Hakuto

Mach 630NP/6630NP

NEXT GENERATION AUTO FILM LAMINATOR

FOR THE PRINTED CIRCUIT BOARD INDUSTRY

An Innovation

for Dry Film Lamination

EVEN PRESSURE • EVEN HEAT • RELIABILITY

Plus...

No Expensive Hot Rolls

Easy Maintenance

Higher Film Placement Accuracy

Change Rubber Durometer and Rolls in 5 minutes

Offline Cassette Loading of Film

HAKUTO CERTIFIED SERVICE

Distribution, Sales and Service by:

MATRIX
CIRCUIT BOARD MATERIALS

TORONTO • SANTA ANA • SANTA CLARA • MINNESOTA • OSAKA

A Laminator's Most Important Function

The application of UV photo sensitive dry film onto a PCB copper panel requires optimum EVEN pressure and EVEN temperature across the entire surface.

Historic Technology

From the beginning of the PCB manufacturing industry in the early 1950's, printed circuit board dry film lamination has been implemented by applying pressure to the end shafts of heated rubber rollers. The mechanical physics as shown in Fig. 1 demonstrates how there is uneven pressure across the surface of the film lamination with increasing lower pressure and lower heat toward the center of the board.

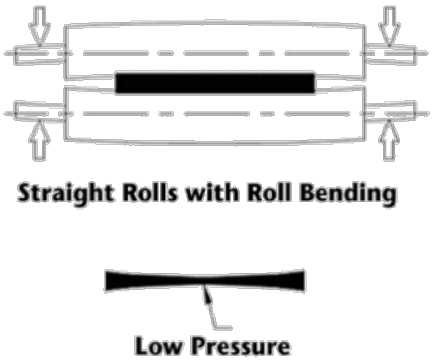


Figure 1

As electronic circuit packages became miniaturized, their connection leads moved to 50 mil pitch and smaller – requiring the resulting PCB traces and spaces to reach sub 0.005" size.

This uneven pressure phenomenon across the surface of the PCB can ultimately cause faulty image transfer resulting in open circuit defects on the final etched layer further resulting in an entire panel being scrapped. To deal with this new dry film precision requirement (sub 5 mil features), the industry has tried many modifications; heavy duty rolls, cantilevered pressures mechanisms, and wet lamination.

Success has been limited.

A Technology Breakthrough

The uneven pressure situation has now been solved by utilizing a new mechanical concept whereby a heavy barrel type roller transfers pressure onto a common rubber roller with remarkable consistency for both pressure and temperature.

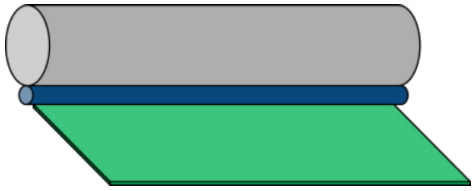
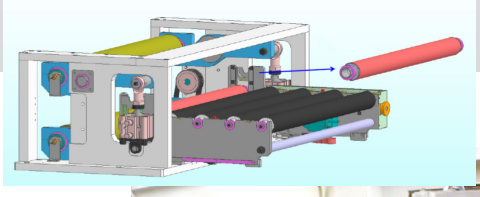


Figure 2

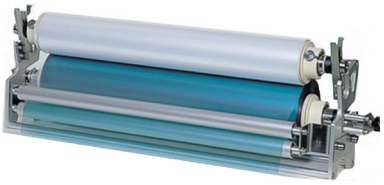
Mach 630NP Standard Features

- Easy Lamination Roll Exchange
- Easy Maintenance
- New Pressure and Temperature Uniformity Module
- New Enclosure for Clean Operation
- ECO Take-up Roll for Easy Mylar Removal
- Touch-screeen PLC Panel Control



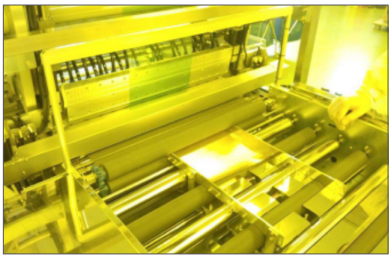
Laminator Options

Film Loading Cartridge (Offline)



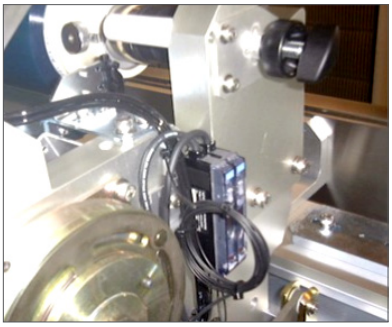
- Convenient loading and unloading of dry film offline
  Note: once the film is loaded offline, the time to reload the laminator is less than 10 minutes for both top and bottom

Ultra Thin Transport



- Standard thin core: minimum 0.06mm (incl. Copper) (0.00236")
- Special Order: minimum 0.04mm (incl. Copper) (0.00156")

Exit Panel Temperature Indicator



- Monitor device (only)
- Comprised of thermometer sensors located on top and bottom of the exit tray to indicate the surface temperature (both sides) of the finished PCB with dry film attached.
- Also available to the auto control function for monitoring

Dry Film Usage and End Warning

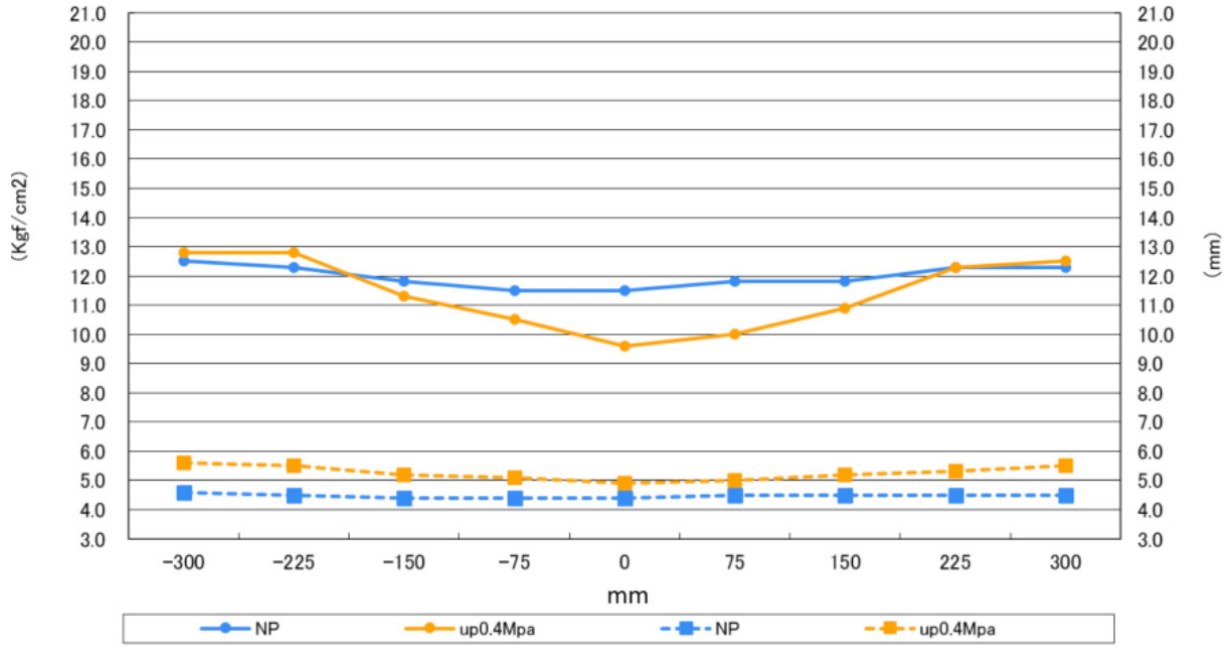
- Beam Sensors (light source and receiver)
- Mounted at both sides of the DF roll and parallel with DF facing each other. The beam sensor detects when the remaining rolled DF thickness gets thin enough for the receiver to receive a signal from the light source and give the operator a warning.

Mach Prolog Software

- Recipe storage of up to 100 operational parameters

Film Pressure Comparison

Hakuto's Cantilevered "UP" system vs the new "NP" system



Laminator Features and Options

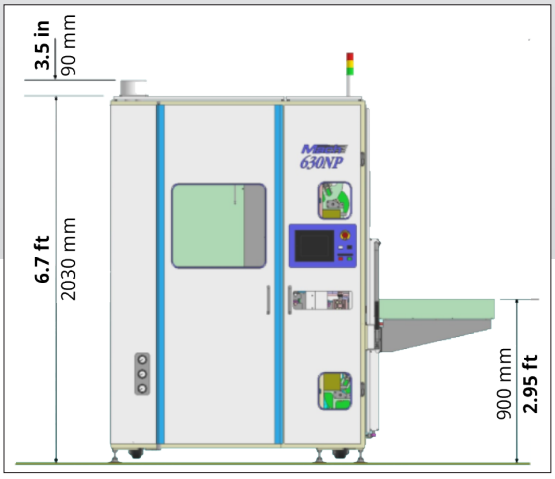
	Mach 630NP	Mach 6630NP
Easy Lamination Roll Exchange	●	●
Easy Maintenance	●	●
EVEN Pressure Uniformity Module	●	●
EVEN Temperature Uniformity Module	●	●
Full Enclosure for Clean Operation	●	●
Touch Screen PLC Control	●	●
ECO Take-up Roll for Easy Mylar Removal	●	●
Cartridge Film Loading System	○	●
Exit Panel Temperature Monitoring	○	●
Dry Film Usage and End Warning Indicators	○	●
Ultra Thin Transport	○	○
Mach Prolog Software (Custom Request)	○	○

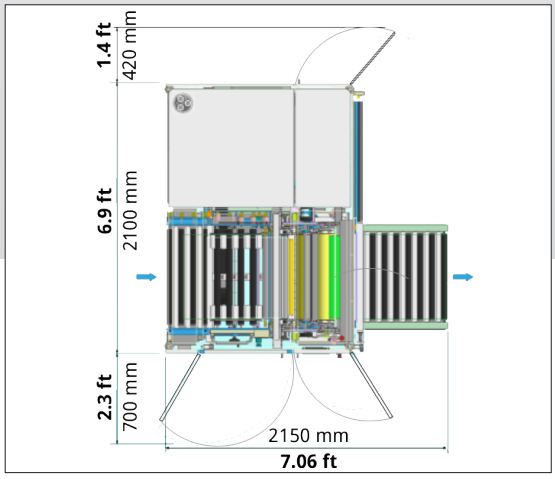
● Standard Feature ○ Optional Feature

Specifications - Mach 630NP, 6630NP

Lamination	Laminating Roll	1.6" (50mm) Diameter Rubber - various coatings and durometers
	Roll Pressure	Max. 500 Kgf/cm^2 (7112 psi)
DF Cutter	Non-Contaminating Disc Cutter - 2.5" diameter (64mm)	
Anti Contamination	DF Anti-Static Bar	Eliminates charge that attracts dust and contaminants
	Enclosure	Forced circulation with HEPA filter (Option)
Panel Dimensions	Size (Width)	Min. 9.8" (250mm) Max. 25.2" (640mm)
	Thickness (incl. copper foil)	**Standard:** 0.0040" to 0.236" (0.06mm to 6.0mm) **Thin Core Option:** 0.0016" to 0.236" (0.04mm to 6.0mm)* * Sample test required before shipment
Conveyor	Width	27.2" (690mm)
	Speed	3.28 to 18.0 ft/min. (1.0 to 5.5 m/min.)
Dry Film	Width	9.85" to 24.8" (250mm to 630mm)
	DF Roll Diameter	6" Core Diameter: Max. Film Diameter 9.85" (250mm) 3" Core Diameter: Max. Film Diameter 11.0" (280mm)
	Bobbin Diameter	3" or 6"
Film Placement	Front and Back Accuracy	+/- 0.02" (0.5mm)
	Side to Side Accuracy	+/- 0.02" (0.5mm)

Dimensions (L to R)





Utilities

Power	3 Phase 220/200V 50/60Hz, 10kW
Air	0.5MPa, 100L/min ISO Rc 1/4 inch
Exhaust	9.5m^3/min φ 150mm

MATRIX
CIRCUIT BOARD MATERIALS

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