

MATERIAL SAFETY DATA SHEET

IMPHY, S.A.

SECTION I - Identification

Manufacturer: IMPHY, S.A.
Acieres d'Imphy
58160 Imphy
FRANCE

U.S.A. Subsidiary

Sales and Distribution: UGINE STAINLESS & ALLOYS, INC.
2005 South Easton Road, Suite 208
Doylestown, PA 18901
Telephone: (215) 345-5200
Contact: Julie Ringwood

Product Identification

- Alloy: Invar
- Nominal Composition (% by weight):

Ni	36.00
Cr	0.25 max
Co	0.50 max
Fe	Balance

UGINE STAINLESS & ALLOYS, INC. makes no warranty with respect to information contained in this M.S.D.S. and relinquishes all liability from reliance thereon.

SECTION II - Hazardous Ingredients for Invar

Substance	CAS #	ACGIH TLVs			OSHA PELs			NIOSH RELs			Carcinogenicity Category
		TWA	STEL/CEIL (C)	TWA	STEL/CEIL (C)	TWA	STEL/CEIL (C)	TWA	STEL/CEIL (C)		
Ni	7440-02-0	1.5 I	0	1.0	0	0	0	0.015	0	IARC-2B, MAK-1 NIOSH-Ca, NTP-R TLV-A5	
Cr	7440-47-3	0.5	0	1.0	0	0	0	0.5	0	IARC-3 TLV-A4	
Fe – oxide dust & fume	1309-37-1	5.0	0	10.0	0	0	0	5.0	0	IARC-3 TVL-A4	
Co – fume & dust	7440-48-4	0.02	0	0.1*	0	0	0	0.05*	0	IARC-2B MAK-2* TLV-A3 *- Cobalt as inspirable dusts/aerosols	

NOTE: PEL/TWA data based on solid, metallic form, unless otherwise indicated.

SECTION III - Physical Data

<i>Boiling Point</i>	:	N/A
<i>Melting Point</i>	:	2400° to 2800° Fahrenheit
<i>Vapor Pressure</i>	:	N/A
<i>Vapor Density</i>	:	N/A
<i>Solubility in Water</i>	:	N/A
<i>Specific Gravity</i>	:	7.5 to 8.5
<i>Percent Volatile by Volume</i>	:	N/A
<i>Evaporation Rate</i>	:	N/A
<i>Appearance and Odor</i>	:	Solid metal, odorless

SECTION IV - Fire and Explosion Hazard Data

None. Product is a metallic solid in wire, rod, bar, strip, sheet, plate or disc form.

SECTION V - Health Hazard Data

Specialty metals, in their various forms, as delivered, are not known to present any health hazards. Welding, grinding, cutting, stamping, abrading, or any other manufacturing method creating a dust, fume or oxide may cause hazardous levels of certain elements, as addressed in SECTION II. In such cases, extra precautions appropriate to the operation and industry safety standards should be taken (see SECTION VIII for more details)

Listed below are certain critical effects (TLV Basis) which apply to hazardous ingredients found in alloys supplied. Please refer to SECTION II for a list of potential hazardous ingredients found in the subject alloy(s).

<i>Chromium</i>	:	Irritation; dermatitis.
<i>Cobalt</i>	:	Asthma; lung; CVS
<i>Copper</i>	:	Irritation; GI; metal fume fever
<i>Iron</i>	:	Pneumoconiosis
<i>Manganese</i>	:	CNS (manganism); lung; reproductive
<i>Molybdenum</i>	:	Irritation
<i>Nickel</i>	:	Dermatitis; pneumoconiosis; kidney; Cancer (lung); irritation
<i>Silicon</i>	:	Lung
<i>Titanium</i>	:	(Dioxide) Lung.
<i>Vanadium</i>	:	(Pentoxide Dust & Fume) Irritation; lung.

Primary routes of entry:

Exposure occurs generally through inhalation of fumes and dust created during certain manufacturing operations. Certain elements, however, may be hazardous through direct skin and/or eye contact. Ingestion, while highly unlikely, could also be harmful in the case of certain elements.

Emergency and first-aid procedures:

Utilize standard First-Aid procedures as normally administered for situations resulting from day-to-day operation.

Examples:

<i>Inhalation</i>	:	Move individual to fresh air. Consult physician.
<i>Skin</i>	:	Wash immediately with water and mild antiseptic detergent. Consult physician.
<i>Eye</i>	:	Flush with water. Consult physician.
<i>Ingestion</i>	:	Highly unlikely. Consult physician.

SECTION VI - Reactivity Data

<i>Stability</i>	:	Stable
<i>Incompatibility</i>	:	N/A
<i>Hazardous Decomposition</i>	:	N/A
<i>Hazardous Polymerization</i>	:	N/A

SECTION VII - Spill or Leak Procedures

Not applicable.

SECTION VIII - Special Protection Information

<i>Respiratory Protection</i>	:	In manufacturing or handling procedures creating dust or fumes in excess of the PEL/TLV levels given in SECTION II, NIOSH-approved respirators should
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- be worn to limit unnecessary inhalation of potentially hazardous dust particles or fumes.
- Skin and Eye Protection* : Protective clothing, gloves and glasses should be worn as warranted by the manufacturing operation.
- Ventilation* : In manufacturing or handling procedures creating dust or fumes in excess of the PEL/TLV levels given in SECTION II, exhaust systems should be utilized to keep potentially harmful dust particles or fumes below PEL/TLV levels stated in SECTION II.
- Protective Equipment* : As warranted by accepted safety standards pertinent to your warehouse/manufacturing operation. Special attention should be given to respirator protection, proper ventilation and protection against skin and eye irritation, through the use of protective clothing, gloves and glasses.

SECTION IX - Special Precautions / Additional Information

- Special Precautions* : None, other than those indicated in SECTION VIII.
- Additional information* : During welding, precautions should be taken for airborne contaminants and noxious gases that may originate from the welding process or from components of the welding rod. Of special concern are silica or silicates, or both; fluorides; copper; manganese; carbon monoxide and nitrogen oxides. Arc and sparks generated when welding with this product could be a source of ignition for combustible and flammable materials.

REFERENCES

- Code of Federal Regulations, Title 29, Part 1910.1000, Subpart Z, “*Toxic and Hazardous Substances*,” Rev. July 1, 1990.
- Code of Federal Regulations, Title 29, Part 1910.12000, “*Hazard Communication*.”
- Code of Federal Regulations, Title 29, Appendices B and C to Part 1900.1200. “*Hazard Determination (Mandatory)*” and “*Information Sources (Advisory)*.”
- Guide to Occupational Exposure Values - 2000. Compiled by the American Conference of Governmental Industrial Hygienists, 2000.
- 1999 Threshold Limit Values and Biological Exposure Indices. (American Conference of Governmental Industrial Hygienists)., 1999.