SAFETY DATA SHEET
ROHM AND HAAS ELECTRONIC MATERIALS LLC

Product name: MICROPOSIT™ REMOVER 1165

ROHM AND HAAS ELECTRONIC MATERIALS LLC encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. IDENTIFICATION

Product name: MICROPOSIT™ REMOVER 1165

Recommended use of the chemical and restrictions on use
Identified uses: Chemical Specialty

COMPANY IDENTIFICATION
ROHM AND HAAS ELECTRONIC MATERIALS LLC
A Subsidiary of The Dow Chemical Company
455 FOREST STREET
MARLBOROUGH MA 01752
UNITED STATES

Customer Information Number: 215-592-3000
SDSQuestion@dow.com

EMERGENCY TELEPHONE NUMBER
24-Hour Emergency Contact: 1 800 424 9300
Local Emergency Contact: 800-424-9300

2. HAZARDS IDENTIFICATION

Hazard classification
This material is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29CFR 1910.1200.
Flammable liquids - Category 4
Skin irritation - Category 2
Eye irritation - Category 2A
Reproductive toxicity - Category 1B
Specific target organ toxicity - single exposure - Category 3

Label elements
Hazard pictograms
Signal word: **DANGER!**

**Hazards**
Combustible liquid.
Causes skin irritation.
Causes serious eye irritation.
May cause respiratory irritation.
May damage fertility or the unborn child.

**Precautionary statements**

**Prevention**
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
Wash skin thoroughly after handling.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/ eye protection/ face protection.
Use personal protective equipment as required.

**Response**
IF ON SKIN: Wash with plenty of soap and water.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF exposed or concerned: Get medical advice/ attention.
If skin irritation occurs: Get medical advice/ attention.
If eye irritation persists: Get medical advice/ attention.
Take off contaminated clothing and wash before reuse.
In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

**Storage**
Store in a well-ventilated place. Keep container tightly closed.
Store in a well-ventilated place. Keep cool.
Store locked up.

**Disposal**
Dispose of contents/ container to an approved waste disposal plant.

**Other hazards**
no data available

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**3. COMPOSITION/INFORMATION ON INGREDIENTS**
Chemical nature: Solution of organic compounds
This product is a mixture.

<table>
<thead>
<tr>
<th>Component</th>
<th>CASRN</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-methyl-2-pyrrolidinone</td>
<td>872-50-4</td>
<td>90.0 - 99.0 %</td>
</tr>
<tr>
<td>Pyrrolidinone Compound</td>
<td></td>
<td>1.0 - 10.0 %</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

Description of first aid measures

General advice: If potential for exposure exists refer to Section 8 for specific personal protective equipment. First Aid responders should pay attention to self-protection and use the recommended protective clothing.

Inhalation: Remove from exposure. If there is difficulty in breathing, give oxygen. Seek medical attention if symptoms persist.

Skin contact: Wash skin with water. Continue washing for at least 15 minutes. Observe medical attention if blistering occurs or redness persists.

Eye contact: Immediately flush the eye with plenty of water for at least 15 minutes, holding the eye open. Obtain medical attention if soreness or redness persists.

Ingestion: Wash out mouth with water. Have victim drink 1-3 glasses of water to dilute stomach contents. Induce vomiting if person is conscious. Immediate medical attention is required. Never administer anything by mouth if a victim is losing consciousness, is unconscious or is convulsing.

Most important symptoms and effects, both acute and delayed: Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

Indication of any immediate medical attention and special treatment needed

Notes to physician: Treat symptomatically.

5. FIREFIGHTING MEASURES

Suitable extinguishing media: Use water spray, foam, dry chemical or carbon dioxide. Keep containers and surroundings cool with water spray.

Unsuitable extinguishing media: no data available

Special hazards arising from the substance or mixture
Hazardous combustion products: no data available

Unusual Fire and Explosion Hazards: This product may give rise to hazardous vapors in a fire. Vapors can travel a considerable distance to a source of ignition and result in flashback.
Advice for firefighters
Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry.

Special protective equipment for firefighters: Wear full protective clothing and self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Wear suitable protective clothing. Wear respiratory protection. Eliminate all ignition sources.

Environmental precautions: Prevent the material from entering drains or water courses. Do not discharge directly to a water source. Advise Authorities if spillage has entered watercourse or sewer or has contaminated soil or vegetation.

Methods and materials for containment and cleaning up: Contain spills immediately with inert materials (e.g., sand, earth). Transfer into suitable containers for recovery or disposal. Finally flush area with plenty of water.

7. HANDLING AND STORAGE

Precautions for safe handling: Use local exhaust ventilation. Avoid contact with eyes, skin and clothing. Keep container tightly closed.

Conditions for safe storage: Store in original container. Keep away from heat and sources of ignition. Storage area should be: cool dry well ventilated out of direct sunlight
Keep away from heat, sparks, flame, and other sources of ignition. Practice good personal hygiene to prevent accidental exposure.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters
Exposure limits are listed below, if they exist.

<table>
<thead>
<tr>
<th>Component</th>
<th>Regulation</th>
<th>Type of listing</th>
<th>Value/Notation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-methyl-2-pyrrolidinone</td>
<td>Rohm and Haas</td>
<td>TWA</td>
<td>10 ppm</td>
</tr>
<tr>
<td></td>
<td>Rohm and Haas</td>
<td>TWA</td>
<td>10 ppm</td>
</tr>
<tr>
<td></td>
<td>Rohm and Haas</td>
<td>STEL</td>
<td>25 ppm</td>
</tr>
<tr>
<td></td>
<td>Rohm and Haas</td>
<td>STEL</td>
<td>25 ppm</td>
</tr>
<tr>
<td></td>
<td>Rohm and Haas</td>
<td>Absorbed via skin</td>
<td>Absorbed via skin</td>
</tr>
<tr>
<td></td>
<td>US WEEL</td>
<td>TWA</td>
<td>10 ppm</td>
</tr>
<tr>
<td></td>
<td>US WEEL</td>
<td>TWA</td>
<td>Absorbed via skin</td>
</tr>
</tbody>
</table>

Exposure controls
Engineering controls: Engineering methods to prevent or control exposure are preferred. Methods include process or personnel enclosure, mechanical ventilation (local exhaust), and control of process conditions.

Individual protection measures
Eye/face protection: Goggles
Skin protection

Hand protection: Butyl rubber gloves. Other chemical resistant gloves may be recommended by your safety professional.

Other protection: Normal work wear.

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.

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td></td>
</tr>
<tr>
<td>Physical state</td>
<td>liquid</td>
</tr>
<tr>
<td>Color</td>
<td>Natural, slightly white</td>
</tr>
<tr>
<td>Odor</td>
<td>Amines.</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>no data available</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Melting point/range</td>
<td>no data available</td>
</tr>
<tr>
<td>Freezing point</td>
<td>no data available</td>
</tr>
<tr>
<td>Boiling point (760 mmHg)</td>
<td>202 °C (396 °F)</td>
</tr>
<tr>
<td>Flash point</td>
<td>88 °C (190 °F)</td>
</tr>
<tr>
<td>Evaporation Rate (Butyl Acetate = 1)</td>
<td>Slower than ether</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Lower explosion limit</td>
<td>no data available</td>
</tr>
<tr>
<td>Upper explosion limit</td>
<td>no data available</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>no data available</td>
</tr>
<tr>
<td>Relative Vapor Density (air = 1)</td>
<td>Heavier than air</td>
</tr>
<tr>
<td>Relative Density (water = 1)</td>
<td>1.03</td>
</tr>
<tr>
<td>Water solubility</td>
<td>completely soluble</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>no data available</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>no data available</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>no data available</td>
</tr>
<tr>
<td>Kinematic Viscosity</td>
<td>no data available</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>no data available</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>no data available</td>
</tr>
<tr>
<td>Molecular weight</td>
<td>no data available</td>
</tr>
<tr>
<td>Volatile Organic Compounds</td>
<td>1,030 g/L</td>
</tr>
</tbody>
</table>

NOTE: The physical data presented above are typical values and should not be construed as a specification.
10. STABILITY AND REACTIVITY

Reactivity: no data available

Chemical stability: Stable under normal conditions.

Possibility of hazardous reactions: No dangerous reaction known under conditions of normal use. Product will not undergo hazardous polymerization.

Conditions to avoid: High temperatures  Static discharge

Incompatible materials: Reducing agents  Oxidizing agents  Acids

Hazardous decomposition products: Carbon monoxide  carbon dioxide  Nitrogen oxides (NOx)

11. TOXICOLOGICAL INFORMATION

Toxicological information on this product or its components appear in this section when such data is available.

Acute toxicity

Acute oral toxicity
Product test data not available.

Acute dermal toxicity
Product test data not available.

Acute inhalation toxicity
Product test data not available.

Skin corrosion/irritation
Product test data not available.

Serious eye damage/eye irritation
Product test data not available.

Sensitization
Product test data not available.

Specific Target Organ Systemic Toxicity (Single Exposure)
Product test data not available.

Specific Target Organ Systemic Toxicity (Repeated Exposure)
Product test data not available.

Carcinogenicity
Not considered carcinogenic by NTP, IARC, and OSHA
Teratogenicity
Product test data not available.

Reproductive toxicity
Product test data not available.

Mutagenicity
Product test data not available.

Aspiration Hazard
Product test data not available.

COMPONENTS INFLUENCING TOXICOLOGY:

1-methyl-2-pyrrolidinone

Acute oral toxicity
LD50, Rat, male and female, 4,150 mg/kg  OECD Test Guideline 401

Acute dermal toxicity
LD50, Rat, male and female, > 5,000 mg/kg  OECD Test Guideline 402

Acute inhalation toxicity
LC50, Rat, male and female, 4 Hour, Aerosol, > 5.1 mg/l  OECD Test Guideline 403 No deaths occurred at this concentration.

Skin corrosion/irritation
Brief contact may cause skin irritation with local redness.
Prolonged contact may cause moderate skin irritation with local redness.
Repeated contact may cause skin burns. Symptoms may include pain, severe local redness, swelling, and tissue damage.
May cause drying and flaking of the skin.
May cause more severe response if skin is abraded (scratched or cut).

Serious eye damage/eye irritation
May cause severe eye irritation.
May cause moderate corneal injury.

Sensitization
Did not cause allergic skin reactions when tested in guinea pigs.

For respiratory sensitization:
No relevant data found.

Specific Target Organ Systemic Toxicity (Single Exposure)
May cause respiratory irritation.
Route of Exposure: Inhalation
Target Organs: Respiratory Tract

Specific Target Organ Systemic Toxicity (Repeated Exposure)
Based on available data, repeated exposures are not anticipated to cause significant adverse effects.

Teratogenicity
N-methyl pyrrolidone has caused toxic effects to the fetus in laboratory animals at high dose levels with either mild or undetectable maternal toxicity.

**Reproductive toxicity**
In animal studies, did not interfere with reproduction.

**Mutagenicity**
In vitro genetic toxicity studies were negative in some cases and positive in other cases. Animal genetic toxicity studies were negative.

**Aspiration Hazard**
Based on physical properties, not likely to be an aspiration hazard.

**Pyrrolidinone Compound**

**Acute oral toxicity**
LD50, Rat, 14,430 mg/kg

**Acute dermal toxicity**
The dermal LD50 has not been determined.

**Acute inhalation toxicity**
The LC50 has not been determined.

**Skin corrosion/irritation**
Essentially nonirritating to skin.

**Serious eye damage/eye irritation**
Mild eye irritation

**Sensitization**
For skin sensitization:
No relevant data found.

For respiratory sensitization:
No relevant data found.

**Specific Target Organ Systemic Toxicity (Single Exposure)**
May cause respiratory irritation.
Route of Exposure: Inhalation
Target Organs: Respiratory Tract

The substance or mixture is not classified as specific target organ toxicant, single exposure.

**Specific Target Organ Systemic Toxicity (Repeated Exposure)**
No relevant data found.

**Teratogenicity**
No relevant data found.

**Reproductive toxicity**
No relevant data found.

**Mutagenicity**
No mutagenic activity was observed in bacterial cells.

**Aspiration Hazard**
No aspiration toxicity classification

**Carcinogenicity**
Not considered carcinogenic by NTP, IARC, and OSHA

### 12. ECOLOGICAL INFORMATION

Ecotoxicological information on this product or its components appear in this section when such data is available.

**Toxicity**

**1-methyl-2-pyrrolidinone**

**Acute toxicity to fish**
Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).
LC50, Oncorhynchus mykiss (rainbow trout), static test, 96 Hour, > 5,000 mg/l
LC50, Pimephales promelas (fathead minnow), static test, 96 Hour, 1,072 mg/l

**Acute toxicity to aquatic invertebrates**
EC50, Daphnia magna (Water flea), static test, 24 Hour, > 1,000 mg/l, OECD Test Guideline 202 or Equivalent

**Acute toxicity to algae/aquatic plants**
ErC50, Desmodesmus subspicatus (green algae), static test, 72 Hour, Growth rate inhibition, > 500 mg/l, OECD Test Guideline 201 or Equivalent

**Chronic toxicity to aquatic invertebrates**
NOEC, Daphnia magna (Water flea), semi-static test, 21 d, 12.5 mg/l

**Pyrrrolidine Compound**

**Acute toxicity to fish**
No relevant data found.

**Persistence and degradability**

**1-methyl-2-pyrrolidinone**

**Biodegradability:** Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.
10-day Window: Pass

**Biodegradation:** 91 %

**Exposure time:** 28 d

**Method:** OECD Test Guideline 301B or Equivalent

**Theoretical Oxygen Demand:** 2.58 mg/mg

**Photodegradation**
Test Type: Half-life (indirect photolysis)
Sensitizer: OH radicals
Atmospheric half-life: 0.486 d
Method: Estimated.

Pyrrolidinone Compound
Biodegradability: No relevant data found.

Bioaccumulative potential

1-methyl-2-pyrrolidinone
Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
Partition coefficient: n-octanol/water(log Pow): -0.38 Measured

Mobility in soil

1-methyl-2-pyrrolidinone
Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process.
Potential for mobility in soil is very high (Koc between 0 and 50).
Partition coefficient(Koc): 21 Estimated.

Pyrrolidinone Compound
No relevant data found.

13. DISPOSAL CONSIDERATIONS

Disposal methods: Dispose in accordance with all local, state (provincial), and federal regulations. Incineration is the recommended method of disposal for containers. Under RCRA, it is the responsibility of the product's user to determine at the time of disposal, whether the product meets RCRA criteria for hazardous waste. This is because the product uses, transformations, mixtures, processes, etc. may render the resulting materials hazardous.

Treatment and disposal methods of used packaging: Empty containers retain product residues. Follow label warnings even after container is emptied. Improper disposal or reuse of this container may be dangerous and illegal. Refer to applicable federal, state and local regulations.

14. TRANSPORT INFORMATION

DOT
Proper shipping name: Combustible liquid, n.o.s.(N-Methyl-2-pyrrolidone)
UN number: NA 1993
Class: CBL
Packing group: III

Classification for SEA transport (IMO-IMDG):
Transport in bulk: Not regulated for transport
according to Annex I or II: Consult IMO regulations before transporting ocean bulk
of MARPOL 73/78 and the
IBC or IGC Code

Classification for AIR transport (IATA/ICAO):
Not regulated for transport

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. REGULATORY INFORMATION

OSHA Hazard Communication Standard
This product is considered hazardous under the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312
Immediate (acute) Health Hazard
Fire Hazard

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313
This product contains a chemical which is listed in Section 313 at or above de minimis concentrations.

Components  CASRN
Methyl pyrrolidone  872-50-4

California (Proposition 65)
This product contains a component or components known to the state of California to cause cancer and/or reproductive harm.

Components  CASRN
1-methyl-2-pyrrolidinone  872-50-4

United States TSCA Inventory (TSCA)
All components of this product are in compliance with the inventory listing requirements of the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

:
16. OTHER INFORMATION

Hazard Rating System
NFPA

<table>
<thead>
<tr>
<th>Health</th>
<th>Fire</th>
<th>Reactivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

Revision
Identification Number: 101103192 / 1304 / Issue Date: 03/09/2015 / Version: 2.0
Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

<table>
<thead>
<tr>
<th>Absorbed via skin</th>
<th>Absorbed via skin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rohm and Haas</td>
<td>Rohm and Haas OEL's</td>
</tr>
<tr>
<td>STEL</td>
<td>Short term exposure limit</td>
</tr>
<tr>
<td>TWA</td>
<td>Time weighted average</td>
</tr>
<tr>
<td>US WEEL</td>
<td>USA. Workplace Environmental Exposure Levels (WEEL)</td>
</tr>
</tbody>
</table>

Information Source and References
This SDS is prepared by Product Regulatory Services and Hazard Communications Groups from information supplied by internal references within our company.

ROHM AND HAAS ELECTRONIC MATERIALS LLC urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.