1. IDENTIFICATION OF THE PRODUCT AND THE COMPANY

TRADE NAME: Norland Optical Adhesive 148

TRADE CODE: NOA 148

PRODUCT USE: Ultraviolet Curing Adhesive

MANUFACTURER: Norland Products Inc

& SUPPLIER: 2540 Route 130, Bldg. 100
Cranbury, NJ 08512 USA

Telephone (609) 395-1966
Fax (609) 395-9006 Email: SDS@norlandproducts.com

2. HAZARDS IDENTIFICATION

2.1 Classification of the Substance or Mixture GHS-US Classification

Acute oral toxicity : Cat.4
Skin Sensitization : Cat.1A
Eye Damage/irritation : Cat.2A

Pictogram

Signal Word: Warning

2.2. Label Elements GHS-US Labeling
Hazard Statements (GHS-US)
H301 Toxic if swallowed.
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H227 Combustible Liquid

Precautionary Statements:
P301+310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P313: If skin irritation occurs: Get medical advice/attention.
P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Seek medical attention.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P501 Dispose of contents/container in accordance with local, regional, national and international regulations.

Other Hazard: None know.
3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature: Acrylate related resin based formulation.

<table>
<thead>
<tr>
<th>Composition</th>
<th>Cas#</th>
<th>Content</th>
<th>GHS-US Classifications for all chemicals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flourester</td>
<td>Trade Secret</td>
<td>40-50%</td>
<td>H301 Cat.3 Acute Oral Toxicity</td>
</tr>
<tr>
<td>Aliphatic Urethane</td>
<td></td>
<td></td>
<td>H317 Cat.3 Skin Sensitization</td>
</tr>
<tr>
<td>Acrylate</td>
<td>Trade Secret</td>
<td>35-45%</td>
<td>H319 Cat.2A Eye Damage/Irritation</td>
</tr>
<tr>
<td>1-Propanone,</td>
<td></td>
<td></td>
<td>H335 Cat.3 Respiratory Tract Irritation</td>
</tr>
<tr>
<td>2-hydroxy-2-methyl</td>
<td>7473-98-5</td>
<td>7-15%</td>
<td>H227 Cat.4 Flammable liquid</td>
</tr>
<tr>
<td>1-phenyl</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES  First Aiders should wear gloves/protective clothing, eye/face protection

In case of inhalation: If tightness in the chest, irritation or coughing occurs, remove to fresh air. Get medical attention if symptoms persist.

In case of splashes in eye: If the material gets in the eyes, immediately wash the eyes with copious amounts of water, occasionally lifting the lower and upper eyelids. Continue for 15 minutes and get medical attention immediately.

In case of skin contact: If the material gets on the skin, immediately wash the area with soap and water and flush with water. If irritation develops, get medical attention immediately.

In case of clothing spattering: Discard or wash contaminated clothing before reuse.

In case of ingestion: If the material has been swallowed, dilute with milk or water if the victim is alert. See doctor as soon as possible.

First Aiders should wear gloves/protective clothing, eye/face protection if there is a potential for exposure to liquid product.

5. FIRE-FIGHTING MEASURES

Extinguishing Media recommended: Carbon Dioxide, foam, dry chemical.

Extinguishing Media inadvisable: Water. Jets of water from fire hose.

Special Hazards: None.

Hazardous decomposition/combustion products: Could generate carbon monoxide, carbon dioxide, sulfur dioxide or hydrogen sulfide.

Special protective equipment: A self-contained breathing apparatus.
6. ACCIDENTAL RELEASE MEASURES

Measures for personal safety:
GLOVES: Use gloves made from an impervious material, e.g. nitrile, butyl or latex rubber. Latex rubber may soften and become pervious if also exposed to organic solvents.
RESPIRATOR: Not required under normal operating conditions. Respiratory protection may be needed in unusual circumstances where significant exposure to fumes or mists can occur. A NIOSH approved air purifying respirator with an organic vapor cartridge would then be recommended. Use must comply with OSHA (29 CFR 1910.134) and other regulatory standards.
EYE: Wear safety glasses.
FOOTWEAR: Impervious shoes, e.g. leather, not cloth or sandals.

Ventilation Requirements:
A fume hood is not generally required. The room should have adequate ventilation to avoid potential for concentration of mist or vapors.

Environmental measures:
Stop the product from entering the drainage system and the natural environment. Limit leakage with earth.

Cleaning methods:
Recovery: Absorb material with paper towel or other absorbent. Place in container for disposal. If possible, expose absorbed resin to UV light or sunlight to solidify the resin.

Cleaning/decontamination: Clean up with soap and water.
Elimination: Eliminate according to local and national regulations.

7. HANDLING AND STORAGE

Handling:
Technical measures: Do not reuse container. This product is for industrial use only. Practice good housekeeping and vigorous personal hygiene to minimize contact with material.

Precautions to take: Avoid contact with skin and eyes.
Storage: Store at 5°C to 25°C. Keep away from sunlight.

8: EXPOSURE CONTROL/PERSOAL PROTECTION

Precautionary Measure: None.
Exposure limits: None.
Protective personal equipment:
Respiratory protection: Not needed with normal use.
Protection for hands: Use gloves made from an impervious material, e.g. nitrile, butyl or latex rubber. Latex rubber may soften and become pervious if also exposed to organic solvents.
Eye Protection: Wear safety glasses.
Protection from skin: Wear clothing that provides protection to skin.
9: PHYSICAL AND CHEMICAL PROPERTIES
Appearance:
Color: Clear liquid
Odor: Acrylic odor
pH: No data available
Melting point: No data available
Boiling point: No data available
Decomposition temperature: >300°C
Flash point: 175°C
Auto ignition temperature: No data available
Explosive properties: None
Oxidizing properties: None
Vapor pressure: <0.1 @ 20°C
Density: >1
Solubility/Miscibility:
Solubility in water Not miscible
Viscosity: 1500-2000cps @ 25°C

10: STABILITY AND REACTIVITY
Conditions to avoid: Keep away from UV and sunlight. Temperatures above 65°C may cause exothermic nonhazardous polymerization.
Substances to avoid: None
Hazardous decomposition products: None

11: TOXICOLOGICAL INFORMATION
Acute toxicity:
Ingestion: LD50 Oral (Rat): 1,000-2000 mg/kg.
Method: OECD Test Guidelines 423
Inhalation: LC50 (Rat): >3.6v mg/l
Method: OECD Test Guidelines 403
Local effects:
On skin: slight irritating to skin.
On eyes: irritating to eyes.
Long term toxicity: Skin contact: May cause sensitization by skin contact.
Reproductive toxicity: No data available.

12: ECOLOGICAL INFORMATION
Toxicity to fish: LC50 (oncorhynchus mykiss (rainbow trout)): 0.42 mg/l
Method: OECD Test Guidelines 203
Toxicity to daphnia & other EC50 (Daphnia magna (water flea)): 0.35mg/l
Mobility: Cured adhesives are immobile.
General ecological: Do not empty liquid into drains or ground water.

13: DISPOSAL CONSIDERATION
Disposal Methods for product and waste:
Send to authorized disposal plants or for incineration under controlled conditions.
Disposal methods for contaminated packaging:
Do not reuse package. Send to authorized disposal plants or for incineration under controlled conditions.
You should comply with the local and national regulations in force when disposing.
14: TRANSPORTATION INFORMATION
International Regulations:
IATA-DGR UN/ID No. : UN 3272 liquid, Class: 3
Packing group:III, low danger(Z), classification code F1

IMDG-Code UN number : UN 3272 liquid, Class: 3
Packing group:III, low danger(Z), EmS F-E S-D

15: REGULATORY INFORMATION
Contains:
Acrylate related adhesives.

US Federal Regulations
Unless otherwise noted, this product is in compliance with the inventory Listing of the countries shown below.

<table>
<thead>
<tr>
<th>Country</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe (EINECS?ELINCS)</td>
<td>Listed/registered</td>
</tr>
<tr>
<td>USA (TSCA)</td>
<td>Listed/registered</td>
</tr>
<tr>
<td>Canada (DSL)</td>
<td>Listed/registered</td>
</tr>
<tr>
<td>Australia (AICS)</td>
<td>Listed/registered</td>
</tr>
<tr>
<td>Japan (MITI)</td>
<td>Listed/registered</td>
</tr>
<tr>
<td>Korea (TCCL)</td>
<td>Listed/registered</td>
</tr>
<tr>
<td>Philippines (PICCS)</td>
<td>Listed/registered</td>
</tr>
<tr>
<td>China</td>
<td>Listed/registered</td>
</tr>
</tbody>
</table>

16: OTHER INFORMATION
Custom Situation: Harmonized System (HTS/Schedule B) 35.06.91.0000

Last revision May 23, 2019
Latest revision August 14, 2019

The information included in this Safety Data Sheet is correct to the best of Our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the test.