



長興材料
ETERNAL MATERIALS

ETERNAL MATERIALS Your Solution Provider

ICS

ABF

PCB

FPC

HDI

ENIG

IC Packaging



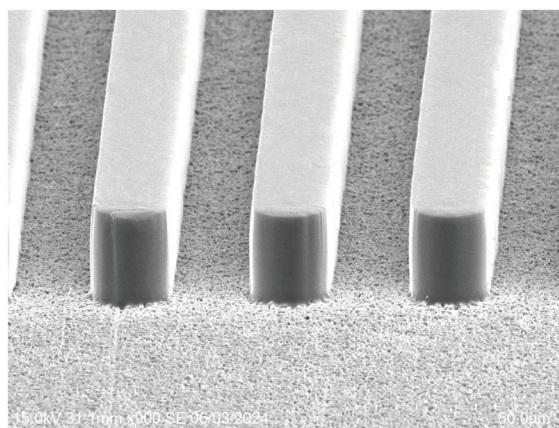
LDI DRY FILM PHOTORESIST

FEATURES

- » Designed for core etching applications
- » Designed for UV laser direct imaging applications
- » For i-line and h-line
- » Excellent tenting ability
- » Excellent high resolution and adhesion

特性

- » 針對內層蝕刻製程設計
- » 針對雷射曝光製程設計
- » 適用i-line與h-line波長
- » 優良蓋孔能力
- » 優良線路解析度及附著力



UDH5525F 16/41sst L/S=20 μm/20 μm (i-line)

CHARACTERISTICS

Item	UDH5525F	
Thickness (μm)	24	
Wavelength	i-line	h-line
Exposure Energy (mj/cm ²) ^{*1}	11	10
41 STOUFFER STEP HELD	16	16
Minimum Developing Time x2 (sec) ^{*2}	26	26
Adhesion (μm) ^{*2}	20	18
Resolution (μm) ^{*2}	20	18
Stripping Break Time (sec) ^{*3}	18	

*1: Test by Nuvogo 800, 375nm 100% & Adtec IP-4 *2: 50% BP, 28°C *3: 3% NaOH, 50°C by dipping

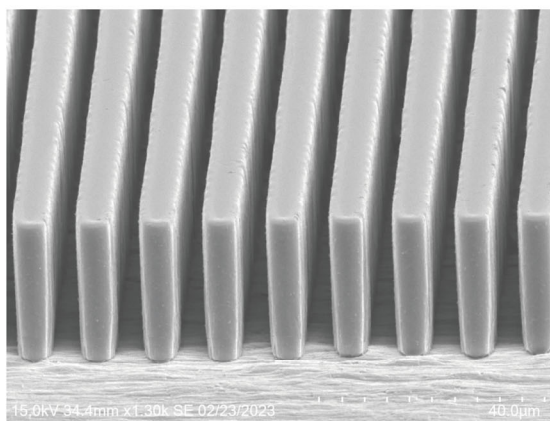
LDI DRY FILM PHOTORESIST

FEATURES

- » Designed for UV laser direct imaging applications
- » For i-line & h-line
- » For SAP/mSAP
- » Excellent chemical resistance
- » Excellent resolution and adhesion

特性

- » 針對雷射曝光製程設計
- » 適用i-line&h-line波長
- » 可用 SAP/mSAP
- » 優良抗化性
- » 優良線路解析度及附著力



UDH5625 13/41sst L/S= 5.5 μm / 5.5 μm

CHARACTERISTICS

Item	UDH5625
Thickness (μm)	25
Exposure Energy (mj/cm ²) ^{*1}	60
41 STOUFFER STEP HELD	13
Minimum Developing Time x2 (sec) ^{*2}	44
Adhesion (μm) ^{*2}	5.5
Resolution (μm) ^{*2}	5.5
Stripping Break Time (sec) ^{*3}	42

*1: Test by h-line DI machine *2: 50% BP, 28°C *3: 3% NaOH by dipping.

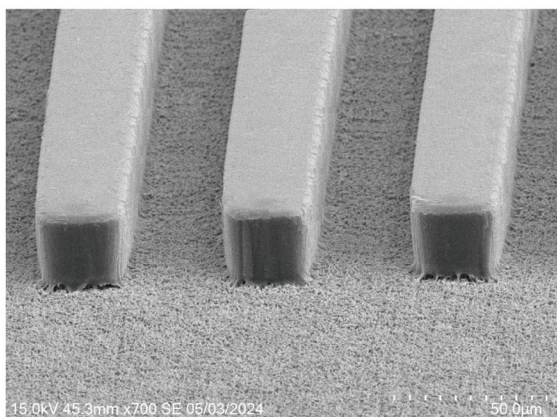
LDI DRY FILM PHOTORESIST

FEATURES

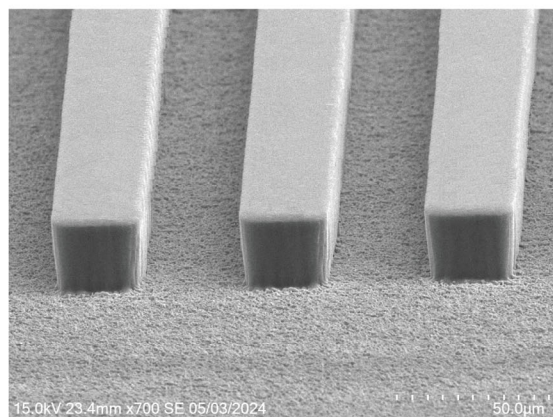
- » Designed for UV laser direct imaging applications
- » For i-line and h-line
- » Excellent tenting ability
- » Excellent high resolution and adhesion

特性

- » 針對雷射曝光製程設計
- » 適用i-line&h-line波長
- » 優良蓋孔能力
- » 優良線路解析度及附著力



UDF3325 16/41sst L/S=24 μm/24 μm (i-line)



UDF3325 16/41sst L/S=24 μm/24 μm (h-line)

CHARACTERISTICS

Item	UDF3325	
Thickness (μm)	24	
Wavelength	i-line	h-line
Exposure Energy (mj/cm ²) ^{*1}	13	16
41 STOUFFER STEP HELD	16	16
Minimum Developing Time x2 (sec) ^{*2}	29	29
Adhesion (μm) ^{*2}	22	22
Resolution (μm) ^{*2}	22	24
Tent Ability (via Φ mm)	4	

*1: Test by Orbotech Nuvogo 800 *2: 50% BP, 28°C

DRY FILM PHOTORESIST

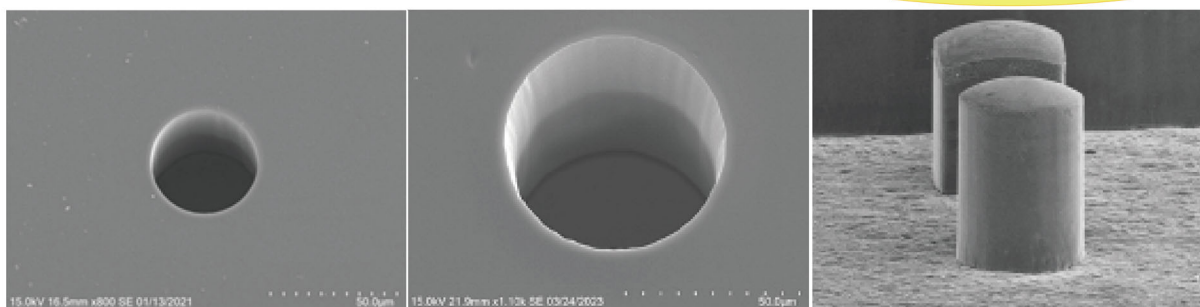
FEATURES

- » High resolution, high aspect ratio
- » Excellent adhesion
- » Copper pillar bump for semiconductor package
- » Easy to Strip

特性

- » 極佳線路解析度與深寬比
- » 極佳線路附著力
- » 適用於半導體封裝銅柱凸塊
- » 去膜容易

After Plating



BR42120 Diameter=40 µm BR42240 Diameter=80 µm BR42120 Diameter=40 µm

CHARACTERISTICS

Item	BR42080	BR42120	BR42240
Thickness (µm)	80	120	240
Exposure Energy (mj/cm ²) ^{*1}	200	220	300
41 STOUFFER STEP HELD	22	22	25
Minimum Developing Time x2 (sec) ^{*2}	120	230	460
Adhesion (µm) ^{*2}	25	40	80
Resolution (via) (µm) ^{*2}	30	40	80

*1: Exposure: Projection *2: 50% BP, 28°C

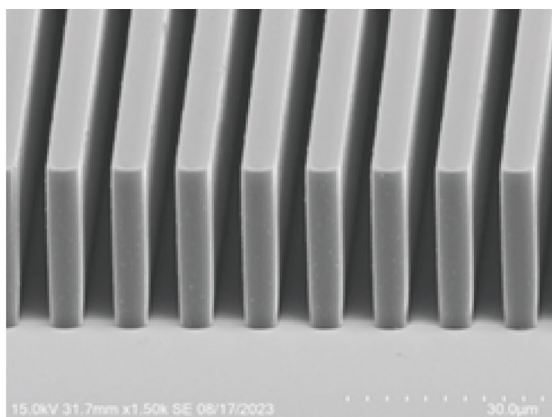
DRY FILM PHOTORESIST

FEATURES

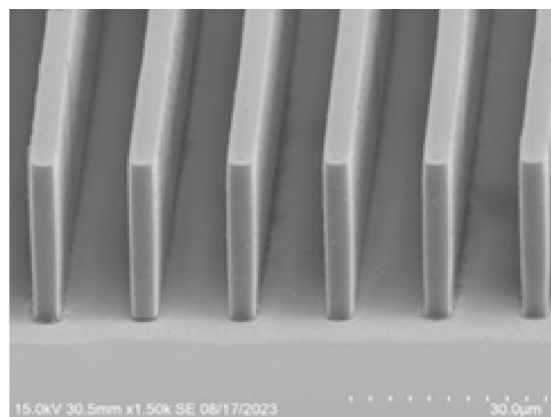
- » Designed for SAP process
- » Excellent adhesion
- » Excellent resolution
- » Good resistance to acid plating

特性

- » 針對SAP製程設計
- » 極佳線路附著力
- » 極佳線路解析度
- » 酸性電鍍抗化性佳



APR910 16/41sst L/S=5 μm/5 μm



APR910 16/41sst L/S=3 μm/12 μm

CHARACTERISTICS

Item	APR910	
Thickness (μm)	25	25
Exposure Energy (mj/cm ²) ^{*1}	175	220
41 STOUFFER STEP HELD	13	16
Minimum Developing Time x2 (sec) ^{*2}	36	36
Adhesion (μm) ^{*2}	4	3.5
Resolution (μm) ^{*2}	4.5	5

*1: Exposure: Projection *2: 50% BP, 28°C

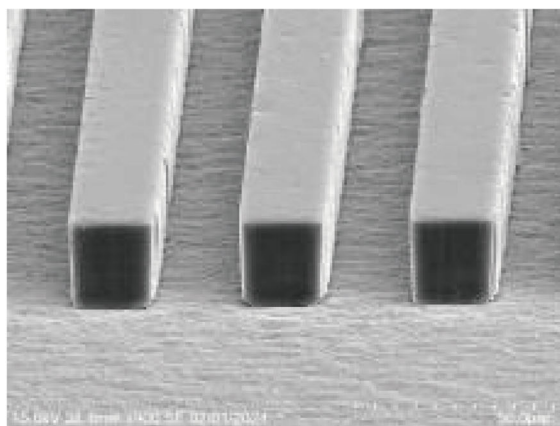
DRY FILM PHOTORESIST

FEATURES

- » Designed for FPC applications
- » Excellent tent ability & flexibility
- » Excellent high resolution and adhesion
- » Easily stripping/ break flake size

特性

- » 針對FPC製程設計
- » 優良蓋孔能力和撓折性
- » 優良線路解析度及附著力
- » 去膜容易/膜屑小



APR508 16/41sst L/S=16 μm/16 μm

CHARACTERISTICS

Item	APR508	
Thickness (μm)	20	
Exposure Energy (mj/cm ²) ^{*1}	21	29
41 STOUFFER STEP HELD	13	16
Minimum Developing Time x2 (sec) ^{*2}	25	
Adhesion (μm) ^{*2}	14	12
Resolution (μm) ^{*2}	14	16
Stripping Break Time (sec) ^{*3}	13	

*1: Test by ORC EXM-1201F 5KW *2: 50% BP, 28°C *3: 3% NaOH (aq) 50°C by dipping

DRY FILM PHOTORESIST

FEATURES

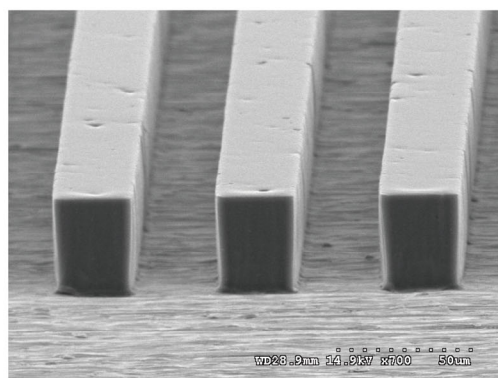
- ▶ Excellent resistance to ENIG
- ▶ Excellent resistance to Alkaline etching
- ▶ Excellent tenting ability
- ▶ High resolution
- ▶ Low developing foaming
- ▶ Good contrast after exposure

特性

- ▶ 抗化鍍浸金製程具優良抗化性
- ▶ 對鹼性蝕刻製程具優良抗化性
- ▶ 蓋孔能力佳
- ▶ 線路解析度高
- ▶ 顯影泡沫低
- ▶ 曝光後對比佳

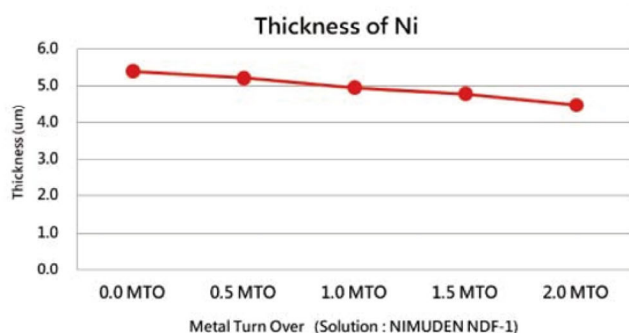
CHARACTERISTICS

Item	HQ6720
Thickness (μm)	49
Exposure Energy (mj/cm ²)	202
41 STOUFFER STEP HELD	22
Minimum Developing Time x2 (sec) ^{*1}	42
Adhesion (μm) ^{*1}	22
Resolution (μm) ^{*1}	36
Tent Ability (via Φ mm)	6
Stripping Break Time (sec) ^{*2}	On Copper 100
	On Solder Mask 110
	On FR-4 101

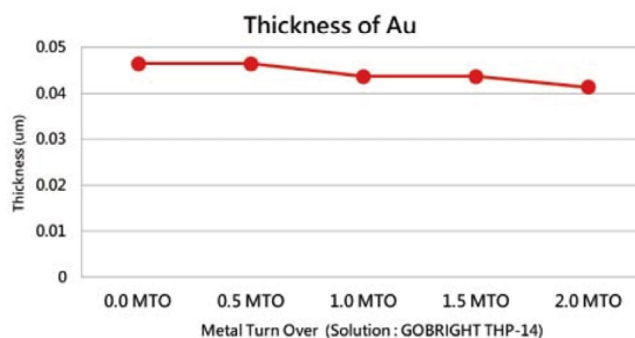


HQ6720 22/41sst L/S= 40 μm / 40 μm

*1: 50% BP, 28°C *2: 10% organic stripper, 60°C by dipping



Thickness of Ni



Thickness of Au

SAP/mSAP用途 ALPHO® LDF700シリーズ

For SAP/mSAP process ALPHO® LDF700 series

For
DI / LDI特長
Features

- ▶ 半導体パッケージ用サブストレートの配線形成に適したh線DI露光に対応した高解像ドライフィルムフォトレジストです。
High resolution Dry Film Photoresist suitable for patterning of IC Package substrate.
Designed for h-line direct imaging exposure machine.
- ▶ 良好な剥離性及び柔軟性を有しているため、めっき潜り及びめっき後のレジスト残渣低減に優れています。
LDF700 has good stripping ability and flexibility so it has excellent performance for reduction of under plating and resist residue.

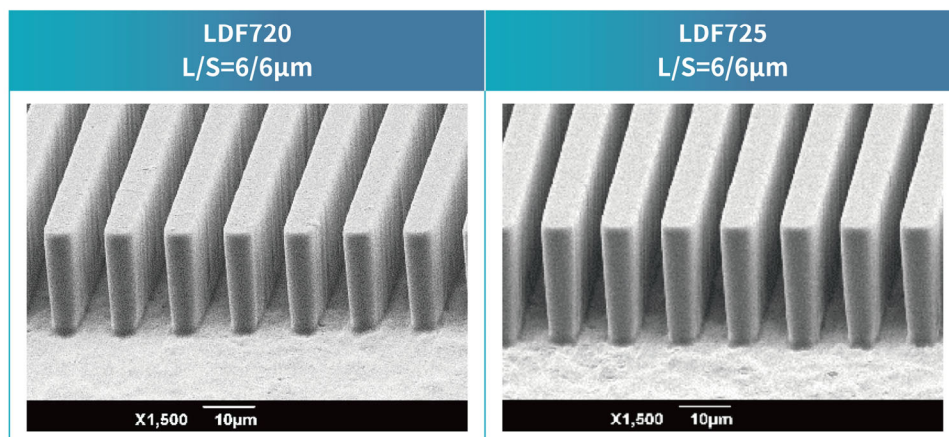
レジスト特性 Resist performance

Dry film	LDF720	LDF725
レジスト厚 Resist Thickness (μm)	20	25
最少現像時間※1 Minimum Developing Time (sec.)	13	18
露光量※2 Exposure Energy (mJ/cm ²)	60	60
ステップ段数 Photosensitivity (41SST)	14	14
解像密着性 Resolution and Adhesion (L/S = x/x, μm)	6	6
細線密着性 Fine Line Adhesion (L/S = x/9x, μm)	6	6
剥離時間※3 Stripping Time (sec.)	15	22
剥離片サイズ※3 Stripping Flake Size (mm)	<5	<5

※1 現像条件 (Developing condition) : 1.0% Na₂CO₃, 30°C, 0.15MPa, BP x 2

※2 DI露光 (Direct imaging exposure) : オーク製作所製 FDIシリーズ (ORC FDI series) , Post exposure bake : 60°C, 30sec

※3 剥離条件 (Stripping condition) : 50°C, Amine type, Dipping test, Pattern size 50×66mm



特長
Features

- ▶ i線プロジェクション露光に対応したSAP/mSAP用高解像密着のドライフィルムフォトレジストです。
For SAP/mSAP high resolution/adhesion Dry Film Photoresist which is suitable for patterning with i-line Projection exposure machine.
- ▶ パッケージ基板、およびFPC基板を使用する工程で求められる、高解像密着性と柔軟性を両立したドライフィルム・フォトレジストです。
Achieved excellent high resolution/adhesion property and flexibility required in package substrate and FPC manufacturing process.

レジスト特性 Resist Performance

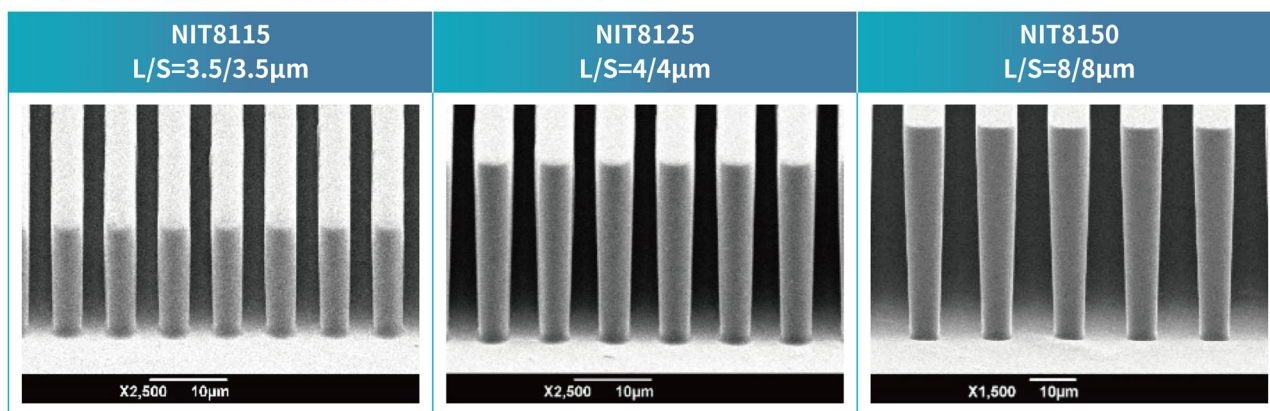
Dry film	NIT8115	NIT8125	NIT8150
レジスト厚 Resist Thickness (μm)	15	25	50
最少現像時間※1 Minimum Developing Time (sec.)	21	32	63
露光量※2 Exposure Energy (mJ/cm ²)	155	240	310
解像密着性 Resolution and Adhesion L/S=x/x (μm)	3.5	4	8
細線密着性 Fine Line Adhesion L/S=x/4x (μm)	3	4	6
剥離時間※3 Stripping Time (sec.)	13	26	104
剥離片サイズ※3 Stripping Flake Size (μm)	<5mm	<5mm	<5mm

※1 現像条件 (Developing condition) : 0.7%Na₂CO₃, 27°C, 0.10MPa, BP x 2

※2 i線プロジェクション露光装置 (i-Line Projection exposure machine)

※3 剥離条件 (Stripping condition) : 50°C, Amine type, Dipping test, Test piece size: 50mm x 66mm

平滑基板上の現像後レジスト形状 Resist Pattern after Developing on smooth substrate



真空RtoR対応 ALPHO® 502Jシリーズ

For FPC Vacuum R to R process ALPHO® 502J series

For
Collimated特長
Features

▶ FPCの回路形成プロセスに適合するドライフィルムフォトレジストです。

高解像、易剥離、良好なテンティング性能、低スカム量によりファインピッチ品の量産をサポートします。

Dry Film Photo-resist suitable for FPC patterning process. Realizing high resolution/adhesion, easy stripping, good tenting performance and low sludge/scum amount. Contribute to mass production for Fine pitch products.

▶ 真空Roll to Roll／ウェットラミネーションプロセスに適応した製品です。

This product is suitable for vacuum roll to roll/wet lamination process.

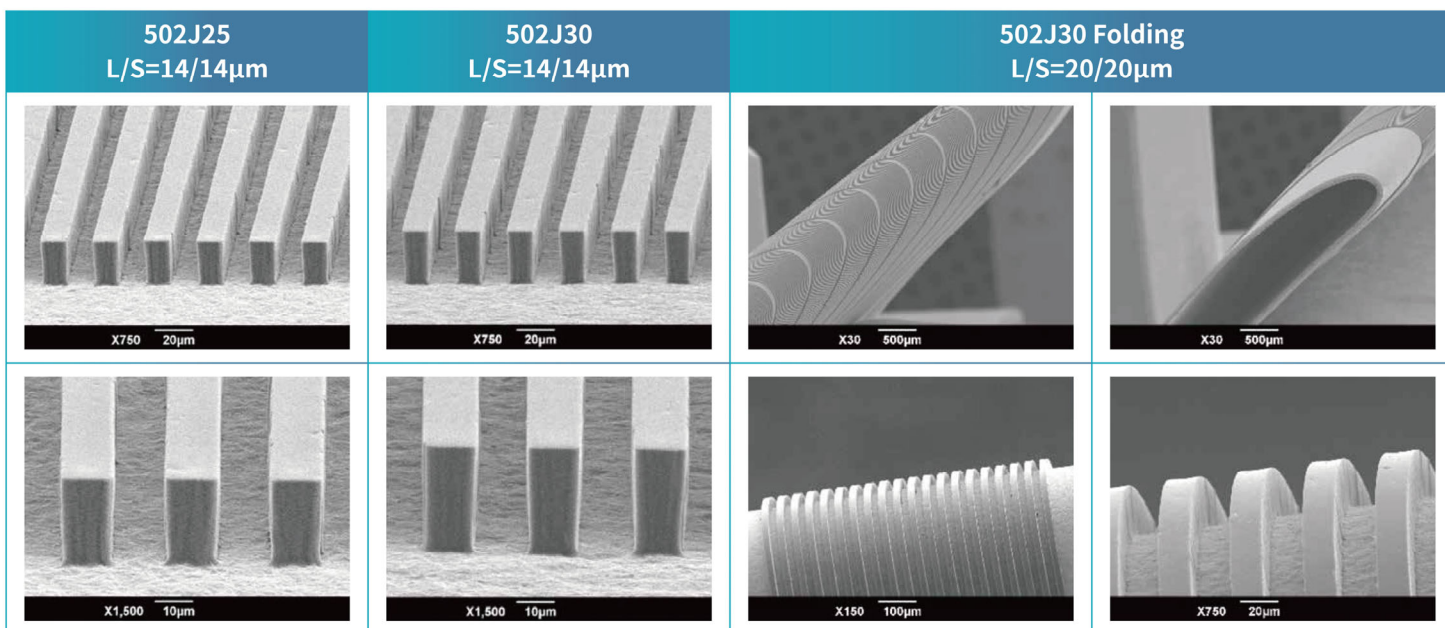
レジスト特性 Resist Performance

Dry film	502J25	502J30
レジスト厚 Resist Thickness (μm)	25	30
露光量※1 Exposure Energy (mJ/cm ²)	70	70
解像密着性※2 Resolution and Adhesion L/S = x/x (μm)	14	14
細線密着性※2 Fine Line Adhesion L/S = x/400 (μm)	14	16
剥離時間※3 Stripping Time (sec.)	27	36

※1 コンタクト露光 (Collimated light exposure)

※2 現像条件 (Developing condition) : 1.0%Na₂CO₃, 30°C, 0.15MPa, BP x 2

※3 剥離条件 (Stripping condition) : 50°C, 3%NaOHaq.



特長
Features

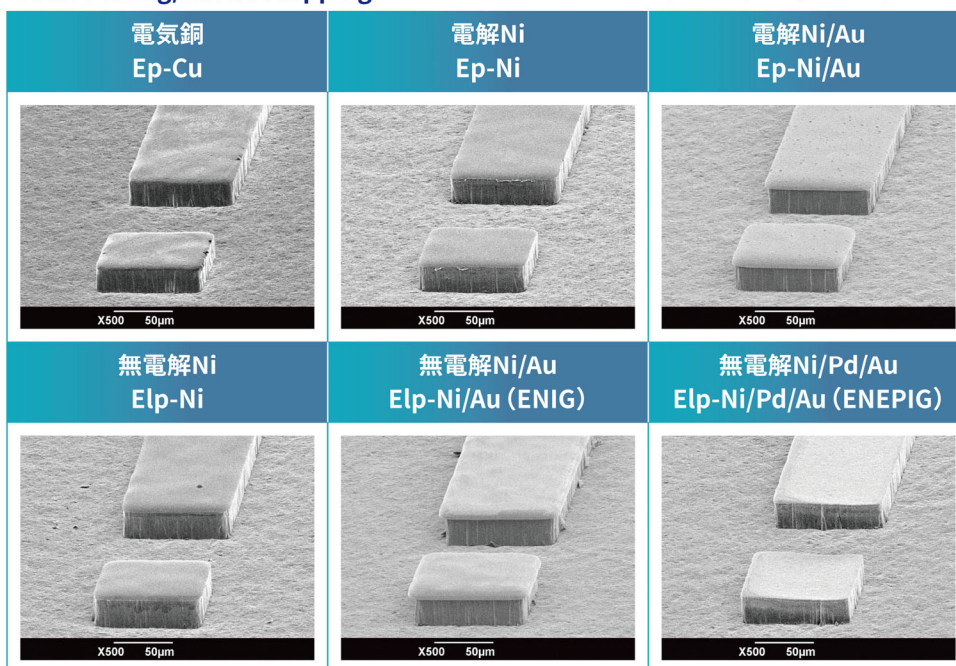
▶ A357シリーズは電気銅めっき、電解・無電解ニッケルめっき、無電解パラジウムめっき、電解・無電解金めっき浴への高い耐薬品性を有する製品になります。

A357 series show high chemical resistance to electro copper plating, electro/electroless nickel plating, electroless palladium plating, and electro/electroless gold plating.

めっき後・レジスト剥離後

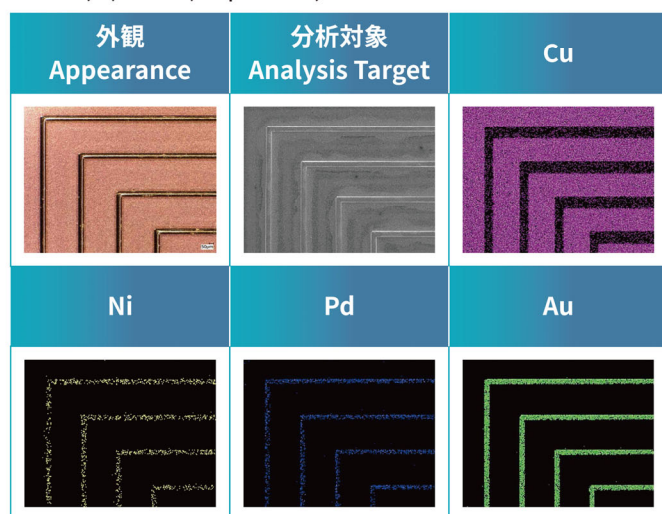
After Plating/Resist Stripping

L/S=400/100μm箇所, ×500



めっき潜り (EDX) 分析 Analysis of Under-Plating

ENEPIG, L/S=400/50μm箇所, ×150

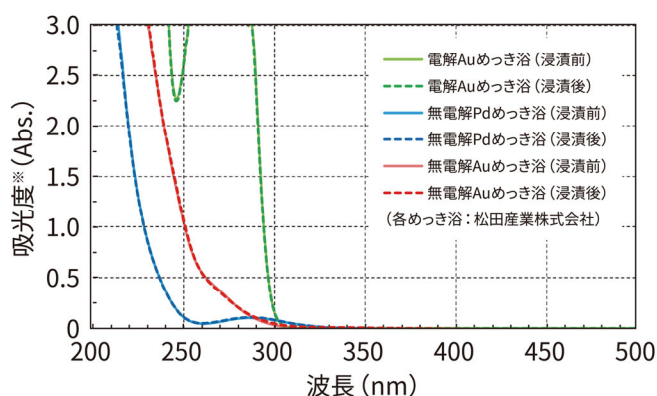


めっき浴汚染性 Leaching Test

浴負荷: 20dm²/L

電解めっき: 現像後バーク無し, 露光後168時間浸漬

無電解めっき: 現像後バーク無し, 露光後5時間浸漬



浸漬前後のピークに差異無し ※めっき液25倍希釈

ETERTEC® PR8200 Series

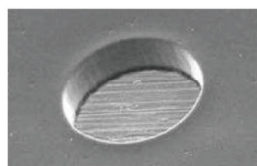
Photo-Imageable Coverlay (PIC)

ETERTEC® PR8200 是低溫 150°C 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°C 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
- ▶ 優良耐化學鍍金
- ▶ 優良柔韌性與低反翹力
- ▶ Wide operation
- ▶ 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

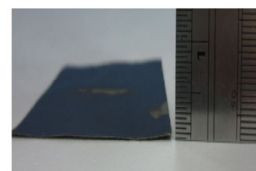
ITEM	ETERTEC®	
	PR8200B1	PR8200Y1
(Applications)	Flexible-board	
Color	Matt black	Amber
Thickness	23 µm/ 30 µm/ 38 µm	
Solid content	100 wt%	
Shelf life	3 months (In dark room below 0~5 °C)	
Minimum developing time 1%(wt) Na ₂ CO ₃ aqueous solution at 30 °C	~50% Break point	
Exposure energy High mercury 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	>90 GU



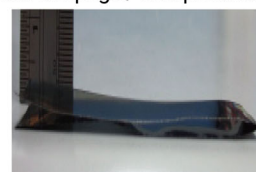
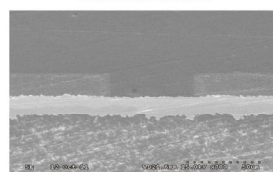
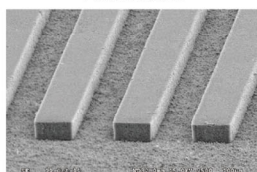
Resolution



Conformation



Low warpage / Sharp-memory

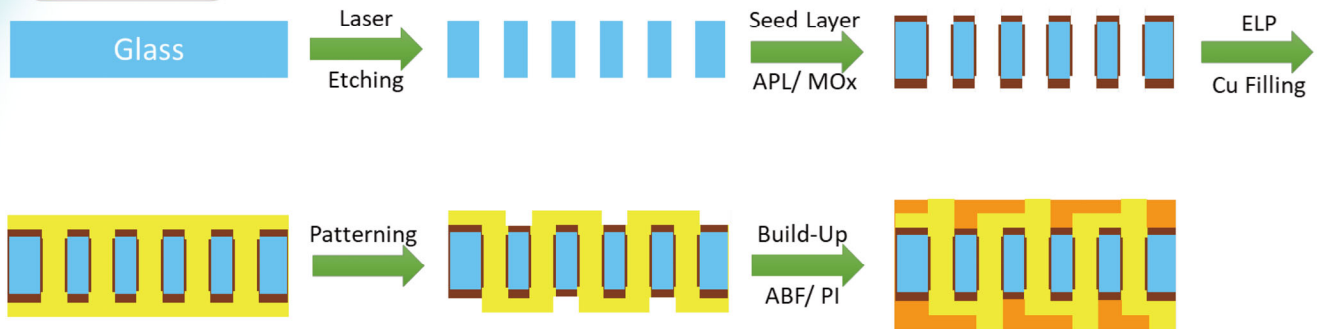


長興材料
ETERNAL MATERIALS

Photoresist Materials Division

Polyimide Materials for TGV Process

Process



Characteristics of APL

- » High adhesion to glass and metal.
- » Suitable for various types of glass.

Item	Method / Unit	NPI-3002T2
Coating Method	-	Dip Coating
Thickness	um	<1 um
Peeling Strength	(N/cm) @18um Cu	>7
Available Glass Type	-	Corning EXG
		Schott BF33
		AGC AN100

Dry film type PI for Build-Up Process

- » Low Temp. Curable & Low df.

Properties	NPI-1717D
Maximum Curing Temp. (°C)	250
Dk / Df	3.4/0.004 @10GHz
CTE (ppm / °C)	~14
Moisture Absorption (%)	0.3
Glass Transition Temp. (Tg), °C	356
Thermal Decomposition Temp. (Td _{5%}), °C	480

真空壓膜機

EFV-1000 VACUUM LAMINATOR

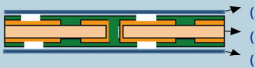
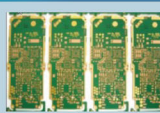
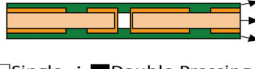
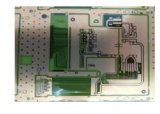
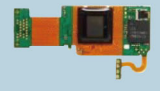
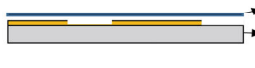
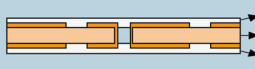
Features 特色

- 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 (Dupont W250/...) (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



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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。

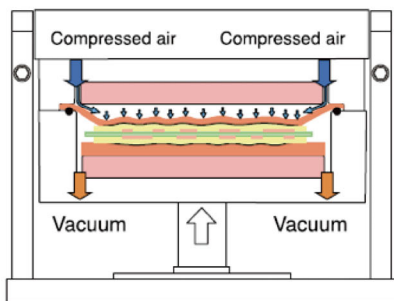
採用氣壓和橡膠的方式，相較於液壓做動方式更為柔和，可適用於易碎、極薄的晶片等材料。

Diaphragm Lamination is to laminate with silicon rubber.

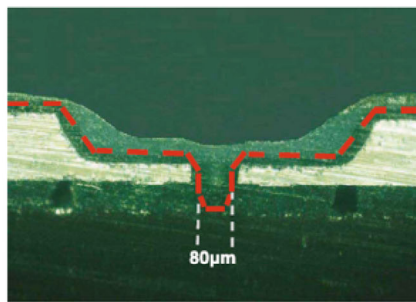
- Rubber fits uneven substrate surface, Vacuum function removes air between substrate and film, which facilitates void-free lamination.

- 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 x 610
	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 x 510 (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



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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。在第二段進行樹脂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.

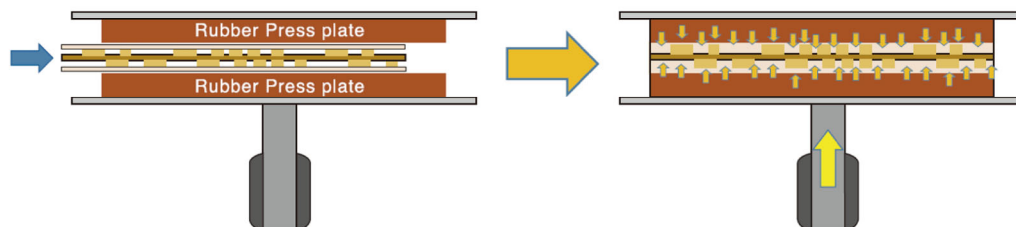
- 1st stage /Elastic rubber press plate fits uneven substrate and conforms film.

- 2nd stage /SUS plate press does Resin flattening.

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

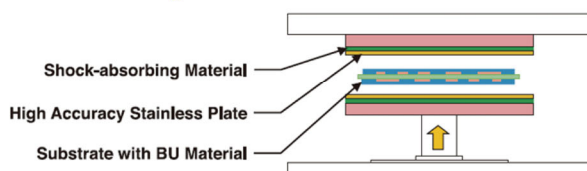
1st 設備抽真空並透過橡膠壓台使膜材料填附板材凹凸表面。

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 (3 σ)	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 x 510 (Option 510 x 610)
	CVP-600T	Rubber Press	Flattening Press	350 x 350
	CVP-700	Rubber Press	Flattening Vacuum Press	510 x 510 (Option 510 x 610)
	CVP-1600SP	Rubber Press	Flattening Press/Servo Press	510 x 510 (Option 510 x 610)
	CVP-1700SP	Rubber Press	Flattening Press/Servo Press	510 x 510 (Option 510 x 610)



Auto type /CVP-600



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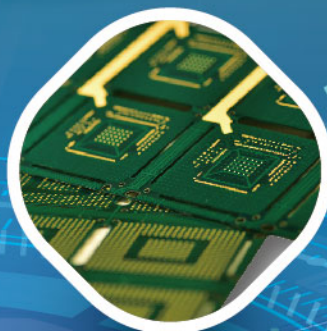
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Liquid UV Curable Marking Ink
液態文字油墨

Copper Clad Laminate
銅箔基板

Vacuum Laminator
真空壓膜機

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