Safety Data Sheet

1. PRODUCT AND COMPANY IDENTIFICATION

Identification
Product name: YMF-02A
Generic Name: IR-Shielding Dispersion Liquid
Type of product: Mixture

Use of the substance or preparation
For painting or ink.

Company/Undertaking Identification
Sumitomo Metal Mining Co. Ltd., Material div.
11-3, 5-chome, Shimbashi, Minato-ku, Tokyo, 105 Japan
Tel.: +81-3-3436-7872  Fax: +81-3-3436-7827

Emergency telephone
+81-3-3436-7872

2. SUMMARY OF DANGER AND HAZARD

GHS Classification
Physical hazards
- Explosives: not classified
- Flammable gases: not classified
- Flammable aerosols: not classified
- Gases under pressure: not classified
- Flammable liquids: 2
- Flammable solids: not classified
- Self-reactive substances and mixtures: not classified
- Pyrophoric liquids: not classified
- Pyrophoric solids: not classified
- Self-heating substances and mixtures: not classified
- Substances and mixtures, which in contact with water, emit flammable gases: not classified
- Oxidizing liquids: not classified
- Oxidizing solids: not classified
- Organic peroxides: not classified
- Corrosive to metals: not classified

Health hazards
- Acute toxicity (oral): not classified
- Acute toxicity (dermal): not classified
- Acute toxicity (inhalation, vapor): 4
- Skin corrosion/irritation: not classified
Serious eye damage/eye irritation - 2A
Respiratory sensitizer - not classified
Skin sensitizer - not classified
Germ cell mutagenicity - not classified
Carcinogenicity - not classified
Toxic to reproduction - not classified
STOT SE - 3 (respiratory tract irritation, narcotic effects)
STOT RE - 1 (general toxicity)
Aspiration hazard - not classified
Effects on or via lactation - not classified

Environmental hazards
Acute hazards to the aquatic environment - not classified
Chronic hazards to the aquatic environment - not classified

**Signal word:** Danger

**Symbol:**

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**Hazard Statement:**
H225: Highly flammable liquid and vapor.
H319: Causes serious eye irritation.
H332: Harmful if inhaled.
H335: May cause respiratory irritation.
H336: May cause drowsiness or dizziness.
H371: May cause damage to organs.
H372: Causes damage to organs through prolonged or repeated exposure.

**Precautionary Statements:**
P210: Keep away from heat/sparks/open flames/hot surfaces. — No smoking.
P240: Ground/bond container and receiving equipment.
P241: Use explosion-proof electrical/ventilating/light/.../equipment.
P242: Use only non-sparking tools.
P243: Take precautionary measures against static discharge.
P260: Do not breathe dust/fume/gas/mist/vapors/spray.
P271: Use only outdoors or in a well-ventilated area.
P264: Wash hands thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.
P280: Wear protective gloves (e.g. rubber gloves) /protective clothing (clothing made of antistatic...
synthetic fiber / eye protection / face protection.

Response Precautionary Statements:
P378: Use proper media for extinction (e.g. CO₂, chemical powder, sand. Do NOT use water jet.).
P303+361+353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P332+313: If skin irritation occurs: Get medical advice/attention.
P304+340+309+310: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. IF exposed or you feel unwell: Immediately call a POISON CENTER or doctor/physician.
P305 + P351 + P338: IF IN EYES: Remove contact lenses if present and easy to do. Continue rinsing.
P337+P313: If eye irritation persists: Get medical advice/attention.
P301+P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P312: Call a POISON CENTER or doctor/physician if you feel unwell.

Storage precautionary statements:
P403+235: Store in a well-ventilated place. Keep cool.
P404: Store in a closed container.
P405: Store locked up.

Disposal precautionary statements:
P501: Dispose of contents/container to relevant local and national regulations.

3. COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS</th>
<th>EINECS</th>
<th>% by weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Methyl-4-pentanal</td>
<td>108-10-1</td>
<td>203-550-1</td>
<td>63%</td>
</tr>
<tr>
<td>Cesium tungsten oxide</td>
<td>52350-17-1</td>
<td>237-019-0</td>
<td>18.5%</td>
</tr>
<tr>
<td>Butyl acetate</td>
<td>123-86-4</td>
<td>204-658-1</td>
<td>7%</td>
</tr>
<tr>
<td>2-Butanol</td>
<td>78-92-2</td>
<td>201-158-5</td>
<td>1.5%</td>
</tr>
<tr>
<td>Others</td>
<td>Trade secret</td>
<td>Trade secret</td>
<td>10%</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

Persons using this product should consult a physician or other medical professional if an accident involving this product occurred or caused injury. Specific first-aid measures are as follows:

Eyes Contact: Immediately raise eyelids and flush with plenty of water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If irritation persists, seek medical care.

Skin Contact: Immediately wash contaminated area with plenty of water and soap. If irritation persists, get medical attention.

Inhalation: Remove to fresh air. Call a POISON CENTER or doctor/physician if you feel unwell.
**Ingestion:** Do not induce vomiting without professional instruction. Get medical attention immediately.

**5. FIRE FIGHTING MEASURES**

- **Flash point:** 18°C (closed cup)
- **Flammable/Explosive Limits:**
  - Lower Vol %: Not available
  - Upper Vol %: Not available
- **Extinguishing Media:** Use dry chemical or sand for small fire; foam or CO₂ for large fire. DO NOT use water jet. Seek advice from local fire-fighting authority.
- **Fire Fighting Equipment:** Firefighters must wear self-contained breathing apparatus and full protective equipment.
- **Unusual Fire and Explosion Hazards:** This product is highly flammable. Mixture of its vapor and air may be explosive which may ignite or explode when it is exposed to open flame or heat.
- **Hazardous Combustion Products:** Carbon oxides, nitrogen oxides and fumes may be released from heating or fire which is irritating to respiratory system.

**6. ACCIDENTAL RELEASE MEASURES**

- **Personal precautions:** Use proper personal protective equipment as indicated in Section 8.
- **Measures for Cleaning/Collection:**
  - **Small Spill:**
    - Mop up or absorb with an inert dry material (e.g. sand, dry lime) and place in an appropriately labeled waste disposal container.
  - **Large Spill:**
    - Isolate contaminated area and set up a warning board. The persons handling emergency are recommended wearing protective clothing. Do NOT touch spilled material. Keep away from heat and sources of ignition.
    - Build up dike or dig pit for collection. Spray fog water to cool down and dilute vapor. Dilute the spilled liquid till it is not combustible. Protect the working staff. Collect the spilled material with explosion-proof pump into an appropriate container and transport the waste to the disposal place.
    - **Environmental Precautions:** Keep cleaning run-offs out of municipal sewers and open bodies of water. Comply with local and national laws and regulations.

**7. CAUTIONS OF HANDLING AND STORAGE**

- **Handling:**
  - Do not breathe vapor that may be evolved during processing.
  - Workers must wear proper protective equipment and must operate strictly according to relative rules.
  - Workers are recommended wearing anti-poison respirators, safety goggles, anti-poison clothing and rubber gloves.
- **Information about fire- and explosion protection:**
Keep ignition sources away—Do not smoke.

Storage:
Requirements to be met by storerooms: Store it in a well-ventilated, cool and dry store room. Keep containers tightly sealed.
Additional Information: The storeroom should be equipped with proper facilities for accidental leakage and fire.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>OSHA PEL-TWA</th>
<th>ACGIH TLV-TWA</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Methyl-4-pentanal (CAS: 108-10-1)</td>
<td>50ppm</td>
<td>20ppm</td>
</tr>
<tr>
<td>Cesium tungsten oxide (CAS: 52350-17-1)</td>
<td>Not available</td>
<td>Not available</td>
</tr>
<tr>
<td>Butyl acetate (CAS:123-86-4)</td>
<td>150ppm</td>
<td>150ppm</td>
</tr>
<tr>
<td>2-Butanol (CAS: 78-92-2)</td>
<td>150ppm</td>
<td>100ppm</td>
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</tbody>
</table>

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate vapor, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protective Equipment:
Protection of Hands:
Wear protective gloves. (e.g. impermeable rubber gloves)

Protection of Eyes:
No special requirements under normal conditions. Wear safety glasses when liquid may splash.

Respiratory Protection:
Use an approved respirator if exposure limits are exceeded or if irritation or other symptoms occurred. Do not aspirate dried product.

Protection of Body:
Recommend wearing uniforms.

General protective and hygienic measures:
Keep away from foodstuffs, beverages and feed.
Wash hands before breaks and at the end of work.
Avoid contact with eyes and skin.

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>General Information</th>
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<tbody>
<tr>
<td>Form</td>
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</tbody>
</table>
Color | Dark blue
--- | ---
Odor | Aromatic
Boiling Range | Not available
Melting point/Melting range | Not available
Flash point | 18°C (closed cup)
Self-igniting | Not available
Flammable/Explosive Limits-Lower Vol % | Not available
Flammable/Explosive Limits-Upper Vol % | Not available
Density (@20°C) | Not available
Relative Vapor density | Heavier than air
Vapor pressure | Not available
Solubility in/Miscibility with Water | Slightly soluble in water
PH-Value (Saturated solution) | Not available
Viscosity (@25°C) | 7 mPa • s

10. STABILITY AND REACTIVITY

Chemical Stability: Stable under normal temperatures and pressures.

Hazardous Decomposition Products: Carbon oxides, nitrogen oxides and fumes may be released from heating or fire which is irritating to respiratory system.

Materials to avoid: Ignition sources.

Hazardous Polymerizations: Will not occur.

Conditions to Avoid: Heat and high temperature.

11. TOXICOLOGICAL INFORMATION

Product Toxicity Data: The toxicity data of this product has not been determined by testing or research, but to relevant literature and classification standard in Annex 2 of GHS, the toxicity of this product is classified as category 4. The toxicity data shown below is for reference only.

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS</th>
<th>LD 50/ LC 50</th>
</tr>
</thead>
</table>
| 2-Methyl-4-pentanal | 108-10-1 | Acute Oral LD50: 2,080mg/kg (rat)  
Acute Oral LD50: 2,671mg/kg (mouse) |
| Nanoparticulate Cesium tungsten oxide | 52350-17-1 | Acute Oral LD50: >2000mg/kg (rat) |
| Butyl acetate | 123-86-4 | Acute Oral LD50: 10,768mg/kg (rat)  
Acute Oral LD50: 7,076mg/kg (mouse) |
| 2-Butanol    | 78-92-2 | Acute Oral LD50: 6,480mg/kg (rat) |

Contact with Eyes: It can cause serious irritation to eyes and symptoms may include redness, tear and ache.
Contact with Skin: No hazard for normal use. Repeated or long-time contact may cause mild irritation.

Inhalation: It may cause irritation to nose, throat and respiratory system if inhaling concentrated vapor of this liquid.

Ingestion: It can cause irritation to intestinal tract. Symptoms may include bellyache, nausea, vomiting, sickness and dizziness.

Aspiration into lungs: It has been concerned that aspiration of dried product may cause serious health effects.

Effects of Overexposure – Chronic: It causes damage to organs through prolonged or repeated exposure.

Carcinogenicity: Not listed by IARC, NTP, ACGIH and EPA.

Sensitivity: Not found.

Teratogenicity: Not found.

Mutagenicity: Not found.

Irritation Data:
2-Methyl-4-pentanal (CAS: 108-10-1)
   Draize test, rabbit, skin, 500mg/24h: mild
   Draize test, rabbit, eye, 500mg/24h: mild
Butyl acetate (CAS:123-86-4)
   Draize test, rabbit, skin, 500mg/24h: moderate
   Draize test, rabbit, eye, 500mg/24h: mild
2-Butanol (CAS: 78-92-2)
   Draize test, rabbit, skin, 500mg/24h: mild
   Draize test, rabbit, eye, 500mg/24h: moderate

12. ECOLOGICAL INFORMATION

Ecotoxicity Data: Not available.

Persistence and Degradability: This product is biodegradable.

Bioaccumulative Potential: Not found.

Mobility in Soil: It can move in soil due to its liquid nature.

Notes: Do not allow product to reach ground water, water course or sewage system.

13. DISPOSAL INFORMATION

Do not allow product to reach sewage system.

Do not throw it into any open bodies of water.

Waste recycling must be operated strictly according to relevant regulations.

14. TRANSPORTATION INFORMATION

DOT:
Proper Shipping Name: Coating solution
Hazard Class: 3
UN Code: UN1139
Packing Group: II

Air-Transportation- IATA/ICAO:
Proper Shipping Name: Coating solution
Hazard Class: 3
UN Code: UN1139
Packing Group: II

Sea-Transportation-IMO/IMDG:
Proper Shipping Name: Coating solution
Hazard Class: 3
UN Code: UN1139
Packing Group: II
Marine pollutant: No

Note:
Check whether the package is completed or sealed before transporting; make sure there are no damage and no falling down of packages during transporting; the transport vehicle should be equipped with fire-fighting equipment and emergency facilities for handling with release; do NOT transport this product together with incompatible substances.

15. REGULATORY INFORMATION
US Laws and Regulations:
TSCA (Toxic Substance Control Act): 2-Methyl-4-pentanal (CAS: 108-10-1), Cesium tungsten oxide (CAS: 52350-17-1), Butyl acetate (CAS:123-86-4), 2-Butanol (CAS: 78-92-2) and Others (Trade secret) are on the U.S. Toxic Substances Control Act Chemical Substance Inventory List.

SNUR (Significant New Use Rule): It is negligible for workers to inhale Cesium tungsten oxide(CAS: 52350-17-1) because the product is used in aqueous form. However, it has been concerned that aspiration of Cesium tungsten oxide (CAS: 52350-17-1) as a solid may cause serious health effects.

Clean Water Act: 2-Methyl-4-pentanal (CAS: 108-10-1) and butyl acetate (CAS:123-86-4) are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
SARA 313: This product doesn’t contain SARA 313 Toxic Release Chemicals.
Section 355 (extremely hazardous substances): Not listed.
Proposition 65: Not applicable
Carcinogenicity categories: Not listed by EPA, IARC and NTP.

HMIS-Rating (0-4)

<table>
<thead>
<tr>
<th>Rating</th>
<th>Health</th>
<th>Flammability</th>
<th>Physical hazard</th>
<th>Personal protection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>E</td>
</tr>
</tbody>
</table>

Rating:
- None
- Least
- Moderate
- High
- Extremely high

0 1 2 3 4

Other laws and regulations:
. 67/548/EEC Annex III & Annex IV:

<table>
<thead>
<tr>
<th>Ingredient(s)</th>
<th>R-phrases</th>
<th>S-Phrases</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Methyl-4-pentanal (CAS: 108-10-1)</td>
<td>R11-20-36/37-66</td>
<td>S: (2-)9-16-29</td>
</tr>
<tr>
<td>Butyl acetate (CAS: 123-86-4)</td>
<td>R10-66-67</td>
<td>S: (2-)25</td>
</tr>
</tbody>
</table>

Candidate List of Substances of very high concern (SVHC) according to ECHA: Not listed.
REACH Regulation Annex XVII Regulation List: Not listed.

16. OTHER INFORMATION

DISCLAIMER: This data contained herein are furnished for information only and are believed to be reliable. However, SUMITOMO METAL MINING CO., LTD. does not assume responsibility for any results obtained by persons over whose methods are not controlled. It is the user's responsibility to determine the suitability of products or any production methods mentioned herein for a particular purpose, and to adopt such precautions as may be advisable for the protection of property and persons against any hazards that may be involved in the handling and use of this product. SUMITOMO METAL MINING CO., LTD. further disclaims any liability for consequential or incidental damages of any kind, including lost profits.

References:
GHS Annex II
GHS SDS Instruction
ANSI Z400.1/Z129.1-2010
OSHA Hazard Communication Standard (HCS) 2012

Full description of some acronyms:
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