Material Safety Data Sheet

Material Name: Aluminum and Aluminum Alloys **SDS ID: DY-01**

Section 1 - Chemical Product and Company Identification

Identification Number: DY-01
Chemical Name: Aluminum
Product Use: Wrought Aluminum Alloy Extrusions, Mill finish, Anodized, Painted, 6xxx Alloys
Synonyms: None
Manufacturer Information

Hanwood Group Company Limited
Rm 2102, CRE Building,
303 Hennessy Road, Wanchai, Hong Kong

Section 2 - Hazards Identification

Emergency Overview

Product is solid metallic pieces. Product may form explosive dust/air mixtures if high concentration of product dust is suspended in air. Firefighters should wear full protective clothing and self contained breathing apparatus. Exposure to dust may be irritating to eyes, nose, and throat. Contact with hot metal may cause severe thermal burns. Do not touch or handle cast aluminum or heated materials before determining the temperature. Hot work operation such as welding, torch cutting, etc may potentially generate hexavalent chromium which has been identified as a carcinogen. See Section 15.

Potential Health Effects: Eyes

Dust, fumes or powder may irritate eye tissue. Eye contact with aluminum particles may cause corneal necrosis.

Potential Health Effects: Skin

Dust or powder may irritate the skin. Some products may contain residual coating. Prolonged skin contact with the coating oils may result in skin sensitization (allergy) in some individuals. Do not touch or handle cast aluminum or heated materials before determining the temperature. Aluminum does not change color on heating. Contact with hot metal may cause severe thermal burns.

Potential Health Effects: Ingestion

Not a likely route of entry. Ingestion of large amounts of dusts or particulates may produce gastrointestinal disturbances including irritation, nausea, and diarrhea.

Potential Health Effects: Inhalation

Dusts of this product may cause irritation of the nose, throat, and respiratory tract.

HMIS Ratings: Health: 1 **Fire:** 1 **Reactivity:** 0 **Pers. Prot.:** Goggles, Gloves, Protect Clothing

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe * = Chronic hazard

Hazard Label Pictograms:

Explosive

Irritant

Respiratory Sensitizer

Section 3 - Composition / Information on Ingredients

CAS #	Component	Percent[1]
7429-90-5	Aluminum	>97.0
	Alloying Elements	
7440-21-3	Silicon	<1.0
7439-89-6	Iron	<0.8
7440-50-8	Copper	<0.3
7439-96-5	Manganese	<0.2
7439-95-4	Magnesium	<1.2
7440-47-3	Chromium	<0.1

Section 4 - First Aid Measures

First Aid: Eyes

Flush immediately with water for at least 15 minutes. Do not rub eyes. If irritation persists get medical attention.

First Aid: Skin

For skin contact, flush with large amounts of water. If irritation persists, get medical attention.

First Aid: Ingestion

Due to the physical nature of this material, ingestion is unlikely to occur. If ingestion of a large amount does occur, seek medical attention.

First Aid: Inhalation

If symptoms are experienced, remove source of contamination or move victim to fresh air. Give oxygen if breathing is difficult. Call a physician if symptoms develop or persist.

Section 5 - Fire Fighting Measures

General Fire Hazards

High concentration of airborne dust may form explosive mixture with air.
Coating oils that may be present on some products can be ignited by open flames and other sources of ignition while the aluminum base product will ignite only under extreme conditions.

Unusual Fire and Explosion Hazards

Fresh, very finely ground aluminum, may be pyrophoric when its particle size is 0.03 um or less. Dust is moderately flammable/explosive by heat, flame or chemical reaction with powerful oxidizers. May ignite on contact with vapors of AsCl3, SCl2, Se2Cl2, PCl5; on contact with barium peroxide; contact with O2; mixtures with picric acid + water after a delayed period; exothermic reaction with water + iron powder which emits hydrogen gas; and spontaneously ignites in CS2 vapors.

May ignite and react violently with mixtures of sodium peroxide and O2+H2O; on contact with halogens and interhalogens. May react violently with hydrochloric acid, hydrofluoric 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 peroxide. May have a violent or explosive reaction when heated with metal oxides, oxosalts (nitrates, sulfates), some halocarbons, sulfides or hot copper oxide worked with an iron or steel tool. May have an explosive reaction with sodium sulfate above 800 oC; in powdered form with KClO4+Ba (NO3) 2+ KNO3+H2O and Ba (NO3)2+KNO3+sulfur+vegetable adhesives+H2O after a delayed period; powder forms sensitive explosive mixture with oxidants; mixtures with powdered AgCl, NH4NO3, or NH4NO3+Ca (NO3)2+formamide+H2O are powerful explosives; mixtures with ammonium peroxodisulfate+water is explosive; and potential explosive reaction with CCl4 during ball milling operations. Many violent or explosive reactions with the following halocarbons have occurred in industry: bromothane, bromotrifluoromethane, CCl4, chlorodifluoromethane, chloroform, chloromethane, chloromethane+2-methylpropane, dichlorodifluoromethane, 1, 2-dichloroethane, dichloromethane, 1, 2-dichloropropane, 1,2, -difluorotetrafluoroethane, fluorotrichloroethane, hexachloroethane alcohol, polytrifluorethylene oils and greases, tetrachlorethylene, tetrachlorethylene,

tetrafluoromethane, 1,1,1-trichloroethane, trichloroethylene, 1,1,2-trichlorotrifluoroethane, and trichlorotrifluoroethane-dichlorobenzene. (Sax, Dangerous Properties of Industrial Materials, eighth edition).

Hazardous Combustion Products

Decomposition of base metal product may yield metallic oxides.
Decomposition of coating oils present on some products will release carbon monoxide, carbon dioxide, and other hydrocarbon species.

Extinguishing Media

Use dry chemical, foam, carbon dioxide, water spray or water fog for oil fires.
Use dry powder, talc, or sand to extinguish metal fires.
Material in or near fires should be cooled with a water spray or fog if compatible with fire fighting techniques for the other materials involved in the fire.

Unsuitable Extinguishing Media

Do NOT use water or halogenated agents.

Fire Fighting Equipment/Instructions

Fire fighters should wear full-face, self contained breathing apparatus and impervious protective clothing. Fire fighters should avoid inhaling any combustion products. Avoid creation of dusts.

NFPA Ratings: Health: 1 **Fire:** 1 **Reactivity:** 0
Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

Section 6 - Accidental Release Measures

Containment Procedures

Contain the discharged material. Remove sources of ignition.

Clean-Up Procedures

Shovel the material into waste container. Avoid the generation of dusts during clean-up. When dealing with aluminum powder/dust, wear appropriate respiratory and protective equipment specified in Section 8. Isolate spill area, provide ventilation and extinguish sources of ignition. Vacuum up spill using a high efficiency particulate absolute (HEPA) air filter and place in a closed container for proper disposal. Use non-sparking tools.

Evacuation Procedures

Isolate area. Keep unnecessary personnel away.

Special Procedures

Wear appropriate personal protective equipment. See Section 8. Follow all Local, State, Federal and Provincial regulations for disposal.

Section 7 - Handling and Storage

Handling Procedures

Do not breathe fumes or dusts from this material. Use with adequate ventilation. Keep dusts and powders of this product from heat, sparks, or open flame. Use non-sparking tools when opening or closing containers. Do not touch or handle cast aluminum or heated materials before determining the temperature. Aluminum does not change color on heating. Products may have sharp edges. Handle with caution and wear appropriate personal protective equipment.

Storage Procedures

Keep the container tightly closed and in a cool, well-ventilated place. Store away from incompatible materials. If dusts and powders are formed, use adequate ventilation in storage and do not handle or store dusts or powders of this product near an open flame, heat or other sources of ignition.
Good housekeeping and engineering practices should be employed to prevent the generation and accumulation of dusts. Vacuuming with a HEPA (High Efficiency Particulate Air) equipped vacuum is recommended to clean up any dusts that may be generated during handling and processing. Wash hands and face thoroughly before eating, drinking or smoking.

Engineering Controls

Use local exhaust ventilation.

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment: Eyes/Face

Wear safety glasses with side shields.

Personal Protective Equipment: Skin

Wear leather or other appropriate work gloves, if necessary for type of operation.

Personal Protective Equipment: Respiratory

If ventilation is not sufficient to effectively control exposures, appropriate NIOSH approved respirators should be used. Respirators should be selected and used under the direction of trained health and safety professionals in accordance with all applicable health, safety, and environmental regulations.

Personal Protective Equipment: General

Wear appropriate protective clothing.

Section 8 - Physical & Chemical Properties

Appearance:	Solid metallic pieces	**Odor:**	None
Physical State:	Solid	**pH:**	Not Available
Vapor Pressure:	Not Available	**Vapor Density:**	Not Available
Boiling Point:	Not Available	**Melting Point:**	660°C - 720°C
Solubility (H2O):	<1 %	**Specific Gravity:**	2.5-2.9 g/cc

Section 9 - Chemical Stability & Reactivity Information

Chemical Stability

Stable under normal conditions.

Chemical Stability: Conditions to Avoid

Avoid ignition sources where dust is produced. Avoid incompatible materials.

Special Sensitivity: When melting aluminum, aluminum alloys, or aluminum scrap, care must be taken to exclude water or moisture. Water or moisture trapped under hot or molten metal can result in a violent explosion. Strong oxidizing agents must be excluded during heating and melting operations to prevent the possibility of an explosion. Finely divided aluminum dusts may form explosive mixtures in air. Care should be taken to employ effective dust control measures.

Incompatibility

This product may react with strong acids, bases and oxidizing agents to produce hydrogen gas, which is highly flammable. Contact with chlorinated solvents may release toxic and corrosive hydrogen chloride gas. Hot aluminum may react with chlorinated solvents to produce phosgene, a highly irritating and toxic gas.

Hazardous Decomposition

Decomposition of this product may yield metallic oxides, such as aluminum oxide. Hydrogen may also be produced when reacted with some acids and caustic solutions.

Decomposition of coating oils present on some products will release carbon monoxide, carbon dioxide, and other hydrocarbon species.

Possibility of Hazardous Reactions

Will not occur

Section 10 - Toxicological Information

Acute Dose Effects

A: General Product Information

Inhalation of metal fumes may cause metal fume fever, a flu-like illness generally lasting 24 hours or less.

Accumulation of aluminum in the body may result in neurological damage, anemia and bone softening. Repeated overexposure to high levels of aluminum oxide may lead to pulmonary fibrosis, a progressive lung disorder.
Aluminum: Chronic overexposure to aluminum can result in lung damage and has been associated with asthma-like syndrome.

Copper: Acute poisoning from ingestion of excessive copper can cause temporary gastrointestinal distress with symptoms such as nausea, vomiting, and abdominal pain. High levels of exposure to copper can cause destruction of red blood cells, possibly resulting in anemia.

Silicon: Silicon dust seems to have little adverse effect on lungs and does not appear to produce significant organic disease or toxic effects when exposures are kept under reasonable control.

Iron: Chronic inhalation of iron has resulted in mottling of the lungs, a condition referred to as siderosis. This is considered benign pneumoconiosis and does not ordinarily cause significant physiologic impairment.

Manganese: Overexposure to manganese may result in CNS effects, anemia and pneumonitis, which increased the risk of pneumonia.

B: Component Analysis - LD50/LC50

Silicon (7440-21-3)
Oral LD50 Rat: 3160 mg/kg

Iron (7439-89-6)
Oral LD50 Rat: 984 mg/kg

Manganese (7439-96-5)
Oral LD50 Rat: 9 g/kg

Magnesium (7439-95-4)
Oral LD50 Rat: 230 mg/kg

Repeated Dose Effects

Exposure to metal dusts and oxides may cause fume fever. Fume fever is a temporary flu-like condition characterized by chills, fever, muscle aches and pains, nausea and vomiting. Typically the symptoms appear within a few hours after exposure and subside within 2-3 days with no permanent effects.

Carcinogenicity

A: General Product Information

No carcinogenicity data available for this product.

B: Component Carcinogenicity

Iron W (7439-89-6)

ACGIH: A4 - Not Classifiable as a Human Carcinogen (dust and fume) (related to Iron oxide)
IARC: Supplement 7 [1987], Monograph 1 [1972] (related to Ferric oxide) (Group 3 (not classifiable))

Magnesium W (7439-95-4)

ACGIH: A4 - Not Classifiable as a Human Carcinogen (related to Magnesium oxide)

Section 11 - Ecological Information

Ecotoxicity

A: General Product Information

No data available for this product. Coating oils may present an environmental hazard to aquatic and terrestrial flora and fauna.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Iron (7439-89-6)

Test & Species		Conditions
96 Hr LC50 Morone saxatilis	13.6 mg/L	static

Copper (7440-50-8)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	23 µg/L	
96 Hr LC50 Oncorhynchus mykiss	13.8 µg/L	
96 Hr LC50 Lepomis macrochirus	236 µg/L	
72 Hr EC50 Scenedesmus subspicatus	120 µg/L	
96 Hr EC50 water flea	10 µg/L	
96 Hr EC50 water flea	200 µg/L	

Environmental Fate

No data available for this product.

Section 12 - Disposal Considerations

US EPA Waste Number & Descriptions

A: General Product Information

Material, if discarded, is not expected to be a characteristic hazardous waste under RCRA.

B: Component Waste Numbers

No EPA Waste Numbers are applicable for this product's components.

Disposal Instructions

Dispose of waste material according to Local, State, Federal, and Provincial Environmental Regulations.
See Section 7 for Handling Procedures. See Section 8 for Personal Protective Equipment recommendations.

Section 13 - Transportation Information

US DOT Information

Shipping Name: Not regulated.
Additional Info.: Aluminum and aluminum alloys are not regulated for transportation. Aluminum powder is regulated: Aluminum Powder, Class 4.3, UN 1396, PG II.

TDG Information

Shipping Name: Not regulated.
Additional Info.: Aluminum and aluminum alloys are not regulated for transportation. Aluminum powder is regulated: Aluminum Powder, Class 4.3, UN 1396, PG II.

Section 14 - Regulatory Information

US Federal Regulations

A: General Product Information

Components of this product have been checked against the non-confidential TSCA inventory by CAS Registry Number. Components not identified on this non-confidential inventory are either exempt from listing (i.e. polymers, hydrates) or are listed on the confidential inventory as declared by the supplier.

B: Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Aluminum (7429-90-5)

SARA 313: 1.0 % de minimis concentration (dust or fume only)

Copper (7440-50-8)

SARA 313: 1.0 % de minimis concentration

CERCLA: 5000 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is equal to or exceeds 0.004 inches); 2270 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is equal to or exceeds 0.004 inches)

Manganese (7439-96-5)

SARA 313: 1.0 % de minimis concentration

Chromium (7440-47-3)

The product contains less than 0.1 % chromium. Hot work operations such as welding, torch cutting, etc. will generate metal oxides, which can include hexavalent chromium. OSHA has enacted a standard for exposure to hexavalent chromium [29 CFR 1910.1026], which mandates very stringent exposure limits. Users of the product are urged to read this standard and determine how it might affect their operations.

C: Component Marine Pollutants

This material contains one or more of the following chemicals required by US DOT to be identified as marine pollutants.

Component	CAS #	
Copper	7440-50-8	DOT regulated severe marine pollutant

Acute Health: Yes **Chronic Health:** No **Fire:** No **Pressure:** No **Reactive:** No

State Regulations

A: General Product Information

Other state regulations may apply. Check individual state requirements.

Aluminum and its alloys may contain up to 0.005% beryllium, 0.05% cadmium, <0.1% chromium, 0.05% lead, and 0.05% nickel as impurities if these elements are not listed in Section 3. Beryllium, cadmium, chromium, lead, and nickel have been identified as carcinogens or having developmental or reproductive toxicity by the State of California, as Special Health Hazard Substances by the States of New Jersey and Pennsylvania, and as Extraordinarily Hazardous Substances by the State of Massachusetts.

B: Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Aluminum	7429-90-5	Yes	Yes	Yes	Yes	Yes	Yes
Silicon	7440-21-3	No	Yes	Yes	Yes	Yes	Yes
Iron ([1]related to Iron oxide) ([2]related to Iron oxide fume)	7439-89-6	Yes	Yes[1]	Yes[2]	Yes[1]	Yes[1]	Yes[1]
Zinc ([1]related to Zinc oxide)	7440-66-6	Yes	Yes	Yes[1]	Yes	Yes	Yes
Copper	7440-50-8	Yes	Yes	Yes	Yes	Yes	Yes
Manganese	7439-96-5	Yes	Yes	Yes	Yes	Yes	Yes
Magnesium ([1]related to Magnesium oxide fume)	7439-95-4	Yes	Yes	Yes[1]	Yes	Yes	Yes

Canadian WHMIS Information

A: General Product Information

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all information required by CPR.

B: Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Aluminum	7429-90-5	1 %

Iron	7439-89-6	1 % (related to Ferric oxide)
Zinc	7440-66-6	1 % (related to Zinc oxide)
Copper	7440-50-8	1 %
Manganese	7439-96-5	1 %
Magnesium	7439-95-4	1 % (related to Magnesium oxide)

WHMIS Classification:
Class D2B: Eye and skin irritation (If dusts are formed)

Additional Regulatory Information

A: General Product Information

No additional information available.

B: Component Analysis - Inventory

Component	CAS #	TSCA	CAN	EEC
Aluminum	7429-90-5	Yes	DSL	EINECS
Silicon	7440-21-3	Yes	DSL	EINECS
Iron	7439-89-6	Yes	DSL	EINECS
Zinc	7440-66-6	Yes	DSL	EINECS
Copper	7440-50-8	Yes	DSL	EINECS
Manganese	7439-96-5	Yes	DSL	EINECS
Magnesium	7439-95-4	Yes	DSL	EINECS

Section 15 - Other Information

Other Information

Coating Component Information:
111-82-0: Dodecanoic acid, methyl ester
112-39-0: Methyl palmitate
112-72-1: Myristic alcohol
124-10-7: Methyl tetradecanoate
30399-84-9: Isooctadecanoic acid
64771-72-8: Paraffins, petroleum, normal C5-20
Exercise caution when cutting the containment strapping that may secure some products, particularly wrought materials, during transportation. It may rebound and cause serious injury.

Reasonable care has been taken in the preparation of this information, but the manufacturer makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The manufacturer makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use.

Key/Legend

ACGIH = American Conference of Governmental Industrial Hygienists. AICS = Australian Inventory of Chemical Substances. CAS = Chemical Abstract Service. CERCLA = Comprehensive Environmental Response, Compensation and Liability Act. CFR = Code of Federal Regulations. CHEMTREC = Chemical Transportation Emergency Center. DSL = Canadian Domestic Substance List. EINECS = European Inventory of New and Existing Chemical Substances. ELINCS = European List of Notified Chemical Substances. EPA = Environmental Protection Agency. HEPA = High Efficiency Particulate Air. HMIS = Hazardous Material Information System. IARC = International Agency for Research on Cancer. IDLH = Immediately Dangerous to Life and Health. MITI = Japanese Ministry of International Trade and Industry. NDSL = Canadian Non-Domestic Substance List. NFPA = National Fire Protection Association. NIOSH = National Institute of Occupational Safety and Health. NJTSR = New Jersey Trade Secret Registry. NTP = National Toxicology Program. OSHA = Occupational Safety and Health Administration. NA = Not available or Not Applicable. SARA = Superfund Amendments and Reauthorization Act. TDG = Transportation of Dangerous Goods. TLV = Threshold Limit Value. TSCA = Toxic Substances Control Act. WHMIS = Workplace Hazardous Materials Information System.