

Material Safety Data Sheet

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

1.1. Identification of the **mixture**:

ECO-UV, EUV-BK

1.2. Use of the substance/ **mixture**:

Inkjet Printing

1.3. Company/undertaking identification:

Manufacture's name: Roland DG Corporation

Address: 1-6-4 Shinmiyakoda, Kita-ku, Hamamatsu-shi,
Shizuoka-ken, 431-2103

JAPAN

Phone: + 81-53-484-1224

Fax: + 81-53-484-1226

Revision: **30 October 2009**

E-mail address:

1.4. Emergency telephone:

2. Hazard Identification

2.1 Emergency overview: warning statement

Classified as hazardous according the EU directives 1999/45/EC.

In case of contact, causes eye and skin irritation and dermatitis.

Dangerous for the environment. Harmful to aquatic organisms.

2.2 Potential Health Effects:

Eyes: Causes severe eye injury which may persist for several days.

Skin: May cause skin irritation, injury, dermatitis and/or allergy.

Inhalation: Vapors or mist, especially as generated from heating the material or as from exposure in poorly ventilated areas or confined spaces, may irritate nose, throat/respiratory system.

Ingestion: May cause injury of mouth ,throat, and stomach.

3. Composition/Information on Ingredients

Chemical nature: mixture(colored dispersion)

| Ink Composition | CAS No. | EC No. | EU registration No. | % By Weight | EU Symbols | EU R phrases | Remarks |
|---|--------------|--------------|------------------------------|-------------|------------|---------------|---------|
| Synthetic resins | Trade secret | Trade secret | Not available for the moment | 0.5-5 | - | - | - |
| Acrylated amine synergist | Trade secret | Trade secret | Not available for the moment | 10-20 | Xi | R36/38 R43 | - |
| hexamethylene diacrylate hexane-1,6-diol diacrylate | 13048-33-4 | 235-921-9 | Not available for the moment | 10-20 | Xi | R36/38 R43 | - |
| Carbon Black | 1333-86-4 | 215-609-9 | Not available for the moment | 1-5 | - | - | - |
| Acrylic esters | Trade secret | Trade secret | Not available for the moment | 30-45 | - | - | - |
| Other photo sensitive monomers | Trade secret | Trade secret | Not available for the moment | 15-30 | - | - | - |
| Phosphine oxide derivative | Trade secret | Trade secret | Not available for the moment | 5-15 | - | - | - |
| Other polymerization initiator | Trade secret | Trade secret | Not available for the moment | 1-5 | - | - | - |
| Others | Trade secret | Trade secret | Not available for the moment | 0-1 | - | - | - |

4. First Aid Measures

- 4.1 Eyes: Wash eye(s) immediately with large amounts of water, occasionally lifting upper and lower lids, until no evidence of chemical remains (at least 15-20 minutes). Get medical attention immediately.
- 4.2 Skin: Remove contaminated clothing and shoes immediately. Wash with soap or mild detergent and large amounts of water until no evidence of chemical remains (at least 15-20 minutes). If burns occur, proceed with the following: Cover affected area securely with sterile, dry, loose-fitting dressing. Get medical attention immediately.
- 4.3 Inhalation: Remove victim from exposure area to fresh air immediately.
Get medical attention immediately.
Perform artificial respiration if necessary.
Qualified medical personnel should consider administering oxygen.
- 4.4 Ingestion: Get medical attention immediately. Do not give anything by mouth as long as doctor does not allow.

5. Fire Fighting Measures

- 5.1 Flammability Combustible liquid under Hazard Communication Standard (HCS, U.S.A).
Flash Point: 67-70deg.C.
- 5.2 Extinguishing Media: Carbon dioxide, dry chemical, foam.
- 5.3 Fire Fighting Instructions: Wear special chemical protective clothing and positive pressure self-contained breathing apparatus. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. Decontaminate or discard any clothing that may contain chemical residues.

6. Accidental Release Measures

- 6.1 Personal precautions: Do not touch spilled material.
- 6.2 Environmental precautions: Prevent entry into sewers and waterways.
- 6.3 Methods for cleaning up: Stop leak if you can do it without risk. Take up with sand or other absorbent material and place into containers for later disposal. Move containers from spill area.

7. Handling and Storage

- 7.1 Handling: Use only in well-ventilated areas. Avoid contact with skin and eyes. Keep away from heat and open flame.
- 7.2 Storage: Keep containers tightly closed. Store in a cool, dry place. Keep away from strong oxidizing agents. Store away from incompatible substances (metals, amines, free radical initiators, oxidising agents.).
- 7.3 Specific use(s): No information

8. Exposure Controls and Personal Protection

8.1. Exposure limit values:

| <u>components</u> | <u>OSHA:PEL</u> | <u>ACGIH:TLV</u> |
|-------------------|----------------------|----------------------|
| Carbon black | 3.5mg/m ³ | 3.5mg/m ³ |

8.2 Exposure controls:

- Occupational Exposure controls: Provide general and/or local exhaust ventilation.
- Eye protection: Employee must wear splash-proof or dust safety goggles and a faceshield to prevent contact with this product. Emergency wash facilities. where there is any possibility that an employee's eyes and/or skin may be exposed to this substance. The employer should provide an eye wash fountain and quick drench shower within the immediate work area for emergency use.
- Skin protection: Employee must wear appropriate protective impervious clothing and equipment to prevent repeated or prolonged skin contact with this substance.
- Hand protection: Employee must wear appropriate protective impervious gloves to prevent contact with this substance.
- Respiratory protection: For emergency and other conditions where the exposure guideline may be exceeded, use an approved positive-pressure self-contained breathing apparatus or positive-pressure airline with auxiliary self contained air supply.
- Environmental exposure controls: Prevent entry into sewers and waterways.

9. Physical and Chemical Properties of Ink Formulation

9.1 General Information

- Appearance: Black Liquid
- Odor: Characteristic odor

9.2 Important health, safety and environmental information

| | |
|---|-------------------|
| pH: | Not applicable |
| Boiling point (deg.C) | No data available |
| Flash point (deg.C) | 67-70deg.C |
| Ignition temperature(deg.C) | No data available |
| Flammability limits(vol-%) | No data available |
| Specific Gravity(H ₂ O=1) (g/cm ³ , 20deg.C) | Approx 1.0 |
| Explosive properties: | No data available |
| Oxidizing properties: | No data available |
| Vapor pressure: | No data available |
| Solubility | Insoluble |
| Solubility in water (g/l, 20deg.C) | Insoluble |
| Partition coefficient: n-octanol/water: | No data available |
| Viscosity: | 6-8mPa·s(25deg.C) |
| Melting Point | No data available |
| Evaporation Rate(Butyl Acetate=1) | No data available |
| Vapor Density(AIR=1) | >1 |

10. Stability and Reactivity

| | |
|-----------------------------------|--|
| Stability: | Unstable. Polymerize under heat and/or light. |
| Conditions to avoid: | Elevated temperatures/heat, UV light, when not in use. |
| Materials to avoid: | Avoid contact with acids, amines, free radical initiators, oxidizing agents. |
| Hazardous decomposition products: | Carbon monoxide, carbon dioxide, oxides of nitrogen, toxic gases/vapors. |
| Hazardous polymerization: | High temperatures may cause rapid polymerization. |

11. Toxicological Information

Toxicity data:

Acrylic esters (of one component of this product)

| | |
|----------------------------------|-----------|
| LD ₅₀ (oral-rat) | 400µL/kg |
| LD ₅₀ (skin-rabbit) | 250µL/kg |
| LC ₅₀ (skin-rat) | 500ppm/4h |

Carcinogenic status:

IARC evaluated carbon black as a Group2B (Possibly carcinogenic to humans) and printing ink as a Group3(Not classifiable as to carcinogenicity to humans).

Acute Health Hazards: No data available

Mutagenicity: No data available

Chronic Health Hazards: Repeated skin contact may cause a persistent irritation or dermatitis.

Eye irritating

EUV-BK, YE, CY, MG, GL MIX applied once to the rabbit eye mucosa caused significant conjunctival and corneal effects. No iridial response was noted at 1, 48, and 72 hours, or at 1 week post treatment; the iridial effect could not be scored 24 hours following test item application, due to the swelling of the conjunctive and nictitating membrane. The effects were reversible within one week post application. In conclusion, according to Directive 2001/59/EC EUV-BK, YE, CY, MG, GL MIX should be classified as “R36” Irritating to eyes.

<The OECD Guidelines for Testing of Chemicals No.:405(24th April 2002), Directive 2004/73/EEC B.5, OPPTS870.2400, and the Principles of GLP>

Skin irritating

According to Directive 2001/59/EC EUV-BK, YE, CY, MG, GL MIX should be classified as “R38” Irritating to skin. According to the classification system based on the scheme devised by Draze(1959), EUV-BK, YE, CY, MG, GL MIX is “mild irritant”.

<The OECD Guidelines for Testing of Chemicals No.:404(24th April 2002), Directive 2004/73/EEC B.4, OPPTS870.2500, and the Principles of GLP >

Skin sensitizing: Skin contact with this product may cause an allergic or sensitization.

12. Ecological Information

12.1 Ecotoxicity:

The followings are according to the data on Phosphine oxide derivative.

| | |
|--|------------------------------|
| Acute toxicity to fish(Lauciscus idus 96h) | LC ₅₀ 10-100mg/l. |
| Acute toxicity to daphnia(48h) | EC ₅₀ 10-100mg/l. |
| Acute toxicity to bacteria | >500mg/l. |
| Acute toxicity to algae(plankton 72h) | EC ₅₀ 10-100mg/l. |

12.2 Mobility: No data available

12.3 Persistence and degradability: No data available

12.4 Bioaccumulative potential: No data available

12.5 Result of PBT assessment: No data available

12.6 Other adverse effects: No data available

13. Disposal Considerations

Waste disposal method: Incineration recommended. Waste disposal must be made in compliance with applicable local, state and country regulations.

14. Transportation Information

| | |
|-------------------------|--|
| UN. CLASS | Not applicable |
| UN. No. | Not applicable |
| Packing Group | Not applicable |
| Transportation Practice | Any transportation practice must be done in compliance with law and regulation. Avoid direct sunlight and/or heat. |

15. Regulatory Considerations

Regulatory information with regard to this product in your country or region should be examined by your own responsibility.

US information:

Toxic Substances Control Act (TSCA):

All components of this product are listed on the TSCA Inventory.

This product contains an ingredient that is regulated under the TSCA Significant New Use Rule (SNUR) prescribed 40 CFR 721.9664.

This product is subject to TSCA export notification requirements prescribed 40 CFR 707.60.

SARA Title III: Not regulated

California; Proposition 65: Not regulated

OSHA hazardous according to 29 CFR 1910.1200: Carbon Black

EU information:

Symbols and indication according to 1999/45/EC:



Xi Irritant

Wording of Risk and Safety Phase:

R 36/38 Irritating to eyes and skin.

R 43 May cause sensitization by skin contact.

S 21 When using do not smoke.

S 24/25 Avoid contact with skin and eyes.

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 37 Wear suitable gloves.

S 39 Wear eye/face protection.

S 41 In case of fire and/or explosion do not breathe fumes.

16. Other Information

List of relevant R-phrases: R 36/38 Irritating to eyes and skin.
 R 43 May cause sensitization by skin contact.

The information on this sheet is not a specification, it does not guarantee specific properties.

The information is intended to provide general guidance as to health and safety based upon our knowledge of the handling, storage and use of the product. It is not applicable to unusual or non-standard uses of the product, nor where instructions or recommendations are not followed.

Material Safety Data Sheet

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

1.1. Identification of the **mixture**:

ECO-UV, EUV-YE

1.2. Use of the substance/ **mixture**:

Inkjet Printing

1.3. Company/undertaking identification:

Manufacture's name: Roland DG Corporation

Address: 1-6-4 Shinmiyakoda, Kita-ku, Hamamatsu-shi,
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Revision: **30 October 2009**

E-mail address:

1.4. Emergency telephone:

2. Hazard Identification

2.1 Emergency overview: warning statement

Classified as hazardous according the EU directives 1999/45/EC.

In case of contact, causes eye and skin irritation and dermatitis.

Dangerous for the environment. Harmful to aquatic organisms.

2.2 Potential Health Effects:

Eyes: Causes severe eye injury which may persist for several days.

Skin: May cause skin irritation, injury, dermatitis and/or allergy.

Inhalation: Vapors or mist, especially as generated from heating the material or as from exposure in poorly ventilated areas or confined spaces, may irritate nose, throat/respiratory system.

Ingestion: May cause injury of mouth ,throat, and stomach.

3. Composition/Information on Ingredients

Chemical nature: mixture(colored dispersion)

| Ink Composition | CAS No. | EC No. | EU registration No. | % By Weight | EU Symbols | EU R phrases | Remarks |
|---|--------------|--------------|------------------------------|-------------|------------|---------------|---------|
| Synthetic resins | Trade secret | Trade secret | Not available for the moment | 0.5-5 | - | - | - |
| Acrylated amine synergist | Trade secret | Trade secret | Not available for the moment | 10-20 | Xi | R36/38 R43 | - |
| hexamethylene diacrylate hexane-1,6-diol diacrylate | 13048-33-4 | 235-921-9 | Not available for the moment | 20-30 | Xi | R36/38 R43 | - |
| Nickel, metal and insoluble compounds | 68511-62-6 | 270-944-8 | Not available for the moment | 1-5 | - | - | - |
| Acrylic esters | Trade secret | Trade secret | Not available for the moment | 30-45 | - | - | - |
| Other photo sensitive monomers | Trade secret | Trade secret | Not available for the moment | 15-30 | - | - | - |
| Phosphine oxide derivative | Trade secret | Trade secret | Not available for the moment | 5-15 | - | - | - |
| Other polymerization initiator | Trade secret | Trade secret | Not available for the moment | 1-5 | - | - | - |
| Others | Trade secret | Trade secret | Not available for the moment | 0-1 | - | - | - |

4. First Aid Measures

- 4.1 Eyes: Wash eye(s) immediately with large amounts of water, occasionally lifting upper and lower lids, until no evidence of chemical remains (at least 15-20 minutes). Get medical attention immediately.
- 4.2 Skin: Remove contaminated clothing and shoes immediately. Wash with soap or mild detergent and large amounts of water until no evidence of chemical remains (at least 15-20 minutes). If burns occur, proceed with the following: Cover affected area securely with sterile, dry, loose-fitting dressing. Get medical attention immediately.
- 4.3 Inhalation: Remove victim from exposure area to fresh air immediately.
Get medical attention immediately.
Perform artificial respiration if necessary.
Qualified medical personnel should consider administering oxygen.
- 4.4 Ingestion: Get medical attention immediately. Do not give anything by mouth as long as doctor does not allow.

5. Fire Fighting Measures

- 5.1 Flammability: Combustible liquid under Hazard Communication Standard (HCS, U.S.A).
Flash Point: 67-70deg.C.
- 5.2 Extinguishing Media: Carbon dioxide, dry chemical, foam.
- 5.3 Fire Fighting Instructions: Wear special chemical protective clothing and positive pressure self-contained breathing apparatus. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. Decontaminate or discard any clothing that may contain chemical residues.

6. Accidental Release Measures

- 6.1 Personal precautions: Do not touch spilled material.
- 6.2 Environmental precautions: Prevent entry into sewers and waterways.
- 6.3 Methods for cleaning up: Stop leak if you can do it without risk. Take up with sand or other absorbent material and place into containers for later disposal. Move containers from spill area.

7. Handling and Storage

- 7.1 Handling: Use only in well-ventilated areas. Avoid contact with skin and eyes. Keep away from heat and open flame.
- 7.2 Storage: Keep containers tightly closed. Store in a cool, dry place. Keep away from strong oxidizing agents. Store away from incompatible substances (metals, amines, free radical initiators, oxidising agents.).
- 7.3 Specific use(s): No information

8. Exposure Controls and Personal Protection

8.1. Exposure limit values:

| <u>components</u> | <u>OSHA:PEL</u> | <u>ACGIH:TLV</u> |
|---|--------------------|----------------------|
| Nickel, metal and insoluble compounds (as Ni) | 1mg/m ³ | 0.2mg/m ³ |

8.2 Exposure controls:

- Occupational Exposure controls: Provide general and/or local exhaust ventilation.
- Eye protection: Employee must wear splash-proof or dust safety goggles and a faceshield to prevent contact with this product. Emergency wash facilities. where there is any possibility that an employee's eyes and/or skin may be exposed to this substance. The employer should provide an eye wash fountain and quick drench shower within the immediate work area for emergency use.
- Skin protection: Employee must wear appropriate protective impervious clothing and equipment to prevent repeated or prolonged skin contact with this substance.
- Hand protection: Employee must wear appropriate protective impervious gloves to prevent contact with this substance.
- Respiratory protection: For emergency and other conditions where the exposure guideline may be exceeded, use an approved positive-pressure self-contained breathing apparatus or positive-pressure airline with auxiliary self contained air supply.
- Environmental exposure controls: Prevent entry into sewers and waterways.

9. Physical and Chemical Properties of Ink Formulation

9.1 General Information

- Appearance: Yellow Liquid
- Odor: Characteristic odor

9.2 Important health, safety and environmental information

| | |
|---|-------------------|
| pH: | Not applicable |
| Boiling point (deg.C) | No data available |
| Flash point (deg.C) | 67-70deg.C |
| Ignition temperature(deg.C) | No data available |
| Flammability limits(vol-%) | No data available |
| Specific Gravity(H ₂ O=1) (g/cm ³ , 20deg.C) | Approx 1.0 |
| Explosive properties: | No data available |
| Oxidizing properties: | No data available |
| Vapor pressure: | No data available |
| Solubility | Insoluble |
| Solubility in water (g/l, 20deg.C) | Insoluble |
| Partition coefficient: n-octanol/water: | No data available |
| Viscosity: | 6-8mPa·s(25deg.C) |
| Melting Point | No data available |
| Evaporation Rate(Butyl Acetate=1) | No data available |
| Vapor Density(AIR=1) | >1 |

10. Stability and Reactivity

| | |
|-----------------------------------|--|
| Stability: | Unstable. Polymerize under heat and/or light. |
| Conditions to avoid: | Elevated temperatures/heat, UV light, when not in use. |
| Incompatibility: | Avoid contact with acids, amines, free radical initiators, oxidizing agents. |
| Hazardous decomposition products: | Carbon monoxide, carbon dioxide, oxides of nitrogen, toxic gases/vapors. |
| Hazardous polymerization: | High temperatures may cause rapid polymerization. |

11. Toxicological Information

Toxicity data:

| | |
|---|-----------|
| Acrylic esters (of one component of this product) | |
| LD ₅₀ (oral-rat) | 400µL/kg |
| LD ₅₀ (skin-rabbit) | 250µL/kg |
| LC ₅₀ (skin-rat) | 500ppm/4h |

Carcinogenic status:

IARC evaluated Nickel compounds as a group 1 (Carcinogenic to humans) and printing ink as a Group3(Not classifiable as to carcinogenicity to humans).

| | |
|-------------------------|--|
| Acute Health Hazards: | No data available |
| Mutagenicity: | No data available |
| Chronic Health Hazards: | Repeated skin contact may cause a persistent irritation or dermatitis. |
| Eye irritating | |

EUV-BK, YE, CY, MG, GL MIX applied once to the rabbit eye mucosa caused significant conjunctival and corneal effects. No iridial response was noted at 1, 48, and 72 hours, or at 1 week post treatment; the iridial effect could not be scored 24 hours following test item application, due to the swelling of the conjunctive and nictitating membrane. The effects were reversible within one week post application. In conclusion, according to Directive 2001/59/EC EUV-BK, YE, CY, MG, GL MIX should be classified as "R36" Irritating to eyes.
 <The OECD Guidelines for Testing of Chemicals No.:405(24th April 2002), Directive 2004/73/EEC B.5, OPPTS870.2400, and the Principles of GLP>

Skin irritating

According to Directive 2001/59/EC EUV-BK, YE, CY, MG, GL MIX should be classified as "R38" Irritating to skin. According to the classification system based on the scheme devised by Draze(1959), EUV-BK, YE, CY, MG, GL MIX is "mild irritant".
 <The OECD Guidelines for Testing of Chemicals No.:404(24th April 2002), Directive 2004/73/EEC B.4, OPPTS870.2500, and the Principles of GLP >

| | |
|-------------------|--|
| Skin sensitizing: | Skin contact with this product may cause an allergic or sensitization. |
|-------------------|--|

12. Ecological Information

12.1 Ecotoxicity:

The followings are according to the data on Phosphine oxide derivative.

| | |
|--|------------------------------|
| Acute toxicity to fish(Lauciscus idus 96h) | LC ₅₀ 10-100mg/l. |
| Acute toxicity to daphnia(48h) | EC ₅₀ 10-100mg/l. |
| Acute toxicity to bacteria | >500mg/l. |
| Acute toxicity to algae(plankton 72h) | EC ₅₀ 10-100mg/l. |

12.2 Mobility: No data available

12.3 Persistence and degradability: No data available

12.4 Bioaccumulative potential: No data available

12.5 Result of PBT assessment: No data available

12.6 Other adverse effects: No data available

13. Disposal Considerations

Waste disposal method: Incineration recommended. Waste disposal must be made in compliance with applicable local, state and country regulations.

14. Transportation Information

| | |
|-------------------------|--|
| UN. CLASS | Not applicable |
| UN. No. | Not applicable |
| Packing Group | Not applicable |
| Transportation Practice | Any transportation practice must be done in compliance with law and regulation. Avoid direct sunlight and/or heat. |

15. Regulatory Considerations

Regulatory information with regard to this product in your country or region should be examined by your own responsibility.

US information:

Toxic Substances Control Act (TSCA):

All components of this product are listed on the TSCA Inventory.

This product contains an ingredient that is regulated under the TSCA Significant

New Use Rule (SNUR) prescribed 40 CFR 721.9664.

This product is subject to TSCA export notification requirements prescribed 40 CFR 707.60.

SARA Title III:

Subject to the reporting requirements of section 313 of TitleIII of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

Nickel compounds (Nickel, metal and insoluble compounds)

California; Proposition 65:

Nickel compounds (Nickel, metal and insoluble compounds)

WARNING: This product contains a chemical known to the State of California to cause cancer.

OSHA hazardous according to 29 CFR 1910.1200: Nickel compounds (Nickel, metal and insoluble compounds)

EU information:

Symbols and indication according to 1999/45/EC:



Xi Irritant

Wording of Risk and Safety Phase:

R 36/38 Irritating to eyes and skin.

R 43 May cause sensitization by skin contact.

S 21 When using do not smoke.

S 24/25 Avoid contact with skin and eyes.

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 37 Wear suitable gloves.

S 39 Wear eye/face protection.

S 41 In case of fire and/or explosion do not breathe fumes.

16. Other Information

List of relevant R-phrases: R 36/38 Irritating to eyes and skin.
R 43 May cause sensitization by skin contact.

The information on this sheet is not a specification, it does not guarantee specific properties.

The information is intended to provide general guidance as to health and safety based upon our knowledge of the handling, storage and use of the product. It is not applicable to unusual or non-standard uses of the product, nor where instructions or recommendations are not followed.

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1.1. Identification of the **mixture**:

ECO-UV, EUV-CY

1.2. Use of the substance/ **mixture**:

Inkjet Printing

1.3. Company/undertaking identification:

Manufacture's name: Roland DG Corporation

Address: 1-6-4 Shinmiyakoda, Kita-ku, Hamamatsu-shi,
Shizuoka-ken, 431-2103
JAPAN

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Revision: **30 October 2009**

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1.4. Emergency telephone:

2. Hazard Identification

2.1 Emergency overview: warning statement

Classified as hazardous according the EU directives 1999/45/EC.

In case of contact, causes eye and skin irritation and dermatitis.

Dangerous for the environment. Harmful to aquatic organisms.

2.2 Potential Health Effects:

Eyes: Causes severe eye injury which may persist for several days.

Skin: May cause skin irritation, injury, dermatitis and/or allergy.

Inhalation: Vapors or mist, especially as generated from heating the material or as from exposure in poorly ventilated areas or confined spaces, may irritate nose, throat/respiratory system.

Ingestion: May cause injury of mouth ,throat, and stomach.

3. Composition/Information on Ingredients

Chemical nature: mixture(colored dispersion)

| Ink Composition | CAS No. | EC No. | EU registration No. | % By Weight | EU Symbols | EU R phrases | Remarks |
|---|--------------|--------------|------------------------------|-------------|------------|--------------|---------|
| Copper phthalocyanine blue | 147-14-8 | 205-685-1 | Not available for the moment | 1-5 | - | - | - |
| Synthetic resins | Trade secret | Trade secret | Not available for the moment | 0.5-5 | - | - | - |
| Acrylated amine synergist | Trade secret | Trade secret | Not available for the moment | 10-20 | Xi | R36/38 R43 | - |
| hexamethylene diacrylate hexane-1,6-diol diacrylate | 13048-33-4 | 235-921-9 | Not available for the moment | 20-30 | Xi | R36/38 R43 | - |
| Acrylic esters | Trade secret | Trade secret | Not available for the moment | 30-45 | - | - | - |
| Other photo sensitive monomers | Trade secret | Trade secret | Not available for the moment | 15-30 | - | - | - |
| Phosphine oxide derivative | Trade secret | Trade secret | Not available for the moment | 5-15 | - | - | - |
| Other polymerization initiator | Trade secret | Trade secret | Not available for the moment | 1-5 | - | - | - |
| Others | Trade secret | Trade secret | Not available for the moment | 0-1 | - | - | - |

4. First Aid Measures

- 4.1 Eyes: Wash eye(s) immediately with large amounts of water, occasionally lifting upper and lower lids, until no evidence of chemical remains (at least 15-20 minutes). Get medical attention immediately.
- 4.2 Skin: Remove contaminated clothing and shoes immediately. Wash with soap or mild detergent and large amounts of water until no evidence of chemical remains (at least 15-20 minutes). If burns occur, proceed with the following: Cover affected area securely with sterile, dry, loose-fitting dressing. Get medical attention immediately.
- 4.3 Inhalation: Remove victim from exposure area to fresh air immediately.
Get medical attention immediately.
Perform artificial respiration if necessary.
Qualified medical personnel should consider administering oxygen.
- 4.4 Ingestion: Get medical attention immediately. Do not give anything by mouth as long as doctor does not allow.

5. Fire Fighting Measures

- 5.1 Flammability Combustible liquid under Hazard Communication Standard (HCS, U.S.A).
Flash Point: 67-70deg.C.
- 5.2 Extinguishing Media: Carbon dioxide, dry chemical, foam.
- 5.3 Fire Fighting Instructions: Wear special chemical protective clothing and positive pressure self-contained breathing apparatus. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. Decontaminate or discard any clothing that may contain chemical residues.

6. Accidental Release Measures

- 6.1 Personal precautions: Do not touch spilled material.
- 6.2 Environmental precautions: Prevent entry into sewers and waterways.
- 6.3 Methods for cleaning up: Stop leak if you can do it without risk. Take up with sand or other absorbent material and place into containers for later disposal. Move containers from spill area.

7. Handling and Storage

- 7.1 Handling: Use only in well-ventilated areas. Avoid contact with skin and eyes. Keep away from heat and open flame.
- 7.2 Storage: Keep containers tightly closed. Store in a cool, dry place. Keep away from strong oxidizing agents. Store away from incompatible substances (metals, amines, free radical initiators, oxidising agents.).
- 7.3 Specific use(s): No information

8. Exposure Controls and Personal Protection

8.1. Exposure limit values:

components

None

OSHA:PEL

ACGIH:TLV

8.2 Exposure controls:

Occupational Exposure controls:

Provide general and/or local exhaust ventilation.

Eye protection:

Employee must wear splash-proof or dust safety goggles and a faceshield to prevent contact with this product. Emergency wash facilities. where there is any possibility that an employee's eyes and/or skin may be exposed to this substance. The employer should provide an eye wash fountain and quick drench shower within the immediate work area for emergency use.

Skin protection:

Employee must wear appropriate protective impervious clothing and equipment to prevent repeated or prolonged skin contact with this substance.

Hand protection:

Employee must wear appropriate protective impervious gloves to prevent contact with this substance.

Respiratory protection:

For emergency and other conditions where the exposure guideline may be exceeded, use an approved positive-pressure self-contained breathing apparatus or positive-pressure airline with auxiliary self contained air supply.

Environmental exposure controls:

Prevent entry into sewers and waterways.

9. Physical and Chemical Properties of Ink Formulation

9.1 General Information

Appearance:

Cyan Liquid

Odor:

Characteristic odor

9.2 Important health, safety and environmental information

| | |
|---|-------------------|
| pH: | Not applicable |
| Boiling point (deg.C) | No data available |
| Flash point (deg.C) | 67-70deg.C |
| Ignition temperature(deg.C) | No data available |
| Flammability limits(vol-%) | No data available |
| Specific Gravity(H ₂ O=1) (g/cm ³ , 20deg.C) | Approx 1.0 |
| Explosive properties: | No data available |
| Oxidizing properties: | No data available |
| Vapor pressure: | No data available |
| Solubility | Insoluble |
| Solubility in water (g/l, 20deg.C) | Insoluble |
| Partition coefficient: n-octanol/water: | No data available |
| Viscosity: | 6-8mPa·s(25deg.C) |
| Melting Point | No data available |
| Evaporation Rate(Butyl Acetate=1) | No data available |
| Vapor Density(AIR=1) | >1 |

10. Stability and Reactivity

| | |
|-----------------------------------|--|
| Stability: | Unstable. Polymerize under heat and/or light. |
| Conditions to avoid: | Elevated temperatures/heat, UV light, when not in use. |
| Incompatibility: | Avoid contact with acids, amines, free radical initiators, oxidizing agents. |
| Hazardous decomposition products: | Carbon monoxide, carbon dioxide, oxides of nitrogen, toxic gases/vapors. |
| Hazardous polymerization: | High temperatures may cause rapid polymerization. |

11. Toxicological Information

Toxicity data:

| | |
|---|-----------|
| Acrylic esters (of one component of this product) | |
| LD ₅₀ (oral-rat) | 400µL/kg |
| LD ₅₀ (skin-rabbit) | 250µL/kg |
| LC ₅₀ (skin-rat) | 500ppm/4h |

Carcinogenic status:

IARC evaluated printing ink as a Group3(Not classifiable as to carcinogenicity to humans).

| | |
|-------------------------|--|
| Acute Health Hazards: | No data available |
| Mutagenicity: | No data available |
| Chronic Health Hazards: | Repeated skin contact may cause a persistent irritation or dermatitis. |

Eye irritating

EUV-BK, YE, CY, MG, GL MIX applied once to the rabbit eye mucosa caused significant conjunctival and corneal effects. No iridial response was noted at 1, 48, and 72 hours, or at 1 week post treatment; the iridial effect could not be scored 24 hours following test item application, due to the swelling of the conjunctive and nictitating membrane. The effects were reversible within one week post application. In conclusion, according to Directive 2001/59/EC EUV-BK, YE, CY, MG, GL MIX should be classified as “R36” Irritating to eyes.
 <The OECD Guidelines for Testing of Chemicals No.:405(24th April 2002), Directive 2004/73/EEC B.5, OPPTS870.2400, and the Principles of GLP>

Skin irritating

According to Directive 2001/59/EC EUV-BK, YE, CY, MG, GL MIX should be classified as “R38” Irritating to skin. According to the classification system based on the scheme devised by Draze(1959), EUV-BK, YE, CY, MG, GL MIX is “mild irritant”.
 <The OECD Guidelines for Testing of Chemicals No.:404(24th April 2002), Directive 2004/73/EEC B.4, OPPTS870.2500, and the Principles of GLP >

| | |
|-------------------|--|
| Skin sensitizing: | Skin contact with this product may cause an allergic or sensitization. |
|-------------------|--|

12. Ecological Information

12.1 Ecotoxicity:

The followings are according to the data on Phosphine oxide derivative.

| | |
|--|------------------------------|
| Acute toxicity to fish(Lauciscus idus 96h) | LC ₅₀ 10-100mg/l. |
| Acute toxicity to daphnia(48h) | EC ₅₀ 10-100mg/l. |
| Acute toxicity to bacteria | >500mg/l. |
| Acute toxicity to algae(plankton 72h) | EC ₅₀ 10-100mg/l. |

| | |
|-------------------------------------|-------------------|
| 12.2 Mobility: | No data available |
| 12.3 Persistence and degradability: | No data available |
| 12.4 Bioaccumulative potential: | No data available |
| 12.5 Result of PBT assessment: | No data available |
| 12.6 Other adverse effects: | No data available |

13. Disposal Considerations

Waste disposal method: Incineration recommended. Waste disposal must be made in compliance with applicable local, state and country regulations.

14. Transportation Information

| | |
|-------------------------|--|
| UN. CLASS | Not applicable |
| UN. No. | Not applicable |
| Packing Group | Not applicable |
| Transportation Practice | Any transportation practice must be done in compliance with law and regulation. Avoid direct sunlight and/or heat. |

15. Regulatory Considerations

Regulatory information with regard to this product in your country or region should be examined by your own responsibility.

US information:

Toxic Substances Control Act (TSCA):

All components of this product are listed on the TSCA Inventory.

This product contains an ingredient that is regulated under the TSCA Significant

New Use Rule (SNUR) prescribed 40 CFR 721.9664.

This product is subject to TSCA export notification requirements prescribed 40 CFR 707.60.

SARA Title III: Not regulated

California; Proposition 65: Not regulated

EU information:

Symbols and indication according to 1999/45/EC:



Xi Irritant

Wording of Risk and Safety Phase:

R 36/38 Irritating to eyes and skin.

R 43 May cause sensitization by skin contact.

S 21 When using do not smoke.

S 24/25 Avoid contact with skin and eyes.

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 37 Wear suitable gloves.

S 39 Wear eye/face protection.

S 41 In case of fire and/or explosion do not breathe fumes.

16. Other Information

List of relevant R-phrases: R 36/38 Irritating to eyes and skin.
 R 43 May cause sensitization by skin contact.

The information on this sheet is not a specification, it does not guarantee specific properties.
The information is intended to provide general guidance as to health and safety based upon our knowledge of the handling, storage and use of the product. It is not applicable to unusual or non-standard uses of the product, nor where instructions or recommendations are not followed.

Material Safety Data Sheet

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

1.1. Identification of the **mixture**:

ECO-UV, EUV-MG

1.2. Use of the substance/ **mixture**:

Inkjet Printing

1.3. Company/undertaking identification:

Manufacture's name: Roland DG Corporation

Address: 1-6-4 Shinmiyakoda, Kita-ku, Hamamatsu-shi,
Shizuoka-ken, 431-2103
JAPAN

Phone: + 81-53-484-1224

Fax: + 81-53-484-1226

Revision: **30 October 2009**

E-mail address:

1.4. Emergency telephone:

2. Hazard Identification

2.1 Emergency overview: warning statement

Classified as hazardous according the EU directives 1999/45/EC.

In case of contact, causes eye and skin irritation and dermatitis.

Dangerous for the environment. Harmful to aquatic organisms.

2.2 Potential Health Effects:

Eyes: Causes severe eye injury which may persist for several days.

Skin: May cause skin irritation, injury, dermatitis and/or allergy.

Inhalation: Vapors or mist, especially as generated from heating the material or as from exposure in poorly ventilated areas or confined spaces, may irritate nose, throat/respiratory system.

Ingestion: May cause injury of mouth ,throat, and stomach.

3. Composition/Information on Ingredients

Chemical nature: mixture(colored dispersion)

| Ink Composition | CAS No. | EC No. | EU registration No. | % By Weight | EU Symbols | EU R phrases | Remarks |
|---|--------------|--------------|------------------------------|-------------|------------|---------------|---------|
| Red pigment | Trade secret | Trade secret | Not available for the moment | 1-5 | - | - | - |
| Synthetic resins | Trade secret | Trade secret | Not available for the moment | 0.5-5 | - | - | - |
| Acrylated amine synergist | Trade secret | Trade secret | Not available for the moment | 10-20 | Xi | R36/38 R43 | - |
| hexamethylene diacrylate hexane-1,6-diol diacrylate | 13048-33-4 | 235-921-9 | Not available for the moment | 5-10 | Xi | R36/38 R43 | - |
| Acrylic esters | Trade secret | Trade secret | Not available for the moment | 30-45 | - | - | - |
| Other photo sensitive monomers | Trade secret | Trade secret | Not available for the moment | 15-30 | - | - | - |
| Phosphine oxide derivative | Trade secret | Trade secret | Not available for the moment | 5-15 | - | - | - |
| Other polymerization initiator | Trade secret | Trade secret | Not available for the moment | 1-5 | - | - | - |
| Others | Trade secret | Trade secret | Not available for the moment | 0-1 | - | - | - |

4. First Aid Measures

- 4.1 Eyes: Wash eye(s) immediately with large amounts of water, occasionally lifting upper and lower lids, until no evidence of chemical remains (at least 15-20 minutes). Get medical attention immediately.
- 4.2 Skin: Remove contaminated clothing and shoes immediately. Wash with soap or mild detergent and large amounts of water until no evidence of chemical remains (at least 15-20 minutes). If burns occur, proceed with the following: Cover affected area securely with sterile, dry, loose-fitting dressing. Get medical attention immediately.
- 4.3 Inhalation: Remove victim from exposure area to fresh air immediately.
Get medical attention immediately.
Perform artificial respiration if necessary.
Qualified medical personnel should consider administering oxygen.
- 4.4 Ingestion: Get medical attention immediately. Do not give anything by mouth as long as doctor does not allow.

5. Fire Fighting Measures

- 5.1 Flammability: Combustible liquid under Hazard Communication Standard (HCS, U.S.A).
Flash Point: 67-70deg.C.
- 5.2 Extinguishing Media: Carbon dioxide, dry chemical, foam.
- 5.3 Fire Fighting Instructions: Wear special chemical protective clothing and positive pressure self-contained breathing apparatus. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. Decontaminate or discard any clothing that may contain chemical residues.

6. Accidental Release Measures

- 6.1 Personal precautions: Do not touch spilled material.
- 6.2 Environmental precautions: Prevent entry into sewers and waterways.
- 6.3 Methods for cleaning up: Stop leak if you can do it without risk. Take up with sand or other absorbent material and place into containers for later disposal. Move containers from spill area.

7. Handling and Storage

- 7.1 Handling: Use only in well-ventilated areas. Avoid contact with skin and eyes. Keep away from heat and open flame.
- 7.2 Storage: Keep containers tightly closed. Store in a cool, dry place. Keep away from strong oxidizing agents. Store away from incompatible substances (metals, amines, free radical initiators, oxidising agents.).
- 7.3 Specific use(s): No information

8. Exposure Controls and Personal Protection

8.1. Exposure limit values:

components
None

OSHA:PEL

ACGIH:TLV

8.2 Exposure controls:

- Occupational Exposure controls: Provide general and/or local exhaust ventilation.
- Eye protection: Employee must wear splash-proof or dust safety goggles and a faceshield to prevent contact with this product. Emergency wash facilities where there is any possibility that an employee's eyes and/or skin may be exposed to this substance. The employer should provide an eye wash fountain and quick drench shower within the immediate work area for emergency use.
- Skin protection: Employee must wear appropriate protective impervious clothing and equipment to prevent repeated or prolonged skin contact with this substance.
- Hand protection: Employee must wear appropriate protective impervious gloves to prevent contact with this substance.
- Respiratory protection: For emergency and other conditions where the exposure guideline may be exceeded, use an approved positive-pressure self-contained breathing apparatus or positive-pressure airline with auxiliary self contained air supply.
- Environmental exposure controls: Prevent entry into sewers and waterways.

9. Physical and Chemical Properties of Ink Formulation

9.1 General Information

- Appearance: Magenta Liquid
- Odor: Characteristic odor

9.2 Important health, safety and environmental information

| | |
|---|-------------------|
| pH: | Not applicable |
| Boiling point (deg.C) | No data available |
| Flash point (deg.C) | 67-70deg.C |
| Ignition temperature(deg.C) | No data available |
| Flammability limits(vol-%) | No data available |
| Specific Gravity(H ₂ O=1) (g/cm ³ , 20deg.C) | Approx 1.0 |
| Explosive properties: | No data available |
| Oxidizing properties: | No data available |
| Vapor pressure: | No data available |
| Solubility | Insoluble |
| Solubility in water (g/l, 20deg.C) | Insoluble |
| Partition coefficient: n-octanol/water: | No data available |
| Viscosity: | 6-8mPa·s(25deg.C) |
| Melting Point | No data available |
| Evaporation Rate(Butyl Acetate=1) | No data available |
| Vapor Density(AIR=1) | >1 |

10. Stability and Reactivity

| | |
|-----------------------------------|--|
| Stability: | Unstable. Polymerize under heat and/or light. |
| Conditions to avoid: | Elevated temperatures/heat, UV light, when not in use. |
| Incompatibility: | Avoid contact with acids, amines, free radical initiators, oxidizing agents. |
| Hazardous decomposition products: | Carbon monoxide, carbon dioxide, oxides of nitrogen, toxic gases/vapors. |
| Hazardous polymerization: | High temperatures may cause rapid polymerization. |

11. Toxicological Information

Toxicity data:

Acrylic esters (of one component of this product)

LD₅₀ (oral-rat) 400µL/kg

LD₅₀ (skin-rabbit) 250µL/kg

LC₅₀ (skin-rat) 500ppm/4h

Carcinogenic status:

IARC evaluated printing ink as a Group3(Not classifiable as to carcinogenicity to humans).

Acute Health Hazards: No data available

Mutagenicity: No data available

Chronic Health Hazards: Repeated skin contact may cause a persistent irritation or dermatitis.

Eye irritating

EUV-BK, YE, CY, MG, GL MIX applied once to the rabbit eye mucosa caused significant conjunctival and corneal effects. No iridial response was noted at 1, 48, and 72 hours, or at 1 week post treatment; the iridial effect could not be scored 24 hours following test item application, due to the swelling of the conjunctive and nictitating membrane. The effects were reversible within one week post application. In conclusion, according to Directive 2001/59/EC EUV-BK, YE, CY, MG, GL MIX should be classified as "R36" Irritating to eyes.

<The OECD Guidelines for Testing of Chemicals No.:405(24th April 2002), Directive 2004/73/EEC B.5, OPPTS870.2400, and the Principles of GLP>

Skin irritating

According to Directive 2001/59/EC EUV-BK, YE, CY, MG, GL MIX should be classified as "R38" Irritating to skin. According to the classification system based on the scheme devised by Draze(1959), EUV-BK, YE, CY, MG, GL MIX is "mild irritant".

<The OECD Guidelines for Testing of Chemicals No.:404(24th April 2002), Directive 2004/73/EEC B.4, OPPTS870.2500, and the Principles of GLP >

Skin sensitizing: Skin contact with this product may cause an allergic or sensitization.

12. Ecological Information

12.1 Ecotoxicity:

The followings are according to the data on Phosphine oxide derivative.

| | |
|--|------------------------------|
| Acute toxicity to fish(Lauciscus idus 96h) | LC ₅₀ 10-100mg/l. |
| Acute toxicity to daphnia(48h) | EC ₅₀ 10-100mg/l. |
| Acute toxicity to bacteria | >500mg/l. |
| Acute toxicity to algae(plankton 72h) | EC ₅₀ 10-100mg/l. |

| | |
|-------------------------------------|-------------------|
| 12.2 Mobility: | No data available |
| 12.3 Persistence and degradability: | No data available |
| 12.4 Bioaccumulative potential: | No data available |
| 12.5 Result of PBT assessment: | No data available |
| 12.6 Other adverse effects: | No data available |

13. Disposal Considerations

Waste disposal method: Incineration recommended. Waste disposal must be made in compliance with applicable local, state and country regulations.

14. Transportation Information

| | |
|-------------------------|--|
| UN. CLASS | Not applicable |
| UN. No. | Not applicable |
| Packing Group | Not applicable |
| Transportation Practice | Any transportation practice must be done in compliance with law and regulation. Avoid direct sunlight and/or heat. |

15. Regulatory Considerations

Regulatory information with regard to this product in your country or region should be examined by your own responsibility.

US information:

Toxic Substances Control Act (TSCA):

All components of this product are listed on the TSCA Inventory.

This product contains an ingredient that is regulated under the TSCA Significant

New Use Rule (SNUR) prescribed 40 CFR 721.9664.

This product is subject to TSCA export notification requirements prescribed 40 CFR 707.60.

SARA Title III:

Not regulated

California; Proposition 65:

Not regulated

EU information:

Symbols and indication according to 1999/45/EC:



Xi Irritant

Wording of Risk and Safety Phase:

R 36/38 Irritating to eyes and skin.

R 43 May cause sensitization by skin contact.

S 21 When using do not smoke.

S 24/25 Avoid contact with skin and eyes.

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 37 Wear suitable gloves.

S 39 Wear eye/face protection.

S 41 In case of fire and/or explosion do not breathe fumes.

16. Other Information

List of relevant R-phrases: R 36/38 Irritating to eyes and skin.
R 43 May cause sensitization by skin contact.

The information on this sheet is not a specification, it does not guarantee specific properties.
The information is intended to provide general guidance as to health and safety based upon our knowledge of the handling, storage and use of the product. It is not applicable to unusual or non-standard uses of the product, nor where instructions or recommendations are not followed.

Material Safety Data Sheet

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

1.1. Identification of the **mixture**:

ECO-UV, EUV-WH

1.2. Use of the substance/ **mixture**:

Inkjet Printing

1.3. Company/undertaking identification:

Manufacture's name: Roland DG Corporation

Address: 1-6-4 Shinmiyakoda, Kita-ku, Hamamatsu-shi,
Shizuoka-ken, 431-2103
JAPAN

Phone: + 81-53-484-1224

Fax: + 81-53-484-1226

Revision: **30 October 2009**

E-mail address:

1.4. Emergency telephone:

2. Hazard Identification

2.1 Emergency overview: warning statement

Classified as hazardous according the EU directives 1999/45/EC.

In case of contact, causes eye and skin irritation and dermatitis.

Dangerous for the environment. Harmful to aquatic organisms.

2.2 Potential Health Effects:

Eyes: Causes severe eye injury which may persist for several days.

Skin: May cause skin irritation, injury, dermatitis and/or allergy.

Inhalation: Vapors or mist, especially as generated from heating the material or as from exposure in poorly ventilated areas or confined spaces, may irritate nose, throat/respiratory system.

Ingestion: May cause injury of mouth ,throat, and stomach.

3. Composition/Information on Ingredients

Chemical nature: mixture(colored dispersion)

| Ink Composition | CAS No. | EC No. | EU registration No. | % By Weight | EU Symbols | EU R phrases | Remarks |
|--|--------------|--------------|------------------------------|-------------|------------|----------------------------|---------|
| Synthetic resins | Trade secret | Trade secret | Not available for the moment | 0.5-5 | - | - | - |
| (1-methyl-1,2-ethanediyl) bis[oxy(methyl-2,1-ethanediyl)] diacrylate | 42978-66-5 | 256-032-2 | Not available for the moment | 10-20 | Xi,N | R36/37/38 R43 R51/53 | - |
| hexamethylene diacrylate hexane-1,6-diol diacrylate | 13048-33-4 | 235-921-9 | Not available for the moment | 10-20 | Xi | R36/38 R43 | - |
| Titanium Dioxide | 13463-67-7 | 236-675-5 | Not available for the moment | 10-20 | - | - | - |
| Acrylic esters | Trade secret | Trade secret | Not available for the moment | 30-40 | - | - | - |
| Other photo sensitive monomers | Trade secret | Trade secret | Not available for the moment | 0-5 | - | - | - |
| Phosphine oxide derivative | Trade secret | Trade secret | Not available for the moment | 5-15 | - | - | - |
| Others | Trade secret | Trade secret | Not available for the moment | 0-1 | - | - | - |

4. First Aid Measures

- 4.1 Eyes: Wash eye(s) immediately with large amounts of water, occasionally lifting upper and lower lids, until no evidence of chemical remains (at least 15-20 minutes). Get medical attention immediately.
- 4.2 Skin: Remove contaminated clothing and shoes immediately. Wash with soap or mild detergent and large amounts of water until no evidence of chemical remains (at least 15-20 minutes). If burns occur, proceed with the following: Cover affected area securely with sterile, dry, loose-fitting dressing. Get medical attention immediately.
- 4.3 Inhalation: Remove victim from exposure area to fresh air immediately. Get medical attention immediately. Perform artificial respiration if necessary. Qualified medical personnel should consider administering oxygen.
- 4.4 Ingestion: Get medical attention immediately. Do not give anything by mouth as long as doctor does not allow.

5. Fire Fighting Measures

- 5.1 Flammability: Combustible liquid under Hazard Communication Standard (HCS, U.S.A).
Flash Point: 66deg.C.
- 5.2 Extinguishing Media: Carbon dioxide, dry chemical, foam.
- 5.3 Fire Fighting Instructions: Wear special chemical protective clothing and positive pressure self-contained breathing apparatus. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. Decontaminate or discard any clothing that may contain chemical residues.

6. Accidental Release Measures

- 6.1 Personal precautions: Do not touch spilled material.
- 6.2 Environmental precautions: Prevent entry into sewers and waterways.
- 6.3 Methods for cleaning up: Stop leak if you can do it without risk. Take up with sand or other absorbent material and place into containers for later disposal. Move containers from spill area.

7. Handling and Storage

- 7.1 Handling: Use only in well-ventilated areas. Avoid contact with skin and eyes. Keep away from heat and open flame.
- 7.2 Storage: Keep containers tightly closed. Store in a cool, dry place. Keep away from strong oxidizing agents. Store away from incompatible substances (metals, amines, free radical initiators, oxidising agents.).
- 7.3 Specific use(s): No information

8. Exposure Controls and Personal Protection

8.1. Exposure limit values:

components

Titanium Dioxide

OSHA:PEL

15mg/m³ *

*for total dust

ACGIH:TLV

10mg/m³

8.2 Exposure controls:

- Occupational Exposure controls: Provide general and/or local exhaust ventilation.
- Eye protection: Employee must wear splash-proof or dust safety goggles and a faceshield to prevent contact with this product. Emergency wash facilities. where there is any possibility that an employee's eyes and/or skin may be exposed to this substance. The employer should provide an eye wash fountain and quick drench shower within the immediate work area for emergency use.
- Skin protection: Employee must wear appropriate protective impervious clothing and equipment to prevent repeated or prolonged skin contact with this substance.
- Hand protection: Employee must wear appropriate protective impervious gloves to prevent contact with this substance.
- Respiratory protection: For emergency and other conditions where the exposure guideline may be exceeded, use an approved positive-pressure self-contained breathing apparatus or positive-pressure airline with auxiliary self contained air supply.
- Environmental exposure controls: Prevent entry into sewers and waterways.

9. Physical and Chemical Properties of Ink Formulation

9.1 General Information

- Appearance: White Liquid
- Odor: Characteristic odor

9.2 Important health, safety and environmental information

| | |
|---|-------------------|
| pH: | Not applicable |
| Boiling point (deg.C) | No data available |
| Flash point (deg.C) | 66deg.C |
| Ignition temperature(deg.C) | No data available |
| Flammability limits(vol-%) | No data available |
| Specific Gravity(H ₂ O=1) (g/cm ³ , 20deg.C) | Approx 1.2 |
| Explosive properties: | No data available |
| Oxidizing properties: | No data available |
| Vapor pressure: | No data available |
| Solubility | Insoluble |
| Solubility in water (g/l, 20deg.C) | Insoluble |
| Partition coefficient: n-octanol/water: | No data available |
| Viscosity: | 6-8mPa·s(25deg.C) |
| Melting Point | No data available |
| Evaporation Rate(Butyl Acetate=1) | No data available |
| Vapor Density(AIR=1) | >1 |

10. Stability and Reactivity

| | |
|-----------------------------------|--|
| Stability: | Unstable. Polymerize under heat and/or light. |
| Conditions to avoid: | Elevated temperatures/heat, UV light, when not in use. |
| Incompatibility: | Avoid contact with acids, amines, free radical initiators, oxidizing agents. |
| Hazardous decomposition products: | Carbon monoxide, carbon dioxide, oxides of nitrogen, toxic gases/vapors. |
| Hazardous polymerization: | High temperatures may cause rapid polymerization. |

11. Toxicological Information

Toxicity data:

Acrylic esters (of one component of this product)

LD₅₀ (oral-rat) 400μL/kg

LD₅₀ (skin-rabbit) 250μL/kg

LC₅₀ (skin-rat) 500ppm/4h

Carcinogenic status:

IARC evaluated Titanium Dioxide as a Group2B (Possibly carcinogenic to humans) and printing ink as a Group3(Not classifiable as to carcinogenicity to humans).

Acute Health Hazards: No data available

Mutagenicity: No data available

Chronic Health Hazards: Repeated skin contact may cause a persistent irritation or dermatitis.

Eye irritating

EUV-WH applied once to the rabbit eye mucosa caused significant conjunctival, corneal and iridial effects. Discrete opalescence in the anterior chamber was still observed at the end of the 21 day observation period. In conclusion, according to Directive 2001/59/EC EUV-WH should be classified as “R41”Risk of serious damage to eyes.

<The OECD Guidelines for Testing of Chemicals No.:405(24th April 2002), Directive 2004/73/EEC B.5, OPPTS870.2400, and the Principles of GLP>

Skin irritating

According to Directive 2001/59/EC EUV-WH should be classified as “R38” Irritating to skin.

<The OECD Guidelines for Testing of Chemicals No.:404(24th April 2002), Directive 2004/73/EEC B.4, OPPTS870.2500, and the Principles of GLP >

Skin sensitizing: Skin contact with this product may cause an allergic or sensitization.

12. Ecological Information

12.1 Ecotoxicity:

The followings are according to the data on Phosphine oxide derivative.

| | |
|--|------------------------------|
| Acute toxicity to fish(Lauciscus idus 96h) | LC ₅₀ 10-100mg/l. |
| Acute toxicity to daphnia(48h) | EC ₅₀ 10-100mg/l. |
| Acute toxicity to bacteria | >500mg/l. |
| Acute toxicity to algae(plankton 72h) | EC ₅₀ 10-100mg/l. |

| | |
|-------------------------------------|-------------------|
| 12.2 Mobility: | No data available |
| 12.3 Persistence and degradability: | No data available |
| 12.4 Bioaccumulative potential: | No data available |
| 12.5 Result of PBT assessment: | No data available |
| 12.6 Other adverse effects: | No data available |

13. Disposal Considerations

Waste disposal method: Incineration recommended. Waste disposal must be made in compliance with applicable local, state and country regulations.

14. Transportation Information

| | |
|-------------------------|--|
| UN. CLASS | Not applicable |
| UN. No. | Not applicable |
| Packing Group | Not applicable |
| Transportation Practice | Any transportation practice must be done in compliance with law and regulation. Avoid direct sunlight and/or heat. |

15. Regulatory Considerations

Regulatory information with regard to this product in your country or region should be examined by your own responsibility.

US information:

Toxic Substances Control Act (TSCA):

All components of this product are listed on the TSCA Inventory.

| | |
|--|------------------|
| SARA Title III: | Not regulated |
| California; Proposition 65: | Not regulated |
| OSHA hazardous according to 29 CFR 1910.1200: | Titanium Dioxide |

EU information:

Symbols and indication according to 1999/45/EC:



Xi Irritant

Wording of Risk and Safety Phase:

- R 38 Irritating to skin.
- R 41 Risk of serious damage to eyes.
- R 43 May cause sensitization by skin contact.
- R 52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
- S 24/25 Avoid contact with skin and eyes.
- S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
- S 37/39 Wear suitable gloves and eye/face protection.
- S 61 Avoid release to the environment. Refer to special instructions/Safety data sheets.

16. Other Information

List of relevant R-phrases:

- R36/37/38 Irritating to eyes, respiratory system and skin.
- R 38 Irritating to skin.
- R 41 Risk of serious damage to eyes.
- R 43 May cause sensitization by skin contact.
- R 51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
- R 52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

The information on this sheet is not a specification, it does not guarantee specific properties.

The information is intended to provide general guidance as to health and safety based upon our knowledge of the handling, storage and use of the product. It is not applicable to unusual or non-standard uses of the product, nor where instructions or recommendations are not followed.

Material Safety Data Sheet

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

1.1. Identification of the mixture:

ECO-UV, EUV-GL

1.2. Use of the substance/ mixture:

Inkjet Printing

1.3. Company/undertaking identification:

Manufacture's name: Roland DG Corporation

Address: 1-6-4 Shinmiyakoda, Kita-ku, Hamamatsu-shi,
Shizuoka-ken, 431-2103
JAPAN

Phone: + 81-53-484-1224

Fax: + 81-53-484-1226

Revision: 30 October 2009

E-mail address:

1.4. Emergency telephone:

2. Hazard Identification

2.1 Emergency overview: warning statement

Classified as hazardous according the EU directives 1999/45/EC.

In case of contact, causes eye and skin irritation and dermatitis.

Dangerous for the environment. Harmful to aquatic organisms.

2.2 Potential Health Effects:

Eyes: Causes severe eye injury which may persist for several days.

Skin: May cause skin irritation, injury, dermatitis and/or allergy.

Inhalation: Vapors or mist, especially as generated from heating the material or as from exposure in poorly ventilated areas or confined spaces, may irritate nose, throat/respiratory system.

Ingestion: May cause injury of mouth ,throat, and stomach.

3. Composition/Information on Ingredients

Chemical nature: mixture(colored dispersion)

| Ink Composition | CAS No. | EC No. | EU registration No. | % By Weight | EU Symbols | EU R phrases | Remarks |
|---|--------------|--------------|------------------------------|-------------|------------|---------------|---------|
| Acrylated amine synergist | Trade secret | Trade secret | Not available for the moment | 10-20 | Xi | R36/38 R43 | - |
| hexamethylene diacrylate hexane-1,6-diol diacrylate | 13048-33-4 | 235-921-9 | Not available for the moment | 30-40 | Xi | R36/38 R43 | - |
| Acrylic esters | Trade secret | Trade secret | Not available for the moment | 30-40 | - | - | - |
| Other photo sensitive monomers | Trade secret | Trade secret | Not available for the moment | 10-20 | - | - | - |
| Phosphine oxide derivative | Trade secret | Trade secret | Not available for the moment | 5-15 | - | - | - |
| Others | Trade secret | Trade secret | Not available for the moment | 0-1 | - | - | - |

4. First Aid Measures

- 4.1 Eyes: Wash eye(s) immediately with large amounts of water, occasionally lifting upper and lower lids, until no evidence of chemical remains (at least 15-20 minutes). Get medical attention immediately.
- 4.2 Skin: Remove contaminated clothing and shoes immediately. Wash with soap or mild detergent and large amounts of water until no evidence of chemical remains (at least 15-20 minutes). If burns occur, proceed with the following: Cover affected area securely with sterile, dry, loose-fitting dressing. Get medical attention immediately.
- 4.3 Inhalation: Remove victim from exposure area to fresh air immediately.
Get medical attention immediately.
Perform artificial respiration if necessary.
Qualified medical personnel should consider administering oxygen.
- 4.4 Ingestion: Get medical attention immediately.. Do not give anything by mouth as long as doctor does not allow.

5. Fire Fighting Measures

- 5.1 Flammability Combustible liquid under Hazard Communication Standard (HCS, U.S.A).
Flash Point: 69deg.C.
- 5.2 Extinguishing Media: Carbon dioxide, dry chemical, foam.
- 5.3 Fire Fighting Instructions: Wear special chemical protective clothing and positive pressure self-contained breathing apparatus. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. Decontaminate or discard any clothing that may contain chemical residues.

6. Accidental Release Measures

- 6.1 Personal precautions: Do not touch spilled material.
- 6.2 Environmental precautions: Prevent entry into sewers and waterways.
- 6.3 Methods for cleaning up: Stop leak if you can do it without risk. Take up with sand or other absorbent material and place into containers for later disposal. Move containers from spill area.

7. Handling and Storage

- 7.1 Handling: Use only in well-ventilated areas. Avoid contact with skin and eyes. Keep away from heat and open flame.
- 7.2 Storage: Keep containers tightly closed. Store in a cool, dry place. Keep away from strong oxidizing agents. Store away from incompatible substances (metals, amines, free radical initiators, oxidising agents.).
- 7.3 Specific use(s): No information

8. Exposure Controls and Personal Protection

8.1. Exposure limit values:

| <u>components</u> | <u>OSHA:PEL</u> | <u>ACGIH:TLV</u> |
|-------------------|-----------------|------------------|
| None | | |

8.2 Exposure controls:

- Occupational Exposure controls: Provide general and/or local exhaust ventilation.
- Eye protection: Employee must wear splash-proof or dust safety goggles and a faceshield to prevent contact with this product. Emergency wash facilities where there is any possibility that an employee's eyes and/or skin may be exposed to this substance. The employer should provide an eye wash fountain and quick drench shower within the immediate work area for emergency use.
- Skin protection: Employee must wear appropriate protective impervious clothing and equipment to prevent repeated or prolonged skin contact with this substance.
- Hand protection: Employee must wear appropriate protective impervious gloves to prevent contact with this substance.
- Respiratory protection: For emergency and other conditions where the exposure guideline may be exceeded, use an approved positive-pressure self-contained breathing apparatus or positive-pressure airline with auxiliary self contained air supply.
- Environmental exposure controls: Prevent entry into sewers and waterways.

9. Physical and Chemical Properties of Ink Formulation

9.1 General Information

- Appearance: Clear Liquid
- Odor: Characteristic odor

9.2 Important health, safety and environmental information

| | |
|---|-------------------|
| pH: | Not applicable |
| Boiling point (deg.C) | No data available |
| Flash point (deg.C) | 69deg.C |
| Ignition temperature(deg.C) | No data available |
| Flammability limits(vol-%) | No data available |
| Specific Gravity(H ₂ O=1) (g/cm ³ , 20deg.C) | Approx 1.0 |
| Explosive properties: | No data available |
| Oxidizing properties: | No data available |
| Vapor pressure: | No data available |
| Solubility | Insoluble |
| Solubility in water (g/l, 20deg.C) | Insoluble |
| Partition coefficient: n-octanol/water: | No data available |
| Viscosity: | 6-8mPa·s(25deg.C) |
| Melting Point | No data available |
| Evaporation Rate(Butyl Acetate=1) | No data available |
| Vapor Density(AIR=1) | >1 |

10. Stability and Reactivity

| | |
|-----------------------------------|--|
| Stability: | Unstable. Polymerize under heat and/or light. |
| Conditions to avoid: | Elevated temperatures/heat, UV light, when not in use. |
| Incompatibility: | Avoid contact with acids, amines, free radical initiators, oxidizing agents. |
| Hazardous decomposition products: | Carbon monoxide, carbon dioxide, oxides of nitrogen, toxic gases/vapors. |
| Hazardous polymerization: | High temperatures may cause rapid polymerization. |

11. Toxicological Information

Toxicity data:

| | |
|---|-----------|
| Acrylic esters (of one component of this product) | |
| LD ₅₀ (oral-rat) | 400µL/kg |
| LD ₅₀ (skin-rabbit) | 250µL/kg |
| LC ₅₀ (skin-rat) | 500ppm/4h |

Carcinogenic status:

IARC evaluated printing ink as a Group3(Not classifiable as to carcinogenicity to humans) .

Acute Health Hazards: No data available

Mutagenicity: No data available

Chronic Health Hazards: Repeated skin contact may cause a persistent irritation or dermatitis.

Eye irritating

EUV-BK, YE, CY, MG, GL MIX applied once to the rabbit eye mucosa caused significant conjunctival and corneal effects. No iridial response was noted at 1, 48, and 72 hours, or at 1 week post treatment; the iridial effect could not be scored 24 hours following test item application, due to the swelling of the conjunctive and nictitating membrane. The effects were reversible within one week post application. In conclusion, according to Directive 2001/59/EC EUV-BK, YE, CY, MG, GL MIX should be classified as "R36" Irritating to eyes.

<The OECD Guidelines for Testing of Chemicals No.:405(24th April 2002), Directive 2004/73/EEC B.5, OPPTS870.2400, and the Principles of GLP>

Skin irritating

According to Directive 2001/59/EC EUV-BK, YE, CY, MG, GL MIX should be classified as "R38" Irritating to skin. According to the classification system based on the scheme devised by Draze(1959), EUV-BK, YE, CY, MG, GL MIX is "mild irritant".

<The OECD Guidelines for Testing of Chemicals No.:404(24th April 2002), Directive 2004/73/EEC B.4, OPPTS870.2500, and the Principles of GLP >

Skin sensitizing: Skin contact with this product may cause an allergic or sensitization.

12. Ecological Information

12.1 Ecotoxicity:

The followings are according to the data on Phosphine oxide derivative.

| | |
|--|------------------------------|
| Acute toxicity to fish(Lauciscus idus 96h) | LC ₅₀ 10-100mg/l. |
| Acute toxicity to daphnia(48h) | EC ₅₀ 10-100mg/l. |
| Acute toxicity to bacteria | >500mg/l. |
| Acute toxicity to algae(plankton 72h) | EC ₅₀ 10-100mg/l. |

| | |
|-------------------------------------|-------------------|
| 12.2 Mobility: | No data available |
| 12.3 Persistence and degradability: | No data available |
| 12.4 Bioaccumulative potential: | No data available |
| 12.5 Result of PBT assessment: | No data available |
| 12.6 Other adverse effects: | No data available |

13. Disposal Considerations

Waste disposal method: Incineration recommended. Waste disposal must be made in compliance with applicable local, state and country regulations.

14. Transportation Information

| | |
|-------------------------|--|
| UN. CLASS | Not applicable |
| UN. No. | Not applicable |
| Packing Group | Not applicable |
| Transportation Practice | Any transportation practice must be done in compliance with law and regulation. Avoid direct sunlight and/or heat. |

15. Regulatory Considerations

Regulatory information with regard to this product in your country or region should be examined by your own responsibility.

US information:

Toxic Substances Control Act (TSCA):

All components of this product are listed on the TSCA Inventory.

SARA Title III: Not regulated

California; Proposition 65: Not regulated

EU information:

Symbols and indication according to 1999/45/EC:



Xi Irritant

Wording of Risk and Safety Phase:

- R 36/38 Irritating to eyes and skin.
- R 43 May cause sensitization by skin contact.
- S 21 When using do not smoke.
- S 24/25 Avoid contact with skin and eyes.
- S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
- S 37 Wear suitable gloves.
- S 39 Wear eye/face protection.
- S 41 In case of fire and/or explosion do not breathe fumes.

16. Other Information

List of relevant R-phrases: R 36/38 Irritating to eyes and skin.
 R 43 May cause sensitization by skin contact.

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