

# *Introduction of Vacuum Laminator system*

Auto cutting Laminator

Vacuum Laminator



*Nikko-Materials Co., Ltd*

2016

**Confidential**

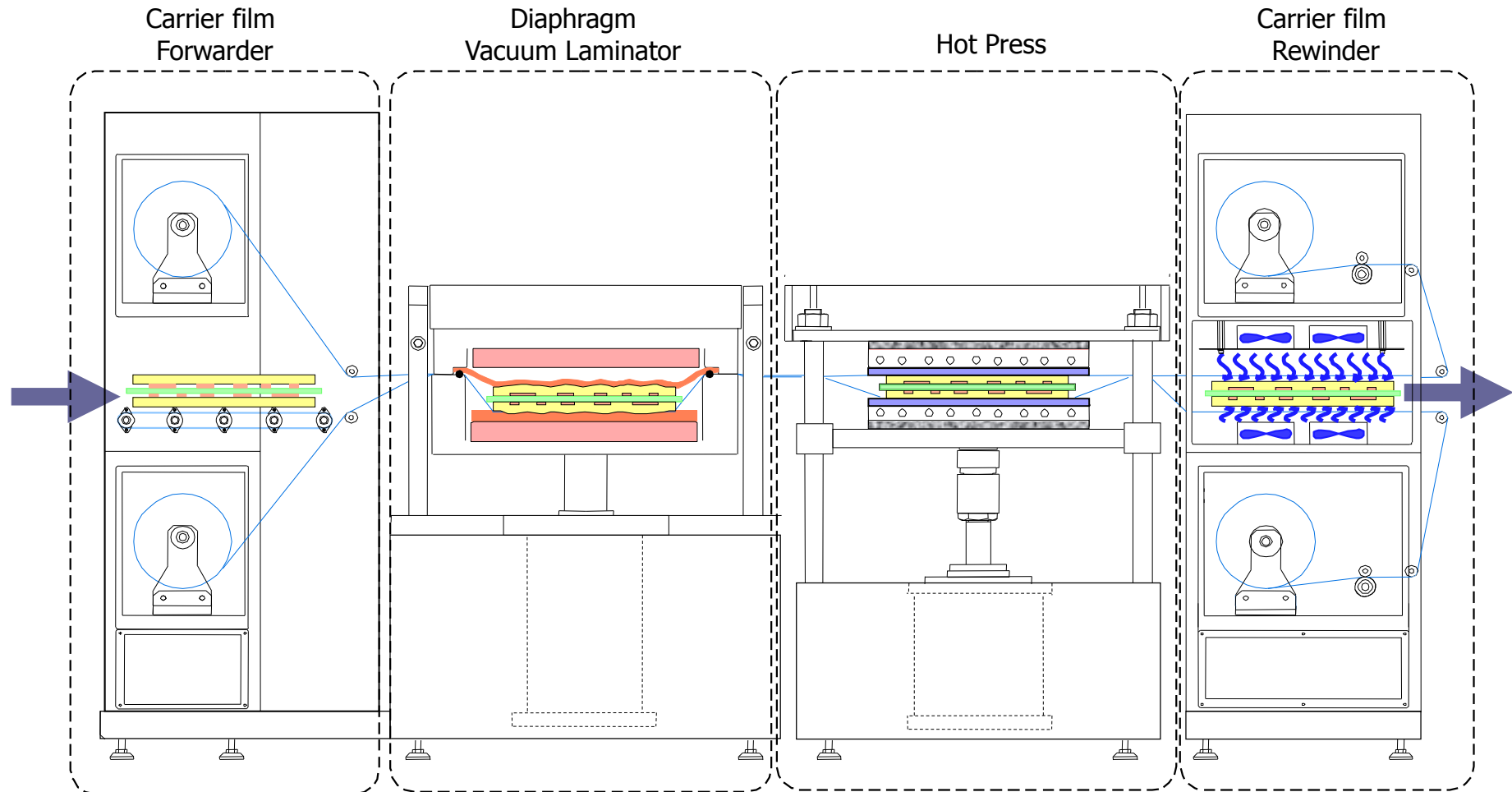
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## Line Up of Vacuum Laminator system

Spec. / model	CVP-300	CVP-500	CVP-600	CVP-700
1st stage Diaphragm type Vacuum Laminator	○	○		
1st stage Rubber Press type Vacuum Laminator			○	○
2nd stage Hot Press Flattener	○		○	
2nd stage Vacuum Press Flattener		○		○

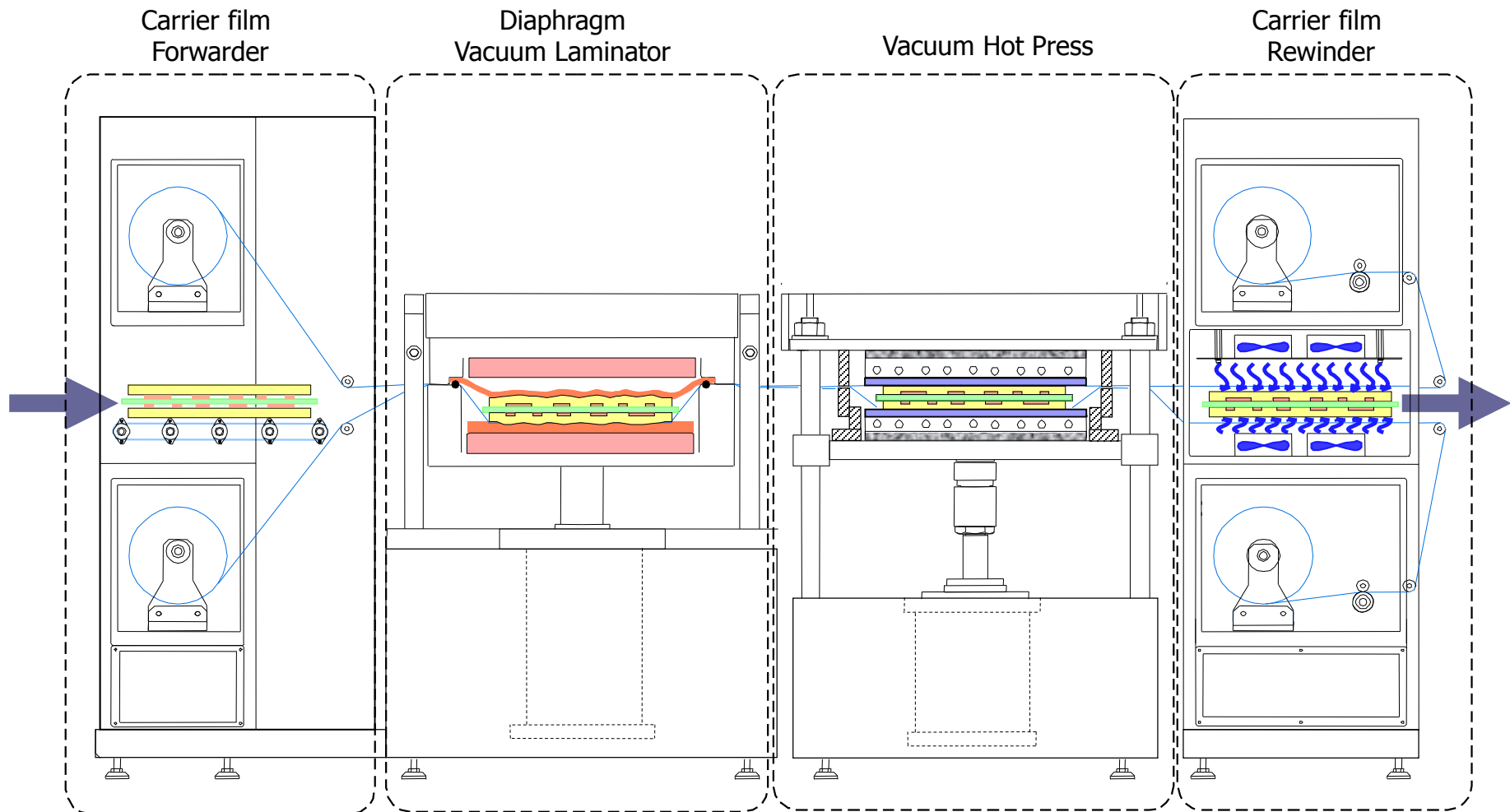
# Diaphragm Laminator & Hot Press

## *Model CVP-300*

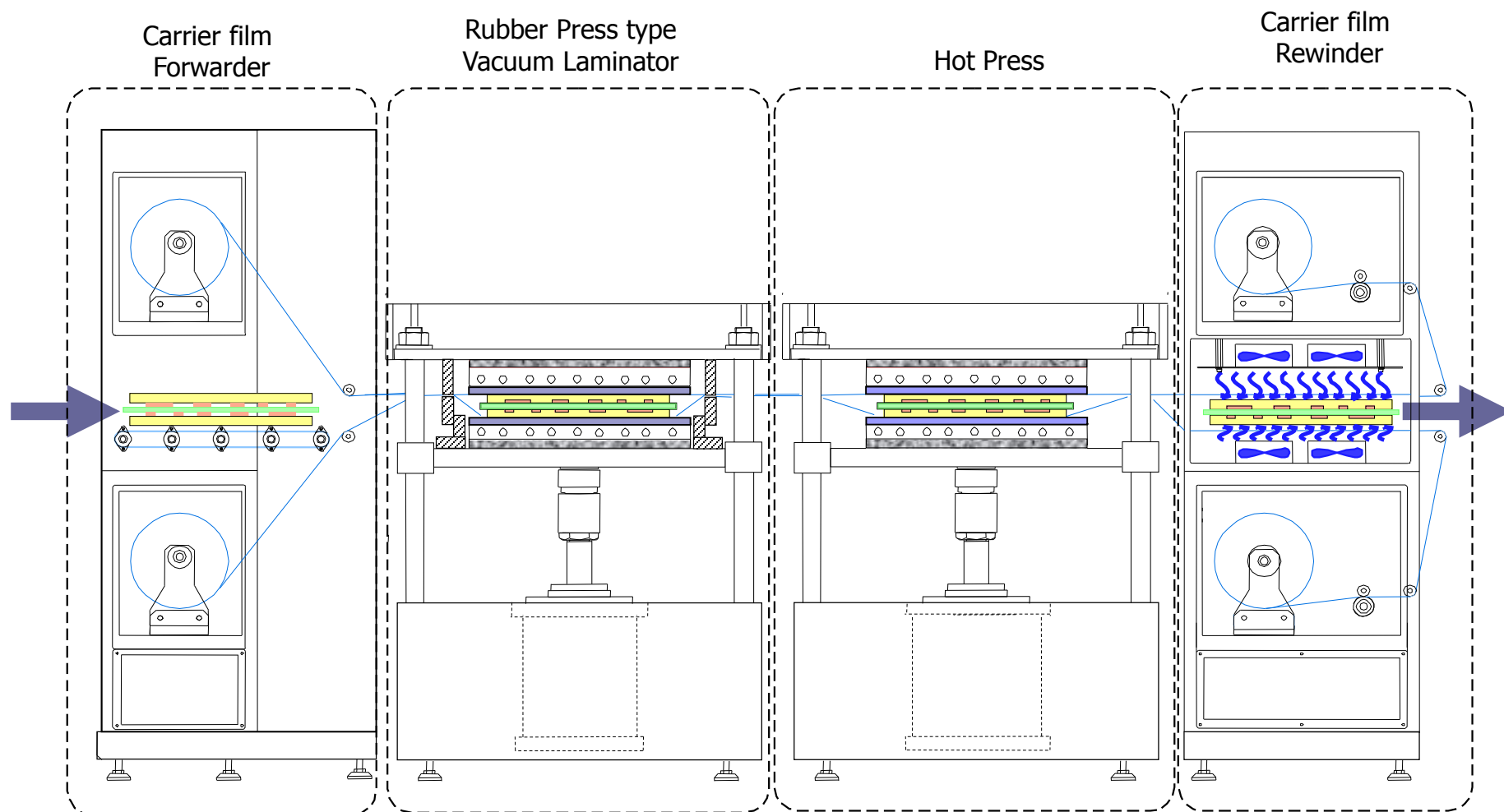


# Diaphragm Laminator & Vacuum Press

## *Model CVP-500*

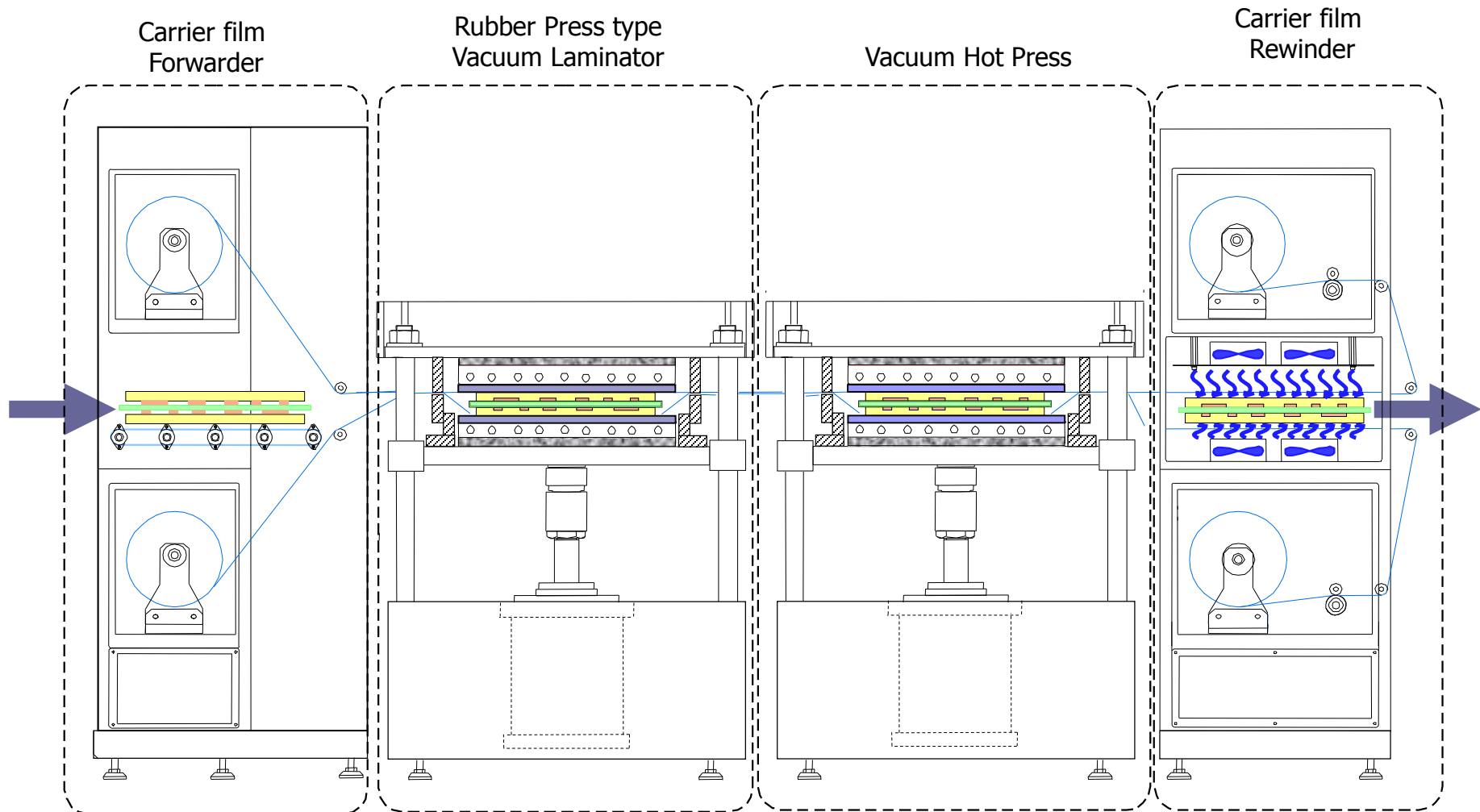


# Rubber Press Laminator & Hot Press *Model CVP-600*

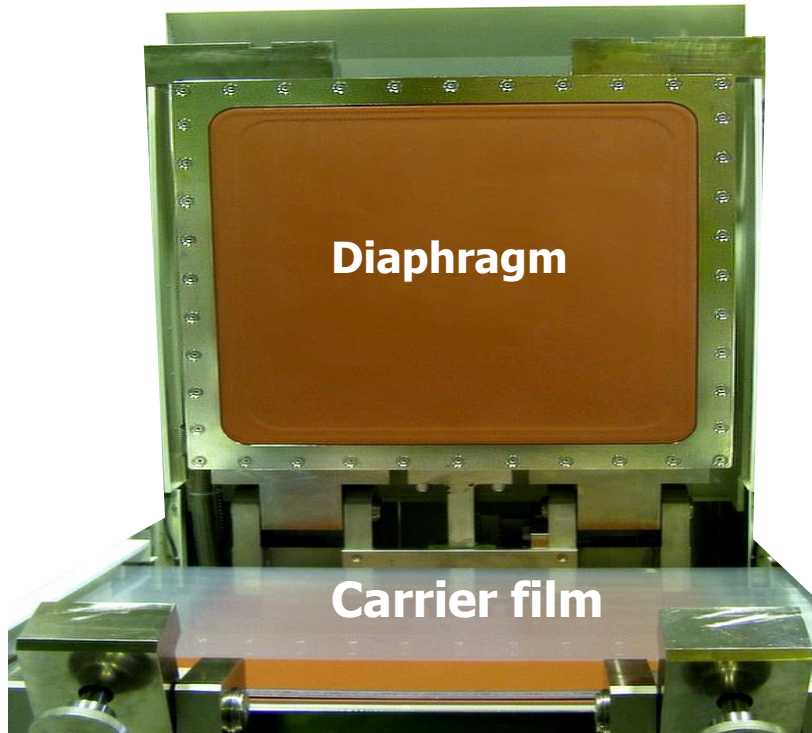


# Rubber Press Laminator & Vacuum Press

## *Model CVP-700*

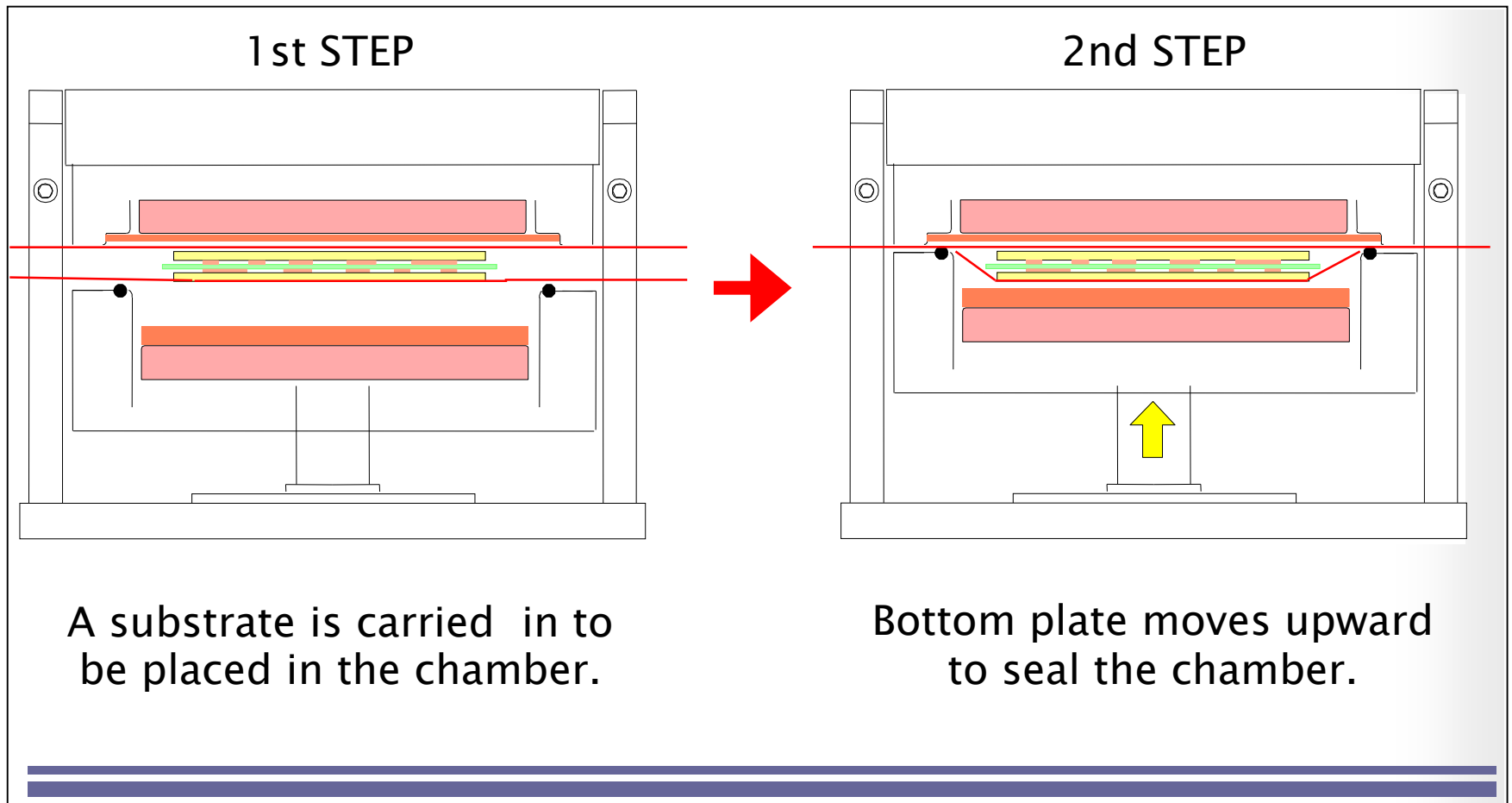


# 1st Stage Diaphragm Vacuum Laminator



- Temperature  
Max. 180°C  
Precision  $\pm 4^{\circ}\text{C}$
- Pressure lamination  
Max. 0.5 MPa
- Highly durable diaphragm  
/ 4 layers sheet
- Vacuuming: under 1 hPa  
(Reaching 1 hPa in 30 sec.  
after vacuuming)

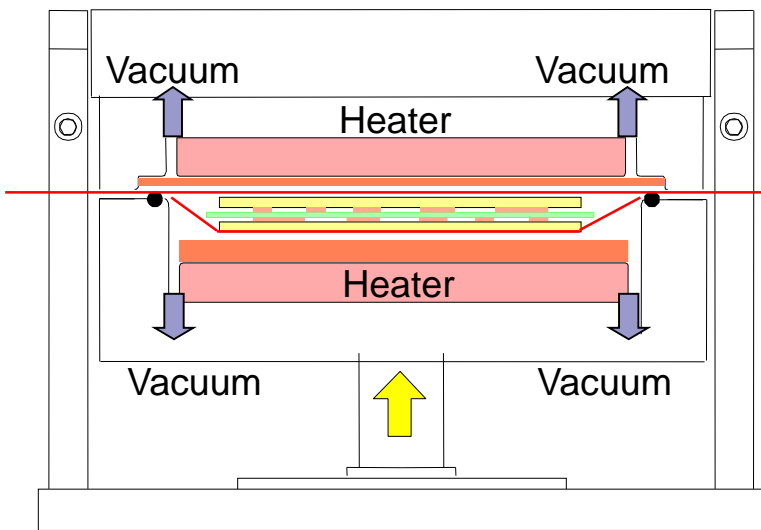
# Vacuum Lamination process (1)





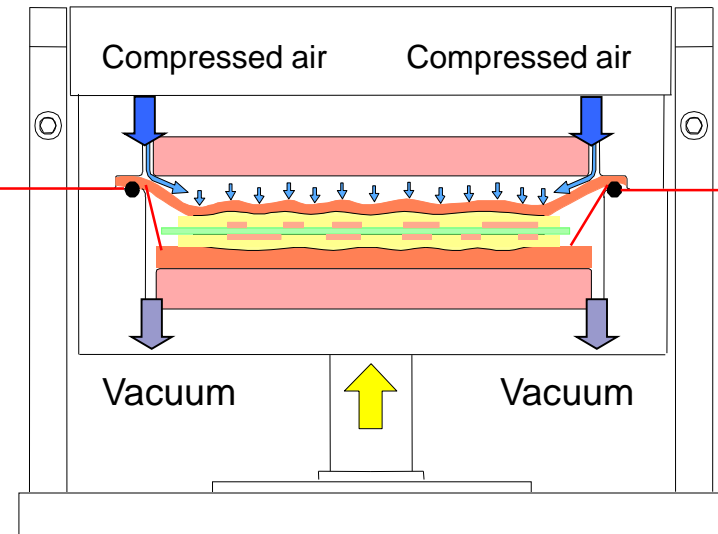
## Vacuum Lamination process (2)

3rd STEP



The vacuum process starts.  
During vacuuming, if a material  
Film is damaged by radiant heat,  
it may cause a void.

4th STEP



Compressed air supplied to upper  
plate. Upper silicon rubber of  
diaphragm stretches downward  
and presses substrate with films.

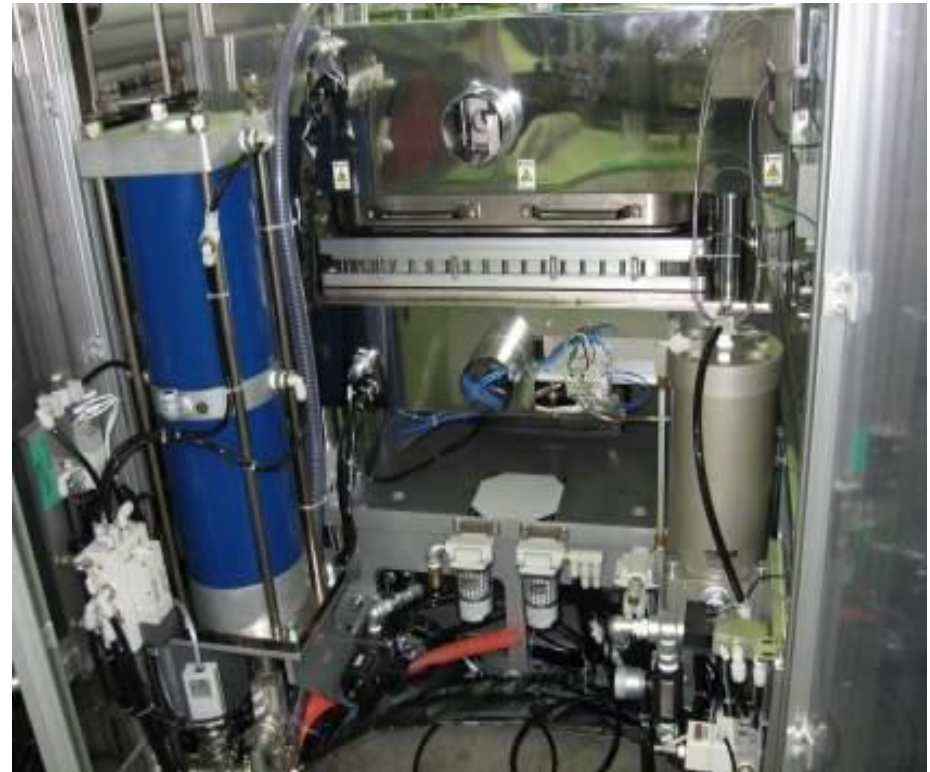
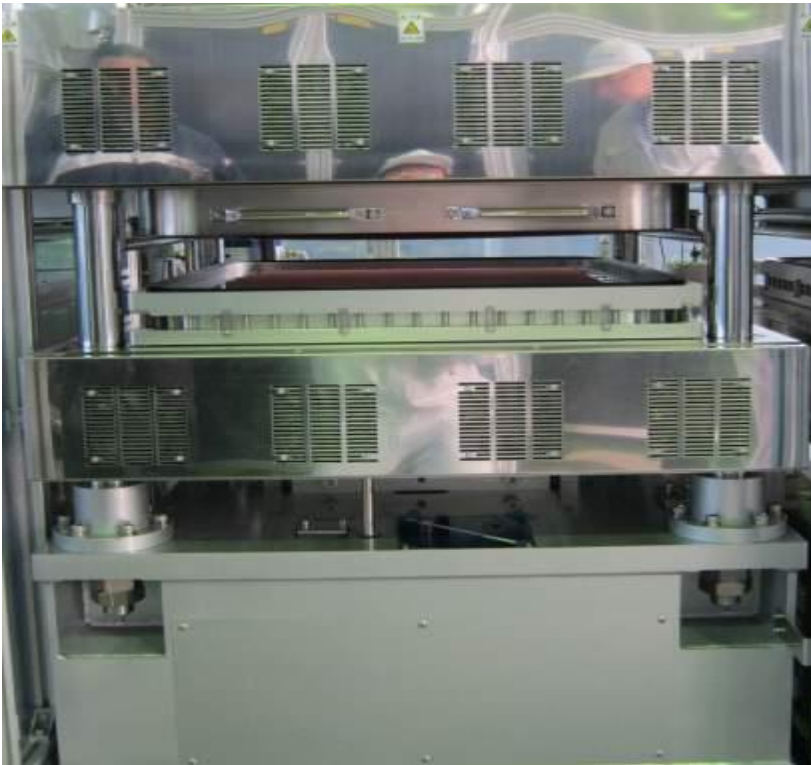
# 1st Stage Vacuum Rubber Press Laminator

This unit is suitable for hard materials lamination such as ABF-GC type, PP type etc.

Temperature Max.  $180 \pm 4^{\circ}\text{C}$

Pressure lamination Max. 1.5MPa (panel size 510X510 mm)

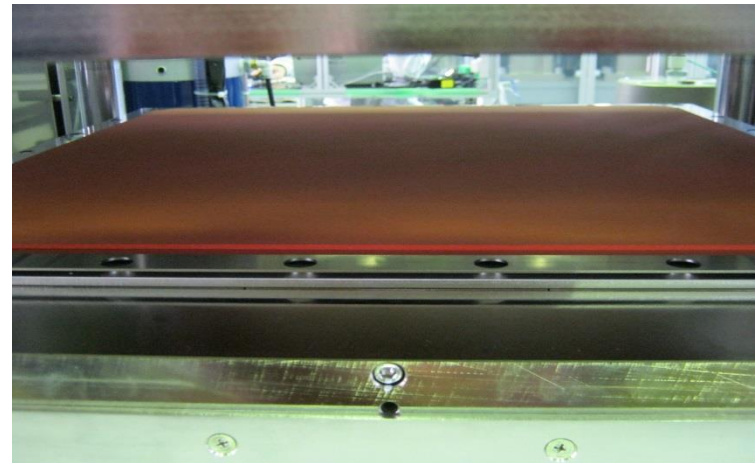
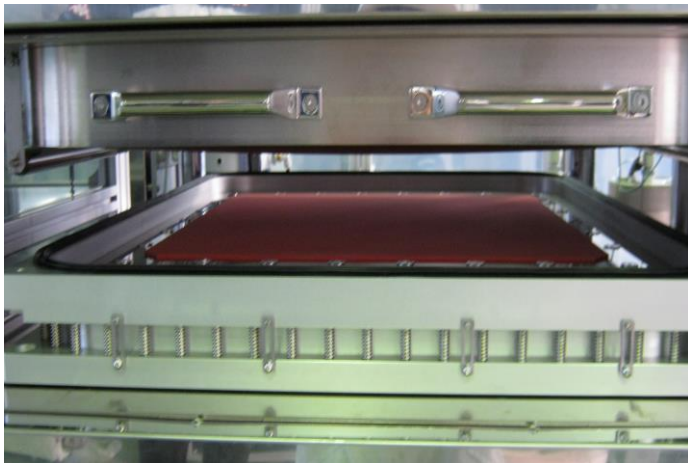
Vacuum under 1 hPa (Reaching 1 hPa in 30 sec. after vacuuming)



# *Mechanism of Vacuum Rubber Press*

The Vacuum Rubber Press enable to heat and press the substrate with uniform pressure.

Pressure can be applied in the direction of the resin filling for the substrate at the same time ..pressuring vertically...



# Performance of Vacuum Pump

KASHIYAMA Dry pump

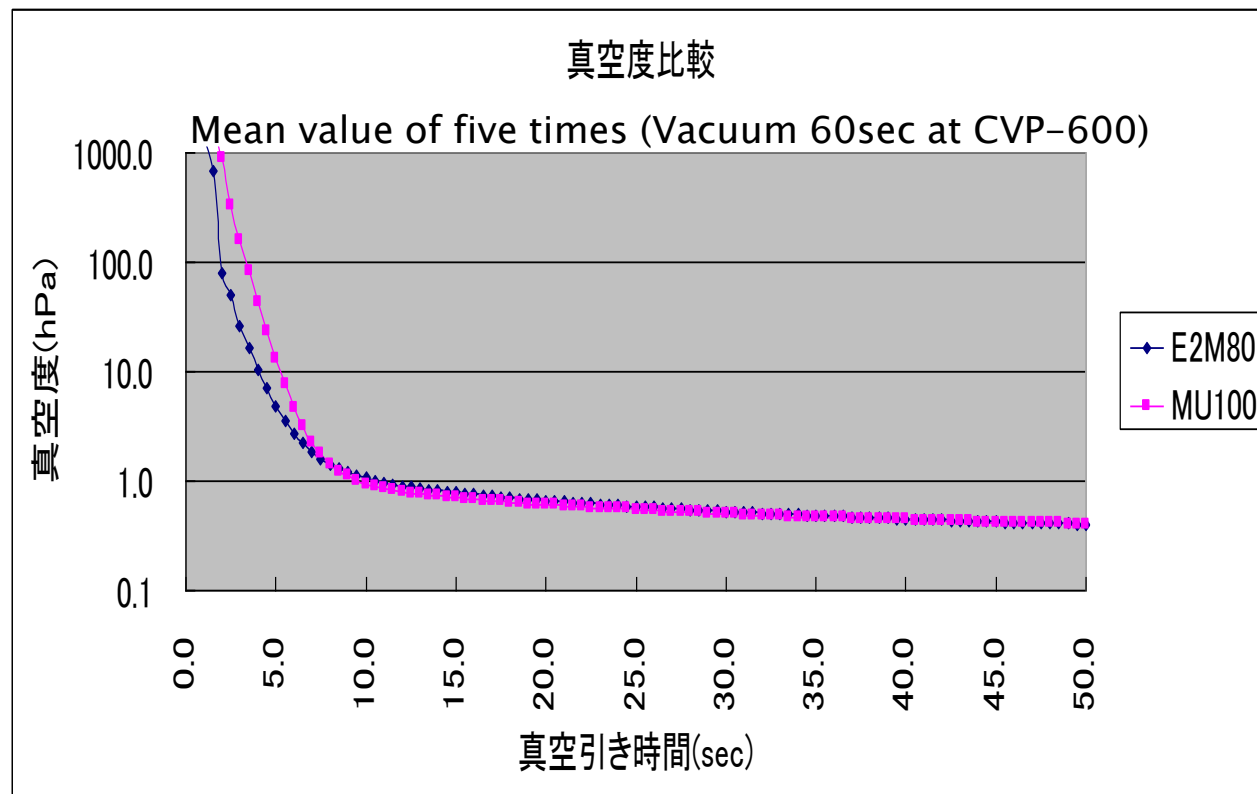
exhaust / MU-100 1600 L/min

MU-300 5000 L/min



EDWARDS Dry pump

exhaust / iXL-120 1800 L/min



# 2nd Stage Flattening Press (atmosphere type / Vacuum type)

Vacuum type



Packing Glands

atmosphere type

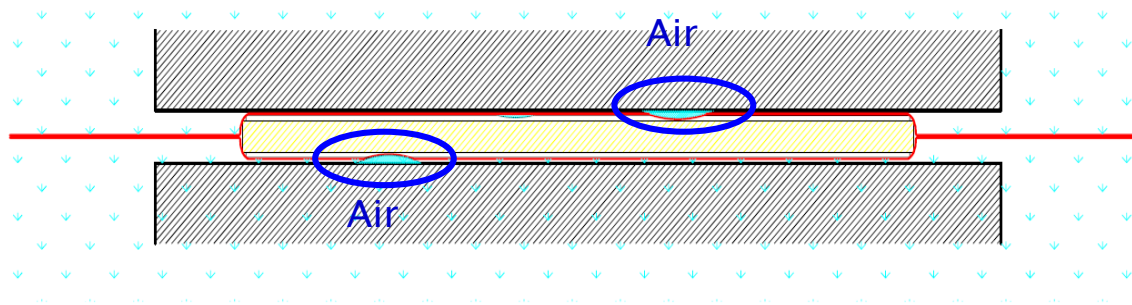


	Atmosphere type	Vacuum type
Model	CVP-300, CVP-600	CVP-500, CVP-700
Vacuuming	–	under 1 hpa
Pressure	Max. 49 ton	Max. 45 ton
Temperature (Precision)	Max. 180°C (±4°C)	
Remarks	<ul style="list-style-type: none"> <li>• Easy Operation with Touch Panel</li> <li>• Using air hydro-booster</li> <li>• Not using oil pressure pump</li> <li>• Using Stainless or Electro Ni plating</li> </ul>	

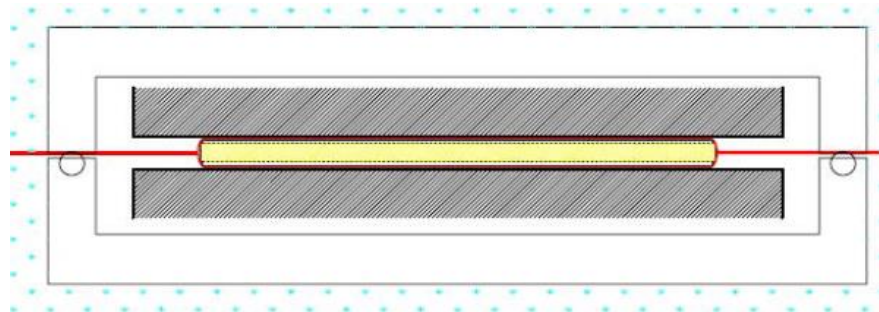


# Comparison of atmosphere press and Vacuum press

Atmosphere type : When air remains between hot plate and carrier film or carrier film and substrate, The resin surface does not become uniform. It use the emboss PET film for these measures.

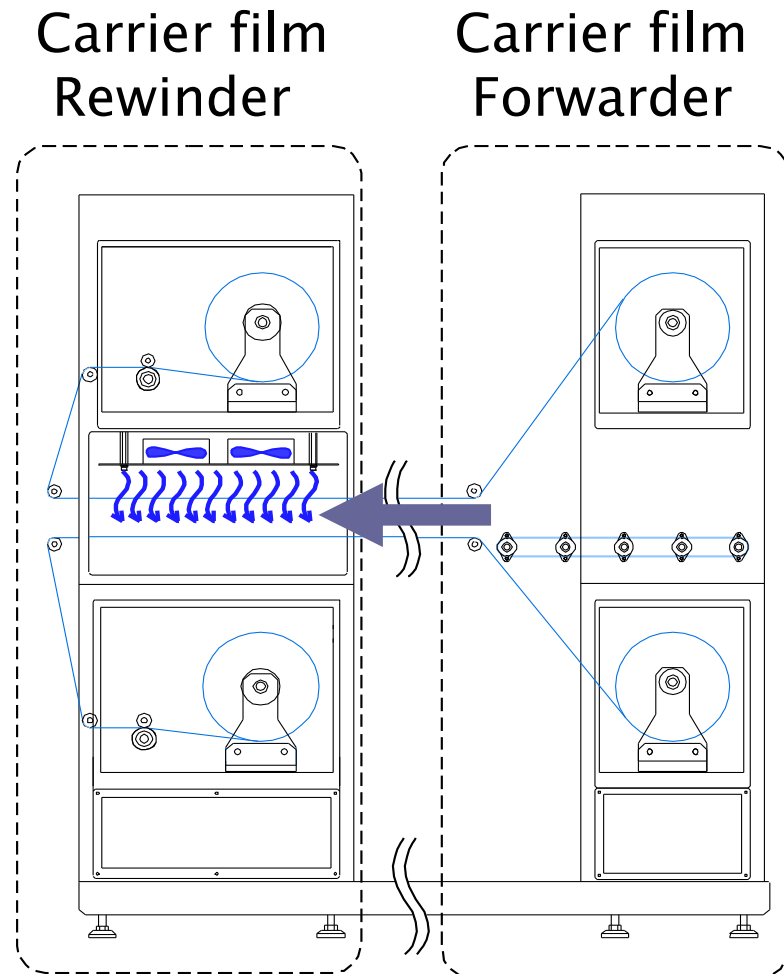


Vacuum type : Because air does not remain in the vacuum type, It can use the transparency PET film.



# Transfer system with PET films

- 1) A Substrate is carried by a set of two rolls of PET films.
- 2) The Film tension controlled with the servo motors and the nip-roles.  
(From 1 to 100 N/m)
- 3) PET Film's Conveyor Speed: 2~18m/min (changeable)
- 4) Stopping position Precision  $\pm 2.5\text{mm}$
- 5) A substrate up to 1500 g can be transported.



# *Movement cycle Time chart*

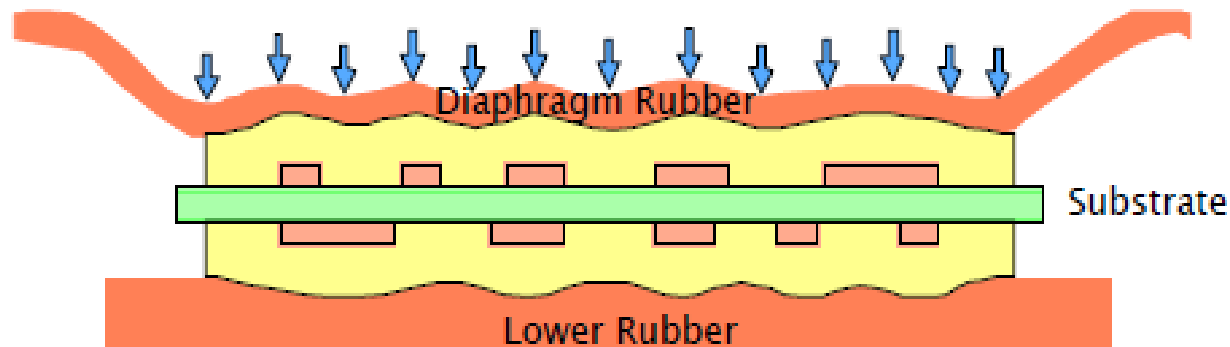
## Standard Takt Time

	← 1 cycle = 1 min →		
IN PUT Convayer		40 sec	
Transfer film (substrate)			
+			
Top and bottom movement of	20 sec		20 sec
1st Vacuum chamber			
2nd HOT Press			
1st Vacuum		20 sec	
1st Press			20 sec
2nd Press		40 sec	
Cooling		40 sec	



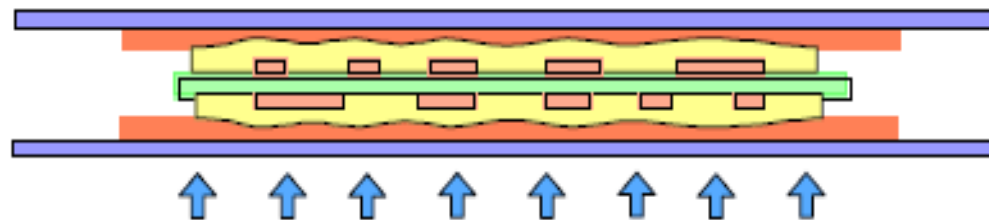
# *Difference of Diaphragm and Rubber Press*

Diaphragm will swell by compressed air. Pressure can be uniformly applied on the material. It is suitable for fragile materials (e.g. thin Wafers, LED substrate)



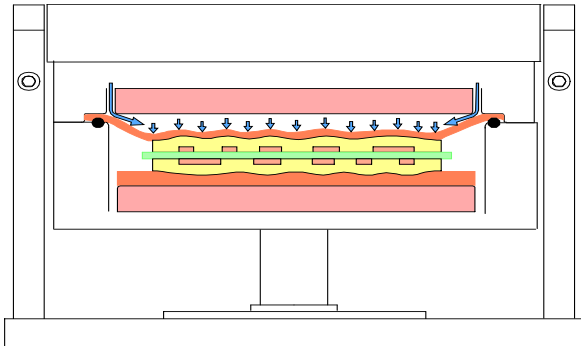
Press both sides of the substrate by hydraulic power, which is much higher than diaphragm. The pressure is subject to panel size

(smaller the panel, bigger the power)



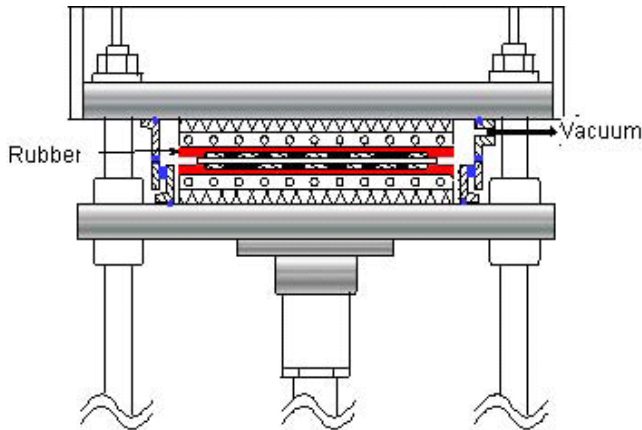
# *Difference of surface temperature*

## Diaphragm



Because of the substrate parting from the heat source, there is a possibility of temperature difference on surface between upper and lower side on thick substrate. This may influence resin liquidity which may lead un-uniformity thickness after flattening processes.

## Rubber Press



The upper and rubbers are always contacted heat sources. A substrate is heated evenly both upper and lower side. As a result the resin thickness of the both sides will be uniformed after flattening process.

# Running cost

- Diaphragm type  
Rubber life is estimated 70,000–100,000 shots.  
The rubber swells out by every shot and gets bending.  
Needs to replacement regularly.
- Rubber Press type  
Rubber life is estimated after approx. 300,000 shots  
(Depends on the using conditions)



# Standard Specification (1)

No	Spec.	CVP300	CVP500	CVP600	CVP700
1	equipment size (mm)	4023 x 2540 x 1900 ( W x D x H )	4052 x 2540 x 1900 ( W x D x H )	4070 x 2540 x 1900 ( W x D x H )	4070 x 2540 x 1900 ( W x D x H )
2	equipment weight	ca. 6.9 ton	ca. 7.0 ton	ca. 6.9 ton	ca. 7.0 ton
3	work size	Max.510 x 510mm option:510 x 610	Max.510 x 510mm	Max.510 x 510mm option:510 x 610	Max.510 x 510mm option:510 x 610
4	servo system	Mitsubishi Electric	Mitsubishi Electric	Mitsubishi Electric	Mitsubishi Electric
5	touch panel	Digital Electronics TFT-Color 10inch	Digital Electronics TFT-Color 10inch	Digital Electronics TFT-Color 10inch	Digital Electronics TFT-Color 10inch
6	memorable Laminate conditions	80 patterns	80 patterns	80 patterns	80 patterns
7	Cover	Al-Profile structure	Al-Profile structure	Al-Profile structure	Al-Profile structure
8	Utility	AC 200V , 50/60Hz Compressed air 0.5MPa Exhaust duct 100mm-dia. x 2	AC 200V , 50/60Hz Compressed air 0.5MPa Exhaust duct 100mm-dia. x 3	AC 200V , 50/60Hz Compressed air 0.6MPa Exhaust duct 100mm-dia. x 3	AC 200V , 50/60Hz Compressed air 0.6MPa Exhaust duct 100mm-dia. x 4

## Standard Specification (2)

No	Spec.	CVP300	CVP500	CVP600	CVP700
9	1 <sup>st</sup> Stage	Diaphragm	Diaphragm	Rubber Press	Rubber Press
10	1 <sup>st</sup> Stage Temperature	Max.180°C±4°C	Max.180°C±4°C	Max.180°C±4°C	Max.180°C±4°C
11	1 <sup>st</sup> Stage Vacuum performance	To 1hPa in 30 sec. (w/o board in chamber )	To 1hPa in 30 sec. (w/o board in chamber )	To 1hPa in 30 sec. (w/o board in chamber )	To 1hPa in 30 sec. ( no board in chamber )
12	1 <sup>st</sup> Stage work size	Max. 510 × 610	Max 510 × 510	Max 510 × 510	Max. 510 × 510
	*optional work size	Max 510 × 610		Max 510 × 610	Max 510 × 610
13	1 <sup>st</sup> Stage Press Power	0~0.5MPa Compressed air	0~0.5MPa Compressed air	10~45 ton (consultation necessary) Oil pressure	10~45ton (Consultation necessary) Oil pressure

\*we can make much bigger size based on consultation

## Standard Specification (3)

No	Spec.	CVP300	CVP500	CVP600	CVP700
14	2 <sup>nd</sup> Stage	Air-Oil pressure converter Hot Press	Air-Oil pressure converter Vacuum Hot Press	Air-Oil pressure converter Hot Press	Air-Oil pressure converter Vacuum Hot Press
15	2 <sup>nd</sup> Stage Temperature	Max.180°C±4°C	Max.180°C±4°C	Max.180°C±4°C	Max.180°C±4°C
16	2 <sup>nd</sup> Stage Vacuum performance	N/A	To 1hPa in 30 sec. (no board in chamber )	N/A	To 1hPa in 30 sec. (no board in chamber)
17	2 <sup>nd</sup> Stage Press Power	Max. 6~49ton (Consultation necessary)	Max. 10~45 ton (Consultation necessary)	Max. 6~49ton (Consultation necessary)	Max. 10~45ton (Consultation necessary)
18	2 <sup>nd</sup> Stage work size	Max 510 × 610	Max 510 × 510	Max 510 × 510	Max 510 × 510
	*Optional work size	Max 510 × 610		Max 510 × 610	Max 510 x 610



***Thank you***