



Safety Data Sheet

Section 1. Identification of the substance/mixture and of the company/undertaking

Product identifier:

Product name: Devarda's alloy, powder

SDS No. : 2155E-3

Relevant identified uses of the substance or mixture and uses advised against

Research and Development

Details of the supplier of the safety data sheet

Manufacturer/Supplier: KISHIDA CHEMICAL CO., LTD.

Address: 3-1, Honmachibashi, Chuo-ku, Osaka, JAPAN

Division: Chemical Safety Management Department

Telephone number: +81-6-6946-8061

FAX: +81-6-6946-1607

Section 2. Hazards identification

GHS classification and label elements of the product

Classification of the substance or mixture

PHYSICAL AND CHEMICAL HAZARDS

Flammable solids: Category 1

HEALTH HAZARDS

Skin sensitization: Category 1

Specific target organ toxicity – single exposure: Category 1 (gastrointestinal tract, respiratory system)

Specific target organ toxicity – repeated exposure: Category 1 (respiratory system)

ENVIRONMENT HAZARDS

Hazardous to the aquatic environment, short-term (acute): Category 2

Hazardous to the aquatic environment, long-term (chronic): Category 2

(Note) GHS classification without description: Not classified/Classification not possible

Label elements



Signal word: Danger

HAZARD STATEMENT

H228 Flammable solid

H317 May cause an allergic skin reaction

H370 Causes damage to organs (gastrointestinal tract, respiratory system)

H372 Causes damage to organs through prolonged or repeated exposure (respiratory system)

H411 Toxic to aquatic life with long lasting effects

PRECAUTIONARY STATEMENT

Prevention

P273 Avoid release to the environment.

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P240 Ground and bond container and receiving equipment.



- P241 Use explosion-proof electrical/ventilating/lighting equipment.
P260 Do not breathe dust/fume/gas/mist/vapors/spray.
P264 Wash contaminated parts thoroughly after handling.
P272 Contaminated work clothing should not be allowed out of the workplace.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P270 Do not eat, drink or smoke when using this product.

Response

- P370 + P378 In case of fire: Use appropriate media to extinguish.
P391 Collect spillage.
P314 Get medical advice/attention if you feel unwell.
P308 + P311 IF exposed or concerned: Call a POISON CENTER/doctor/physician.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P333 + P313 If skin irritation or rash occurs: Get medical advice/attention.
P362 + P364 Take off contaminated clothing and wash it before reuse.

Storage

- P405 Store locked up.

Disposal

- P501 Dispose of contents/container in accordance with local/national regulation.

Specific adverse human health effects

See "11. Toxicological Information".

Section 3. Composition/information on ingredients

Mixture/Substance selection:

Substance

Ingredient name	Content (%)	CAS No.	ENCS	Chemical formula
Devarda's alloy	100	8049-11-4	—	—

Note : The figures shown above are not the specifications of the product.

Supplementary information concerning ingredients

- Copper 50% (CAS No.7440-50-8)
Aluminium 45% (CAS No.7429-90-5)
Zinc 5.0% (CAS No.7440-66-6)

Section 4. First-aid measures**Descriptions of first-aid measures****General measures**

- Get medical advice/attention if you feel unwell.

IF INHALED

- Remove person to fresh air and keep comfortable for breathing.
IF INHALED: Call a POISON CENTER/doctor/physician if you feel unwell.

IF ON SKIN

- Take off immediately all contaminated clothing. Rinse skin with water or shower.
Wash with plenty of soap and water.
If skin irritation or rash occurs: Get medical advice/attention.

IF IN EYES

- Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.



If eye irritation persists: Get medical advice/attention.

IF SWALLOWED

Rinse mouth.

IF SWALLOWED: Call a POISON CENTER/doctor/physician if you feel unwell.

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media

Use appropriate extinguishing media suitable for surrounding facilities.

Unsuitable extinguishing media

Unsuitable extinguishing media data is not available.

Specific hazards arising from the substance or mixture

Fire may produce irritating, corrosive and/or toxic gases.

Runoff from fire control or dilution water may cause pollution.

See "10. Stability and Reactivity".

Advice for firefighters

Specific fire-fighting measures

Evacuate non-essential personnel to safe area.

Special protective equipment and precautions for fire-fighters

Wear fire resistant or flame retardant clothing.

Wear protective gloves/protective clothing/eye protection/face protection.

Firefighters should wear self-contained breathing apparatus with a full facepiece operated in the positive pressure mode.

Section 6. Accidental release measures

Personnel precautions, protective equipment and emergency procedures

Keep unauthorized personnel away.

Ventilate area until material pick up is complete.

Wear proper protective equipment.

Environmental precautions

Prevent spills from entering sewers, watercourses, low areas or rivers. To be careful not discharged to the environment without being properly handled waste water contaminated.

Methods and materials for containment and cleaning up

Sweep up, place in a bag and hold for waste disposal.

Preventive measures for secondary accident

Collect spillage.

Section 7. Handling and storage

Precautions for safe handling

Preventive measures

(Exposure Control for handling personnel)

Do not breathe dust/fume/gas/mist/vapors/spray.

(Protective measures against fire and explosion)

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Ground and bond container and receiving equipment.

Use explosion-proof electrical/ventilating/lighting equipment.



(Exhaust/ventilator)

Exhaust/ventilator should be available.

(Safety treatments)

Avoid contact with skin.

Avoid contact with eyes.

Safety Measures

Wear protective gloves/protective clothing/eye protection/face protection.

Wash hands et al thoroughly after handling.

When using do not eat, drink or smoke.

Any incompatibilities

See "10.Stability and Reactivity".

Advice on general occupational hygiene

Wash contaminated parts thoroughly after handling.

Do not eat, drink or smoke when using this product.

Contaminated work clothing should not be allowed out of the workplace.

Take off contaminated clothing and wash it before reuse.

Storage

Conditions for safe storage

Keep container tightly closed.

Store locked up. (P405)

Store in a cool, dry place. Do not store in direct sunlight.

Storage in accordance with local/national regulation.

Container and packaging materials for safe handling

Use closed unbreakable containers.

Section 8. Exposure controls/personal protection

Control parameters

Control value and Concentration standard value

Not established

Adopted value

The Japan Society for Occupational Health

(Aluminium)

Class 1 of dust: Respirable dust 0.5mg/m³; Total dust 2mg/m³

(Other inorganic and organic dust (third class dust))

JSOH Respirable dust 2mg/m³, Total dust 8mg/m³

ACGIH

(Copper)

TWA: 0.2mg-Cu/m³(Fume); TWA: 1mg-Cu/m³(Dusts and mists) (Irr; GI; metal fume fever)

(Aluminium)

TWA: 1mg/m³(R) (Pneumoconiosis; LRT irr; neurotoxicity)

Exposure controls

Appropriate engineering controls

Do not use in areas without adequate ventilation.

Eye wash station should be available.

Washing facilities should be available.

Individual protection measures

Recommend to use protective equipment in conformity with the standards.

Use appropriate protective equipment in accordance with local/national regulation.

Respiratory protection



Wear respiratory protection (dust-proof mask/gas mask). Select chemical cartridge corresponding to type of gases when using a gas mask.

Hand protection

Wear impervious protective glove.

Eye protection

Wear eye/face protection. Wear safety goggles in cases gas is generated.

Skin and body protection

Wear protective clothing.

Section 9. Physical and Chemical Properties

Information on basic physical and chemical properties

Physical state: Lumps or powder

Color: Gray

Odor: Odorless

Melting point/Freezing point data is not available.

Boiling point or initial boiling point data is not available.

Boiling range data is not available.

Flammability (gases, liquids and solids) data is not available.

Lower and upper explosion limit/flammability limit data is not available.

Flash point data is not available.

Auto-ignition temperature data is not available.

Decomposition temperature data is not available.

pH data is not available.

Kinematic viscosity data is not available.

Solubility:

Solubility in water data is not available.

Solubility in solvent data is not available.

n-Octanol/water partition coefficient data is not available.

Vapor pressure data is not available.

Density and/or relative density: about 6 (20°C)

Relative vapor density (Air=1) data is not available.

Particle characteristics data is not available.

Other information

Other information is not available.

Section 10. Stability and Reactivity

Reactivity

Not available.

Chemical stability

Oxidized slowly in air.

Possibility of hazardous reactions

(Copper)

Mixtures with acetylenic compounds, ethylene oxide and azides are shock-sensitive. Reacts with strong oxidants such as chlorates, bromates and iodates. This generates explosion hazard. (ICSC 0240)

(Aluminium)

Ignites in air when finely divided. Dust explosion possible if in powder or granular form, mixed with air.



Reacts with water and alcohols. Reacts violently with oxidants, strong acids, strong bases, chlorinated hydrocarbons and halogens. This generates fire and explosion hazard. (ICSC 0988)

(Zinc)

Ignites in air when finely divided. If dry, it can be charged electrostatically by swirling, pneumatic transport, pouring, etc.

On combustion forms zinc oxide fumes. The substance is a strong reducing agent. It reacts violently with oxidants, acids and bases. Reacts with water. This produces flammable/explosive gas (hydrogen). Reacts violently with sulfur, halogenated hydrocarbons and many other substances. This generates fire and explosion hazard. (ICSC 1205)

Conditions to avoid

Contact with incompatible materials.

Contact with fire source.

Incompatible materials

Acids, Bases, Oxidizing agents, Water, Alcohols, Chlorinated hydrocarbons, Halogens, Sulfur, Halogenated hydrocarbons

Hazardous decomposition products

Copper compounds, Zinc oxide, Hydrogen

Section 11. Toxicological Information

Information on toxicological effects

Acute toxicity

Acute toxicity (Oral)

[Data for components of the product]

[NITE-CHIRP]

(Zinc)

rat LD50: > 2000 mg/kg (source: NITE)

Acute toxicity (Inhalation)

[Data for components of the product]

[NITE-CHIRP]

(Zinc)

dust/mist: rat LC50: 5410 mg/m³ (OECD TG 403) (source: NITE)

Irritant properties

Skin corrosion/irritation data is not available.

Serious eye damage/irritation

[Data for components of the product]

[NITE-CHIRP]

(Zinc)

Category 2B (source: NITE)

Sensitization

Skin sensitization

[Product]

Category 1, May cause an allergic skin reaction

[Data for components of the product]

[NITE-CHIRP]

(Copper)

Category 1A (source: NITE)

Mutagenic effects data is not available.

Carcinogenicity



[Data for components of the product]

[ACGIH]

(Aluminium)

A4: Not Classifiable as a Human Carcinogen

Reproductive toxicity data is not available.

Specific target organ toxicity (STOT)

STOT-single exposure

[Product]

Category 1, Causes damage to organs

[Data for components of the product]

[NITE-CHIRP]

(Copper)

Category 1 (gastrointestinal tract), Category 3 (Respiratory tract irritation) (source: NITE)

(Aluminium)

Category 1 (respiratory system) (source: NITE)

STOT-repeated exposure

[Product]

Category 1, Causes damage to organs through prolonged or repeated exposure

[Data for components of the product]

[NITE-CHIRP]

(Aluminium)

Category 1 (respiratory system) (source: NITE)

Aspiration hazard data is not available.

Information on other hazards

May cause lung disorders by massive inhalation of powdered substance.

–e.g. fibrosis of lung tissue, cough, sputum, breath shortness, dyspnea, decline of lung function, interstitial lung disease, pneumothorax

Section 12. Ecological Information

Toxicity

Aquatic toxicity

[Product]

Category 2, Toxic to aquatic life

Category 2, Toxic to aquatic life with long lasting effects

[Data for components of the product]

Hazardous to the aquatic environment, short-term (acute)

[NITE-CHIRP]

(Zinc)

Algae (*Pseudokirchneriella subcapitata*) 72-hour ErC50: 0.15 mg/L (source: NITE)

Water solubility

(Copper)

none (source: ICSC, 2016)

(Aluminium)

reaction (source: ICSC, 2019)

(Zinc)

reaction (source: ICSC, 2019)

Persistence and degradability

[Data for components of the product]



- (Zinc)
 - Not rapidly degradable (source: NITE)
- Bioaccumulative potential
 - [Data for components of the product]
 - (Copper)
 - log Pow: -0.57 (calculated value) (source: ICSC, 2016)
- Mobility in soil
 - Mobility in soil data is not available.
- Other adverse effects
 - Ozone depleting chemical data is not available.

Section 13. Disposal considerations

- Description of waste residues and information on their safe handling and methods of disposal, including the disposal of any contaminated packaging
- Waste treatment methods
 - Avoid release to the environment.
 - Dispose of contents/container as industrial waste. Accordance with local/national regulation.

Section 14. Transport Information

- UN Number or ID Number : 3089
- UN Proper Shipping Name :
METAL POWDER, FLAMMABLE, N.O.S.
- Class or division (Transport hazard class) : 4.1
- Packing group : II
- ERG GUIDE No.: 170
- IMDG Code (International Maritime Dangerous Goods Regulations)
 - UN Number or ID Number : 3089
 - UN Proper Shipping Name :
METAL POWDER, FLAMMABLE, N.O.S.
 - Class or division (Transport hazard class) : 4.1
 - Packing group : II
- IATA (Dangerous Goods Regulations)
 - UN Number or ID Number : 3089
 - UN Proper Shipping Name :
METAL POWDER, FLAMMABLE, N.O.S.
 - Class or division (Transport hazard class) : 4.1
 - Hazard labels : Flamm. solid
 - Packing group : II
- Environmental hazards
 - Marine pollutants (yes/no) : yes

Section 15. Regulatory Information

- Safety, health and environmental regulations/legislation specific for the substance or mixture
- U.S. Toxic Substances Control Act (TSCA) Inventory
 - Chemicals listed in TSCA Inventory
 - Copper; Aluminium; Zinc

**Other regulatory information**

Ensure this material in compliance with federal requirements and ensure conformity to local regulations.

Section 16. Other information**References and sources for data**

Globally Harmonized System of classification and labelling of chemicals, UN
Recommendations on the TRANSPORT OF DANGEROUS GOODS 23rd edit., 2023 UN
IMDG Code, 2024 Edition (Incorporating Amendment 42-24)
IATA Dangerous Goods Regulations (66th Edition) 2025
2020 EMERGENCY RESPONSE GUIDEBOOK (US DOT)
2025 TLVs and BEIs. (ACGIH)
JIS Z 7252 : 2019
JIS Z 7253 : 2019
2024 Recommendation on TLVs (JSOH)
Supplier's data/information

General Disclaimer

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Unauthorized translation or modification is prohibited.

Please provide SDS to customers for selling or transferring.

All chemicals have unknown hazard. Handle the product with care.

This data sheet was created based on the information we currently have and may be revised according to new information. In addition, the precautions apply only to normal handling, and in the case of special handling, please make adequate countermeasure to maintain your safety.

The data given here is based on current knowledge and experience. The purpose of this Safety Data Sheet is to describe the products in terms of their safety requirements. The data does not signify any warranty with regard to the products' properties.

The GHS classification data given here is based on current Data published in Japan (National Institute of Technology and Evaluation (NITE) Chemical Risk Information Platform (NITE-CHRIIP), up to FY2023).