Section 1. Identification of Chemical Substance and Company

1.1. PRODUCTS IDENTIFICATION: zb®7 binder

1.2. USE OF SUBSTANCE: zb®7 is a mixture formula to be used as an adhesive to fuse powder for making rapid-prototyping 3D models

1.3. COMPANY: Z Corporation
32 Second Ave.
Burlington, MA 01803
Contact Person: Manager of Technical Services
Telephone Number: 781-852-5050
Foreign Contact: +(45) 48 14 11 22
Svanevang 2, 3450 Allerød, Denmark
Date of Preparation: 11/99 Revised: 4/10

1.4. FOR CHEMICAL EMERGENCY: Spill Leak Fire Exposure or Accident
Call CHEMTREC Day or Night
DOMESTIC NORTH AMERICAN: 800-424-9300
INTERNATIONAL, CALL 703-527-3887 (collect calls accepted)

Section 2. Hazard Information

Potential Human Health Effects:
Prolonged and repeated exposure may cause irritation of the eyes, skin, mucous membranes and upper respiratory tract. May be harmful if swallowed.

Target Organs or Systems:
Caution: May cause irritation to the eyes, skin, mucous membranes, upper respiratory tract, cause gastrointestinal disturbances, and may effect the kidneys.

Route of Exposure:
Skin Contact: May cause skin irritation.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: May cause eye irritation.
Inhalation: May be harmful if inhaled.
Ingestion: May be harmful if swallowed.

Signs and Symptoms of Exposure:
Acute:
May cause irritation of the eyes, skin, mucous membranes, and respiratory tract. May be harmful by inhalation, ingestion, or skin absorption.

Chronic:
Pharmaceutical products that contain the water-soluble adhesive have caused thesaurosis by percutaneous injection. Thesaurosis is abnormal or excessive storage in the body of normal or foreign substances.

Carcinogens:
This product contains no carcinogens in concentrations of 0.1 percent or greater.

Potential Environmental Effects:
No significant environmental hazards are expected when released.
Section 3. Composition/Information on Ingredients

Substance is a mixture with following general composition:

<table>
<thead>
<tr>
<th>Components</th>
<th>Approximate % by weight</th>
<th>C.A.S. No. &amp; EINECS No.</th>
<th>UK/EU Classification according to Directive 67/548/EEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Glycerol</td>
<td>1-20%</td>
<td>56-81-5</td>
<td>S 23 24/25</td>
</tr>
<tr>
<td>2. Water-soluble Adhesive</td>
<td>1-10%</td>
<td>Trade Secret</td>
<td>S 22 24/25</td>
</tr>
<tr>
<td>3. Water</td>
<td>75-98%</td>
<td>7732-18-5</td>
<td>NA</td>
</tr>
</tbody>
</table>

Section 4. Emergency First Aid

**Inhalation Exposure:**
Remove from area to fresh air. Seek medical attention if breathing becomes difficult.

**Eye Contact Exposure:**
Immediately flush eyes with copious amounts of water for at least 15 minutes. Call a physician.

**Skin Contact Exposure:**
Remove contaminated clothing, shoes, and leather goods. Immediately wash with soap and rinse with copious amounts of water.

**Oral Exposure (Ingestion):**
Wash out mouth with water provided the person is conscious and seek medical attention.

Section 5. Fire and Explosion Hazard

**Flash point (Method Used):**
Not Applicable

**Flammable limits:**
Not Applicable

**LEL:**
Not Applicable

**UEL:**
Not Applicable

**Extinguishing Media:**
Water spray, carbon dioxide, dry chemical powder or appropriate foam.

**Special Fire Fighting Procedures:**
None identified.

**Unusual Fire & Explosion:**
May emit toxic fumes under fire conditions.

**Exposure Hazard(s):** Material: Irritant.

Section 6. Accidental Release Measures

**Procedures of Personal Precautions:**
Exercise appropriate precautions to minimize direct contact with skin or eyes. Wear, chemical safety goggles, and rubber gloves.

**Environmental Precautions:**
No significant environmental hazards identified.

**Methods of Cleaning Up:**
Contain spills immediately with inert materials (e.g., sand, earth). Avoid discharge to natural waters. Place in closed containers for disposal. Wash spill site after material pickup is complete prior to re-occupancy.
Waste Disposal Method:
Follow disposal procedures in accordance with federal, state and local regulations or applicable national or regional provisions.

Section 7. Storage and Handling

Handling Precautions:
User Exposure: Avoid inhalation. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure. Wash thoroughly after handling.

Storage Precautions:
Suitable: Keep tightly closed.
Special Requirements:
Store in a cool place.

Section 8. Exposure Controls & Personal Protection

Exposure Limits:

<table>
<thead>
<tr>
<th>Component</th>
<th>IOELVs (UK)</th>
<th>EC OEL</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycerol</td>
<td>TWA = 10 mg/m³</td>
<td>TWA = 10 mg/m³</td>
<td>10 mg/m³ irritation</td>
<td>10 mg/m³ as a mist</td>
</tr>
<tr>
<td>Water-soluble Adhesive</td>
<td>None established</td>
<td>None established</td>
<td>None established</td>
<td>None established</td>
</tr>
<tr>
<td>Water</td>
<td>None established</td>
<td>None established</td>
<td>None established</td>
<td>None established</td>
</tr>
</tbody>
</table>

Notations:
IOELVs = Indicative Occupational Exposure Limit Values
OEL = Occupational Exposure Limits
ACGIH TLV = Threshold Limit Value
OSHA PEL = Permissible Exposure Limit

Ventilation Controls:
Use in well-ventilated areas.

Respiratory Protection:
Generally, not needed for designed usage. Use local exhaust ventilation, if feasible, or a NIOSH/MSHA-approved respirator if exposure limits are exceeded.

Protective Gloves:
Use disposable, powder free, nitrile gloves
Eye Protection:
Chemical safety goggles.

Skin Protection:
Not required for the designed usage. The material should however be kept off clothing.

Other Controls:
Safety shower and eyewash. Wash contaminated clothing before reuse. Wash thoroughly after handling.

Environmental Exposure Controls:
No chemical components requiring specific environmental exposure controls identified for this product. Specific environmental requirements; however do vary and each user needs to follow local Community environmental protection requirements.

Section 9. Physical & Chemical Properties

Appearance: Liquid (mostly water)
Boiling Point (F°): 212° F water
Vapor Pressure (MM Hg): Not applicable (NA)
Vapor Density ( air -1): >1
pH: 6-7
Melting Point: Not applicable

VOC by Weight = 0% (EPA Method 24)
Spec Gravity (H2O=1): 1.05
Color: Depends on which dye is used
Odor: Slight odor
Clarity: Depends on which dye is used
Solubility: Water
Flash Point: NA
Flammability (solid, gas): NA
Explosive Properties: NA
Oxidizing Properties: NA
Bulk Density: NA
Water/Oil Distribution: NA

Solubility Fat: NA
Evaporation Rate: Water
Partition coefficient: n octanol/water: NA
Density: Not known
Viscosity: Not Determined

Section 10. Stability and Reactivity

Stability: Stable
Materials to Avoid: Incompatible: Strong oxidizing agents: strong bases
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide and nitrogen oxides
Hazardous Polymerization: Will not occur

Section 11. Toxicological Information

Data for product components only, mixture not evaluated.

| 1. Glycerol |  
| --- | --- |
| **Human** | Oral LD50 – TDLo 1,600 mg/kg (male repro effects): Eye Irritant – Irritant: Skin Irritation – Irritant: Inhalation Irritant – Irritant as mist: Human Systemic Effects by Ingestion – Mildly toxic, headache, nausea, vomiting: DNA Inhibition – 200 mmol/L (lymphocyte) |
| **Rabbit** | Skin LD50 - >10 g/kg: Oral LD50 – 27 g/kg: Eye Irritation - 126 mg/24 h, mild: Skin Irritation - 500 mg for 24 hr, mild: Intravenous LD50 – 53 g/kg: Intratesticular TDLo – 1,600 mg/kg (male repro effects) |
| **Rat** | Oral LD50 – 12,600 mg/kg: Inhalation LC50 – 570 mg/m3 for 1 hr: Subcutaneous LD50 – 100 mg/kg: Intraperitoneal LD50 – 4,420 mg/kg: Intravenous LD50 – 5,566 mg/kg: Intratesticular TDLo – 1,600 mg/kg (male repro effects) |
| **Mouse** | Oral LD50 – 4,090 mg/kg: Subcutaneous LD50 – 91 mg/kg: Intraperitoneal LD50 – 8,700 mg/kg: Intravenous LD50 – 4,250 mg/kg |
| **Guinea Pig** | Oral LD50 – 7,750 mg/kg |
| **Other** | Thorough toxicity data is available from EC existing chemical data bases (http://ecb.jrc.it/) or from RTEC register number (MA805000) |

| 2. Water Soluble Adhesive |  
| --- | --- |
| **Rabbit** | Oral LD50 – 1,040 mg/kg: Eye Irritant – no effect: Skin Irritant – no effect |
| **Rat** | Oral LD50 – 100,000 mg/kg |
| **Guinea Pig** | Oral LD50 – 100,000 mg/kg |
| **Mouse** | Oral LD50 – >40,000 mg/kg: Intraperitoneal LD50 – 12 g/kg |
| **Other** | Chronic Exposure – Carcinogen: This product is or contains a component that is not classifiable as to its carcinogenicity based on it IARC, ACGIH, NTP, or EPA classification. |
Section 12. Ecological Information

Data for product components only, mixture not evaluated.

<table>
<thead>
<tr>
<th>1. Glycerol</th>
<th>Test: LC50 Fish Species: Other fish Value: &gt;100,000 mg/L</th>
<th>Test: LC50 Fish Species: Fathead Minnow Value: 44,000 mg/L</th>
<th>Test: LC50 Fish Species: Goldfish Value: &gt;5,000 mg/L</th>
</tr>
</thead>
</table>

| 2. Water Soluble Adhesive | No data available |

Follow disposal procedures in accordance with federal, state and local regulations or applicable national or regional provisions.

Section 14. Transportation Information

Non-regulated material.

Section 15. Regulatory Information

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>EPA TSCA</th>
<th>European Economic Community (EEC)</th>
<th>Canada Regs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EINECS</td>
<td>European Community Standards</td>
<td>Listed as</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>dangerous</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>chemicals</td>
</tr>
<tr>
<td>1. Glycerol</td>
<td>Yes</td>
<td>Yes –</td>
<td>No</td>
</tr>
<tr>
<td>2. Water Soluble Adhesive</td>
<td>Yes†</td>
<td>OEL = MAK</td>
<td>No</td>
</tr>
</tbody>
</table>

Relevant European R and S phrases for preparation: None
Safety Phrases:
S24/25: Avoid contact with skin and eyes

Pursuant to Title III of the Superfund Amendments and Reauthorization Act of 1986, (SARA) and 40 CFR 372 Part 372, this product does not contain chemicals subject to the reporting requirements under Section 313.

This product does not contain chemicals subject to the reporting requirements under the Canadian National Pollutant Release Inventory (NPRI).

California Proposition 65: This product does not contain chemicals which are known to the state of California to cause cancer.

Section 16. Other Information

HMIS (Hazardous Materials Information System) for secondary labeling:
Health 1*

† EPA TSCA Section 8(B) Chemical Inventory
Fire Hazard 0
Physical Hazard 0
Personal Protective Equipment B
* additional chronic hazards present

Reason for Revision: Clarification of chemical hazards and format changes to match GHS

References

1) 2009 Threshold Limit Values and Biological Exposure Indices. American Conference of Governmental Industrial Hygienists.
2) MSDS + Cheminfo CD-ROM, Canadian Centre for Occupational Health and Safety
3) SAX’S Dangerous Properties of Industrial Materials, Tenth Edition
4) TSCA & SARA Title III, U.S. Environmental Protection Agency and the National Technical Information Services
5) Raw Material Manufacturers Material Safety Data Sheets
6) US National Institute of Medicines Toxnet current edition

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