



MATERIAL SAFETY DATA SHEET

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SECTION I PRODUCT IDENTIFICATION
RESISTANCE ALLOYS

SECTION II HAZARDOUS INGREDIENTS
Defined by OSHA 29 CFR 1910.1200

Element	CAS No.	PEL-TWA	STEL	Element	CAS No.	PEL-TWA	STEL
Nickel	7440-02-0	1	N	Silicon	7440-21-3	15D	N
Chromium	7440-47-3	0.5	N	Aluminum	7429-90-5	15D, 5F	N
Iron	1309-37-1	10F	N	Copper	7440-50-8	1D, 0.1F	N
Manganese	7439-96-5	5C, 5F	N	Cobalt	7440-48-4	0.1D, 0.1F	N

LEGEND: **PEL** Permissible Exposure Limits (mg/m³).
TWA Time Weighted Average (mg/m³), the transitional **PELS** are 8 hour TWA's.
STEL Short Term Exposure Limit (mg/m³) duration is for 15 minutes.
C Ceiling Limit (mg/m³). **D** - Dust (mg/m³).
F Fume (mg/m³). **N** - Not available.

Trade Name and Nominal Compositions (Expressed in %)

Trade Name	Alloy Designation	Ni	Cr	Fe	Mn	Si	Al	Cu	Co
Chromel-A	111	77	20	1		1			
Chromel-C	113	59	16	23		1			
Cb Stabilized Chromel-A	119	76	19	1		1		1	
Chromel 30	130	68	30	1		1			
Copel Strip	157	43			1			55	
Constantan Strip	158	43			1			55	
Copel	166	43			2			55	
030 Ohm Alloy	230	2						98	
060 Ohm Alloy	260	6						94	
090 Ohm Alloy	290	10						90	
180 Ohm Alloy	380	23						77	
Hoskins Alloy 750	750		15	80			4		
Hoskins Alloy 815	815		23	70		1	5		
Chromel-D	824	35	21	42		1			
Chromel-AA	827	68	20	8		2			1
Iron-Chrome-Aluminum	875		23	70			6		
875 Powder Metallurgy	877		23	70			6		
70/30, Ni Fe	881	70		30					



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SECTION III PHYSICAL DATA

All materials produced are solid rod, wire, strip or ribbon.

SECTION IV FIRE AND EXPLOSION DATA

Non-flammable, although sparks from grinding or welding may ignite flammable or combustible materials.

SECTION V REACTIVITY INFORMATION

The following list is meant to be a guide in determining the potential reaction products formed during grinding or welding of alloys with these elements. These reactions cannot be classified simply, they can vary depending on the particular application, atmospheres, and coatings used.

Aluminum	Metal oxides or fumes.	Manganese	Metal, tetrahydride.
Chromium	As chromates.	Molybdenum	Metal, dust or fumes.
Cobalt	Metal, dust or fumes.	Nickel	Metal oxides, dust or fumes.
Copper	Metal, dust or fumes.	Silicon	Tetrahydroxide
Iron	Metal, dust or fumes.	Tungsten	Metal, dust or fumes.

SECTION VI HEALTH HAZARD INFORMATION

This product poses no health hazard in the solid form. However, grinding powder or welding fumes generated from this product may pose a potential health hazard. OSHA has determined that the potential effects of overexposure resulting from the welding or grinding of this product are as follows.

Aggravation: Some workers may experience discomfort at concentrations below the permissible exposure limits and others may be affected by a pre-existing condition or other occupational illness because of the wide variation in individual susceptibilities.

Primary Route of Entry: Fumes, gases and dust can be a health hazard through inhalation. Skin sensitivity may also be noted upon contact.

Acute Exposure: Irritation to the nose, eyes, throat, or skin, nausea, tightness of chest, or slight discomfort such as dizziness.

Chronic Exposure: Watering of the eyes, headaches, difficulty in breathing, coughing, chest pains, and in severe cases lung disease, lung fibrosis, pneumoconiosis, or neurological damage.

Nickel and chromium are considered potential human carcinogens under OSHA (29CFR 1910.1200). The studies forming the basis for this classification were from operations other than respiratory cancer problems due to nickel and chromium. Nevertheless, exposures must be maintained below the levels specified in Sections II. Cobalt is considered an animal carcinogen. The agent is carcinogenic in experimental animals at relatively high dose which are not considered relevant to worker exposure.

First Aid: Inhalation: Move to fresh air; **Skin:** Wash affected area with soap and water; **Eyes:** Immediately wash with large amounts of water, wash for at least 15 minutes; **Ingestion:** Seek medical attention. In all cases, seek medical attention for first aid.



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SECTION VII SPILL OR LEAK PROCEDURE

Grinding dusts, welding fume and chemical cleaning solution generated from this material must be disposed of in accordance with proper regulating agencies.

SECTION VIII SPECIAL PROTECTION INFORMATION

Respiratory Protection: Required when exposed to levels that exceed those established by OSHA when grinding or welding. Use only NIOSH approved respirators.

Ventilation: Required when the exposure levels exceed those established by OSHA when grinding or welding.

Eye Protection and Protective Clothing: Protect yourself and others. Use only NIOSH approved gloves, face shields and protective clothing where required.

SECTION IX SPECIAL PRECAUTIONS

Important: Practice proper industrial hygiene to insure that the use of this material does not generate grinding dusts or welding fumes in excess of OSHA limits. Consult the Federal Register, 29CFR 1920.1200 for further explanation of terms and abbreviations used in this material safety data sheet.

SECTION X SARA TITLE III (Section 313, Toxic Chemicals)

Notification: The alloy products listed in Section II of this Material Safety Data Sheet contain toxic chemicals subject to the reporting of Section 313 of **Title III** of the Superfund Amendments and Reauthorization ACT of 1986 and 40CFR Part 372 of the Federal Register. However, if this material is considered an "**Article**" as defined by 40CFR 372.3 and 372.38 (b), it may be exempt from reporting.

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