrhea and vomiting. Nickel toxicity may cause: gastroenteritis; nervous symptoms such as tremor, chorea-like movements and paralysis occur prior to death, which occurs mostly from heart failure.  
Skin: May cause redness, itching, swelling, burning and ulcers.  
Eye: May cause redness, itching and watering.

**Medical Conditions Generally Aggravated by Exposure**

Pre-existing respiratory disorders, pulmonary functions, asthma and skin disorders.

**Emergency and First Aid Procedures**

Inhalation: If inhalation occurs, move person to fresh air. If breathing is difficult, provide oxygen and seek medical attention.  
Ingestion: If ingestion occurs, give victim 1-2 glasses of milk, induce vomiting, and seek medical attention immediately. Induce vomiting only if person is conscious.  
Skin: If contact with skin occurs; remove any contaminated clothing, and wash affected skin area with soap and water. If symptoms persist, seek medical attention.  
Eye: If contact with eyes occurs, thoroughly flush eyes with water for at least 15 minutes. If symptoms persist, seek medical attention.

**SECTION 7 - PRECAUTIONS FOR SAFE HANDLING AND USE/DISPOSAL**

**Steps to be Taken in Case Material is Released or Spilled**

Wear protective clothing to prevent contact with skin. Use goggles and NISH approved respirators to avoid contact with eyes and reduce inhalation. During clean up avoid stirring up dust, vacuum up a spill using a HEPA air filter and place in a closed container for proper disposal.

**Waste Disposal Method**

Place material in a sealed container. Dispose of material according to local, state and federal regulations, material is considered hazardous in some states.

**Hazard Label Information**

Store in cool, dry place.  
Store in tightly sealed container.  
Wash thoroughly after handling.

**Precautions to be Taken in Handling**

Prevent contact with high heat or acids.

**Precautions to be Taken in Storing**

Store in dry cool place, and be sure container is sealed closed.

**Other Precautions**

None

**SECTION 8 - CONTROL MEASURES**

**Protective Equipment Summary - Hazard Label Information:**

NIOSH approved respirator

Impervious gloves

Safety glasses

Protective clothing to prevent contact with skin

**Respiratory Equipment (Specify Type)**

NIOSH – approved dust-mist-vapor exchange cartridge respirator

**Eye Protection**

Safety glasses/chemical goggles

**Protective Gloves**

Rubber gloves

**Other Protective Clothing**

Protective clothing, to reduce skin exposure

**Ventilation**

Local exhaust, minimum face velocity of 60 f.p.m, to maintain concentration at or below PEL, TLV

Other: None

**Work/Hygienic/Maintenance Practices**

Maintain a clean work area, free of tobacco and food. Wash thoroughly after use and before eating, drinking or smoking.

**SECTION 9 – Transport Information**

**U.S. Department of Transportation (DOT) regulations - 49 Code of Federal Regulations (CFR)**

NON-BULK (shipped in packages less than or equal to 400 kg gross weight):

**Shipping Name: UN 3077, Environmentally Hazardous Substance Solid, n.o.s., Class 9, III**

**Marking and Labeling Packages:**

- Text: "Environmentally Hazardous Substance, Solid, n.o.s. UN 3077 RQ (contains nickel)"
- Label: Class 9
- List Consignor or Consignee's name and address

**Placarding:**

- Not required for domestic non-bulk shipments of Class 9 materials [49 CFR 172.504(f)(9)]. Hazardous substances are not regulated internationally so it would never be necessary to placard a non-bulk shipment.

BULK (shipped in packages greater than 400 kg gross weight):

**Shipping Name: UN 3077, Environmentally Hazardous Substance Solid, n.o.s., Class 9, III**

**Marking and Labeling Packages:**

Intermediate bulk container (IBC) packages must show the following markings and labels on 2 opposing sides if IBC capacity is > 450 L.

- Text: "Environmentally Hazardous Substance, Solid, n.o.s. UN 3077 RQ (contains nickel)"
- Label: Class 9 and UN Number Marking 3077 (orange panel) or Class 9 placard with the UN Number 3077.
- List Consignor or Consignee's name and address

**SECTION 10 – OTHER**

Control of Substances Hazardous to Health Regulations  
EH40 Occupational Exposure Limits

Maximum Exposure Limit: NE  
Occupational Exposure Standard: NE

HAI Advanced Material Specialists, Inc. requests the users of this product to study this Material Safety Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify its employees, agents, and contractors of the information on this MSDS and any product hazard and safety information, (2) furnish this same information to each of its customers for the product, and (3) request such customers to notify their employees and customers for the product of the product hazards and safety information.

**Company Policy or Disclaimer**

The above information is accurate to the best of our knowledge. However, since data, safety standards, and government regulations are subject to change, and the conditions of handling and use or misuse are beyond our control, HAI MAKES NO WARRANTY, EITHER EXPRESSED NOR IMPLIED, WITH RESPECT TO THE COMPLETENESS OR CONTINUING ACCURACY OF THE INFORMATION CONTAINED HEREIN, AND DISCLAIMS ALL LIABILITY FOR RELIANCE THEREON. Users should satisfy themselves that they have all current data relevant to their particular use.

Abbreviations used: N/A=Not Applicable NE: Not Established