MATERIAL SAFETY DATA SHEET (MSDS)

*** SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION ***

Product name : UFC 170A
Chemical property : UV curable Acrylate coatings
Company identification : URAY CO., LTD
Customer service & sales, call : 82-31-352-5696

*** SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS ***

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS #</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urethane acrylate oligomer</td>
<td>proprietary</td>
<td></td>
</tr>
<tr>
<td>1-hydroxy cyclohexylphenyl ketone</td>
<td>947-19-3</td>
<td></td>
</tr>
<tr>
<td>Acrylate oligomer</td>
<td>proprietary</td>
<td></td>
</tr>
<tr>
<td>Tetrafunctional acrylate oligomer</td>
<td>proprietary</td>
<td></td>
</tr>
</tbody>
</table>

*** SECTION 3 - HAZARDS IDENTIFICATION ***

Warning! Flammable liquid. May cause digestive tract irritation. May cause severe eye irritation and possible injury. Causes digestive and respiratory tract irritation.
Target organs : Kidneys, central nervous system.
Potential health effects

Eye:
Causes eye irritation. Vapors may cause eye irritation.

Skin:
May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material. May cause irritation with pain and stinging, especially if the skin is abraded.

Ingestion:
May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May cause kidney damage. May cause central nervous system depression.

Inhalation:
Inhalation of high concentrations may cause central nervous system effects characterized by headache, dizziness, unconsciousness and coma.
*** SECTION 4 - FIRST AID MEASURES ***

Eyes:
Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower lids. Get medical aid immediately.

Skin:
Get medical aid if irritation develops or persists. Flush skin with plenty of soap and water for at least 15 minutes.

Ingestion:
If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

Inhalation:
Get medical aid immediately. Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

*** SECTION 5 - FIRE FIGHTING MEASURES ***

General information:
As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

Extinguishing Media:
In case of fire, dry chemical, chemical foam, or alcohol-resistant foam.
Use water spray to cool fire-exposed containers. Water may be ineffective.
Autoignition temperature: Not available.
Flash point: Not available.
NFPA rating: Not published.
Explosion Limits, Lower: Not available.
Upper: Not available.

*** SECTION 6 - ACCIDENTAL RELEASE MEASURES ***

General information:
Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks:
Absorb spill with inert material, (e.g., dry sand or earth), then place into a chemical waste container. Remove all sources of ignition.

*** SECTION 7 - HANDLING AND STORAGE ***

Handling:
Use spark-proof tools and explosion proof equipment. Avoid contact with skin and eyes. Empty containers retain product residue, and can be dangerous. Avoid ingestion and inhalation.

Storage:
Keep away from sources of ignition. Store in a cool, dry place. Store in a tightly closed container. Flammable-area.

*** SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION ***

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Explosive Limits
(%) by volume in air) Lower: Not available
(%) by volume in air) Upper: Not available
Personal protective equipment

Eyes:
Wear safety glasses and chemical gaggles.

Skin:
Wear appropriate protective gloves and clothing to prevent skin exposure.

Clothing:
Wear appropriate protective clothing to minimize contact with skin.

Respirators:
A respiratory protection program that meets OSHA's 29 CFR 910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

*** SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES ***

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Pale yellowish liquid</td>
</tr>
<tr>
<td>Appearance</td>
<td>Yellowish, colorless</td>
</tr>
<tr>
<td>Odor</td>
<td>Mild</td>
</tr>
<tr>
<td>pH</td>
<td>Does not apply</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>Not available</td>
</tr>
<tr>
<td>Vapor density</td>
<td>Not available</td>
</tr>
<tr>
<td>Viscosity</td>
<td></td>
</tr>
<tr>
<td>Boiling point</td>
<td>more than 60°C</td>
</tr>
<tr>
<td>Freezing/Melting point</td>
<td>Below -20 °C</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>Not available</td>
</tr>
<tr>
<td>Solubility</td>
<td>Insoluble</td>
</tr>
<tr>
<td>Specific gravity/density</td>
<td>1.10 - 1.20 (25°C)</td>
</tr>
<tr>
<td>Molecular Formula</td>
<td>Not available</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>Not available</td>
</tr>
</tbody>
</table>

*** SECTION 10 - STABILITY AND REACTIVITY ***

Chemical stability:
Stable under normal temperatures and pressures.

Conditions to Avoid:
Ignition sources, exposure to moist air or water.

Hazardous polymerization: Has not been reported.

*** SECTION 11 - TOXICOLOGICAL INFORMATION ***

Non toxicity after perfect curing on the substrate.

LD50/LC50:
Not available.

Neurotoxicity:
No data available.

Mutagenicity:
No data available.

*** SECTION 12 - ECOLOGICAL INFORMATION ***

Ecotoxicity:
Not available.

*** SECTION 13 - DISPOSAL CONSIDERATIONS ***

Dispose of in a manner consistent with federal, state, and local regulations.
*** SECTION 14 - TRANSPORT INFORMATION ***

US DOT : No information available.
IMO     : Not regulated as a hazardous material.
IATA    : Not regulated as a hazardous material.
RID/ADR : Not regulated as a hazardous material.

*** SECTION 15 - REGULATORY INFORMATION ***

US FEDERAL
Health & safety reporting list
None of the chemicals are on the Health & safety reporting list.
Chemical test rules
None of the chemicals in this product are under a Chemical test rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.

SARA
Section 302 (RQ)
None of the chemicals in this material have an RQ.
Section 302 (TPQ)
None of the chemicals in this product have a TPQ.
Section 313
No chemicals are reportable under Section 313.

STATE
None of the chemicals in this product are listed.
European/International regulations
European labeling in accordance with EC directives
Hazard symbols : Not available.

*** SECTION 16 - ADDITIONAL INFORMATION ***

MSDS Creation date : 2 / 14 / 2002

The information above is believed to be accurate and represents the best information currently to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes.