Safety Data Sheet (SDS)

According to Regulation (EC) No 1907/2006 (REACH)

Section 1: Identification of the Substance/Mixture and the Company/Undertaking

1.1. Product Name: Inconnel 600
Synonyms: Ni(72)Cr(17)Fe(10)Mn(1)wt%

1.2. Intended Use of the Product

A tasteless, odorless, solid metal in the form of sheet, bar, plate, tubing, strip, block, and billet. The alloy identification, or trade name, is located on all shippers, invoices, and packing slips accompanying this shipment. The percentage of each hazardous ingredient is listed on the certification accompanying each shipment.

1.3. Name, Address, and Telephone of the Responsible Party

Distributor:

Materials Science International, Inc.
1660 Georgesville Road
Columbus, OH 43228-3620, USA
Phn# 1-614-870-0400
Fax# 1-614-878-6000

1.4. Chemtrec: (800)424-9300 or Poison Center: (800)562-8236

Section 2: Hazards Identification

This product, in the form that it is sold, does not constitute a physical or a health hazard. Welding, cutting, melting, grinding, or any processing that causes the release of dust or fumes may cause some of the ingredients to change to a form which could affect exposed workers. Please refer to the original manufacturer, producing mill, or a physician, for the information indicating the symptoms, and first aid requirements when using these materials.

Exposure to the dust, fume or particulate of these materials may present significant health hazards. Exposure to dust or fume may cause irritation of the eyes, skin and respiratory tract. Fine particulates dispersed in air may present an explosion hazard.

Section 3: Composition / Information on Ingredient

ELEMENT	CAS NO	ELEMENT	CAS NO	ELEMENT	CAS NO
Aluminum (Al)	7429-90-5	Copper (Cu)	7440-50-8	Selenium (Se)	7782-49-2
Carbon (C)	7440-44-0	Iron (Fe)	7439-89-6	Silicon Si)	7440-21-3
Chromium (Cr)	7440-47-3	Manganese (Mn)	7439-96-5	Titanium (Ti)	7440-32-6
Cobalt (Co)	7440-48-4	Molybdenum (Mo)	7439-98-7	Tungsten (W)	7440-33-7
Columbium (Cb) or (Nb)	7440-03-1	Nickel (Ni)	7440-02-0	Vanadium (V)	7440-62-2

Full text of H-phrases: see section 16

More than one of the ranges of concentration prescribed by Controlled Products Regulations has been used where necessary due to varying composition.

Section 4: First Aid Measures

Description of First Aid Measures

General: If exposed or concerned: Get medical advice/attention. Never give anything by mouth to an unconscious person.

Inhalation: When symptoms occur: go into open air and ventilate suspected area. Keep at rest and in a position comfortable for breathing. Obtain medical attention if breathing difficulty persists.

Skin Contact: Cool skin rapidly with cold water after contact with molten product. Removal of solidified molten material from skin requires medical assistance. Remove contaminated clothing. Drench affected area with water for at least 15 minutes. Wash with plenty of soap and water. Wash contaminated clothing before reuse. Obtain medical attention if irritation persists.

Eye Contact: Removal of solidified molten material from the eyes requires medical assistance. Immediately rinse with water for a prolonged period (at least 15 minutes) while holding the eyelids wide open. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention if irritation develops or persists.

Ingestion: Rinse mouth. Do NOT induce vomiting. Call a POISON CENTER/doctor/physician if you feel unwell.

Eyes: Flush particles from eyes with clean water for at least 15 minutes. If irritation persists or burn develops, seek medical attention.

Ingestion: If metallic particles are swallowed, seek medical assistance.

Advice to physician: Treat symptomatically

Section 5: Fire / Fighting Measures

5.1. Extinguishing Media
Suitable Extinguishing Media: Use extinguishing media appropriate for surrounding fire. Dry sand; Class D Extinguishing Agent (for metal powder fires).

Unsuitable Extinguishing Media: Do not use a heavy water stream. Use of heavy stream of water may spread fire. Do not use water when molten material is involved, may react violently or explosively on contact with water.

5.2. Special Hazards Arising From the Substance or Mixture

5.3. Advice for Firefighters Precautionary Measures Fire: Under fire conditions, hazardous fumes will be present.

Firefighting Instructions: Exercise caution when fighting any chemical fire.
Protection During Firefighting: Do not enter fire area without proper protective equipment, including respiratory protection.

Hazardous Combustion Products: Oxides of tin. Oxides of nickel. Oxides of copper. Chromium oxides. Oxides of silicone and carbon. Oxides of lead. Oxides of aluminum. Cobalt oxide.

Reference to Other Sections
Refer to section 9 for flammability properties.

However, **FIRE POINT : NONE** - The product is noncombustible material.

Section 6: Accidental Release Measures

6.1. Personal Precautions, Protective Equipment and Emergency Procedures General Measures:
Do not handle until all safety precautions have been read and understood. Do not breathe vapors from molten product.

6.1.1. For Non-Emergency Personnel
Protective Equipment: Use appropriate personal protection equipment (PPE).
Emergency Procedures: Evacuate unnecessary personnel.

6.1.2. For Emergency Personnel
Protective Equipment: Equip cleanup crew with proper protection.
Emergency Procedures: Ventilate area.

6.2. Environmental Precautions
Prevent entry to sewers and public waters.

6.3. Methods and Material for Containment and Cleaning Up
For Containment: Contain and collect as any solid.

Methods for Cleaning Up: Clear up spills immediately and dispose of waste safely. For particulates and dust: Avoid actions that cause dust to become airborne during clean-up such as dry sweeping or using compressed air. Use HEPA vacuum or thoroughly wet with water to clean-up dust. Use PPE described in Section 8. Vacuum must be fitted with HEPA filter to prevent release of particulates during clean-up.

6.4. Reference to Other Sections

In solid form this material poses no special clean-up problems. If this material is in powder or dust form, notify safety personnel, isolate the area and deny entry. Do not sweep. Clean-up should be conducted with a vacuum system utilizing a high efficiency particulate air (HEPA) filtration system. Caution should be taken to minimize airborne generation of powder or dust and avoid contamination of air and water. Cleanup personnel should protect against exposure. Properly label all materials collected in waste container. Follow applicable emergency response regulations, such as OSHA (29CFR 1910.120). See heading 8, Exposure Controls and Personal Protection. Concerning disposal elimination after cleaning, see item 13.

Section 7: Handling and Storage

7.1. Precautions for Safe Handling

HANDLING PRECAUTIONS - Dust and welding fume should be moved or transported to minimize spill or release potential.

Additional Hazards When Processed:
May generate flammable/explosive dusts or turnings when brushed, machined or ground. Use care during processing to minimize generation of dust. Where excessive dust may result, use approved respiratory protection equipment. Heating of product can release toxic or irritating fumes; ensure proper ventilation is employed, proper precautions are enforced, and applicable regulations are followed. Inhalation of fumes may cause metal fume fever.

Advice on safe handling: Use personal protection recommended in Section 8. Avoid generation of dust. Be familiar with the requirements set forth in the OSHA Lead Standard, 29 CGR 1910.1025.

Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking, or smoking and again when leaving work. Do not eat, drink or smoke when using this product. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reuse.

7.2. Conditions for Safe Storage, Including Any Incompatibilities

STORAGE PRECAUTIONS - In solid form, these materials pose no hazards.
Storage Conditions: Store in a dry, cool and well-ventilated place.

Incompatible Materials: Strong acids, strong bases, strong oxidizers. Alkalis. Metal oxides. Water, humidity. Corrosive substances in contact with metals may produce flammable hydrogen gas.

7.3. Specific End Use(s) - No use is specified.

Section 8: Exposure Controls / Personal Protection

VENTILATION REQUIREMENTS: Use general or local exhaust ventilation to keep airborne concentrations of dust and fumes below the TLV. Consult a professional hygienist.

PERSONAL PROTECTION EQUIPMENT: Always consult a professional hygienist.
RESPIRATORY PROTECTION: If fumes, misting, or dust conditions occur, consult a professional hygienist. Provide NIOSH approved respirators.

EYE PROTECTION: Safety glasses should always be worn when grinding or cutting. Face shields should be worn with proper eye protection when welding or burning.

GLOVES: Gloves and barrier creams may be necessary to prevent skin sensitization and dermatitis.

OTHER CLOTHING OR EQUIPMENT: As required, and as prescribed by a professional hygienist.

Exposure Controls

Appropriate Engineering Controls: Use local exhaust or general dilution ventilation or other suppression methods to maintain dust levels below exposure limits. Power equipment should be equipped with proper dust collection devices. Ensure all national/local regulations are observed.

Personal Protective Equipment: Protective clothing. Gloves. Safety glasses. Dust formation: dust mask. Insufficient ventilation: wear respiratory protection.

Materials for Protective Clothing: Chemically resistant materials and fabrics. With molten material wear thermally protective clothing.

Hand Protection: Wear chemically resistant protective gloves. If material is hot, wear thermally resistant protective gloves.

Eye Protection: Chemical goggles or safety glasses.

Skin and Body Protection: Wear suitable protective clothing. Wash contaminated clothing before reuse.

Respiratory Protection: Use a NIOSH-approved respirator or self-contained breathing apparatus whenever exposure may exceed established Occupational Exposure Limits.

General Hygiene Considerations: Do not eat, drink or smoke when using this product. Contaminated work clothing should not be allowed out of the workplace. Wear disposable gloves and eye/face protection. Wash face, hands and any exposed skin thoroughly after handling.

Section 9: Physical and Chemical Properties

Information on Basic Physical and Chemical Properties

Physical State	:	Solid
Appearance	:	Metallic
Odor	:	Odorless
Odor Threshold	:	Not available
pH	:	Not available
Evaporation Rate	:	Not available
Melting Point	:	3410 C
Freezing Point	:	Not available
Boiling Point	:	5660 C
Flash Point	:	Not applicable
Auto-ignition Temperature	:	Not available
Decomposition Temperature	:	Not available
Flammability (solid, gas)	:	Not available
Lower Flammable Limit	:	Not available
Upper Flammable Limit	:	Not available
Vapor Pressure	:	Not available
Relative Vapor Density at 20 °C	:	Not available
Relative Density	:	Not available
Specific Gravity	:	19.3
Solubility	:	Insoluble in water
Partition Coefficient: N-octanol/water	:	Not available
Viscosity	:	Not available
Explosion Data – Sensitivity to Mechanical Impact	:	Not expected to present an explosion hazard due to mechanical impact.
Explosion Data – Sensitivity to Static Discharge	:	Not expected to present an explosion hazard due to static discharge.

Section 10: Physical and Chemical Properties

Stability: Solid metal alloys in mill product forms are stable under normal conditions.

Reactivity: May react in contact with strong acids to release gaseous acid decomposition products. Fume is produced during welding. Expected fume constituents include oxides of metal as iron, manganese, nickel and chromium. Expected gaseous products would include carbon oxides, nitrogen oxides and ozone. Contamination, dirt, surface protections, paint or primer on the base material can affect the composition of the fumes. If you have any questions or need any added information, please contact the producing mill, a professional hygienist, or a professional metallurgist. We urge you to distribute this information among the personnel processing and handling this material so that they are fully advised of any health hazards when exposed to this product.

Section 11: Toxicological Information

Nickel and cobalt are classified as Category 3 carcinogens. The exposure route of concern is inhalation. As shipped, these complex alloys in massive form have no known toxicological properties other than causing allergic reactions in individuals sensitive to the metal(s) contained in the alloys. However, dust from flux or user-generated dusts and fumes may on contact with the skin or eyes produce mechanical irritation. Chronic exposures coupled with sweat could cause dermatitis (skin) or conjunctivitis (eyes). Excessive inhalation of dust or user-generated fumes from welding or metal spraying may, depending on the specific features of the process used, pose a long term health hazard. The International Agency for Research on Cancer (IARC) has concluded that welding fumes are possibly carcinogenic to humans. The ingredients of fumes and gases generated in welding, metals spraying and grinding will depend on the base metal and the details of the specific process being used. Ingredients may include metals, metal oxides, chromates, fluorides, carbon monoxide, ozone, and oxides of nitrogen.

DELAYED (SUBCHRONIC AND CHRONIC) EFFECTS:

Chromium - The International Agency for Research on Cancer (IARC) considers hexavalent chromium to be a carcinogen (lung, nasal) but does not have adequate evidence for chromium metal and trivalent chromium. Fumes have been associated with lung fibrosis. Iron - Prolonged inhalation of iron oxide fumes can lead to siderosis, which presents as a benign pneumoconiosis. Molybdenum - Repeated inhalation of fumes has caused kidney damage, respiratory irritation and liver damage in animals. Nickel - Nickel metal is "reasonably anticipated to be a human carcinogen" (National Toxicology Program's 10th Report). IARC states that nickel metal is possibly carcinogenic to humans. Epidemiological studies of workers exposed to nickel powders, dusts and fumes in the nickel alloy and stainless steel producing industries do not indicate a significant respiratory cancer hazard. Inhalation of nickel powder produced malignant tumors in rodent studies. Single intratracheal installations of nickel powder at levels close to the LD50 have caused
malignancies in hamsters. Nickel can cause skin sensitization in susceptible individuals through prolonged contact with skin.

Section 12: Ecological Information

12.1. Toxicity No additional information available

Solid metal alloys in mill product forms products are not considered toxic to aquatic species. It is believed that finely divided product, based on its components, will be hazardous to fish, animals, plants and the environment if released, the degree of which would depend on the particle size and quantity released. In addition, if particles are small enough, material may be ingested by wildlife, with possible toxic effects. The solid product is not expected to migrate easily into soil or groundwater based upon its insoluble form, however, finely divided material can become mobile in water and contaminate soil and groundwater.

12.2. Mobility in Soil

It will partially settle out due to their fairly low solubility and partially dissolve. In soil, lead and lead compounds are generally not very mobile or bio-available, as they can be strongly absorbed on soil particles, increasingly over time. It also forms complexes with organic matter and clay minerals that limit its mobility. When released into the soil, this material is not expected to leach into groundwater.

Environmental Notice

It is very persistent in soil and sediments. No data on environmental degradation. Mobility of metallic lead between ecological compartments is slow. Bioaccumulation of lead occurs in aquatic and terrestrial animals and plants, but little bioaccumulation occurs through the food chain. Most studies include lead compounds and not elemental lead.

Bio-accumulation

While its compound metals are generally insoluble, its processing or extended exposure in aquatic and terrestrial environments may lead to the release of other compound in bio-available forms.

12.3. Other Adverse Effects

Other Information: none to the environment

Section 13: Ecological Information

Waste Treatment Methods

Disposal of wastes: Disposal should be in accordance with applicable regional, national and local laws and regulations.

Contaminated packaging: Disposal should be in accordance with applicable regional, national and local laws and regulations.

Section 14: Transport Information

14.1. In Accordance with DOT Not regulated for transport
14.2. In Accordance with IMDG Not regulated for transport
14.3. In Accordance with IATA Not regulated for transport
14.4. In Accordance with TDG Not regulated for transport

Note: This product is not regulated for domestic transport by land, air or rail.

Under 49 CFR 171.8, individual packages that contain lead metal (<100 micrometers) below the reportable quantity (RQ) are not regulated.

Under 49 CFR 171.4, except when transporting aboard a vessel, the requirements of this subchapter specific to marine pollutants do not apply to non-bulk packaging transported by motor vehicles, rail cars and aircrafts.

DOT

Proper shipping name	Not applicable
Hazard Class Packing Group	Not applicable
Reportable Quantity (RQ)	Not applicable
Marine pollutant	Soluble lead compounds are listed as a marine pollutant according to DOT.
Emergency Response Guide	Not applicable

Section 15: Regulatory Information

International Inventories:	
TSCA	Complies
DSL/NDSL	Complies
EINECS/ELINCS	Complies
ENCS	Complies
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies
Legend:	
TSCA	United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL	Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS	European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS	Japan Existing and New Chemical Substances
IECSC	China Inventory of Existing Chemical Substances
KECL	Korean Existing and Evaluated Chemical Substances

PICCS	Philippines Inventory of Chemicals and Chemical Substances
AICS	Australia Inventory of Chemicals and Substances
US Federal Regulations **SARA 313**	Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

Alloys containing less than 1% of nickel or cobalt are not classified as "dangerous for supply". Alloys containing more than 1% of either metal are classified as the metals themselves. However, in recognition of their essentially non-hazardous nature, these alloys in the massive form are not required to be labeled as hazardous.

US EPA Label Information

EPA Pesticide Registration Number: Not available

Please be advised that N/A can either mean Not Applicable or No Data Has Been Established

Section 16: Other Information

Issue Date	**December 9, 2015**
Revision Date	**N / A**
Revision Note	**N / A**

GHS Full Text Phrases:

Acute Tox. 1 (Inhalation:dust,mist)	Acute toxicity (inhalation:dust,mist) Category 1
Acute Tox. 2 (Inhalation)	Acute toxicity (inhalation) Category 2
Acute Tox. 2 (Inhalation:dust,mist)	Acute toxicity (inhalation:dust,mist) Category 2
Acute Tox. 2 (Oral)	Acute toxicity (oral) Category 2
Acute Tox. 3 (Inhalation:dust,mist)	Acute toxicity (inhalation:dust,mist) Category 3
Acute Tox. 3 (Inhalation:gas)	Acute toxicity (inhalation:gas) Category 3
Acute Tox. 4 (Inhalation:dust,mist)	Acute toxicity (inhalation:dust,mist) Category 4
Acute Tox. 4 (Oral)	Acute toxicity (oral) Category 4
Aquatic Acute 1	Hazardous to the aquatic environment - Acute Hazard Category 1
Aquatic Acute 3	Hazardous to the aquatic environment - Acute Hazard Category 3
Aquatic Chronic 1	Hazardous to the aquatic environment - Chronic Hazard Category 1
Aquatic Chronic 3	Hazardous to the aquatic environment - Chronic Hazard Category 3
Carc. 1A	Carcinogenicity Category 1A

Carc. 1B	Carcinogenicity Category 1B
Carc. 2	Carcinogenicity Category 2
Comb. Dust	Combustible Dust
Compressed gas	Gases under pressure Compressed gas
Eye Dam. 1	Serious eye damage/eye irritation Category 1
Eye Irrit. 2A	Serious eye damage/eye irritation Category 2A
Flam. Sol. 1	Flammable solids Category 1
Muta. 1B	Germ cell mutagenicity Category 1B
Muta. 2	Germ cell mutagenicity Category 2
Repr. 1A	Reproductive toxicity Category 1A
Repr. 2	Reproductive toxicity Category 2
Resp. Sens. 1B	Respiratory sensitisation Category 1B
Skin Corr. 1B	Skin corrosion/irritation Category 1B
Skin Sens. 1	Skin sensitization Category 1
STOT RE 1	Specific target organ toxicity (repeated exposure) Category 1
STOT RE 2	Specific target organ toxicity (repeated exposure) Category 2
Water-react. 2	Substances and mixtures which in contact with water emit flammable gases Category 2
H228	Flammable solid
H300	Fatal if swallowed
H302	Harmful if swallowed
H280	Contains gas under pressure; may explode if heated
H261	In contact with water releases flammable gases
H314	Causes severe skin burns and eye damage
H317	May cause an allergic skin reaction
H318	Causes serious eye damage
H319	Causes serious eye irritation
H330	Fatal if inhaled
H331	Toxic if inhaled
H332	Harmful if inhaled
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled
H341	Suspected of causing genetic defects
H350	May cause cancer
H351	Suspected of causing cancer
H360	May damage fertility or the unborn child
H361	Suspected of damaging fertility or the unborn child
H372	Causes damage to organs through prolonged or repeated exposure
H373	May cause damage to organs through prolonged or repeated exposure
H400	Very toxic to aquatic life
H402	Harmful to aquatic life
H410	Very toxic to aquatic life with long lasting effects
H412	Harmful to aquatic life with long lasting effects

D I S C L A I M E R

This 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 guidance for safe handling, use, processing, storage, transportation, disposal and is not to be considered a warranty or quality Specification.

The information above is also believed to be accurate and represents the best information available to Materials Science International, Inc. However, MSI makes no warranty, expressed or implied with respect to such information and assumes no liability resulting from its use.