1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

- **Product Code**: 31140
- **Trade Name**: MICROPOSIT 354 DEVELOPER
- **Manufacturer/Supplier**: Shipley Company
- **Address**: 455 Forest St., Marlborough, Massachusetts 01752
- **Phone Number**: (508) 481-7960
- **Emergency Phone Number**: (508) 481-7960
- **Chemtrec #**: (800) 424-9300
- **MSDS first issued**: 28 August 1996
- **MSDS data revised**: 14 October 1997
- **Prepared By**: Gregory S. Dripps
- **Local Sales Company**: Shipley Company, 455 Forest Street, Marlboro, MA 01752 (508-481-7950)

2. COMPOSITION/INFORMATION ON THE INGREDIENTS

<table>
<thead>
<tr>
<th>Component Name</th>
<th>CAS# / Codes</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>water</td>
<td>7732-18-5</td>
<td>95.00 - 99.00</td>
</tr>
<tr>
<td>sodium tetraborate decahydrate</td>
<td>1303-96-4</td>
<td>1.00 - 5.00</td>
</tr>
<tr>
<td>Sodium hydroxide</td>
<td>1310-73-2</td>
<td>0.10 - 1.00</td>
</tr>
<tr>
<td>Inorganic Borates</td>
<td></td>
<td>0.01 - 1.00</td>
</tr>
</tbody>
</table>

3. HAZARD IDENTIFICATION

- **Main Hazards**: - Irritant - Skin - Eye
- **Routes of Entry**: Inhalation - Skin Contact
- **Carcinogenic Status**: Not considered carcinogenic by NTP, IARC and OSHA
- **Target Organs**: - Eye - Skin
- **Health Effects - Eyes**: Liquid will cause severe conjunctival irritation, corneal damage, and may result in loss of vision. Vapor or mist will cause severe conjunctival irritation and corneal damage.
- **Health Effects - Skin**: Material will cause severe irritation and may cause chemical burns. Effects may be delayed.
- **Health Effects - Ingestion**: Swallowing may have the following effects:
  - severe irritation of mouth, throat and digestive tract
  - severe irritation of nose, throat and respiratory tract

4. FIRST AID MEASURES

- **First Aid - Eyes**: Immediately flush the eye with plenty of water for at least 20 minutes, holding the eye open. Obtain medical attention immediately.
- **First Aid - Skin**: Immediately flush the skin with large quantities of water, preferably under a shower. Remove contaminated clothing while flushing skin. Continue washing for at least 15 minutes. Contaminated clothing should be washed or dry-cleaned before re-use. Obtain medical attention immediately.
- **First Aid - Ingestion**: Do not induce vomiting. Wash out mouth with water. Obtain medical attention immediately.
- **First Aid - Inhalation**: Remove from exposure. If there is difficulty in breathing, give oxygen. Obtain medical attention immediately.
- **Advice to Physicians**: Treat symptomatically. Treat skin burns conventionally.

5. FIRE FIGHTING MEASURES

- **Extinguishing Media**: Use dry chemical. Use water spray, fog or alcohol resistant foam.
- **Special Fire-Fighting Procedures**: No specific measures necessary.
- **Unusual Fire & Explosion Hazards**: None known.
- **Protective Equipment for Fire-Fighting**: Wear full protective clothing and self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

- **Spill Procedures**: Spills may be absorbed with appropriate absorbent material for alkaline materials. Transfer into suitable containers for recovery or disposal.
- **Personal Precautions**: Wear appropriate protective clothing. Wear respiratory protection. Material can create slippery conditions underfoot.
- **Environmental Precautions**: Prevent the material from entering drains or water courses. Advise Authorities if spillage has entered water course or sewer or has contaminated soil or vegetation.

7. HANDLING AND STORAGE

- **Handling**: Use local exhaust ventilation. Avoid contact with eyes, skin and clothing. Emergency shower and eye wash facilities should be readily available. Avoid inhaling vapor. Keep container tightly closed when not in use.
- **Storage**: Store in original containers. Storage area should be:
  - cool - dry - well ventilated - out of direct sunlight - away from incompatible materials

8. EXPOSURE CONTROLS/PERSOANAL PROTECTION

- **Occupational Exposure Standards**:
  - sodium tetraborate decahydrate: OSHA: PEL 10mg/m³ 8 h TWA. ACGIH: TLV 5mg/m³ 8 h TWA.
  - Sodium hydroxide: OSHA: PEL 2mg/m³ 8 h TWA. ACGIH: TLV 2mg/m³ Ceiling limit. UK EH40: OES 2mg/m³ 15min TWA.
Engineering Control Measures
Engineering methods to prevent or control exposure are preferred. Methods include process or personnel enclosure, mechanical ventilation (local exhaust), and control of process conditions.

Respiratory Protection
Respiratory protection if there is a risk of exposure to high vapor concentrations. The specific respirator selected must be based on the airborne concentration found in the workplace and must not exceed the working limits of the respirator.

Hand Protection
Neoprene gloves.

Eye Protection
Chemical goggles and face shield.

Body Protection
- rubber apron

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Physical State</th>
<th>Liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Clear</td>
</tr>
<tr>
<td>Odor</td>
<td>Odorless</td>
</tr>
<tr>
<td>VOC (g/l)</td>
<td>0.0</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>1.019</td>
</tr>
<tr>
<td>pH</td>
<td>&gt;13</td>
</tr>
<tr>
<td>Boiling Range/Point (°C/F)</td>
<td>129 / 289</td>
</tr>
<tr>
<td>Flash Point (PMCC) (°C/F)</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Explosion Limits (%)</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Solubility in Water</td>
<td>Completely soluble.</td>
</tr>
<tr>
<td>Vapor Density (Air = 1)</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>Sodium hydroxide: 6.3 mmHg at 26 °C. 18 mmHg at 51 °C.</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Stability
Stable under normal conditions.

Conditions to Avoid
- contact with incompatible materials

Incompatibilities
- Acids - Aldehydes - Hydrocarbon solvents - Aromatic hydrocarbons - Reducing agents

Hazardous Polymerization
Will not occur.

Hazardous Decomposition Products
None known.

11. TOXICOLOGICAL INFORMATION

Acute Data
Sodium hydroxide: Oral LD50 (rat) 140-340mg/kg. Dermal LD50 (rabbit) 2000mg/kg.

Sodium tetraborate decahydrate: Oral LD50 (rat) 4500 - 5000mg/kg.

Chronic/Subchronic Data
No relevant studies identified.

Genotoxicity
No adverse effects are expected.

Reproductive/Developmental Toxicity
No adverse reproductive or fetal developmental effects are expected.

Additional Data
None.

12. ECOLOGICAL INFORMATION

Mobility
The product will dissolve rapidly in water. The product is volatile and water soluble and will partition to the aqueous phase.

Persistence/Degradability
The product is expected to be readily biodegradable.

Bio-accumulation
Product is not expected to bioaccumulate.

Ecotoxicity
Sodium Hydroxide:
Tests on the following species gave a TLM96 of 125mg/litre: - mosquito fish
Tests on the following species gave a TLM24 of 76.6mg/litre: - bluegills

13. DISPOSAL CONSIDERATIONS

Product Disposal
Dispose of in accordance with all applicable local and national regulations.

Container Disposal
Labels should not be removed from containers until they have been cleaned. Empty containers may contain hazardous residues. Dispose of containers with care.

14. TRANSPORT INFORMATION

DOT Ground:
Sodium hydroxide solution

UN Proper Shipping Name
Sodium hydroxide solution

UN Class
(I) Corrosive

UN Number
UN1824

UN Packaging Group
II

N.O.S. 1:
Not applicable.

N.O.S. 2:
Not applicable.

Subsidiary Risks
None.

ADR/RID Substance Identification Number
None.

CERCLA RQ
Sodium Hydroxide (1000#)

Marine Pollutant
None.

15. REGULATORY INFORMATION

TSCA Listed
Yes

TSCA Exemptions

WHMIS Classification
D.2.B

MA Right To Know Law
All components have been checked for inclusion on the Massachusetts Substance List (MSIL). Those components present at the de minimus concentration have been identified in the hazardous ingredients section of the MSDS.

California Proposition 65
This product does not contain materials which the State of California has found to cause cancer, birth defects or other reproductive harm.

SARA TITLE III-Section 311/312 Categorization (40 CFR 370)
Immediate health hazard

SARA TITLE III-Section 313 (40 CFR 372)
This product does not contain a chemical which is listed in Section 313 at or above de minimis concentrations.

16. OTHER INFORMATION
NFPA Rating - FIRE: 0
NFPA Rating - HEALTH: 2
NFPA Rating - REACTIVITY: 0
NFPA Rating - SPECIAL: None.

Revisions Highlighted: Data not available.

Abbreviations:
- CAS#: Chemical Abstract Services Number
- ACGIH: American Conference of Governmental Industrial Hygienists
- OSHA: Occupational Safety and Health Administration
- TLV: Threshold Limit Value
- PEL: Permissible Exposure Limit
- STEL: Short Term Exposure Limit
- NTP: National Toxicology Program
- IARC: International Agency for Research on Cancer
- R: Risk
- S: Safety
- LD50: Lethal Dose 50%
- LC50: Lethal Concentration 50%
- BOD: Biological Oxygen Demand
- Koc: Soil Organic Carbon Partition Coefficient
- TLm: Median Tolerance Limit

Disclaimer:
The data contained herein is based on information that Shipley Company believes to be reliable, but no expressed or implied warranty is made with regard to the accuracy of such data or its suitability for a given situation. Such data relates only to the specific product described and not to such products in combination with any other product and no agent of Shipley Company is authorized to vary any of such data. Shipley Company and its agents disclaim all liability for any action taken or foregone on reliance upon such data.