



# Material Safety Data Sheet

Date Prepared: November 27, 2008

## 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

• **Product details**

• **Trade name: LIA-01**

• **Application of the substance / the preparation** Photo-alignment compound

• **Manufacturer/Supplier:**

DIC Corporation Saitama plant  
 4472-1, Oaza Komuro, Ina-machi, Kita-Adachi-gun Saitama 362-8577  
 JAPAN

• **Further information obtainable from:**

Liquid Crystal R&D Group  
 Liquid Crystal Materials Technical Dept.

• **Information in case of emergency: Liquid Crystal R&D Group** TELEPHONE +81-48-722-8225  
 FAX number +81-48-722-3600

## 2. HAZARD IDENTIFICATION

• **Hazard description:**



Harmful  
 Explosive

• **Information pertaining to particular dangers for man and environment:**

The product has to be labelled due to the calculation procedure of international guidelines.

Risk of explosion by shock, friction, fire or other sources of ignition.

Harmful by inhalation, in contact with skin and if swallowed.

Irritating to eyes and skin.

• **Classification system:**

The classification was made according to the latest editions of international substances lists, and expanded upon from company and literature data.

• **NFPA ratings (scale 0 - 4)**



Health = 2  
 Fire = 2  
 Reactivity = 4

• **HMIS-ratings (scale 0-4)**



Health = 2  
 Fire = 2  
 Reactivity = 4

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

• **Description: Mixture of substances listed below with nonhazardous additions.**

Dangerous components:		
CAS:872-50-4	N-methyl-2-pyrrolidone	45-55%
CAS: 111-76-2	2-butoxyethanol	45-55%
Non dangerous components:		
	photo-alignment material	<2%

• **Additional information: For the wording of the listed risk phrases refer to section 16.**

#### 4. FIRST AID MEASURES

**General information:**

Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48hours after the accident.

**After inhalation:** Supply fresh air. If required, provide artificial respiration. Keep patient warm.  
Consult doctor if symptoms persist.

In case of unconsciousness place patient stably in side position for transportation.

**After skin contact:** Immediately wash with water and soap and rinse thoroughly.

**After eye contact:** Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.

**After swallowing:** Immediately call a doctor.

#### 5. FIRE-FIGHTING MEASURES

**Suitable extinguishing agents:** CO2, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

**Special hazards caused by the substance, its products of combustion or resulting gases:**  
During heating or in case of fire poisonous gases are produced.

**Protective equipment:** Mouth respiratory protective device.

#### 6. ACCIDENTAL RELEASE MEASURES

**Person-related safety precautions:** Mount respiratory protective device.  
Remove persons from danger area.

**Measures for environmental protection:** Dilute with plenty of water.  
Do not allow to enter sewers / surface or ground water.

**Measures for cleaning / collecting:** Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).  
Dispose contaminated material as waste according to item 13.  
Ensure adequate ventilation.

#### 7. HANDLING AND STORAGING

**Handling:**

**Information for safe handling:** Ensure good ventilation/exhaustion at the workplace.  
Open and handle receptacle with care.Prevent formation of aerosols.

**Information about protection against explosions and fires:** Keep ignition sources away - Do not smoke.  
Prevent impact and friction.  
Keep respiratory protective device available.

**Storage:**

**Requirements to be met by storerooms and receptacles:** No special requirements.

**Information about storage in one common storage facility:** Not required.

**Further information about storage conditions:** Keep receptacle tightly sealed.  
Protect from heat and direct sunlight.

#### 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

**Additional information about design of technical facilities:** No further data; see item 7.

Component with limit values that require monitoring at the workplace:	
<b>872-50-4 N-methyl-2-pyrrolidone</b>	
WEEL	10 ppm Skin
<b>111-76-2 2-butoxyethanol</b>	
PEL	240 mg/m <sup>3</sup> , 50 ppm Skin
REL	24 mg/m <sup>3</sup> , 5ppm Skin
TLV	97 mg/m <sup>3</sup> , 20 ppm

**Additional information:** The lists that were valid during the creation were used as basis.

**• Personal protective equipment:**

- General protective and hygienic measures:** Keep away from foodstuffs, beverages and feed.  
Immediately remove all soiled and contaminated clothing  
Wash hands before breaks and at the end of work.  
Avoid contact with the eyes and skin.

**• Breathing equipment:**

In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use respiratory protective device that is independent of circulating air.

**• Protection of hands:**



**Protective gloves**

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation. Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/the chemical mixture.

Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

**• Material of gloves**

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

**• Penetration time of glove material**

The exact break trough time has to be found out by the manufacturer of the protective gloves and has to be observed.

**• Eye protection:**



**Tightly sealed goggles**

**9. PHYSICAL AND CHEMICAL PROPERTIES**

<b>• General Information</b>	
Form:	Fluid
Colour:	According to product specification
Odour:	Characteristic
<b>• Change in condition</b>	
Melting point/Melting range:	Undetermined.
Boiling point/Boiling range:	171°C
<b>• Flash point:</b>	78°C (172°F)
<b>• Ignition temperature:</b>	240.0°C (464°F)
<b>• Self-igniting:</b>	Product is not selfigniting.
<b>• Danger of explosion:</b>	Product does not present an explosion hazard.
<b>• Explosion limits:</b>	
Lower:	1.1 Vol %
Upper:	10.6 Vol %
<b>• Vapour pressure at 20°C:</b>	1.2 hPa (1mmHg)
<b>• Density:</b>	Not determined.
<b>• Solubility in / Miscibility with water:</b>	
	Fully miscible.

**10. STABILITY AND REACTIVITY**

- Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- Dangerous reactions** No dangerous reactions known.
- Dangerous decomposition products:** No dangerous decomposition products known.

**11. TOXICOLOGICAL INFORMATION**

**• Acute toxicity:**

<b>• LD/LC50 values relevant for classification:</b>
111-76-22-butoxyethanol

Oral	LD50	1480 mg/kg (rat)
Dermal	LD50	400 mg/kg (rab)

**• Primary irritant effect:**

- on the skin:** Irritant to skin and mucous membranes.
- on the eye:** Irritating effect.
- Sensitization:** No sensitizing effects known.

**• Additional toxicological information:**

The product shows the following dangers according to the calculation method of the General EU Classification Guidelines for Preparations as issued in the latest version:

- Harmful
- Irritant

**12. ECOLOGICAL INFORMATION**

**•General notes:**

- Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water
- Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.

**13. DISPOSAL CONSIDERATIONS**

**• Product:**

**• Recommendation**

Must not be disposed together with household garbage. Do not allow product to reach sewage system.

**• Uncleaned packagings:**

- Recommendation:** Disposal must be made according to official regulations.
- Recommended cleansing agents:** Water, if necessary together with cleansing agents.

**14. TRANSPORT REGULATIONS**

<b>• DOT regulations:</b>	
<b>• Hazard class:</b>	-
<b>• Land transport ADR/RID (cross-border):</b>	
<b>• ADR/RID class:</b>	-
<b>• UN Number:</b>	2810 (Class: 6.1, PG: III)
<b>• Maritime transport IMDG:</b>	
<b>• IMDG Class:</b>	-
<b>• UN Number:</b>	2810 (Class: 6.1, PG: III)
<b>• Marine pollutant:</b>	No
<b>• Proper shipping name:</b> TOXIC LIQUID, ORGANIC, N.O.S.	
<b>• Air transport ICAO-TI and IATA-DGR:</b>	
<b>• ICAO/IATA Class:</b>	-
<b>• UN Number:</b>	2810 (Class: 6.1, PG: III)
<b>• Proper shipping name:</b> TOXIC LIQUID, ORGANIC, N.O.S.	

**15. REGULATORY INFORMATION**

**• Sara**

<b>• Section 355 (extremely hazardous substances):</b>	
None of the ingredient is listed.	
<b>• Section 313 (Specific toxic chemical listings):</b>	
872-50-4	N-methyl-2-pyrrolidone
<b>• TSCA (Toxic Substances Control Act):</b>	
872-50-4	N-methyl-2-pyrrolidone
111-76-2	2-butoxyethanol
<b>• Proposition 65</b>	
<b>• Chemicals known to cause cancer:</b>	
None of the ingredients is listed.	
<b>• Chemicals known to cause reproductive toxicity for females:</b>	
None of the ingredients is listed.	

<b>• Chemicals known to cause reproductive toxicity for males:</b>	
None of the ingredients is listed.	

<b>• Chemicals known to cause developmental toxicity:</b>	
872-50-4	N-methyl-2-pyrrolidone

**• Cancerogenity categories**

<b>• EPA (Environmental Protection Agency)</b>	
None of the ingredients is listed.	

<b>• IARC (International Agency for Research on Cancer)</b>	
111-76-2	2-butoxyethnol

<b>• NTP (National Toxicology Program)</b>	
None of the ingredients is listed.	

<b>• TLV (Threshold Limit Value established by ACGIH)</b>	
None of the ingredients is listed.	

<b>• NIOSH-Ca (National Institute for Occupational Safety and Health)</b>	
None of the ingredients is listed.	

<b>• OSHA-Ca (Occupational Safety &amp; Health Administration)</b>	
None of the ingredients is listed.	

**• Product related hazard informations:**

The product has been classified and marked in accordance with directives on hazardous materials.

**• Hazard symbols:**

Harmful

Explosive

**• Hazard-determining components of labelling:** 2-butoxyethanol

**• Risk phrases:** Risk of explosion by shock, friction, fire or other sources of ignition.

Harmful by inhalation, in contact with skin and if swallowed.

Irritating to eyes and skin.

**• Safety phrases:** Keep container in a well-ventilated place.

Do not breathe gas/fumes/vapour/spray (appropriate wording to be specified by the manufacturer).

Wear suitable protective clothing and gloves.

This material and its container must be disposed of as hazardous waste.

**• National regulations:**

**• Water hazard class:** Water hazard class 1 (Self-assessment): slightly hazardous for water.

**16. OTHER INFORMATION**

**Recommended restriction of use:** This product should be used and tested for R&D.

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

**• Department issuing MSDS:** Liquid Crystal Materials Technical Dept.

**• Contact:** Mr. Nishiyama

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To best of our knowledge, the information contained herein is accurate. However, we cannot assume any liability whatsoever for the accuracy of completeness of the information contained herein.

Final determination of suitability of any material is sole responsibility of the user. All material may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are only hazards that exist.