SAFETY DATA SHEET

Nickel Alloys, Titanium, Stainless Steel & Special Alloys
Roopam Steel

TO THE ATTENTION OF: PLANT MANAGER / SAFETY DIRECTOR

Roopam Steel Company, as a manufacturer, stockist, and worldwide exporter of nickel alloys, titanium, stainless steel, and special alloys, furnishes this Safety Data Sheet (SDS) for the products supplied. This document is consistent with international hazard communication practices, including the principles of the OSHA Hazard Communication Standard 29 CFR 1910.1200 (USA), the EU CLP Regulation (EC) No. 1272/2008, and the GHS (Globally Harmonized System) framework followed in most importing nations.

These primary metals, when improperly handled or downstream processed (e.g., through welding, cutting, grinding, machining, or melting), may release hazardous dust, particulates, or fumes which have been associated with severe adverse health effects, including respiratory illness and cancer. In their normal, as-shipped solid mill-product form (such as sheet, plate, bar, tube, pipe, flange, fitting, or customized machined parts), there is no indication of acute or immediate physical or health hazards.

Although reasonable care has been taken to provide current, accurate, and reliable safety information, Roopam Steel Company extends no warranties, expressed or implied, and makes no representations regarding the absolute accuracy or completeness of the information contained herein. Roopam Steel Company assumes no liability for any loss, damage, or injury of any kind arising out of the use of or reliance upon this data. Ultimate responsibility for strict compliance with all applicable local, national, and international laws and workplace safety regulations rests solely upon the purchaser, importer, and end-user.

SECTION I – COMPANY & PRODUCT IDENTIFICATION

Company Name: Roopam Steel
Country of Origin: India
Business Activity: Manufacturer, Stockist & Worldwide Exporter of Specialty Metal Products
Product Categories: Nickel Alloys, Titanium & Titanium Alloys, Stainless Steel, Special Alloys (e.g., Duplex, Super Duplex, Inconel, Hastelloy, Monel, Incoloy, and similar structural grades)
Product Forms: Tubes, Pipes, Flanges, Fittings, Special Drawn / Customized CNC Items, Plates, Sheets, Flats, and Round Bars

Description: This product is a tasteless, odorless, solid metal structural product supplied in the forms listed above. The specific alloy/grade identification (trade name or UNS/ASTM/EN designation) is explicitly indicated on the commercial shipper documents, Material Test Certificates (MTC), commercial invoices, and packing lists accompanying each physical shipment. Typical concentration ranges for the constituent alloying elements are provided in Section III of this SDS; the exact

certified chemical composition of the specific heat/lot supplied is verified strictly on the accompanying MTC.

SECTION II – HAZARDS IDENTIFICATION

As Sold / As Shipped: In its manufactured solid mill form, this product is classified as non-hazardous under OSHA Hazard Communication Standard 29 CFR 1910.1200, EU CLP Regulation (EC) No. 1272/2008, and GHS criteria. It presents no immediate physical, fire, or acute health risks.

Downstream Processing Hazards (Dust & Fumes): Operations such as welding, burning, thermal cutting, grinding, sawing, brazing, or melting can generate airborne particulates, metal dust, and chemical fumes. Downstream processing of these alloys creates airborne exposures that classify under GHS criteria as follows:

- **Carcinogenicity – Category 2:** Suspected of causing cancer via prolonged inhalation of nickel or cobalt dust/fumes.
- **Specific Target Organ Toxicity (Repeated Exposure) – Category 1:** Causes damage to the respiratory tract and lungs through prolonged or repeated inhalation exposure.
- **Skin Sensitization – Category 1:** May cause an allergic skin reaction or severe dermatitis upon prolonged direct skin contact with nickel particulates.
- **Combustible Dust – Hazard Class:** Finely divided metal dust accumulations in enclosed spaces may form explosive mixtures in air.

SECTION III – COMPOSITIONAL INGREDIENTS

The table below details the principal alloying elements, Chemical Abstracts Service (CAS) numbers, and typical weight concentration ranges across the alloy portfolios exported by Roopam Steel Company. Individual grades vary significantly; refer strictly to the lot-specific Material Test Certificate (MTC) for precise chemical analysis.

Element	CAS No.	Updated Typical Concentration Range *(global min–max across all Roopam Steel portfolio)*
Aluminum (Al)	7429-90-5	**0 – 6.75%** *(Ti-6Al-4V contains up to 6.75%; Monel K500 up to 3.15%)*
Carbon (C)	7440-44-0	**0 – 1.0%** *(400 series stainless steels can have ~1.0%; most superalloys are ≤0.15%)*
Chromium (Cr)	7440-47-3	**0 – 27.0%** *(400 series can reach 27%; 2507 super duplex ~26%; Co-based alloys ~20-24%)*
Cobalt (Co)	7440-48-4	**0 – 50.0%** *(Permendur 2V has ~49-50%; L605 and Alloy 188 are Co-based with ~30-40% balance)*
Columbium/Niobium (Cb/Nb)	7440-03-1	**0 – 5.5%** *(Alloy 718 has 4.75-5.50%; Alloy 625 has 3.15-4.15%)*

Copper (Cu)	7440-50-8	**0 – 34.0%** *(Monel 400/K500 contain 27-34%; Alloy 20 has 3-4%)*
Iron (Fe)	7439-89-6	**0 – 70.0%** *(present as balance in many stainless steels and Invar; 0% in pure Ni-200 and Co-based alloys)*
Manganese (Mn)	7439-96-5	**0 – 10.0%** *(Alloy 21-6-9 contains 8-10%; most others are ≤2%)*
Molybdenum (Mo)	7439-98-7	**0 – 26.0%** *(Haynes 242 has 24-26%; Hastelloy C276 has 15-17%)*
Nickel (Ni)	7440-02-0	**0 – 99.0%** *(Nickel 200 is ≥99%; superalloys like 718, 625 have Ni as balance ~50-70%)*
Nitrogen (N)	7727-37-9	**0 – 0.40%** *(Alloy 21-6-9 and 2507 super duplex contain up to 0.35-0.40%)*
Phosphorus (P)	7723-14-0	**0 – 0.05%** *(typically a tramp element, max specified in most grades)*
Selenium (Se)	7782-49-2	**0 – 0.20%** *(not intentionally added in your list; included only for completeness)*
Silicon (Si)	7440-21-3	**0 – 1.5%** *(Alloy 330 has 0.75-1.5%; most grades are ≤1.0%)*
Sulfur (S)	7704-34-9	**0 – 0.03%** *(standard maximum for all listed grades)*
Titanium (Ti)	7440-32-6	**0 – 99.0%** *(commercially pure Ti and Ti-alloys have Ti as balance; in superalloys it is an addition up to ~3.3%)*
Tungsten (W)	7440-33-7	**0 – 16.0%** *(Alloy 188, Alloy 230, and L605 contain 13-16% W – this is the key correction from your original 0–4%)*
Vanadium (V)	7440-62-2	**0 – 4.5%** *(Ti-6Al-4V has 3.5-4.5%; A286 has 0.1-0.5%; Permendur has ~2%)*

*Note: Ranges are indicative of the entire alloy family collective. Certified heat-specific breakdowns are strictly detailed within individual Material Test Certificates.

SECTION IV – FIRST AID MEASURES

Skin: Wash skin thoroughly with soap and water to remove any mechanically deposited metallic particles. If an allergic rash, irritation, or burn develops, seek medical attention immediately.
Eyes: Flush particles immediately from eyes with copious amounts of clean running water for at least 15 minutes, holding eyelids open. If mechanical irritation, pain, or burns persist, seek professional medical attention.
Inhalation: If overexposed to downstream dust or thermal fumes, remove individual immediately to fresh air. If breathing is difficult, administer oxygen (by trained personnel) and seek immediate

medicalattention.
Ingestion: Ingestion is an unlikely route of exposure for solid metal. If industrial dust or particles are swallowed, seek immediate medical assistance. Do not induce vomiting unless directed by medical personnel.
Advice to Physician: Treat symptomatically based on specific processing exposures.

SECTION V – FIRE AND EXPLOSION DATA

Flash Point & Fire Point: None. The product is a completely non-combustible solid structural metal.
Special Hazards: Massive solid forms do not present fire or explosion risks. However, finely divided metal dust generated during intensive dry grinding, polishing, or machining operations can pose a serious combustible dust hazard under certain conditions. Avoid dust accumulations in the presence of ignition sources. Use proper dust-collection systems, explosion venting, and strict workplace housekeeping.

SECTION VI – ACCIDENTAL RELEASE MEASURES

Solid Form: In solid mill form (plates, tubes, bars, etc.), this material poses no special cleanup or environmental release problems. Pick up or reclaim mechanically.
Dust/Powder Form: If material has been processed into fine powder or dust, immediately isolate the spill zone and restrict entry. Eliminate all nearby ignition sources. Do not dry-sweep or use compressed air to clean up dust. Utilize an industrial vacuum cleaner equipped with a certified HEPA filter to minimize airborne dust generation. Place collected waste into properly labeled, sealed containers and dispose of in accordance with local, state, and national environmental regulations.

SECTION VII – HANDLING AND STORAGE

Handling: Use appropriate mechanical lifting machinery or cranes for heavy plates, bars, and bundled tubes/pipes to prevent physical manual-handling strains. Implement engineered local exhaust capture systems at points of cutting, welding, or fabrication to keep worker exposures below regulatory.limits.
Storage: In solid mill-product form, these materials require no special chemical storage precautions. Store in a dry, covered, weather-protected warehouse to prevent aesthetic surface corrosion or moisture staining. Segregate physically by grade to prevent cross-contamination and mixing, and keep away from strong acids and carbon steel cross-contamination.

SECTION VIII – EXPOSURE CONTROLS / PERSONAL PROTECTION

Ventilation: Use local exhaust ventilation or enclosed hoods during thermal cutting, welding, or grinding to maintain airborne concentrations below legal Permissible Exposure Limits (PEL) and Threshold Limit Values (TLV).
Respiratory Protection: If downstream operations generate dust, fumes, or mists above applicable occupational exposure boundaries, workers must wear a NIOSH-approved respirator (e.g., N95 or HEPA-filtered cartridge respirators) selected under a comprehensive workplace respiratory protection program.
Eye Protection: Industrial safety glasses with side shields must be worn at all times during mechanical processing. Full-face shields with appropriate shaded filter lenses are mandatory for welding, thermal burning, or plasma cutting.

Gloves & Body Protection: Wear durable, cut-resistant work gloves. Protective leather or barrier sleeves and aprons may be necessary during hot work or when handling specific nickel-bearing or cobalt-bearing alloys prone to inducing localized skin sensitization and occupational dermatitis.

SECTION IX – PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Solid, metallic grey/silver structural shapes (plates, sheets, tubes, round bars, flanges).
Odor: Odorless. | Vapor Pressure: Nil. | Solubility in Water: Insoluble.
Melting Points (Typical Ranges): Stainless Steel: 1370–1450°C; Nickel Alloys: 1290–1380°C; Titanium and Titanium Alloys: ~1660°C.
Specific Gravity: Varying by grade: Titanium alloys (~4.5), Stainless Steel (7.7–8.0), Nickel Alloys (8.9).

SECTION X – STABILITY AND REACTIVITY

Chemical Stability: Stable under normal conditions of industrial storage, transit, and material handling.
Reactivity & Incompatibilities: May react strongly with concentrated mineral acids to release flammable hydrogen gas or toxic acid decomposition by-products. Thermal processing (welding, cutting) generates complex airborne metal oxides (iron oxide, hexavalent chromium, nickel oxide, manganese oxides, titanium dioxide) and toxic gases like carbon monoxide, nitrogen oxides, and ozone depending on the atmospheric environment and surface primers.

SECTION XI – TOXICOLOGICAL INFORMATION

Acute Toxicity: No toxicological hazards exist for the solid, massive metal as shipped.
Chronic Toxicity / Carcinogenicity (Processed Form Only):
• Nickel: Classified by IARC as Group 2B (Possibly carcinogenic to humans) and by NTP as reasonably anticipated to be a carcinogen. Prolonged skin contact can induce severe allergic contact dermatitis.
• Chromium: While metal form is non-carcinogenic, thermal cutting/welding transforms chromium into Hexavalent Chromium (Cr VI), which is classified by IARC as a Group 1 Human Carcinogen via inhalation, known to cause lung cancer and respiratory tract damage.
• Titanium: Titanium metal is biologically inert. However, generated titanium dioxide dust from specialized processing is classified by IARC as Group 2B via inhalation in high-concentration occupational settings.
• Manganese: Chronic overexposure to manganese dust/fume can cause irreversible central nervous system effects mimicking Parkinson’s disease (manganism).

SECTION XII – ECOLOGICAL INFORMATION

Ecotoxicity: In solid, massive form, these alloys are entirely insoluble, biologically inert, and present no environmental or aquatic toxicity hazards. Downstream generated dusts, fines, or grinding sludges can release metallic ions into soil or surface waters if improperly contained, posing a hazard to aquatic life. Prevent industrial dust or residues from entering storm drains, municipal waterways, or agricultural soil ecosystems.

SECTION XIII – DISPOSAL CONSIDERATIONS

Waste Characterization: The product as supplied is not classified as a hazardous waste. Off-cuts, metal turnings, mill scales, and clean structural scrap are highly valuable and should be collected for commercial recycling and reprocessing.
Dust & Sludges: Air pollution control dusts, HEPA vacuum residues, and grinding sludges must be tested, characterized, and disposed of in strict accordance with national, regional, and municipal industrial waste disposal regulations.

SECTION XIV – TRANSPORT INFORMATION

Regulatory Status: Not regulated or classified as dangerous goods for transport under international codes (DOT, IMDG, IATA, ADR) in solid mill-product form. No UN identification number is assigned. Standard international packaging, export bundling, and grade-labeling protocols apply to all maritime, air, and overland shipments.

SECTION XV – REGULATORY INFORMATION

Global Supply Frameworks: Alloys containing over 1% Nickel or Cobalt are subject to specific safety labeling requirements under European CLP and GHS frameworks if distributed in non-massive forms. In massive solid form, explicit hazard labeling is generally exempted due to the lack of immediate bioavailability.
EU REACH Compliance: Products supplied comply fully with the registration criteria of EU REACH. They do not contain any Substances of Very High Concern (SVHC) on the European Chemicals Agency (ECHA) Candidate List above the regulatory threshold of 0.1% w/w.
California Proposition 65 Warning: Downstream processing of these products can expose workers to chemical elements including Nickel and Cobalt, which are known to the State of California to cause cancer. Appropriate warning documentation is maintained and distributed to downstream entities under California Safe Drinking Water and Toxic Enforcement Act requirements.
TSCA Status: All chemical constituents are fully listed on the United States EPA TSCA Chemical Substance Inventory.

SECTION XVI – OTHER INFORMATION

Prepared By: Roopam Steel Company – Quality Assurance & HSE Department
Issuing Location: India
Document Revision: Revision 2 (Standardized GHS 16-Section SDS Format)
Issue Date: June 29, 2021
Disclaimer: The information compiled in this SDS is provided in good faith and believed correct as of the date of issuance. Roopam Steel Company makes no representation as to its absolute completeness or operational accuracy. This document is intended solely for the guidance of industrial customers handling the material. Users must make independent determinations regarding workplace safety and local environmental compliance before downstream processing.