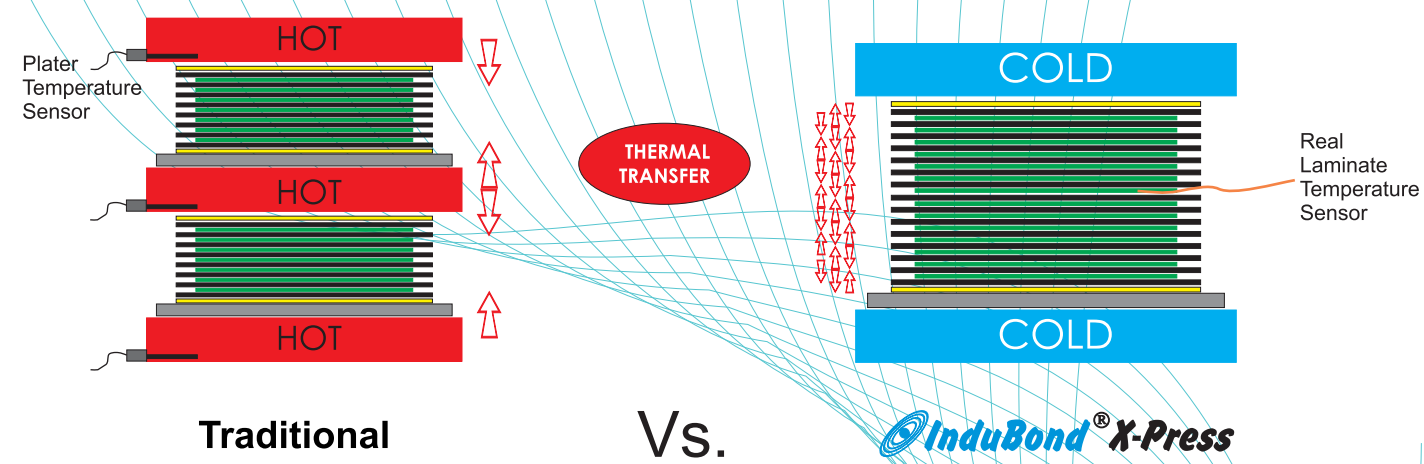
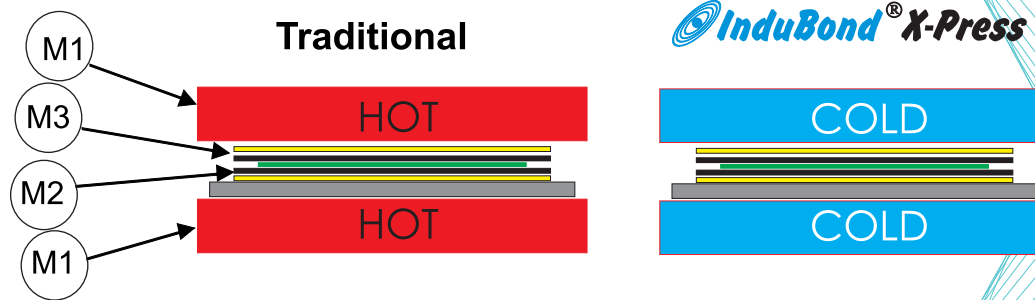


Energy Performance Comparison Analysis



Example Scenario

Traditional system heat up both M1 to transfer the temperature to M2 and M3 through isolators (Pacotane) to prevent thermal shock, Vs. InduBond X-Press that directly heats on the M3.



Q= Energy (J)
Δt= Thermal increase (Kelvin)
Mass= Mass to heat up (Kg)
λ = Especific heat (J/Kg·°K)

$$Q = \Delta t \cdot \text{Mass} \cdot \lambda$$

Let's suppose that we need to heat up both systems from ambience temperature 25°C (77°F) to 220°C (430°F) where as simple example the M1~ 35Kg and the M3~ 2Kg being Fe 120J/Kg·°C.

Energy Calculation

Traditional $Q = (220 - 25^\circ C) \cdot (35 + 35kg) \cdot (120J / Kg \cdot ^\circ C) = 1.638MJ$

InduBond X-Press $Q = (220 - 25^\circ C) \cdot (2 + 2kg) \cdot (120J / Kg \cdot ^\circ C) = 93.6KJ$

Example Conclusion

Traditional method spend about **17.5** times more power to make the same work.

InduBond® X-Press
 The Revolutionary Laminating Technology...



The Revolutionary new way of laminating



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Distributor Tag:



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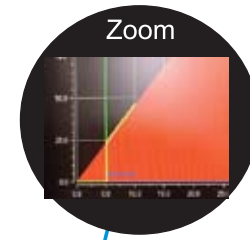
InduBond is presenting X-Press, the revolutionary new way of laminating PCB.

- > Using Induction Heating Technology to deliver precisely the energy to cure the resins with no thermal delays in any direction of the stack. X, Y and Z direction.
- > Cold Cycle is also done in the same chamber by forced air controlling air flow speed and water temp.
- > High uniform hydraulic pressure up to 75Kg/Cm2 (1066PSI)
- > High Vacuum levels due to specific single frame design and long live seal.
- > High Temperature capability 450°C (842F)
- > Modular concept and very compact design.

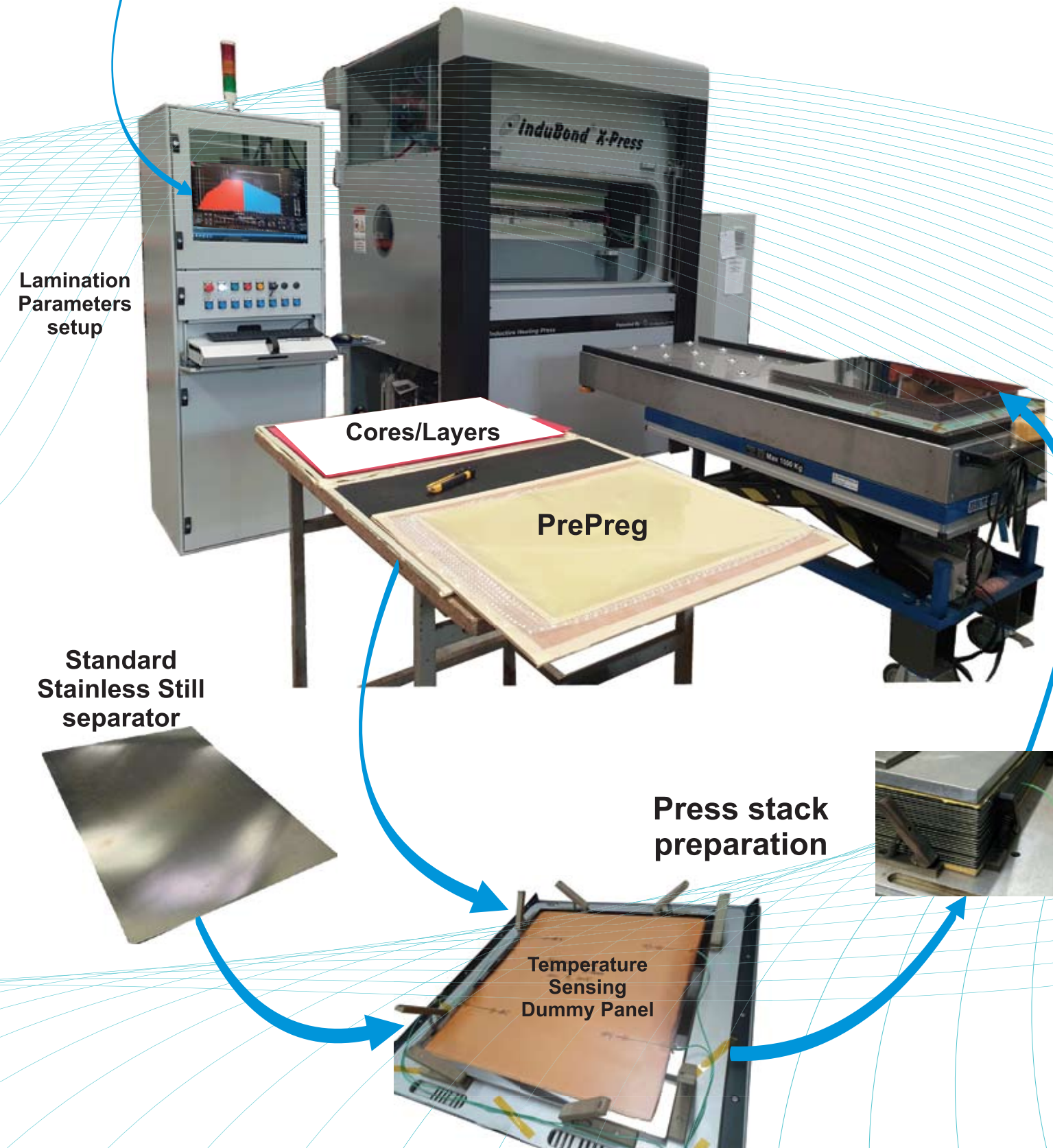
World Wide Patented

REV. 04/2019

- The InduBond X-Press technology is basically a laminating system that have a different way to produce the necessary heat to cure the composites than the standard methods.
- The novelty of the X-Press technology is that the needed thermal energy "heat", is produced just on the laminating material by induction heating technology, in particular on each layer of the press stack at the same time, with the same temperature magnitude, without any thermal conduction delay.
- That simple thing, means to heat up with perfect uniformity in all directions (X/Y/Z) of the press stack. In consequence, all the layers of laminates inside the press, get the same temperature profile at the same time with NO delays.
- As the heat is produced only on the layers of laminating production stack, InduBond X-Press allows to achieve high temperatures uniformly at a very high speed, high energy efficiency, on really clean "Green" system with minimum floor space requirements.
- In this way, the laminating materials, gets the energy of function of time "Thermal profile" instantaneously in all the surface of each layer of the press stack, with no thermal inertia.
- Even more, it allows to the system uses a temperature sensor embedded in a dummy panel to feed back to the control the real temperature that the material is getting instantaneously. This close-loop control system, allows very accurate and reliable lamination.
- As the X-Press technology heat's up only the material and NOT all the big mass of the press, the energy performance / efficiency is very high compare to standards heating methods.
- The technology uses the standard stainless steel separator plates used on the conventional lamination presses.
- The system is designed in a compact way (no external devices, vacuum, hydraulic pump etc.. is embedded in the single machine frame), this reduces dramatically the floor space and allows an easy future expansion to suit changing market demands whenever necessary.
- This modular concept allows maximum flexibility that allows to run a single panel on a prototype or urgency way, or the maximum press capacity. Hot and cold cycle is performed in the same unit for highest quality production demands.
- Some options are available under request like Loading/Unloading systems, layup stations, break down stations conveyor systems etc..



The red area represents the desired programmed heat ramps, blue line represents the real pressure during cycle, the green line, represents the real vacuum value during cycle, and yellow line, represent the real temperature of the material that is in progress, tracking the programmed temperature profile +/-1°C



Press Model		X-Press 360
Platen Size	[X/Y] mm	1025x925
	[X/Y] inch	40.35x36.41
Max. Lamination area	[X/Y] mm	660x610
	[X/Y] inch	26x24"
Number of openings		1
Movable Element		Bottom Platen
Loading/unloading window size	[X/Z]mm	1325x600
	[X/Y] inch	52.16x23.62
Loading height (Floor to Platen)	[Z] mm	1300
	[Z] inch	51.18
Opening Height	[Z] mm	180
	[Z] inch	7.08
Hydraulic cylinders type		Double acting
Main Hydraulic cylinder bore diameter	[Ø] mm	360
	[Ø] inch	14.17
Max. Laminating pressure (over 26x24" panel size)	kg /Cm ²	64.4
	PSI	915.9
Max. Press force	Ton	260
	US Ton	286
Max. hydraulic circuit pressure	bar	250
	PSI	3626
Platen table flatness	µm/meter mil / 3ft	<20 <0.78
Top / Bottom parallelism	µm/meter	<20
	mil / 3ft	<0.78
Lamination working temperature range (Higher under request)	ΔCelsius	20-450
	ΔFahrenheit	68-842
Heating up Rate direct on laminate	ΔCelsius/min	0.5-20
	ΔFahrenheit /min	0.9-36
Cool down Rate direct on laminated	ΔCelsius/min	0.5-5
	ΔFahrenheit /min	0.9-9
Laminate Real time temperature feedback		Sensor Panel
Max. vacuum operation level	mbar	1-10
	inch Hg	0.029-0.59
Max. allowed vacuum leakage	Δmbar/h	<30
	Δinch Hg/h	<0.88
Vacuum speed to 30mbar/0.88inch Mg	Minutes	<2
Front door system		Automatic
Maximum front door close/open speed	Sec.	3-5
Open/close back door Cooling system		Automatic
Max. Opening Open/Close speed	Sec.	3-5
Interface Control system (GUI)	DELL PC	OS Win10 PRO
Approx Max total weight	Kilo	14K
Machine Size	(WxHxD)mm	1660x2476x2180
	(WxHxD)inch	65.35x97.48x85.82
Max. Installation Power	KW	30
Power consumption (Example 20 panels 21x24" 2h Cycle)	KW / h	10-12
Chilled Cooling Water (Required)	l/min @10C	40
	GPM @ 50F	10.5