

## 安全資料表

## 一、化學品與廠商資料

料号：45003

应避免之物质：强氧化剂、酸或碱

化學品名稱：	PIMEL™ BL-301
其他名稱：	感光性聚亞醯胺前驅物 (Photosensitive polyimide precursor)
建議用途及限制使用：	用於電子零件等製造用塗層樹脂
製造者、輸入者或供應者名稱、地址及電話：	
製造者	
公司名稱：	旭化成株式會社 (Asahi Kasei Corporation)
地址：	〒100-0006 日本國東京都千代田區有樂町一丁目1番2號
電話/傳真電話：	+81-3-6699-3991 (電子材料市場銷售部) / +81-3-6699-3923
郵箱地址：	pimel-sales@om.asahi-kasei.co.jp
緊急聯絡電話：	CHEMTREC 00801-14-8954 (Customer Number 798741)
聯絡電話/傳真電話：	03-667-0848/03-668-5830 (漢昇科技有限公司 新竹縣竹北市成功十三街三十號四樓B室)

## 二、危害辨識資料

## 化學品危害分類：

對於物理之危害性：

(1) 易燃液體 第4級

對於健康之危害性：

(1) 急毒性物質 (吞食) 第5級

(2) 嚴重損傷/刺激眼睛物質 第2B級

(3) 生殖毒性物質 第1B級

(4) 特定標的器官系統毒性物質—單一暴露 第3級 (呼吸道刺激)

標示內容：

圖式符號：



警 示 語：危險

危害警告訊息：

H227 可燃液體

H303 吞食可能有害

H320 造成眼睛刺激

H360 可能對生育能力或對胎兒造成傷害

H335 可能造成呼吸系統刺激

危害防範措施：

## 安全資料表

<b>預防措施:</b>	P201 使用前取得說明。 P202 處置前必須閱讀並瞭解所有安全注意事項。 P210 遠離火焰和熱表面。嚴禁抽菸。 P261 避免吸入粉塵/煙/氣體/煙霧/蒸氣/噴霧。 P264 處置後徹底清洗雙手。 P271 只能在通風良好的環境使用。 P280 著用防護手套/穿防護衣/戴眼睛防護具/臉部防護具。
<b>急救處置:</b>	P304+P340 若不慎吸入：將患者轉移到新鮮空氣處，保持呼吸舒適的體位休息。 P305+P351+P338 如進入眼睛：用水小心沖洗幾分鐘。如戴隱形眼鏡並可方便地取出，取出隱形眼鏡。繼續沖洗。 P308+P313 如暴露到或在意，求醫治療/諮詢。 P312 如感覺不適，呼救毒物諮詢中心或送醫。 P337+P313 如仍覺眼睛有刺激，立即求醫/送醫。 P370+P378 火災時，使用灑水、乾粉、泡沫、二氧化碳滅火器滅火。
<b>儲存:</b>	P403+P233 將容器密封後置於通風良好的地方。 P403+P235 存放於涼爽通風處。保持低溫。 P405 加鎖存放。
<b>廢棄處置:</b>	P501 依地方/區域/國家法規，廢棄內容物及容器。
<b>其他危害:</b>	加熱工程或燃燒時(焚燒、火災時)，本製品可能會產生有毒的刺激性煙/氣體/蒸氣。應注意避免吸入。

## 三、成分辨識資料

## 混合物

**化學性質:** 加熱工程或燃燒時(焚燒、火災時)，本製品可能會產生有毒的刺激性煙/氣體/蒸氣。

危害成分之中英文名稱	濃度或濃度範圍 (成分百分比)	CAS No.	資訊保留揭示之 核定同意文號
N-甲基吡咯烷酮 (N-Methylpyrrolidinone) (=NMP)	45~55 wt. %	872-50-4	—
聚醯胺酸酯 (Polyamic acid ester)	25~35 wt. %	商業機密	—
乳酸乙酯 (Ethyl lactate)	10~15 wt. %	97-64-3	—
四甘醇二-2-甲基丙烯酸酯 (Tetraethylene glycol dimethacrylate)	1~5 wt. %	109-17-1	—
N-苯基二乙醇胺 (N-Phenyldiethanolamine)	1~4 wt. %	120-07-0	—
其他成分 (Other components)	< 5 wt. %	商業機密	—

**備註:**

## 安全資料表

乳酸乙酯已列入第一階段 1062 種優先適用 GHS 之危害物質名單，且為優先管理化學品。  
N-甲基吡咯烷酮已列入第二階段-公告適用之 1,089 種危害物質名單，且為優先管理化學品。  
其他成分對製品分類沒貢獻，且不滿足《危害性化學品標示及通識規則》附表三所規定之管制值。  
聚醯胺酸酯不具危險有害性。  
四甘醇二-2-甲基丙烯酸酯不屬於 GHS 危險化學品(由德國 IFA 的 GESTIS 物質數據庫獲得)。

## 四、急救措施

## 不同暴露途徑之急救方法：

吸入：將患者轉移到新鮮空氣處，保持呼吸舒適的體位休息。根據需要進行人工呼吸。如感覺不適，接受醫生治療。  
皮膚接觸：脫掉沾染的工作服、鞋子。沾染部位用肥皂和水充分沖洗幾分鐘。  
眼睛接觸：用水小心沖洗幾分鐘。如發生眼刺激或眼睛發紅，求醫/送醫。  
食入：立即用水充分漱口，接受醫療處置。

## 最重要症狀及危害效應：

急性症狀：刺激呼吸器官，刺激眼睛。  
遲發性症狀：可能對生育能力或對胎兒造成傷害。

## 對急救人員之防護：

救護人員須著用適當之防護手套和眼睛防護具/臉部防護具，穿防護衣以避免發生二次災害。

## 對醫師之提示：無資料

## 五、滅火措施

## 適用滅火劑：

建議使用水、灑水、二氧化碳、乾粉滅火劑、泡沫滅火器。將容器轉移到安全場所。或灑水冷卻。

## 不適用滅火劑：柱狀注水

## 滅火時可能遭遇之特殊危害：

可能會因火災產生具刺激性的有毒煙、氣體或蒸氣：乙醛、環己烯、甲基丙烯酸酯(2-HEMA)及氮氧化物(NO<sub>x</sub>)

## 特殊滅火程序：無資料

## 消防人員之特殊防護設備：

若無危險，將容器轉移至安全場所。著用自給式呼吸器、抗化學藥品性安全工作服、防護手套等適當之個人防護具。

## 六、洩漏處理方法

## 個人應注意事項：

禁止無相關人員進入。進行洩漏處置時，必須著用呼吸防護具、抗化學藥品性安全工作服、防護手套、眼睛防護具、臉部防護具等適當之個人防護具以防止污染擴大。

## 安全資料表

<b>環境注意事項：</b> 避免排放至環境中。注意避免製品流入排水系統。
<b>清理方法：</b> 使用適當之吸附材料(例如乾燥砂、泥土、廢布料、鋸末)或用泵回收洩漏物。將洩漏物裝入適當之容器中並進行焚燒處置。用水和洗滌劑清洗洩漏場所。
<b>二次災害的防止措施：</b> 無資料

## 七、安全處置與儲存方法

<b>處置：</b> 對作業場所進行充分的通風換氣。盡可能在密閉之裝置內進行操作處置。 著用個人防護具(參考“八、暴露預防措施”)。 注意避免製品接觸皮膚或眼睛及誤食。 避免吸入粉塵/煙塵/氣體/霧滴/蒸氣。特別應防止吸入加熱硬化工程中產生的蒸氣。 未穿戴防護具時不得接觸附著在硬化爐壁面上的脂狀物質。 避免與強氧化劑、酸和堿混合(參考“十、安定性及反應性”)。 如手部或臉部等沾染上製品，應充分沖洗沾染部位。 如工作服沾染上製品，清洗後方可重新使用。
<b>儲存：</b> 未使用時物料需置於遮光袋中緊閉袋口與容器口並儲存於冷凍櫃中。 建議儲存溫度：-15 ~ -20° C 運送溫度：低於 23° C

## 八、暴露預防措施

<b>工程控制：</b> 使用密閉的裝置、機器或局部排氣設備。
<b>控制參數：</b> <ul style="list-style-type: none"> <li>• 八小時日時量平均容許濃度(TWA)/短時間時量平均容許濃度(STEL)/最高容許濃度(Ceiling): <ul style="list-style-type: none"> <li>台灣： 未設定</li> <li>ACGIH： 未設定</li> <li>日本產業衛生學會： NMP: 1ppm</li> </ul> </li> <li>• 生物指標(BEIs): <ul style="list-style-type: none"> <li>ACGIH： NMP: 100mg/L (尿中)5-羥基-N-甲基吡咯烷酮、採樣時間：班末</li> </ul> </li> </ul>
<b>個人防護設備：</b> 呼吸防護： 可能暴露於粉塵/煙/氣體/霧滴/蒸氣時，應戴適當之防毒面具。 手部防護： 戴防滲透性防護手套(丁腈橡膠製等抗化學藥品性手套)。 眼睛防護： 戴眼睛防護具(安全護目鏡等)或戴臉部防護具。 皮膚及身體防護： 穿能遮蓋住身體露出部分的防護衣(長袖防護衣或安全靴等)。
<b>衛生措施：</b> 無資料

## 安全資料表

## 九、物理及化學性質

外觀：淡褐色透明液體	氣味：微弱胺氣味
嗅覺閾值：無數據	熔點/凝固點：無數據(製品)、 -23.09° C (NMP)、-25° C (EL)
pH 值：無數據	沸點/沸點範圍： 無數據(製品)、202° C (NMP)、154° C (EL)
易燃性(固體、氣體)：不適用	閃火點：83.0° C (類似構成製品的試驗結果)
分解溫度：無數據	測試方法(開杯或閉杯)：SETA 閉杯法
自燃溫度：無數據(製品)、 346° C (NMP)、400° C (EL)	爆炸界限(上限/下限)：無數據(製品)、 1-10 vol % (NMP)、1.5-14.1 vol % (EL)
蒸氣壓：無數據(製品)、0.33mmHg (23° C) (NMP)、3.75mmHg (25° C) (EL)	溶解度：無數據(製品)、與水混合(1,000g/L) (NMP、 EL)、不溶於水(聚醯胺酸酯)
比重(相對密度)：1.1g/cm <sup>3</sup> (20° C)	蒸氣密度：無數據
辛醇/水分配係數：無數據	揮發速率：無數據
黏度：35~45 poise(23° C)	

## 十、安定性及反應性

安定性：在通常及可預測的儲存條件下安定。
特殊狀況下可能之危害反應：在通常的儲存條件下無反應性。
應避免之狀況：過熱、火焰、火花
應避免之物質：強氧化劑、酸或鹼
危害分解物：醛、環己烯、2-甲基丙烯酸羥乙酯(2-HEMA)、氮氧化物(NO <sub>x</sub> )

## 十一、毒性資料

暴露途徑：吞食、皮膚接觸、眼睛接觸、吸入										
症狀：刺激呼吸器官、刺激眼睛。										
<p style="text-align: right;">*) 本製品的類似構成製品的試驗結果</p> <p><b>急毒性物質 (吞食)：</b></p> <table> <tr> <td>製品</td> <td>大鼠 LD<sub>50</sub> &gt; 2,000mg/kg (OECD TG 425)* 不歸類或第 5 級</td> </tr> <tr> <td>NMP</td> <td>大鼠 LD<sub>50</sub> = 3,500mg/kg</td> </tr> <tr> <td>乳酸乙酯</td> <td>大鼠 LD<sub>50</sub> &gt; 2,000mg/kg</td> </tr> <tr> <td>N-苯基二乙醇胺</td> <td>大鼠 LD<sub>50</sub> = 980mg/kg</td> </tr> </table> <p><b>急毒性物質 (皮膚)：</b></p> <table> <tr> <td>製品</td> <td>無資料</td> </tr> </table>	製品	大鼠 LD <sub>50</sub> > 2,000mg/kg (OECD TG 425)* 不歸類或第 5 級	NMP	大鼠 LD <sub>50</sub> = 3,500mg/kg	乳酸乙酯	大鼠 LD <sub>50</sub> > 2,000mg/kg	N-苯基二乙醇胺	大鼠 LD <sub>50</sub> = 980mg/kg	製品	無資料
製品	大鼠 LD <sub>50</sub> > 2,000mg/kg (OECD TG 425)* 不歸類或第 5 級									
NMP	大鼠 LD <sub>50</sub> = 3,500mg/kg									
乳酸乙酯	大鼠 LD <sub>50</sub> > 2,000mg/kg									
N-苯基二乙醇胺	大鼠 LD <sub>50</sub> = 980mg/kg									
製品	無資料									

## 安全資料表

NMP	家兔 LD <sub>50</sub> =6,000mg/kg
乳酸乙酯	家兔 LD <sub>50</sub> >5 g/kg
<b>急毒性物質 (吸入):</b>	
製品	無資料
NMP	大鼠 LC <sub>50</sub> (4h) >5.1mg/L
乳酸乙酯	大鼠 LD <sub>50</sub> >5.4mg/L
<b>腐蝕/刺激皮膚物質:</b>	
製品	輕微刺激 (OECD TG 404)* GHS 不歸類
NMP	家兔具輕度刺激。有人體具有輕度~中度的短暫性刺激及接觸性皮膚炎的報告。
N-苯基二乙醇胺	家兔 造成輕微刺激
<b>嚴重損傷/刺激眼睛物質:</b>	
製品	中度刺激 (OECD TG 405)* GHS 第2B級之結果
NMP	在家兔試驗中可見對角膜有刺激, 有報告顯示 21 天以內恢復。另外也有報告顯示在家兔試驗中可見中度至強烈的刺激性。
乳酸乙酯	有報告顯示對家兔的眼睛具刺激性。歐洲 CLP Annex VI 歸為第 1 級。
N-苯基二乙醇胺	家兔 造成嚴重刺激
<b>呼吸道/皮膚致敏物質:</b>	
製品	(皮膚) 陰性 (OECD TG 442B)
NMP	(呼吸道) 數據不足因此無法歸類。 (皮膚) 數據不足因此無法歸類。有報告顯示在人體及豚鼠實驗中未見致敏性, 另一方面也有職業的暴露下有接觸性皮膚炎或皮膚症狀等報告。
<b>生殖細胞致突變性物質:</b>	
製品	無資料
NMP	(in vitro 試驗) AMES 試驗為陰性、哺乳類培養細胞染色體畸變試驗為陰性、(in vivo 試驗) 小鼠及中國倉鼠的骨髓細胞微核試驗為陰性、中國倉鼠的骨髓細胞染色體畸變試驗為陰性。
聚醯胺酸酯	AMES 試驗呈陰性。

## 安全資料表

## 致癌物質：

製品	無資料
NMP	無關於人體致癌性資訊。在大鼠吸入或吞食 2 年暴露試驗中，未顯示腫瘤誘導的證據。目前數據不足因此無法歸類。

## 生殖毒性物質：

製品	無資料
NMP	人體中無病例顯示明確的因果關係。在妊娠大鼠的器官形成期給藥發育毒性試驗中，在可見動物母體毒性的劑量下，認為對胎兒具有含骨骼畸形的發育毒性影響。[GHS 第 1B 級]

## 特定標的器官系統毒性物質—單一暴露：

製品	無資料
NMP	實驗動物中可見呼吸道刺激。大鼠的暴露試驗中可見疼痛反應低下，協調運動失調。人體中認為具有重度眼睛刺激及頭痛。[GHS 第 3 級(呼吸道刺激)]
乳酸乙酯	關於人體，有報告顯示 400ppm 劑量下會刺激鼻腔、咽喉。[GHS 第 3 級(呼吸道刺激)]

## 特定標的器官系統毒性物質—重複暴露：

製品	無資料
----	-----

## 吸入性危害物質：

製品	無資料
----	-----

## 其他：

無資料

## 十二、生態資料

<b>生態毒性：</b>	
NMP	魚類：LC <sub>50</sub> (96hr) > 500mg/L 甲殼綱：EC <sub>50</sub> (24h) > 1,000mg/L 藻類：EC <sub>50</sub> (72h) > 500mg/L
<b>持久性及降解性：</b>	
NMP	良好降解性
<b>生物蓄積性：</b>	
NMP	無蓄積性
<b>土壤中之流動性：</b>	
	無資料

## 安全資料表

對臭氧層之危害:	無資料
其他不良效應:	無資料

## 十三、廢棄處置方法

## 廢棄處置方法:

製品:

採取焚燒的方式進行廢棄處置。禁止將本品廢棄至地表、排水溝或其他環境中。  
應遵循相關法規及地方政府之條例進行廢棄。

對於受污染之容器與包裝:

內容物、容器應委託給取得地方政府等許可之專業廢棄物處理商進行處置。  
廢棄空容器時，應徹底清除內容物後再進行處置。

## 十四、運送資料

聯合國編號:	不適用
聯合國運輸名稱:	不適用
運輸危害分類:	不適用
包裝類別:	不適用
海洋污染物(是/否):	否
特殊運送方法及注意事項:	包裝時須確認無洩漏，裝載時應避免容器翻倒、墜落、受損傷等，並捆綁結實，防止貨物散架。

本製品的包裝內含有乾冰。乾冰的相關資料如下:

聯合國編號:	1845
聯合國運輸名稱:	固態二氧化碳(乾冰)
運輸危害分類:	9
包裝標準:	954

## 十五、法規資料

## 適用法規:

1. 職業安全衛生設施規則(2014年)
2. 危害性化學品標示及通識規則(2014年)
3. 事業廢棄物貯存清除處理方法及設施標準(2006年)
4. 毒性化學物質管理法(2013年)
5. 新化學物質及既有化學物質資料登錄辦法(2014年)
6. 新化學物質登記管理辦法(2015年)
7. 道路交通安全規則(2017年)
8. 公共危險物品及可燃性高壓氣體設置標準暨安全管理辦法(2017年)
9. 優先管理化學品之指定及運作管理辦法(2015年)

## 安全資料表

10. 勞工作業環境監測實施辦法(2016年)
11. 化學品分類及標示 CNS15030  
     CNS15030-6 化學品分類及標示—易燃液體  
     CNS15030-17 化學品分類及標示—急毒性物質  
     CNS15030-19 化學品分類及標示—嚴重損傷/刺激眼睛物質  
     CNS15030-23 化學品分類及標示—生殖毒性物質  
     CNS15030-24 化學品分類及標示—特定標的器官系統毒性物質—單一暴露

## 十六、其他資料

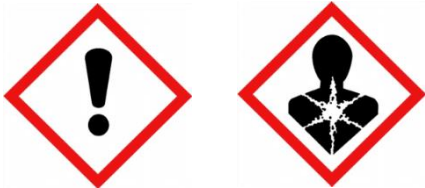
參考文獻	—	
製表單位	旭化成株式會社(Asahi Kasei Corporation) 〒100-0006 日本國東京都千代田區有樂町一丁目1番2號 電話/傳真電話: +81-3-6699-3991 (電子材料市場銷售部) / +81-3-6699-3923	
製表人	職稱: 經理	姓名(簽章): 植竹 伸子
製表日期	2018年9月1日	
備註	<p>聲明:</p> <p>本安全資料表(SDS)中所記載的內容是基於目前所能得到之最新資料、數據製作而成的,但有可能因為新見解而被修訂。而且,本SDS中所記載之注意事項均以常規使用為對象。使用者計畫進行特殊處置時,應在採取適合其用途及用法之安全措施後再使用本製品。此外,所記載之內容僅為資訊的提供,並非製品的安全保證書。</p> <p>上述資料中符號“—”代表目前查無相關資料。</p>	

## SAFETY DATA SHEET

## 1. Chemical and supplier information

<b>Chemicals name:</b>	PIMEL™ BL-301
<b>Other names:</b>	Photosensitive polyimide precursor
<b>Recommended use and restrictions on use:</b>	Coating resin for electronic devices fabrication
<b>Names, addresses, and phone numbers of the manufacturer, importer or supplier:</b>	
<b>Manufacturer</b>	
Name	Asahi Kasei Corporation
Address	1-1-2 Yurakucho, Chiyoda-ku, Tokyo 100-0006 Japan
Phone / FAX number	+81-3-6699-3991 (Fab Materials Marketing Dept.) / +81-3-6699-3923
E-mail	pimel-sales@om.asahi-kasei.co.jp
<b>Emergency telephone number:</b>	CHEMTREC 00801-14-8954 (Customer Number 798741)
<b>Contact Phone / FAX number:</b>	03-667-0848 / 03-668-5830 (Hansheng Technology Corporation Rm. B, 4F., No.30, Chenggong 13th St., Zhubei City, Hsinchu County 302, Taiwan (R.O.C.))

## 2. Hazards identification

<b>Chemicals hazard class:</b>	
Physical hazard:	
(1) Flammable liquids	Category 4
Health hazard:	
(1) Acute toxicity-oral	Category 5
(2) Eye damage/irritation	Category 2B
(3) Toxic to reproduction	Category 1B
(4) Specific target organ toxicity - single exposure	Category 3 (Respiratory irritation)
<b>Label content:</b>	
<b>Pictograms:</b>	
<b>Signal word:</b>	<b>Danger</b>
<b>Hazard statements:</b>	
H227: Combustible liquid	
H303: May be harmful if swallowed	
H320: Causes eye irritation	
H360: May damage fertility or the unborn child	
H335: May cause respiratory irritation	
<b>Precautionary statements:</b>	
<b>Prevention:</b>	P201: Obtain special instructions before use.
	P202: Do not handle until all safety precautions have been read and understood.
	P210: Keep away from flames and hot surfaces. No smoking.

## SAFETY DATA SHEET

	P261: Avoid breathing dust/fume/gas/mist/vapours/spray. P264: Wash hands thoroughly after handling. P271: Use only in a well-ventilated area. P280: Wear protective gloves/protective clothing/eye protection/face protection.
<b>Response:</b>	P304+P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing. P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P308+P313: IF exposed or concerned: Get medical advice/attention. P312: Call a POISON CENTER or doctor/physician if you feel unwell. P337+P313: If eye irritation persists: Get medical advice/ attention. P370+P378: In case of fire: Use water spray, foam, dry chemical or carbon dioxide for extinction.
<b>Storage:</b>	P403+P233: Store in a well-ventilated place. Keep container tightly closed. P403+P235: Store in a well-ventilated place. Keep cool. P405: Store locked up.
<b>Disposal:</b>	P501: Dispose of contents/container in accordance with local/ regional/ national regulations.
<b>Other hazards:</b>	Toxic and irritant fume/gas/vapours may be generated from this product during heating processes and combustion i.e. during incineration and in fire. Please be careful not to inhale these fume/gas/vapours.

## 3. Composition/information on ingredients

## Mixtures

<b>Chemical properties:</b> Toxic and irritant fume/gas/vapours may be generated from this product during heating processes and combustion i.e. during incineration and in fire.			
English names of the hazardous ingredients	Concentration ranges (ingredient percentage)	CAS No.	The approval No. of withholding application
N-methyl-2-pyrrolidone (NMP)	45 ~ 55 wt.%	872-50-4	—
Polyamic acid ester	25 ~ 35 wt.%	Trade secret	—
Ethyl lactate (EL)	10 ~ 15 wt.%	97-64-3	—
Tetraethylene glycol dimethacrylate	1 ~ 5 wt.%	109-17-1	—
N-Phenyldiethanolamine	1 ~ 4 wt.%	120-07-0	—
Other ingredients	< 5 wt.%	Trade secret	—
<b>Remarks:</b> Ethyl lactate: Listed in 1062 first stage of GHS hazardous substances, and Priority Management Chemicals NMP: Listed in 1089 second stage of GHS hazardous substances, and Priority Management Chemicals Other ingredients do not contribute to the classification of the product and do not meet the regulatory values specified in Attachment 3 of Regulation of Labelling and Hazard Communication of Hazardous			

## SAFETY DATA SHEET

Chemicals.

Polyamic acid ester is not hazardous.

Tetraethylene glycol dimethacrylate is not classified the GHS hazardous chemicals. (Referred from GESTIS substance database by IFA in Germany)

#### 4. First-aid measures

##### The first aid measures for different exposure routes:

Inhalation:	Remove person to fresh air and keep comfortable for breathing. Give artificial aspiration if necessary. Consult a physician/doctor if you feel unwell.
Skin contact:	Remove contaminated clothing and boots. Wash affected area thoroughly with soap and water for several minutes. Get medical attention if skin irritation or rash occurs.
Eye contact:	Rinse cautiously with water for several minutes. If eye irritation or redness occurs, immediately get medical attention.
Ingestion:	If swallowed, wash out mouth thoroughly. Get medical attention.

##### The most important symptoms and hazardous effects:

Acute effects:	Irritation and redness to the eyes, and skin and respiratory irritation
Delayed effects:	May damage fertility or the unborn child

##### The protection of first-aiders:

In order to prevent secondary exposure, first-aiders should wear suitable protective gloves/ protective clothing/ eye and face protection.

**Note to physicians:** Not available

#### 5. Fire-fighting measures

##### Suitable fire extinguishing media:

Water, water spray, carbon dioxide, dry chemical and foam are recommended. Remove containers to a safe area or cool them with water spray.

**Unsuitable extinguishing media:** Direct water jet

##### Special hazards arising from the substance or mixture:

Toxic and irritant fume/gas/vapor can be generated in fire; e.g. acetaldehyde, cyclohexene, 2-hydroxyethyl methacrylate (2-HEMA), and nitrogen oxides

**Specific fire-fighting methods:** Not available

##### Special equipment for the protection of firefighters:

Move container to a safe place if it can be done without risk.

Wear suitable personal protective equipment including self-contained respirator, chemical-proof safety clothing, and protective gloves.

#### 6. Accidental release measures

##### Personal precautions:

Keep unnecessary personnel away from spillage. For emergency responders: Prevent spread of contamination. Wear suitable protective equipment including respiratory protection and chemical resistant

## SAFETY DATA SHEET

protective clothing, gloves, and safety goggles or face protection.

**Environmental precautions:**

Do not empty the product into the surface, drains and other natural environments.

**Methods for cleaning up:**

Collect spill using appropriate absorbent material (e.g. dried sand, earth, waste cloth, sawdust) or pumping. Place the collected spills in a suitable container and incinerate it for disposal. Wash contaminated area with water and detergent.

**Methods for prevention of secondary disaster:** Not available

**7. Handling and storage****Handling:**

Ensure thorough ventilation at work areas. Product should be handled in closed equipment as far as possible.

Wear personal protective equipment as described in section 8.

Avoid contact with skin and eye or accidental ingestion.

Avoid inhalation of dust/fume/gas/mist/vapours, particularly during heating processes.

Do not touch wax-like product which may appear on walls of curing oven without personal protective equipment.

Do not mix with strong oxidisers, acids or bases as listed in Section 10.

If the product is attached to skin, wash the contaminated area thoroughly.

Wash contaminated clothing before reuse.

**Storage:**

Store only in the original container with light-shield bag. Tightly close the container and the bag when not in use and store in a freezer.

Recommended storage temperature after shipment: between -15 °C and -20 °C

Temperature during transport: below 23 °C

**8. Exposure controls/personal protection**

**Engineering control:** Closed system or local exhaust system is recommended.

**Control parameters:**

• 8h time weighted average exposure limits (TWA)/Short-term exposure limits (STEL)/Maximum exposure limits (CEILING)

Taiwan: Not established

ACGIH : Not established

Japan Society for Occupational Health: NMP (1ppm)

• Biological standards (BEIs):

ACGIH : NMP: 5-Hydroxy-N-Methyl-Pyrrolidone in urine, 100mg/L (Sampling time: End of shift)

**Personal protective equipment:**

Respiratory protection: Wear approved respirator if exposed dust/ fume/ gas/ mist/ vapours.

Hand protection: Wear impervious gloves (e.g. chemical resistant gloves made from nitrile)

## SAFETY DATA SHEET

Eye protection:	rubber). Wear safety glasses (e.g. safety goggles) or face protection.
Skin and body protection:	Wear protective clothing which covers any exposed parts of the body (e.g. long-sleeves clothing and safety boots).
<b>Hygiene measures:</b> Not available	

## 9. Physical and chemical properties

<b>Appearance:</b> Transparent brown-red liquid	<b>Odour:</b> Mild amine-like odour
<b>Odour threshold:</b> Not available	<b>Melting point/freezing point:</b> No available for the product, -23.09°C (NMP), -25°C (EL)
<b>pH value:</b> Not available	<b>Boiling point/boiling range:</b> No available for the product, 202°C (NMP), 154°C (EL)
<b>Flammability (solid, gas):</b> Not applicable	<b>Flash point:</b> 83.0 °C (Based on the test results of product with similar ingredients) Test method: Closed cup
<b>Decomposition temperature:</b> Not available	
<b>Auto-ignition temperature:</b> No available for the product, 346°C (NMP), 400°C (EL)	<b>Upper/lower flammability or explosive limits:</b> No available for the product, 1-10 vol % (NMP), 1.5-14.1 vol % (EL)
<b>Vapor pressure:</b> No available for the product, 0.33 mmHg (23°C)(NMP), 3.75mmHg (25°C)(EL)	<b>Solubility:</b> No available for the product Miscible with water (1,000g/L) (NMP, EL), Insoluble in water (Polyamic acid ester)
<b>Density:</b> 1.1g/cm <sup>3</sup> at 20 °C	<b>Vapor density:</b> Not available
<b>Partition coefficient (n-octanol/water, log Kow):</b> Not available	<b>Evaporation rate:</b> Not available
<b>Viscosity:</b> 35 - 45 poise (23°C)	

## 10. Stability and reactivity

<b>Stability:</b> Stable under normal recommended storage conditions
<b>Reactivity:</b> Not reactive under normal storage conditions
<b>Possible hazardous reactions under specific conditions:</b> Not available
<b>Conditions to avoid:</b> Excessive heat, exposure to flame or sparks
<b>Materials to avoid:</b> Strong oxidisers, acids or bases
<b>Hazardous decomposition products:</b> Acetaldehyde, cyclohexene, 2-hydroxyethyl methacrylate (HEMA), and nitrogen oxides (NO <sub>x</sub> )

## 11. Toxicological information

<b>Routes of exposure:</b> Inhalation, skin contact, eye contact, and ingestion
<b>Symptoms:</b> Irritation and redness to the eyes, and skin and respiratory irritation. *) Based on the test results of product with similar ingredients
<b>Acute toxicity (oral):</b>

## SAFETY DATA SHEET

Product	Rat LD <sub>50</sub> > 2,000mg/kg (OECD TG 425)*	Not classified or category 5
NMP	Rat LD <sub>50</sub> =3,500mg/kg	
Ethyl lactate	Rat LD <sub>50</sub> > 2,000mg/kg	
N-Phenyldiethanolamine	Rat LD <sub>50</sub> =980mg/kg	

**Acute toxicity (dermal):**

Product	No data available
NMP	Rabbit LD <sub>50</sub> =6,000mg/kg
Ethyl lactate	Rat LD <sub>50</sub> > 5g/kg

**Acute toxicity (inhalation):**

Product	No data available
NMP	Rat LC <sub>50</sub> (4h) > 5.1mg/L
Ethyl lactate	Rat LD <sub>50</sub> > 5.4mg/L

**Skin corrosion or irritation:**

Product	Mild irritant (OECD TG 404)*	GHS not classified
NMP	Slightly irritating to rabbit. It is reported that mild to moderate transient irritation and contact dermatitis were found on humans.	
N-Phenyldiethanolamine	Rabbit mild irritant	

**Serious eye damage or irritation:**

Product	Moderate irritant (OECD TG 405)*	GHS category 2B
NMP	Irritability to the cornea was observed in a rabbit study and it was reported that recovered within 21 days. There are also reports that moderate to strong irritation was observed in a rabbit study.	
Ethyl lactate	There is a report of irritating to rabbit eyes. It was classified as Category 1 by EU CLP Annex VI.	
N-Phenyldiethanolamine	Rabbit severe irritant	

**Respiratory or skin sensitization**

Product	(Skin) Negative (OECD TG 442B)
NMP	(Respiratory tract) Classification not possible due to lack of data. (Skin) Classification not possible due to lack of data. It is reported that sensitization was not observed in human and guinea pig tests, while contact dermatitis and skin symptoms, etc. were reported in occupational exposure.

**Germ cell mutagenicity:**

Product	No data available
NMP	( <i>in vitro</i> test) Negative in AMES test, and chromosome aberration test of mammalian cultured cells. ( <i>in vivo</i> test) Negative in micronucleus test of bone marrow cells in mouse and Chinese hamsters, chromosome aberration test of bone marrow cells in Chinese hamsters.

## SAFETY DATA SHEET

Polyamic acid ester	Negative in AMES test.
<b>Carcinogenicity:</b>	
Product	No data available
NMP	There is no information of human carcinogenicity. No evidence of tumour induction was demonstrated in rat inhalation or oral 2-year exposure studies. Classification not possible due to lack of data at present.
<b>Reproductive toxicity:</b>	
Product	No data available
NMP	There are no cases showing clear causal relationships in humans. In the developmental toxicity test on pregnant rat during the primary period of organogenesis, at the dose that maternal toxicity was observed, developmental toxic effects including skeletal malformations were observed on the fetus. [Category 1B]
<b>Specific target organ toxicity – single exposure:</b>	
Product	No data available
NMP	Respiratory irritation was observed in experimental animals. In the rat exposure test, low pain response and coordination ataxia were observed. Severe eye irritation and headache were observed in human. [Category 3 - Respiratory irritation]
Ethyl lactate	It has been reported that irritation to human nose and throat were caused at 400ppm. [Category 3 - Respiratory irritation]
<b>Specific target organ toxicity – repeated exposure:</b>	
Product	No data available
<b>Aspiration hazard:</b>	
Product	No data available
<b>Other information:</b>	Not available

**12. Ecological information**

<b>Eco-toxicity:</b>	
NMP	Fish: LC <sub>50</sub> (96hr) > 500mg/L Crustacean: EC <sub>50</sub> (24h) > 1,000mg/L Algae: EC <sub>50</sub> (72h) > 500mg/L
<b>Persistence and degradability:</b>	
NMP	Biodegradable
<b>Bioaccumulative potential:</b>	
NMP	Not bioaccumulative
<b>Mobility in soil:</b>	Not available
<b>Adverse effects for ozone layer:</b>	Not available
<b>Other adverse effects:</b>	Not available

## SAFETY DATA SHEET

**13. Disposal considerations****Methods of waste disposal:**

Product:

Dispose by incineration.

Do not throw this product into the surface, sewers, waterways and other natural environments.

Dispose of contents/container in accordance with local/ regional/ national regulations.

Contaminated containers and packaging:

The contents and containers should be entrusted to a professional waste disposer who has obtained permission from the local government.

Clean up the contents thoroughly when dispose of empty container.

**14. Transport information****United Nations number (UN No.):** Not applicable**UN proper shipping name:** Not applicable**Transport hazard class(es):** Not applicable**Packing group:** Not applicable**Marine pollutant(Yes/No):** No**Specific transport measures and precautionary conditions:**

Ensure no leakage on packaging and load the product by taking preventive measures to avoid collapse, invasion, fall or damaging of container.

Packaging may contain dry ice and following provisions should be given.

UN No: 1845

UN proper shipping name: CARBON DIOXIDE, SOLID (Dry Ice)

Transport hazard class(es): 9

Packing instruction: 954

**15. Regulatory information****Applicable regulations:**

1. Regulations for Occupational Safety and Health Facilities (2014)
2. Regulations for the Labelling and Hazard Communication of Hazardous Chemicals Chinese (2014)
3. Methods and Facilities Standards for the Storage, Clearance and Disposal of Industrial Waste (2006)
4. Toxic Chemical Substances Control Act (2013)
5. Regulation of New and Existing Chemical Substances Registration (2014)
6. Regulations on New Chemical Substances Registration (2015)
7. Regulations Governing Road Traffic Safety (2017)
8. Public Hazardous Substances & Flammable Pressurized Gases Establishment Standards & Safety Control Regulations (2017)
9. Regulations Governing Designating and Handling of Priority Management Chemicals (2015)
10. Labor operation environment monitoring implementation measures (2016)
11. Classification and labelling of chemicals CNS15030  
CNS15030-6 Classification and labelling of chemicals - Flammable liquids

## SAFETY DATA SHEET

CNS15030-17	Classification and labelling of chemicals - Acute toxicity
CNS15030-19	Classification and labelling of chemicals - Eye damage/irritation
CNS15030-23	Classification and labelling of chemicals - Reproductive toxicity
CNS15030-24	Classification and labelling of chemicals - Specific target organ toxicity – single exposure

**16. Other information**

<b>Literature references</b>	Not available	
<b>Organization that prepared the SDS</b>	Asahi Kasei Corporation Address: 1-1-2 Yurakucho, Chiyoda-ku, Tokyo 100-0006 Japan Phone number: +81-3-6699-3991 (Fab Materials Marketing Dept.)	
<b>Person who prepared the SDS</b>	Title: manager	Name (signature): Nobuko Uetake
<b>Date that the SDS was prepared</b>	1 September 2018	
<b>Remarks</b>	[Disclaimer] This information is furnished without warranty, express or implied, except that it is accurate to the best knowledge of Asahi Kasei Corporation. It relates only to the specific material designated herein, and does not relate to use in combination with any other materials or in any process. Asahi Kasei Corporation assumes no legal responsibilities for use of or reliance upon this information.	