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## SAFETY DATA SHEET

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

#### 1.1 Product identifier

Product name : BLACK COATING AGENT 420ml (Aerosol)

CAS-No. : Mixture

EC-No. : Mixture

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

Identified use : Melanism processing of the thermal diffusivity measurement

#### 1.3 Details of the supplier of the safety data sheet

Company : AUDEC CO.,LTD

Address : Takanawa Muse Bldg., 3-14-13 Higashi-Gotanda, Shinagawa-ku, Tokyo, 141-0022,  
JAPAN

Customer service phone : +81-3-6447-7461

#### 1.4 Emergency Phone

Telephone No. : +81-3-6447-7461 (during office hours)

Facsimile No. : +81-3-6447-7405

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### 2. Hazards identification

#### 2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No.1272/2008

|              |      |  |
|--------------|------|--|
| Aerosols 1   | H222 | Extremely flammable aerosol                |
|              | H229 | Pressurized container: may burst if heated |
| Eye Irrit. 2 | H319 | Causes serious eye irritation              |
| STOT SE 3    | H336 | May cause drowsiness or dizziness          |

#### 2.2 Label elements

Labelling according to Regulation (EC) No.1271/2008

The mixture is classified and labelled according to the CLP regulation

Hazard pictograms :



Flame



Health hazard



Exclamation mark

Signal word : Danger

Hazard statements :

H222 Extremely flammable aerosol  
H229 Pressurized container: may burst if heated  
H319 Causes serious eye irritation  
H336 May cause drowsiness or dizziness

Precautionary statements :

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

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- P211 Do not spray on an open flame or other ignition source.  
 P251 Do not pierce or burn, even after use.  
 P261 Avoid breathing dust/fume/gas/mist/vapors/spray.  
 P264 Wash hands thoroughly after handling.  
 P271 Use only outdoors or in a well-ventilated area.  
 P280 Wear protective gloves/protective clothing/eye protection/face protection.  
 P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.  
 P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
 P312 Call a POISON CENTER/doctor if you feel unwell.  
 P337+P313 If eye irritation persists: Get medical advice/attention.  
 P403+P233 Store in a well-ventilated place. Keep container tightly closed.  
 P405 Store locked up.  
 P410+P412 Protect from sunlight. Do not expose to temperatures exceeding 50°C/122°F.  
 P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

**Additional information :**

Restricted to professional users.

**2.3 Other hazards**

**Results of PBT and vPvB assessment**

**PBT** : Not applicable

**vPvB** : Not applicable

**3. Composition / information on ingredients**

**3.1 Substances**

Not applicable.

**3.2 Mixtures**

| Component         | CAS number | EC number | % by weight | Hazard Class and Category |      |
|-------------------|------------|-----------|-------------|---------------------------|------|
| Dimethyl ether    | 115-10-6   | 204-065-8 | 70 - 80     | Flam. Gas 1,              | H220 |
| Cyclopentane      | 287-92-3   | 206-016-6 | 10 - 20     | Flam. Liq. 2              | H225 |
|                   |            |           |             | Aquatic Chronic 3         | H412 |
| Isopropyl alcohol | 67-63-0    | 200-661-7 | 5.0 - 10    | Flam. Liq. 2              | H225 |
|                   |            |           |             | STOT SE 3                 | H336 |
|                   |            |           |             | Eye Irrit. 2              | H319 |
| Graphene          | 7782-42-5  | 231-955-3 | 0.5 - 1.0   | None                      |      |
| Binder            | Secret     | Secret    | 0.1 - 0.5   | None                      |      |
| Butan-1-ol        | 71-36-3    | 200-751-6 | 0.1 - 0.5   | Flam. Liq. 3              | H226 |
|                   |            |           |             | Acute Tox. 4              | H302 |
|                   |            |           |             | STOT SE 3                 | H335 |
|                   |            |           |             | STOT SE 3                 | H336 |
|                   |            |           |             | Skin Irrit. 2             | H315 |
|                   |            |           |             | Eye Dam. 1                | H318 |

#### 4. First-aid measures

##### 4.1 Description of first aid measures

**Inhalation :**

Immediately remove person to fresh air. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, give artificial respiration and get medical care.

**Skin contact :**

If irritation occurs, immediately wash the affected area with plenty of water. If irritation persists, get medical care.

**Eye contact :**

Immediately flush eyes gently with large amounts of running water for at least 15 minutes while holding upper and lower lids open. Remove contact lenses, if present and easy to do, then continue rinsing eyes. If irritation persists or is severe, get medical care.

**Ingestion :**

Do not induce vomiting unless directed to do so by medical personnel. Give plenty of water or preferably milk to drink (only in conscious person). If vomiting does occur, administer additional water. Never give anything by mouth to a victim who is unconscious or is having convulsions. Get medical care at once.

##### 4.2 Most important symptoms and effects, both acute and delayed

**Inhalation :**

Excessive inhalation of solvent vapors may give to nausea, headaches and dizziness.

**Skin contact :**

May cause irritation. Symptoms : redness and pain.

**Eye contact :**

Irritating to eyes. Symptoms : redness and pain.

**Ingestion :**

May cause gastrointestinal disturbances. Symptoms : sore throat, abdominal pain, nausea, vomiting.

##### 4.3 Indication of any immediate medical attention and special treatment needed

**General Advice :**

If you feel unwell, seek medical advice.

If symptoms persist always call a doctor.

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#### 5. Fire -fighting measures

##### 5.1 Extinguishing media

**Suitable extinguishing media :** Dry agent, Carbon dioxide, Alcohol-resistant Foam, Water spray

**Unsuitable extinguishing media :** Normal Foam

##### 5.2 Specific hazards arising from the substance or mixture

The container may rupture if exposed to flame or heat above 50 °C.

Vapors accumulate in low areas and may travel to ignition source and flash back.

##### 5.3 Advice for firefighters

**Protective equipment :**

Wear self-contained respiratory protective device and fully protective suit.

**Additional information :**

Keep containers exposed fire cool, by spraying with water.

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Combat fire from a sheltered position.

Do not inhale combustion gases.

Dispose of fire debris and contaminated fire-fighting water in accordance with official regulations.

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## **6. Accidental release measures**

### **6.1 Personal precautions, protective equipment and emergency procedures**

Remove all ignition sources. Gases are extremely flammable.

Clean-up personnel should wear gloves and goggles to prevent irritation from contact.

Avoid inhalation of mist from the spilled material.

Keep unnecessary people away.

If possible, remove leaking container to safe area. If not, isolate and ventilate the area.

### **6.2 Environmental precautions**

If possible, stop the leaking to prevent release to the environment.

Do not allow to enter sewers/ground water or penetrate the soil.

If polluted water reaches drainage systems or water courses, immediately inform appropriate authorities.

### **6.3 Methods and materials for containment and cleaning up**

Collect liquid in an appropriate container or absorb with an inert material (e.g., vermiculite, dry sand, earth), and place in a chemical waste container.

Vapor is heavier than air and can settle into low areas. Flushing with water spray can be used to help dilute vapor concentration in air. But do not flush to sewer or waterways.

Dispose of the material collected according to regulations.

### **6.4 Reference to other sections**

See Section 7 for information on safe handling.

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

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## **7. Handling and storage**

### **7.1 Precautions for safe handling :**

Read the instructions before use.

Use in well-ventilated area.

Do not breathe mist/vapors.

Avoid contact with skin, eyes, mucosae, and clothing.

Take precautionary measures against static discharges.

Use explosion-proof electrical/ventilating/lighting equipment.

Do not puncture or incinerate.

Do not refill.

### **7.2 Conditions for safe storage :**

Keep away from heat, direct sunlight, sparks or other ignition sources.

Store in a cool, dry, well-ventilated place.

Do not store at temperature above 40°C.

Keep out of reach of children.

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### 7.3 Specific end use(s)

Melanism processing of the thermal diffusivity measurement.

## 8. Exposure controls / personal protection

### 8.1 Control parameters

**Exposure limit :**

| Component              | CAS number | EC number | Exposure limit  |
|------------------------|------------|-----------|---|
| Dimethyl ether         | 115-10-6   | 204-065-8 | MAK 1000ppm, 1900mg/m <sup>3</sup> (DFG(2015))  |
| Cyclopentane           | 287-92-3   | 206-016-6 | TWA 600ppm, 1720mg/m <sup>3</sup> (ACGIH(2015))   |
| Isopropyl alcohol      | 67-63-0    | 200-661-7 | MAK 200ppm, 500mg/m <sup>3</sup> (DFG(2015)),<br>TWA 200ppm, 492mg/m <sup>3</sup> (ACGIH(2015)) |
| Graphene<br>(Graphite) | 7782-42-5  | 231-955-3 | MAK 1.5mg/m <sup>3</sup> as respirable fraction<br>(DFG(2015))                                  |
| Butan-1-ol             | 71-36-3    | 200-751-6 | MAK 100ppm, 310mg/m <sup>3</sup> (DFG(2015)),<br>TWA 20ppm, 61mg/m <sup>3</sup> (ACGIH(2015))   |

### 8.2 Exposure controls

**Control procedures :**

Ensure adequate ventilation. Use explosion-proof ventilation equipment.

Keep away from heat and sources of ignition.

Take precautionary measures against static discharges.

**Personal protection :**

Take precautions to avoid contact with skin and eyes when handling the product.

Ensure adequate ventilation.

Eye wash fountain and emergency showers are recommended.

**Individual protection measures :**

**Eye protection ;** Wear chemical goggles or glasses with side shields and/or face shield.

**Skin protection ;** Wear impervious (chemical) gloves and/or impervious apron.

**Respiratory protection ;** Wear respiratory protection for organic vapors.

## 9. Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

| Component                               | Base liquid          | Propellant (Dimethyl ether) |
|---|----------------------|-----------------------------|
| Physical state *                        | Liquid               | Liquid and Vapor            |
| Color                                   | Black                | Colorless                   |
| Odor                                    | Organic solvent odor | Slightly ether odor         |
| Odor threshold                          | Not available        | Not available               |
| pH                                      | Not applicable       | Not applicable              |
| Melting point/freezing point            | Not applicable       | -141.5°C                    |
| Initial boiling point and boiling range | Not applicable       | -24.8°C                     |
| Flash point                             | -37°C (Cyclopentane) | -41.1°C                     |

| Component                                    | Base liquid                                  | Propellant (Dimethyl ether)             |
|--|--|---|
| Evaporation rate                             | Not available                                | Not available                           |
| Flammability (solid, gas)                    | Not available                                | Not available                           |
| Upper/lower flammability or explosive limits | Upper 8.7vol%<br>Lower 1.1vol%(Cyclopentane) | Upper 27.0vol%<br>Lower 3.4vol%         |
| Vapor pressure                               | Not available                                | 0.507MPa @20.8°C                        |
| Vapor density                                | Not available                                | 1.6 (air=1)                             |
| Relative density                             | 0.77 (H <sub>2</sub> O=1) @20°C              | 0.661 (H <sub>2</sub> O=1) @20°C,liquid |
| Solubility                                   | Not available                                | 7.0g/100ml (water,18°C)                 |
| Partition coefficient :<br>n-octanol/water   | Not available                                | 0.2 as log POW                          |
| Auto-ignition temperature                    | Not available                                | 350°C                                   |
| Decomposition temperature                    | Not available                                | Not available                           |
| Viscosity                                    | Not available                                | Not available                           |

\* in the container

## 9.2 Other information

No further relevant information available.

## 10. Stability and reactivity

### 10.1 Reactivity

No reactivity in general handling and storage condition.

### 10.2 Chemical stability

Stable in general handling and storage condition.

### 10.3 Possibility of hazardous reactions

May cause explosion by contact with source of ignition or strong oxidizing agents.

Hazardous polymerization will not occur.

### 10.4 Conditions to avoid

Contact with source of ignition or incompatible materials.

Avoid overheating.

### 10.5 Incompatible materials

Strong oxidizing agents.

### 10.6 Hazardous decomposition products

Carbon monoxide, Carbon dioxide

## 11. Toxicological information

### 11.1 Information on toxicological effects

**Ingestion** ; Irritation to gastrointestinal tract. Swallowing the product may cause nausea and diarrhea.

**Skin and eye contact** ; Causes irritation.

**Inhalation** ; Exposure may produce dizziness and narcosis depending on concentration of exposure.

**Acute toxicity values** ;

Oral : Cyclopentane; LD50>5000mg/kg(rat)(SIDS(2010))

Isopropyl alcohol; LD50=4384mg/kg(rat)(EPA Pesticides(1995))

Butan-1-ol; LD50=790mg/kg(rat)(SIDS(2005))

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Dermal : Isopropyl alcohol; LD50=12870mg/kg(rabbit)(EHC 103(1990))  
Butan-1-ol; LD50=3402mg/kg(rabbit)(SIDS(2005))  
Inhalation : Dimethyl ether; LC50=164000ppm/4hrs(rat)(PATTY(2001))  
Isopropyl alcohol; LC50=68.5mg/L/4hrs(rat)(EPA Pesticides(1995))  
Butan-1-ol; LC50=8000ppm/4hrs(rat)(MOE(2005))

**CMR effects** ; Repr. 2

Carcinogenicity - No information available

Germ cell mutagenicity - No information available

Reproductive toxicity - Suspected of damaging fertility or the unborn child if swallowed.

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## 1 2 . Ecological information

### 12.1 Toxicity

**Ecotoxicity :**

Acute toxicity values : Dimethyl ether; EC50>4000mg/L/48hrs(daphnia magna)(IUCLID(2000))  
Cyclopentane; EC50=10.5mg/L/48hrs(Daphnia magna)(SIDS(2008))  
Isopropyl alcohol; EC50>1000mg/L/48hrs(Daphnia magna)(MOE(1997))  
Butan-1-ol; EC50>1000mg/L/48hrs(Daphnia magna)(MOE(1996))

### 12.2 Persistence and degradability

There is no information of the product.

### 12.3 Bioaccumulative potential

There is no information of the product.

### 12.4 Mobility in soil

There is no information of the product.

### 12.5 Results of PBT and vPvB assessment

There is no information of the product.

### 12.6 Other adverse effects

There is no information of the product.

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## 1 3 . Disposal considerations

### 13.1 Waste treatment methods

This product when emptied and depressurized through normal use, pose no disposal hazard and should be recycled. Consult local authorities for approved procedures.

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## 1 4 . Transport information

### 14.1 UN number

UN 1950

### 14.2 UN proper shipping name

Aerosols, flammable (maximum 1 liter)

### 14.3 Transport hazard class

Class 2.1 (Flammable gas)

### 14.4 Packing group

Not applicable

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**14.5 Environmental hazards**

ADR/RID - Environmentally hazardous ; No  
IMDG - Marine pollutant ; No  
IATA/ICAO - Environmentally hazardous ; No

**14.6 Special precautions for user**

ADR/RID - Tunnelcode ; (D)  
IMDG - Ems ; F-D, S-U  
IATA/ICAO - PAX ; 203  
IATA/ICAO - CAO ; 203

**14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**

Not applicable

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**1 5 . Regulatory information**

**15.1 Safety, health and environmental regulations/legislations specific for the substance or mixture**

The Safety Data Sheet is compiled according to the current European requirements.  
Directive 2013/10/EU, 2008/47/EC amendment of the aerosol dispenser directive 75/324/EEC.  
Regulation (EC) No.1907/2006 (REACH)  
EU-directive 99/45/EC  
Regulation (EC) No.1272/2008 (CLP)

**15.2 Chemical safety assessment**

No information available

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**1 6 . Other information**

Risk-phrases            R12 : Extremely flammable  
                              R36 : Irritating to eyes  
                              R67 : Vapours may cause drowsiness and dizziness

Hazard statements    H222 : Extremely flammable aerosol  
                              H229 : Pressurized container: may burst if heated  
                              H319 : Causes serious eye irritation  
                              H336 : May cause drowsiness or dizziness

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