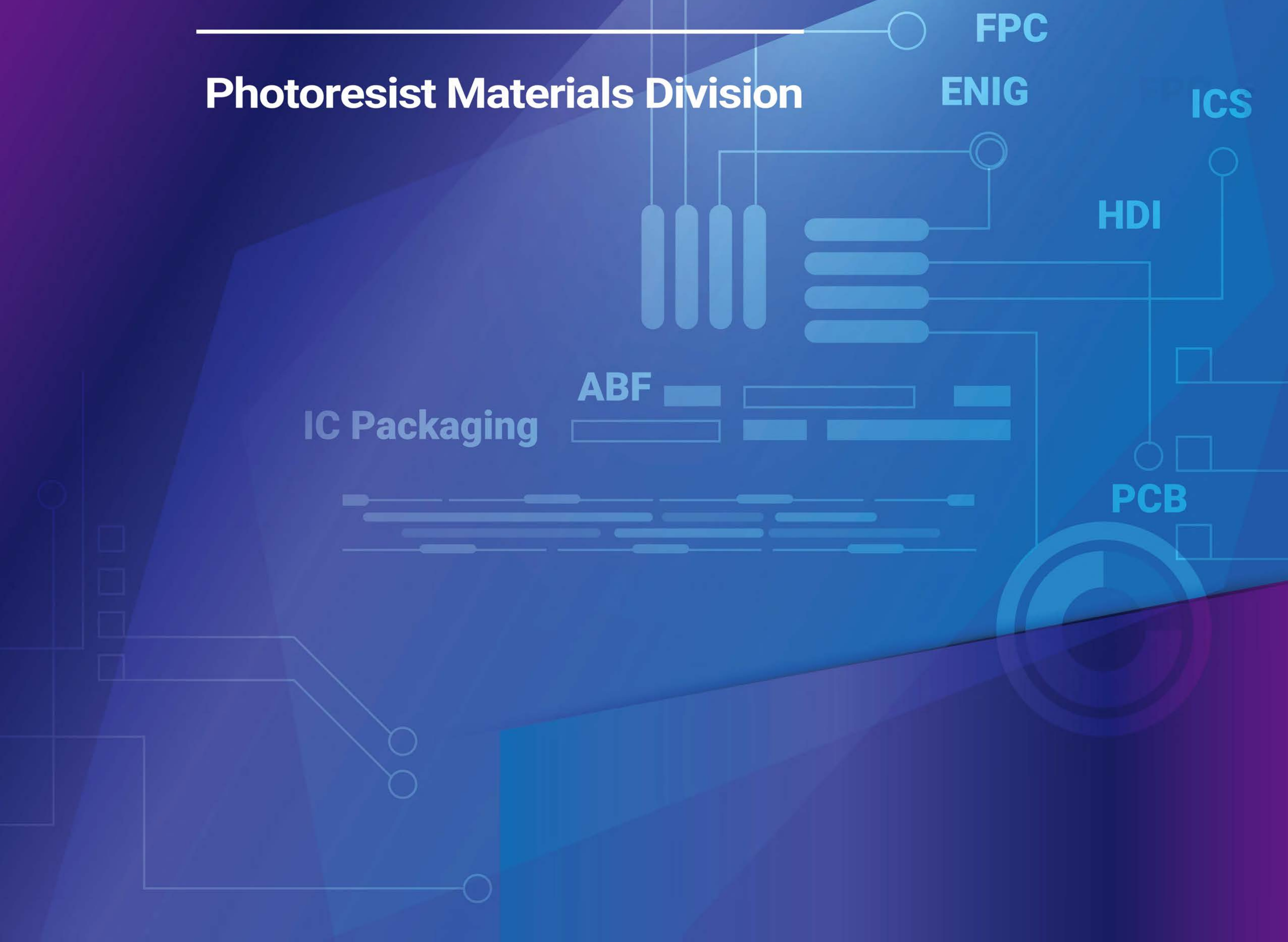
長興材料

ETERNAL MATERIALS

Photoresist Materials Division



ETERNAL MATERIALS PRODUCT LIST

長興材料
ETERNAL MATERIALS

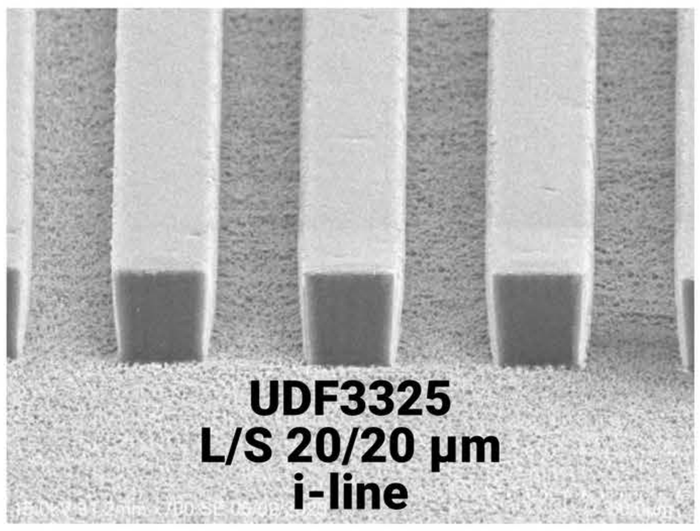
Application	Series	Thickness (μm)	Process
Multi Layer	HT2500DI	30, 40, 45, 50	Tent & Etch, Plating
HDI	UDF3300	25, 30, 35, 40	Tent & Etch
FPC	FPR4600 FPR4700 FPR4800	20, 25, 30 25 20	Tent & Etch
IC Substrate & PKG	UDH5700 APR900 BR41000 BR42000	15, 25 10, 15, 20, 25 60, 80, 100 80, 120, 240	mSAP, SAP Copper Pillar Bumping
ENIG/ENEPIG	HQ6700S	49, 65	ENIG, ENEPIG

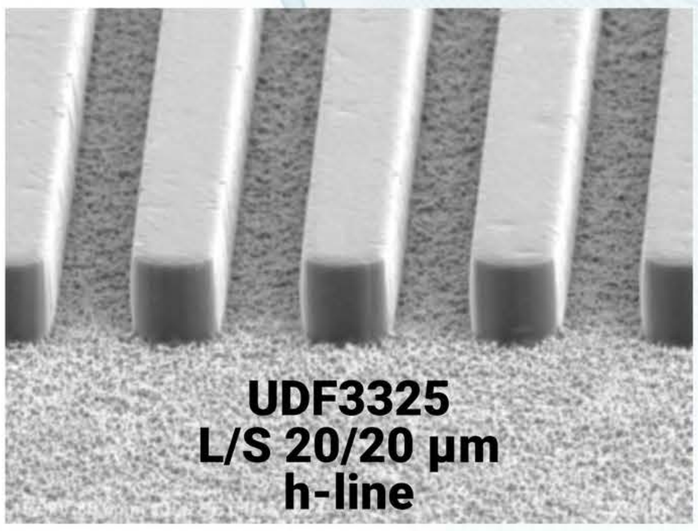
長興 遠規劃未來
創世界品牌

Your Solution Provider
Move Forward With Time

Dry Film Photoresist for HDI / Anylayer HDI Application UDF3300

UDF3300
For Pitch ≧ 80 μm
Direct Imaging (i- & h-line)





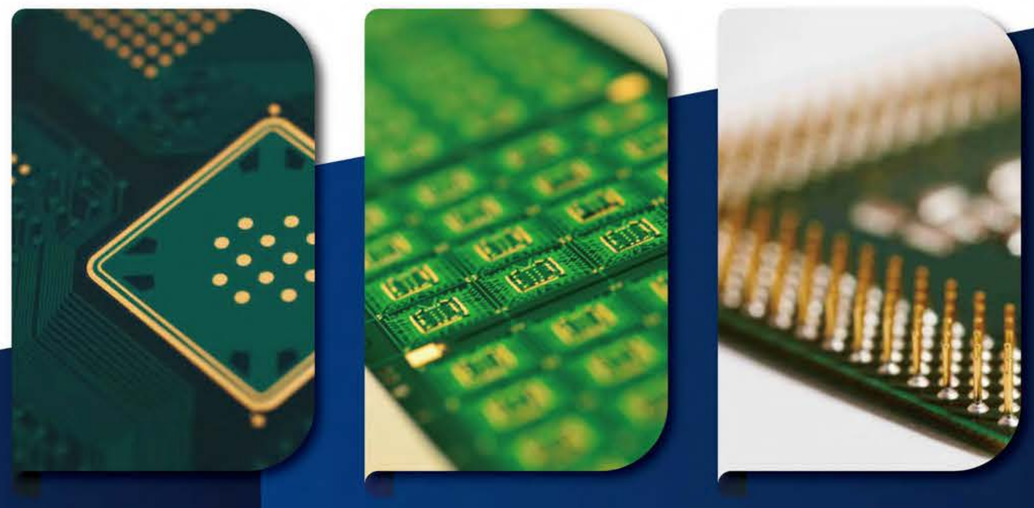
CHARACTERISTICS

DF	UDF3335	UDF3325
DF Thickness	34 μm	24 μm
Photo Speed (i-line) *	23 mj/cm^2	15 mj/cm^2
Photo Speed (h-line) **	31 mj/cm^2	20 mj/cm^2
41sst	19	16
Minimum Developing Time x 2	42 sec	31 sec
Adhesion / Resolution (i-line)	24 / 26 μm	20 / 20 μm
Adhesion / Resolution (h-line)	24 / 26 μm	20 / 20 μm
Tent Via (Φ)	6 mm	4 mm

*i-line: KLA LDI **h-line: ADTEC

Advantages

1. **Fast phtospeed**
2. **Good adhesion & resolution**
3. **Good tenting ability & resistance to acid etchant**



長興材料
ETERNAL MATERIALS

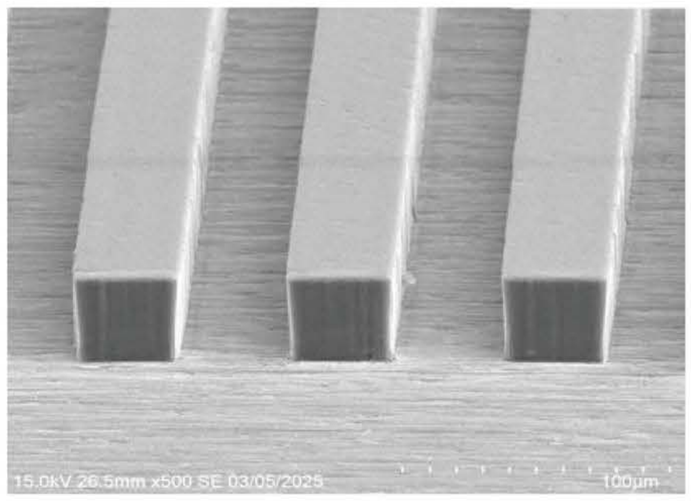
Dry Film Photoresist for MLB Application HT2500DI

FEATURES

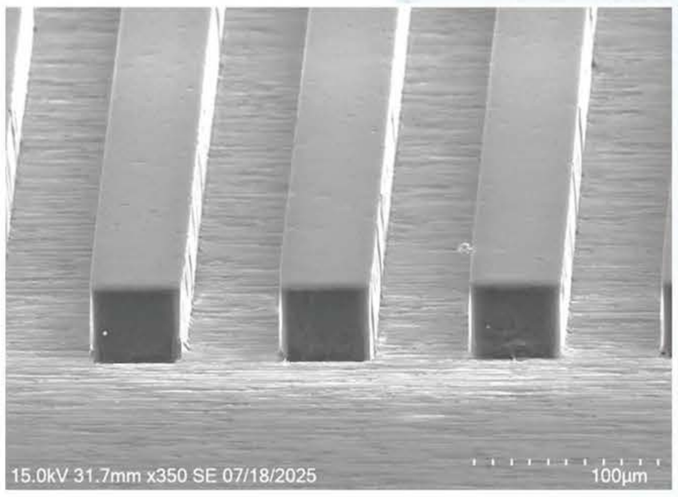
- Designed for conventional and DI/LDI exposure system applications
- For conventional exposure system, i-line and h-line
- Excellent tenting ability
- Excellent resistance to plating
- Excellent high resolution and adhesion

特性

- 可同時於傳統曝光和雷射曝光製程設計
- 適用於傳統曝光與 DI/LDI i-line 與 h-line 波長
- 優良蓋孔能力
- 優良抗電鍍能力
- 優良線路解析度及附著力



HT2515DI L/S=40 µm/40 µm
Collimated light

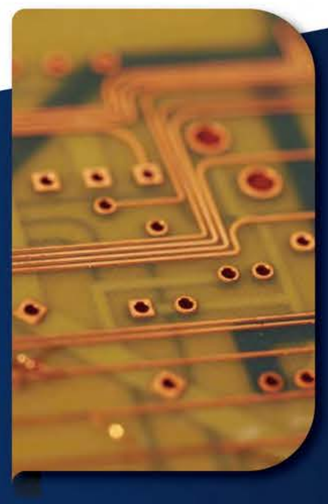


HT2515DI L/S=45 µm/45 µm
Nuvogo 800 (h-line)

CHARACTERISTICS

Item	HT2515DI	
Thickness (µm)	38	
Exposure system	Collimated light	LDI
Exposure Energy (mj/cm^2)	17	45 (h-line)*1
41 STOUFFER STEP HELD	22	22
Minimum Developing Time x2(sec) *2	54	54
Adhesion (µm)*2	30	30
Resolution (µm)*2	40	45
Tent breakdown*3 (Via Φ 5.5 mm)	0	
Stripping Break Time (sec) *4	55	

*1:Test by **Orbotech Nuvogo800**, *2: 50% BP, 28 ℃, *3: (Minimum Developing Timex2)x3,
*4: 3% NaOH by dipping.

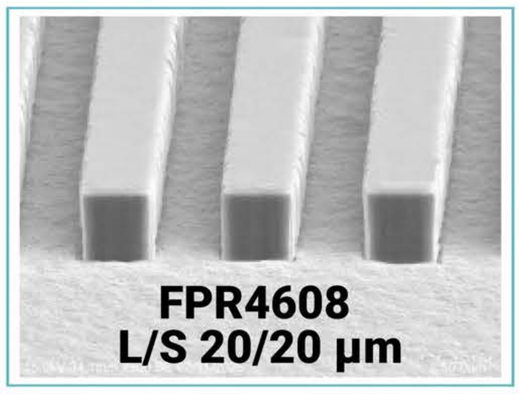


長興材料
ETERNAL MATERIALS

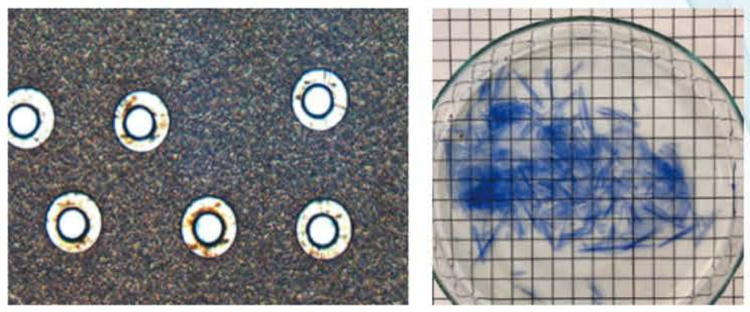
Dry Film Photoresist for FPC Application FPR4600 / FPR4700 / FPR4800

FPR4600 / FPR4700
For Pitch ≧ 80 μm

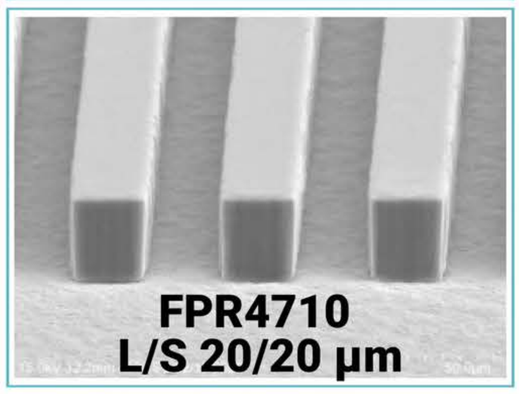
FPR4800
For Pitch ≧ 60 μm



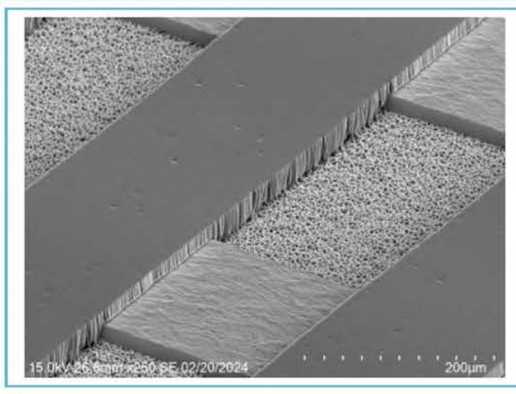
FPR4608
L/S 20/20 μm



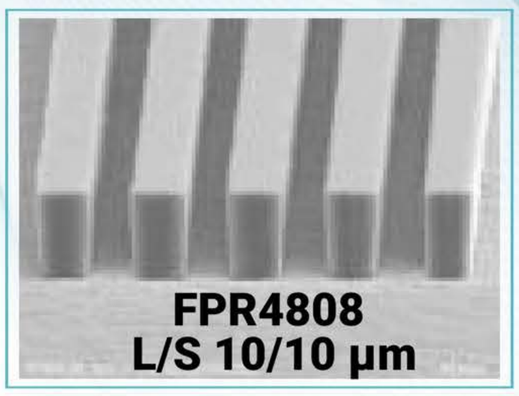
Easy strip ViaΦ 225 μm



FPR4710
L/S 20/20 μm



Conformance (wet. Lam. depth 15 μm)



FPR4808
L/S 10/10 μm

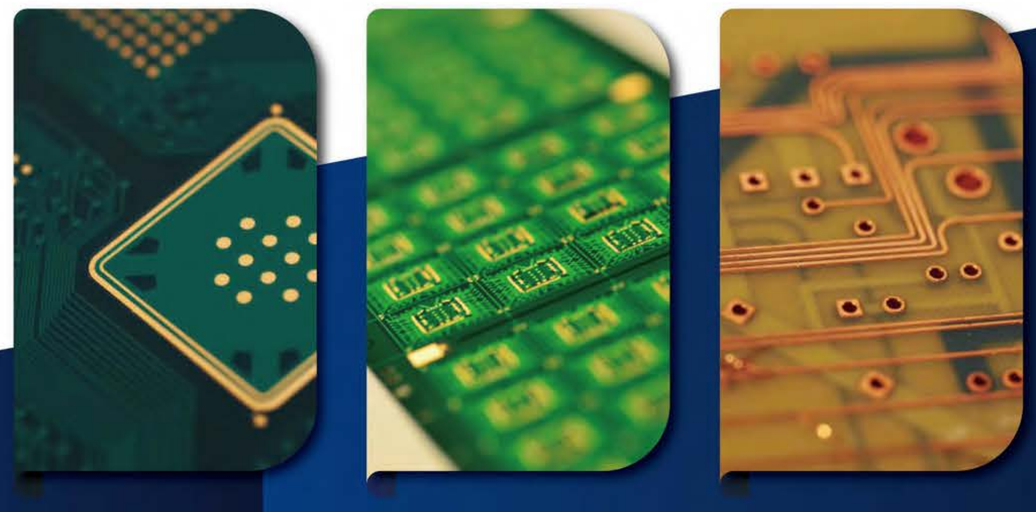
CHARACTERISTICS

DF	FPR4608	FPR4710	FPR4808
DF Thickness	20 μm	25 μm	20 μm
Photo Speed *	28 mj/cm^2	63 mj/cm^2	95 mj/cm^2
41sst	16	16	13
Minimum Developing Time x 2	24 sec	28 sec	26 sec
Adhesion / Resolution	14 / 18 μm	14 / 18 μm	6 / 8 μm
Tent Via (Φ)	3 mm	3 mm	3 mm
Via Without Residue after Stripping (Φ)	≧ 0.25 mm	≧ 0.3 mm	≧ 0.25 mm

* Collimated Light

Advantages

1. Small stripping flake size
2. Good adhesion & resolution
3. Good performance wet lamination



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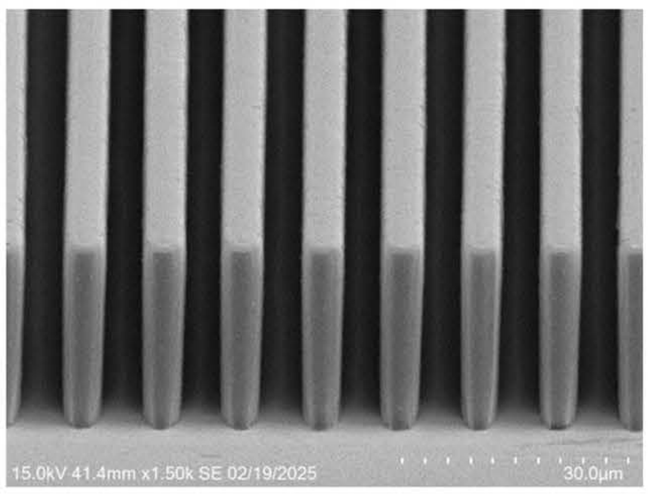
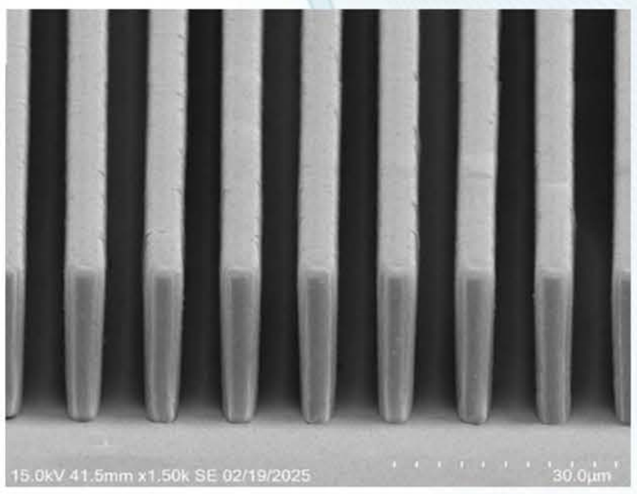
ETERNAL MATERIALS

Dry Film Photoresist for IC Packaging Application UDH5700

UDH5700
Direct Imaging
mSAP



UDH5725
L/S 5/5 µm



UDH5715
L/S 4/4 µm

CHARACTERISTICS

DF	UDH5725	UDH5715
DF Thickness	25 µm	15 µm
Photo Speed *	60 mj/cm^2	60 mj/cm^2
41sst	13	13
Minimum Developing Time x 2	36 sec	27 sec
Adhesion / Resolution	5 / 5 µm	4 / 4 µm

*ADTEC, h-line

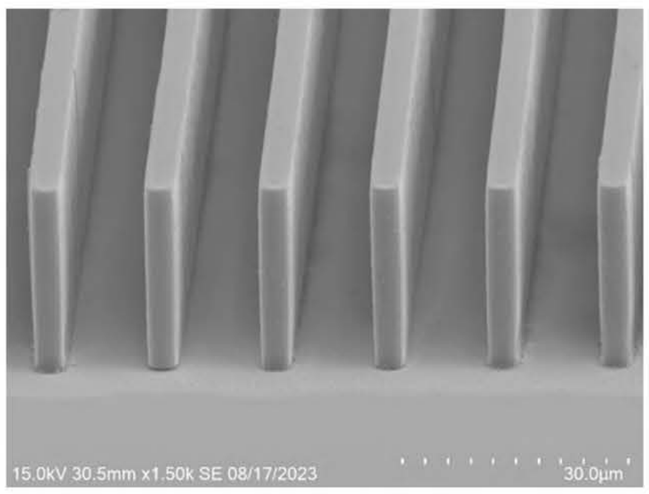
Advantages

1. **Excellent adhesion & resolution**
2. **Excellent resistance to acid plating**
3. **Good sidewall profile**

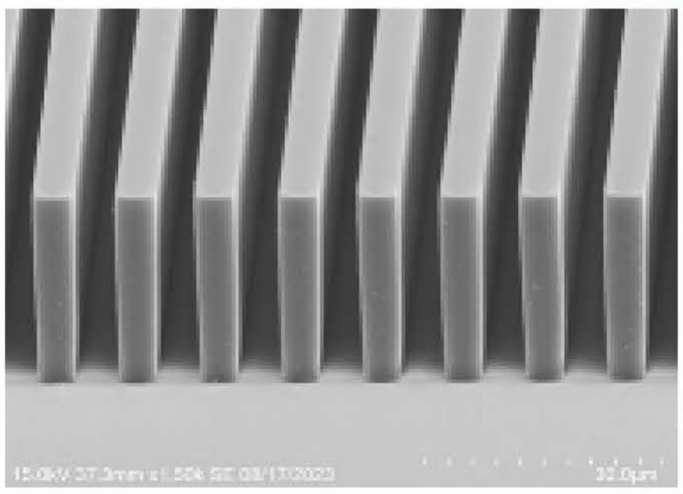
長興材料
ETERNAL MATERIALS

Dry Film Photoresist for IC Packaging Application APR900

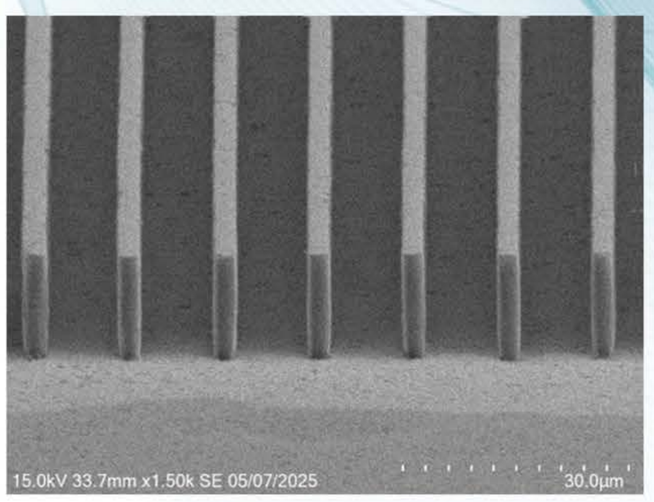
APR900
Stepper / Aligner
SAP



APR910
L/S 4/16 µm



APR910
L/S 4.5/4.5 µm



APR906
L/S 2.5/10 µm

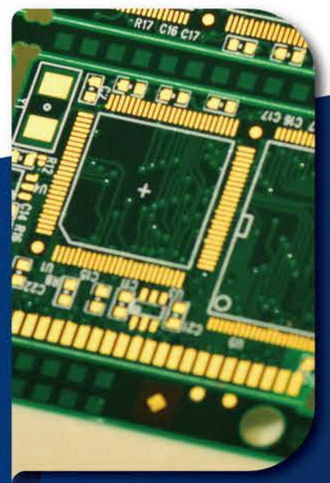
CHARACTERISTICS

DF	APR910	APR906
DF Thickness	24 µm	15 µm
Photo Speed *	175 mj/cm^2	160 mj/cm^2
41sst	16	16
Minimum Developing Time x 2	43 sec	26 sec
Adhesion / Resolution	4 / 4.5 µm	2.5 / 2.5 µm

*Ushio Projection Aligner

Advantages

1. **Excellent adhesion & resolution**
2. **Excellent resistance to acid plating**
3. **Good sidewall profile**

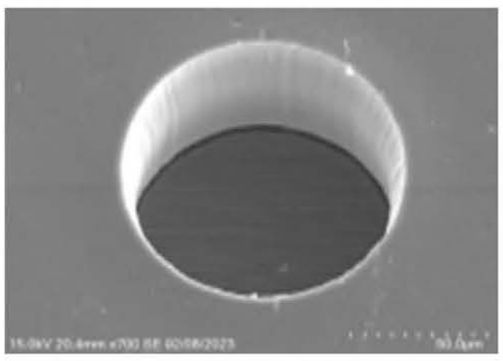


長興材料
ETERNAL MATERIALS

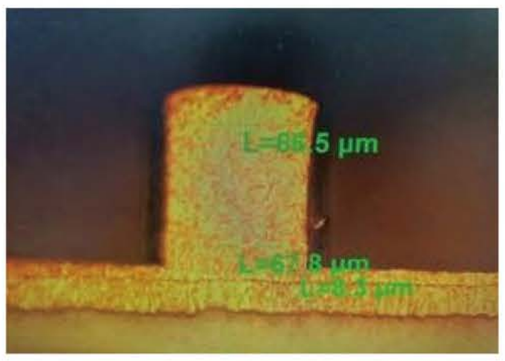
Dry Film Photoresist for Copper Pillar Bump Application BR41000 / BR42000

BR41120
Direct Imaging
(Single-Wavelength, i-line)

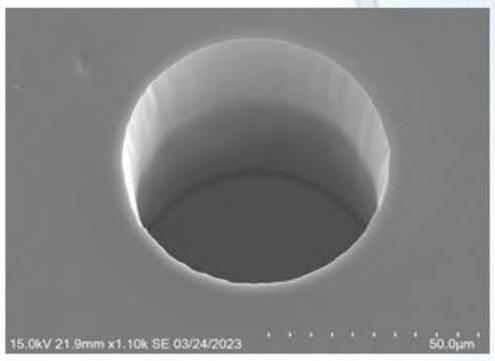
BR42240
Stepper / Aligner
(Multi-Wavelength/Broad Band)

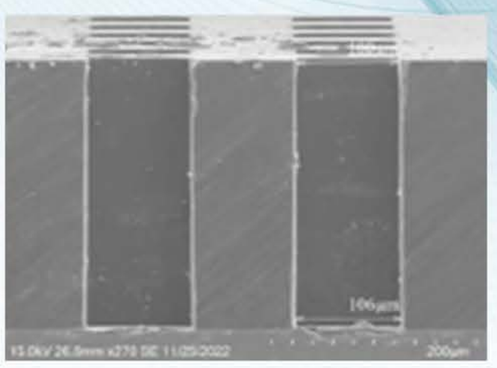


Via Resolution 60 μm



Perpendicularity 98.8% After copper plating





Via Resolution 80 μm

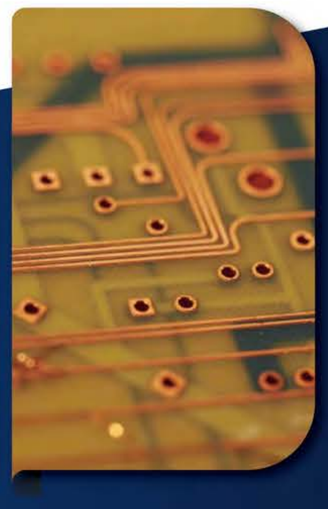
CHARACTERISTICS

DF	BR41120	BR42240
DF Thickness	120 μm	240 μm
Photo Speed	500 mj/cm^2	220 mj/cm^2
Minimum Developing Time x 2	2 min 16 sec	5 min 16 sec
Via Resolution (Φ)	60 μm *	80 μm **

*Nuvogo LDI, i-line **Ushio Projection, i-line

Advantages

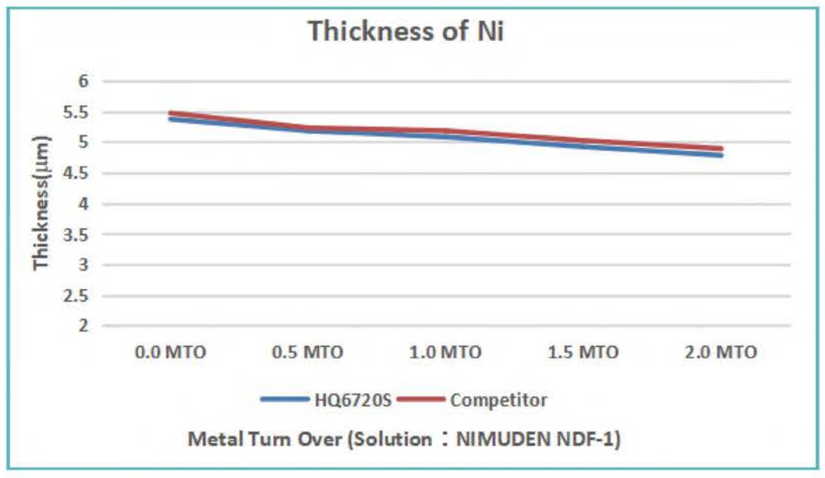
1. **Good via resolution**
2. **Good resistance to acid plating**
3. **Faster stripping & small flake size**
4. **Good dissolvability to specific stripping chemistry**

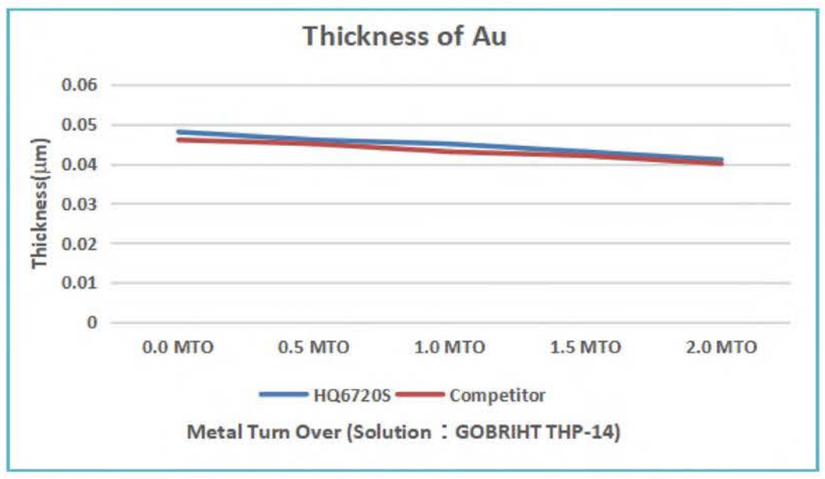


長興材料
ETERNAL MATERIALS

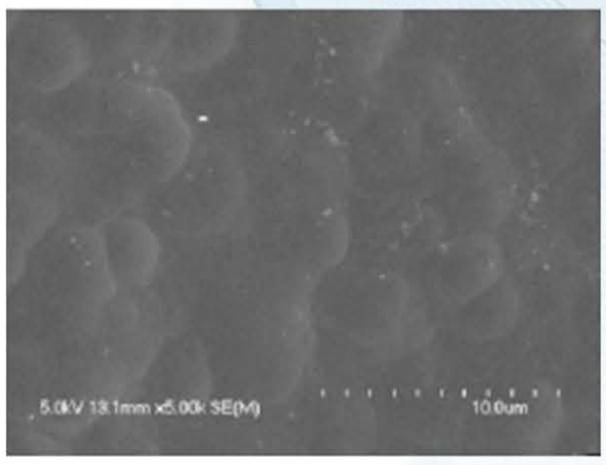
Dry Film Photoresist for ENIG & ENEPIG HQ6700S / HQ6600

ENIG / ENEPIG HQ6700S

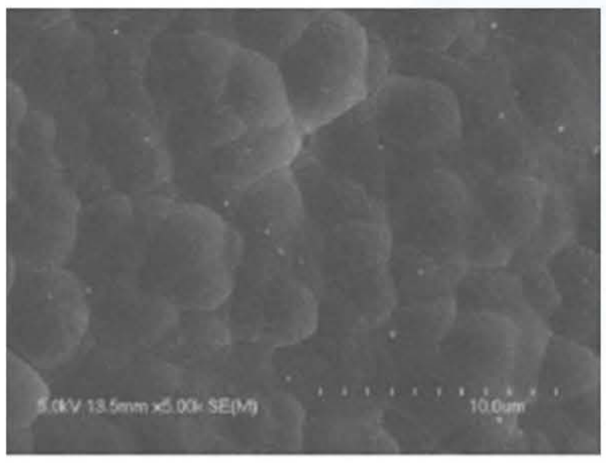




Deposited Thickness of Ni & Au



Blank
Ni/Au：
0/0 MTO



After OSPx3
Ni/Au：
2.0/8.5 MTO

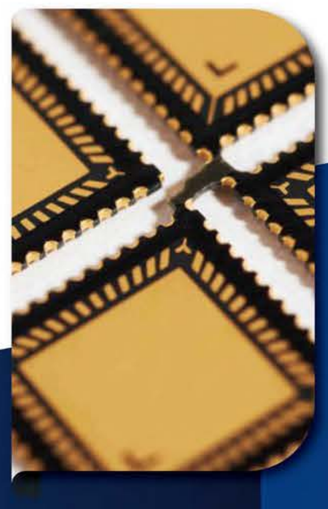
Observation of Nickel Morphology After OSPx3

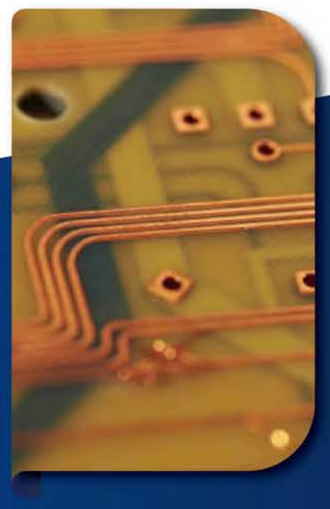
DF	Substrate	HQ6620*	HQ6720S**	Competitor**
Stripping Break Time /25/41sst (5% Organic Stripper, 60℃)	Cu	144 sec	138 sec	176 sec
	S/M	153 sec	217 sec	222 sec
	FRP	190 sec	269 sec	256 sec

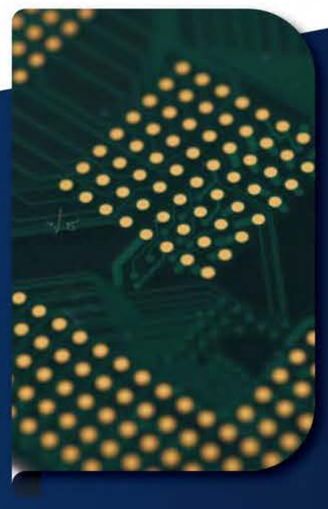
Condition：*after Dev., post Bake at 145℃/30min, then UV bump 700 mJ/cm^2
**after Dev., post Bake at 135℃/30min, then UV bump 700 mJ/cm^2

Advantages

1. Good chemical resistance to gold plating & ENIG & ENEPIG process
2. Good chemical resistance to alkaline etchant
3. Lower leaching amount
4. Easy stripping







長興材料
ETERNAL MATERIALS

ETERTEC® PR8200 Series

Photo-Imageable Coverlay (PIC)

ETERTEC® PR8200是低溫150℃烘烤型的高精密度乾膜感光弱鹼顯像型光阻，應用於高精密度亞醯胺基板(PI)/金屬基板外層線路保護.

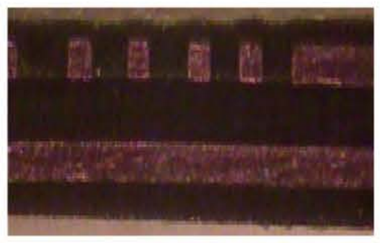
ETERTEC® PR8200 series are alkaline developable photosensitive dry film permanent photoresist of low temperature 150℃ post-bake used for the high accuracy polyimide substrate (PI) / metal substrate to protect wiring.

- 操作範圍寬
- 優良解析能力與結構完整性
- 底材密著性佳
- 優良耐熱焊錫性
- 優良耐化學鎳金
- 優良柔韌性與低反翹力

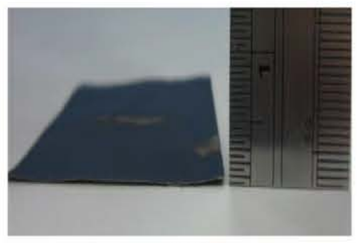
- Wide operation window
- High resolution and conformation
- Excellent adhesion to substrate
- Excellent high temperature solder resistance
- Excellent Electro-less Ni/Au plating resistance
- Excellent flexibility and low warpage / sharp memory

ITEM		ETERTEC®	
		PR8200B1	PR8200Y1
(Applications)		Flexible-board	
Color		Matt black	Amber
Thickness		23 μm/ 30 μm/ 38 μm	
Solid content		100 wt%	
Shelf life		3 months (In dark room below 0~5 ℃)	
Minimum developing time 1%(wt) Na_2CO_3 aqueous solution at 30℃		~50% Break point	
Exposure energy High mercury lamp (ORC EXM-1201F 5KW)		250 ~ 350 mJ/cm^2	200 ~ 300 mJ/cm^2
Recommended Eternal 21-step tablet		8 ~ 10 step (x / 21)	
Resolution	Line/Space L/S=n/n (μm)	60 μm / 60 μm	50 μm / 50 μm
Resistance to bending (180° x 500 g x 10 sec)		20 cycles	20 cycles
Warpage		≦1 mm	≦1 mm
Cosmetic-Glossiness (60°)		~10 GU	50~60 GU

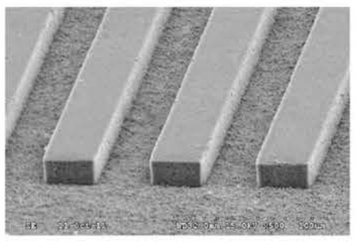
Resolution

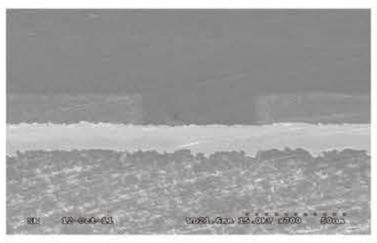


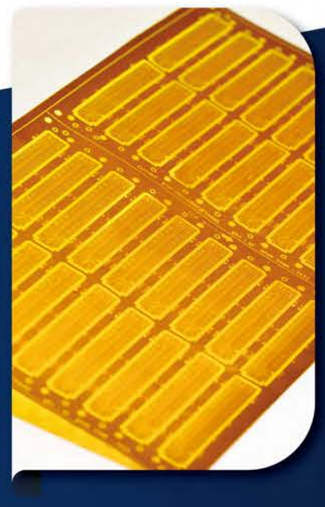
Conformation



Low warpage / Sharp-memory



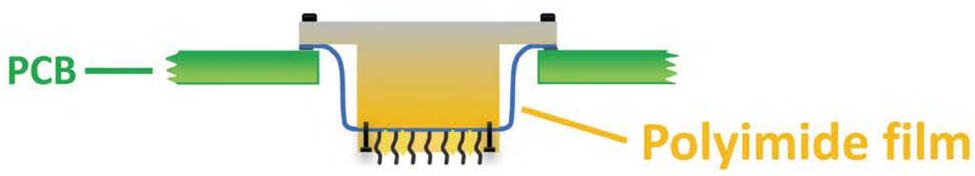




長興材料
ETERNAL MATERIALS

液態型聚醯亞胺於增層介電材料之應用
ETERFLEX Polyimide as dielectric material application in build-up process

FEATURES	特性
Non-photosensitive polyimide precursor	非感光型聚醯亞胺
Low viscosity with high solid content	低黏度高固含量
Low ionic/metallic impurity content	低離子含量
Excellent thermal stability	優異的耐熱特性
Excellent mechanical and electrical properties	優異的機械與電氣特性

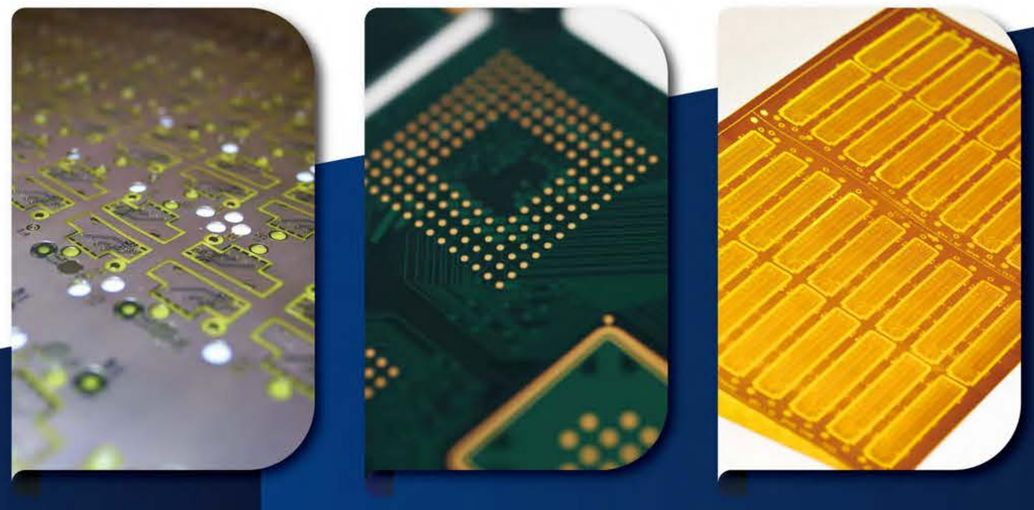


Dielectric PI material in probe card application

ETERFLEX PI as dielectric in multi-layer thin film

CHARACTERISTICS

ITEMS	Unit	ETERFLEX NP2107 series	ETERFLEX NP2404 series
產品特色 Product feature		Ultra low CTE	Low dielectric loss
熱膨脹係數 Thermal expansion coefficient	ppm/℃	3－5	20
介電常數 Dielectric constant (10 GHz)	--	≦3.3	≦3.12
介電損耗 Dielectric loss (10 GHz)	--	≦0.0065	0.0027
抗張強度 Tensile strength	MPa	≧350	≧200
楊氏係數 Young's modulus	GPa	6.6	>7
斷裂伸長量 Tensile elongation	%	≧23	≧25
玻璃轉移溫度 Glass transition temperature	℃	360	> 400
熱裂解溫度 Thermal decomposition temperature	℃	≧610	≧490
體積阻抗 Volume resistivity	Ω-cm	$>1.0\times10^{16}$	$>1.0\times10^{16}$
表面阻抗 Surface resistivity	Ω	$>1.0\times10^{15}$	$>1.0\times10^{14}$



長興材料
ETERNAL MATERIALS

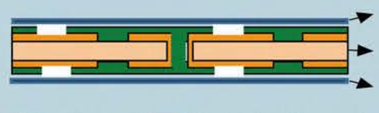
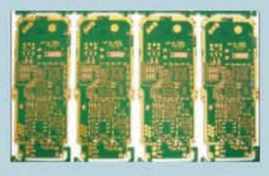
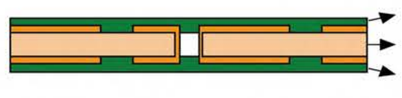
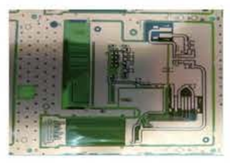
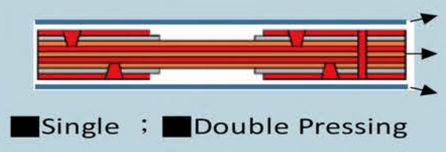
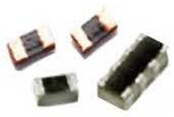
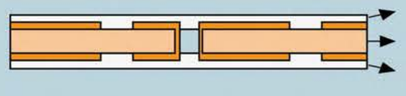
真空壓膜機
EFV-1000 VACUUM LAMINATOR

Features 特色

- High vacuum lamination prevents the occurrence of micro void
  高效能的真空壓膜方式,可以預防微小氣泡不良的產生
- High vacuum performance → 1hpa within 30sec from starting vacuum
  高效率的抽真空速度 → 抽真空開始後30秒內可以達到1hpa
- Easy operation and maintenance
  簡易的操作介面及維護保養工作
- Design with customization demand
  可配合客製化需求的設計

日本Nikko-Materials Co., Ltd. 設計

Applications 應用

Market	Process	Structure	Materials	Products
PCB/ FPC/ IC substrate	Selective Gold(OSP) Process	 □Single ; ■Double Pressing	(A) Dry film (B) PCB/FPC/IC substrate Thickness : 0.2 ～ 2mm	
FPC	PIC Process (Coverlay+Solder Mask)	 □Single ; ■Double Pressing	(A) PIC film (Eternal/PR82XXX,EPD33XX) (B) FPC Thickness : 0.1～1 mm	
PCB/FPC	Rigid-Flex HDI Process or DF Solder Mask Process	 ■Single ; ■Double Pressing	(A) Dry film (B) Rigid-Flex Thickness : 0.2～2 mm	
IC/Passive Components	Dry film/DF Solder Mask Process	 ■Single ; ■Double Pressing	(A) Dry film (B) Substrate Thickness : 0.3～1 mm	
Mini-LED Micro-LED	Backlight for Mini-LED or Othes Film	 □Single ; ■Double Pressing	(A) DFSM or Others Film (B) PCB/FPC or Display Thickness : 0.3～2 mm	

- 適用各類Film材料 → 表面有高低差壓合作業
  Suitable for Film materials
  → Laminating on Surface Pattern
- 選配預貼機系統 → 實現全自動生產線
  Optional Pre-tack system
  → Automatic Production Line

長興材料 ETERNAL MATERIALS

長廣精機 ETERNAL PRECISION MECHANICS

日興材料 氣囊式真空壓膜機
Nikko-Materials Diaphragm Vacuum Laminators

何謂氣囊式壓膜？
What is Diaphragm Lamination?

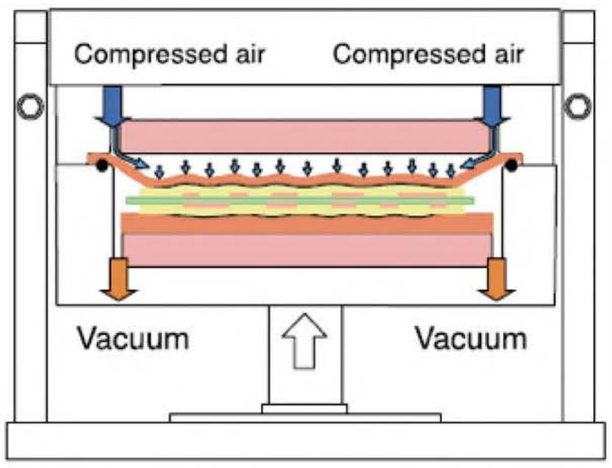
氣囊式壓膜是指通過矽橡膠的彈性變化，實現對板面凹凸、段差等的填附，並通過抽取板材與膜材料之間的空氣， 真空下消除氣泡並使膜材料與板材貼合。

採用氣壓和橡膠的方式，相較於液壓做動方式更為柔和，可適用於易碎、極薄的晶片等材料。

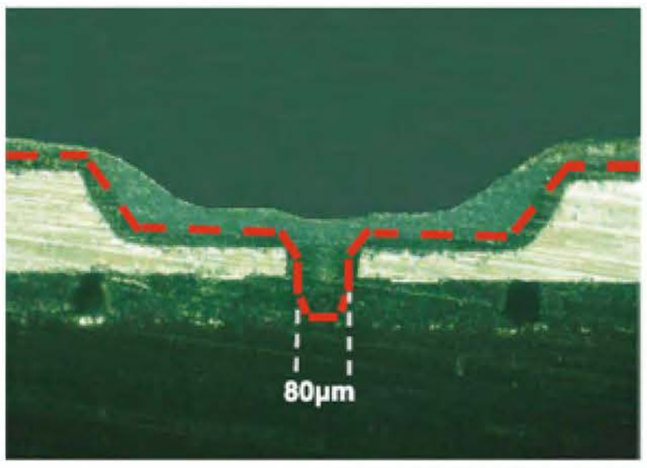
Diaphragm Lamination is to laminate with silicon rubber.

- Rubber fits uneven substrate surface, Vacuum function removes air between substrate and film, which facilitates void-free lamination.
- By using air and rubber, able to laminate soft and gently in comparison to hydraulic-powered press.

The Diaphragm type suits for various materials including fragile thin wafers.



抽真空後，從上部供給高壓空氣，從而使矽橡膠膨脹延伸、向下加壓，使膜材料與板材貼合。
Compressed air supplied to upper plate. Upper silicon rubber of diaphragm stretches downward and presses substrate with films.



對細線路、大間距段差的填附能力卓越。
Excellent conformation is guaranteed not just for fine Pattern, but for the big gap like above as well.

氣囊式真空壓膜機產品系列
Diaphragm Type Vacuum Laminator Line-Up

Nikko-Materials Co., Ltd.

Type	Model	1st Stage	2nd Stage	Applicable Work-Size(mm)
Auto	CV-300	Diaphragm	-	610 x610
	CV-300T	Diaphragm	-	350 x 350 (Option 400 x 400)
	CVP-300	Diaphragm	Flattening Press	510 x 510 (Option 510 x 610)
	CVP-300T	Diaphragm	Flattening Press	350 x 350 (Option 400 x 400)
	CVP-500	Diaphragm	Flattening Vacuum Press	510 x510 (Option 510 x 610)
Manual	V-130	Diaphragm	-	350 x 350 (Option 400 x 400)
	V-160	Diaphragm	-	610 x 610

Auto type / CV-300

Auto type / CVP-300

Manual type / V-160

長興材料 ETERNAL MATERIALS

長廣精機 ETERNAL PRECISION MECHANICS

日興材料 橡膠壓台式真空壓膜機
Nikko-Materials Rubber Press Vacuum Laminators

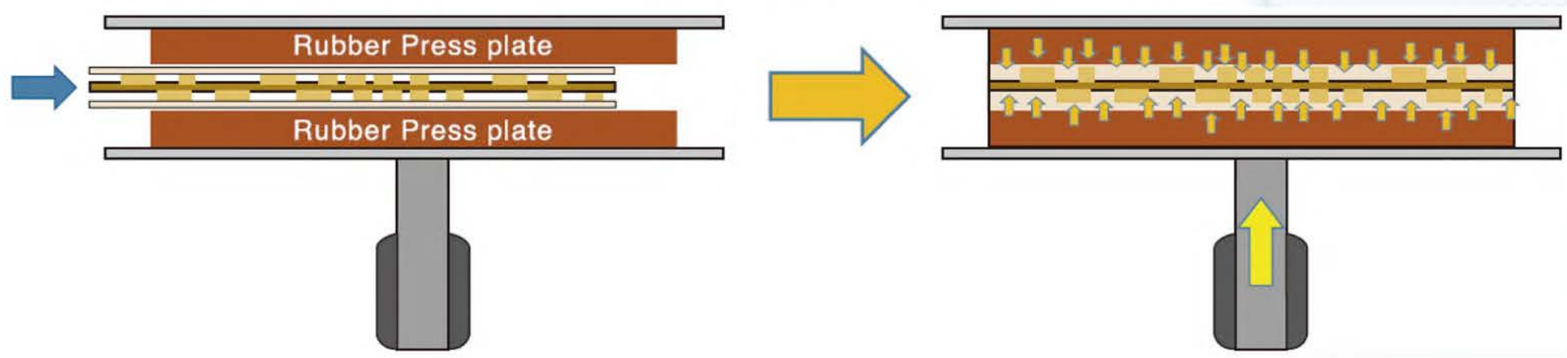
何謂橡膠壓台式壓膜？
What is Rubber Press Lamination?

橡膠壓台式壓膜是指在垂直方向施加高壓，通過橡膠台面的彈性變化，讓膜材料貼着板材的凹凸變化進行壓合。在第二段進行樹酯材料表面的平整性處理。適合自動化生產作業，相較傳統多段式真空壓合生產效率更高。

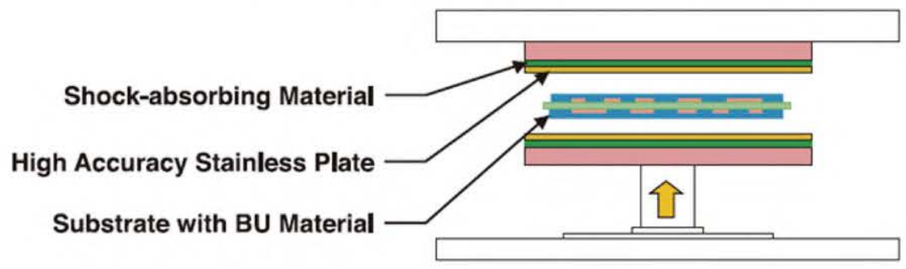
Rubber Press Lamination is to laminate with high pressure in vertical direction.
- 1 st stage /Elastic rubber press plate fits uneven substrate and conforms film.
- 2 nd stage /SUS plate press does Resin flattening.

Rubber press laminator is suitable for automation. The production efficiency is much better than Multiple pressing equipment.

1st 設備抽真空並透過橡膠壓台使膜材料填附板材凹凸表面。
1st Rubber Press removes air and conforms resin film to uneven surface substrate.



2nd 平整段實現樹脂表面的平坦性。
2nd Flattening Press finishes resin surface flat.



Data of Resin Thickness (example)

Machine Type	Rubber Press	Diaphragm
Average thickness	37.8 μm	33.9 μm
Maximum thickness	39.0	36.4
Minimum thickness	36.4	32.1
Standard deviation (3σ)	2.6	4.2

橡膠壓台式真空壓膜機產品系列
Rubber Press Type Vacuum Laminator Line-Up

Nikko-Materials Co., Ltd.

Type	Model	1st Stage (Vacuum Laminator)	2nd/3rd Stage (Flattening)	Applicable Work-Size(mm)
Auto	CV-600/700	Rubber Press	-	510 x 510 (Option 510 x 610)
	CV-600T/700T	Rubber Press	-	350 x 350
	CVP-600	Rubber Press	Flattening Press	510 x510 (Option 510 x610)
	CVP-600T	Rubber Press	Flattening Press	350 x 350
	CVP-700	Rubber Press	Flattening Vacuum Press	510 x510 (Option 510 x 610)
	CVP-1600SP	Rubber Press	Flattening Press/Servo Press	510 x510 (Option 510 x 610)
	CVP-1700SP	Rubber Press	Flattening Press/Servo Press	510 x510 (Option 510 x 610)

Auto type /CVP-600

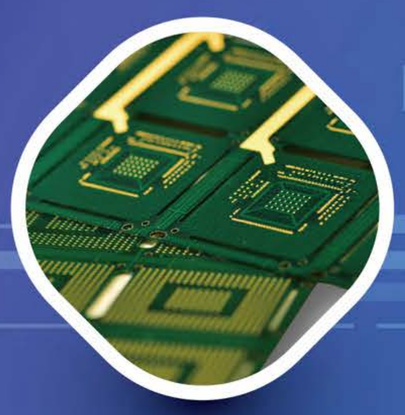
長興材料
ETERNAL MATERIALS

長廣精機
ETERNAL PRECISION MECHANICS

ETERNAL MATERIALS

興長
遠規劃未來
創世界品牌

- **Copper Clad Laminate** 銅箔基板
- **Vacuum Laminator** 真空壓膜機
- **Toll Coating Service** 精密塗佈代工
- **Dry Film Photoresist** 負型水溶性乾膜光阻
- **Dry Film Photoimageable Solder Mask** 乾膜防焊光阻
- **Photo-Imageable Coverlay** 感光型覆蓋膜
- **Liquid UV Curable Marking Ink** 液態文字油墨



電子材料事業單位
Electronic Materials Business Group

長興材料 長廣精機 日興材料