I. INTRODUCTION

A. GENERAL

The Du Pont VACREL® Solder Mask Vacuum Laminators, Models 300 and 330 (SMVL-300/330), are designed to laminate VACREL® Dry Film Solder Mask to one or both sides of printed wiring boards. During the automatic cycle, the film and boards are pulled into a vacuum chamber where they are heated and laminated. Adjustable chamber temperatures and cycle times, combined with high vacuum levels, ensure consistent film conformation without voids or air entrapment.

1. The maximum board size is dependent on the Laminator model:

   - The **SMVL-300** will laminate boards up to 21-1/4 inches long by 24 inches wide (540 mm long x 610 mm wide).

   - The **SMVL-330** will laminate boards up to 30 inches long by 24 inches wide (762 mm long x 610 mm wide).

2. The vacuum chamber consists of upper and lower platens that seal together after the board enters the chamber. Each platen is under vacuum pressure at various times during the cycle.

   - The heated upper platen of the vacuum chamber is covered by a silicone rubber diaphragm that is drawn down onto the film and boards by vacuum to apply lamination pressure.

   - The lower platen heats and supports the board and provides the vacuum for lamination.

3. Lower platens of various sizes are available to accommodate various printed circuit board sizes and to minimize film waste. One or several boards may be laminated in one cycle, depending on board size, platen size, and film width.

   - **SMVL-300** lower platens are stocked in lengths of 12, 15, 18 and 21-1/4 inches. Other lengths in 1-inch increments between 11 and 21 inches can be specially ordered. All platens are 24 inches wide.

   - **SMVL-330** lower platens are available in lengths of 16 to 30 inches in 2-inch increments; all must be specially ordered. The sizes normally used are 26 and 30 inches. All platens are 24 inches wide.

4. Although included in the purchase price of the SMVL-300/330, the Laminators are shipped **WITHOUT** a lower platen installed. The lower platen size required must be specified when ordering the Laminator. The platen is shipped with the SMVL, but in a separate crate. Additional lower platens can be ordered as needed.

NOTE: SMVL-300 and SMVL-330 lower platens are not interchangeable.

B. SMVL-300/330 FEATURES

- A pneumatic cylinder lifts the upper supply roll frame so the operator can swivel the frame over the side of the Laminator to change the supply rolls.

- A built-in cycle timer controls all machine functions throughout the cycle. The operator simply places the boards on the feed table and pushes the Start button.

- A selector switch on the control panel permits either automatic or operator-action recycling.

- A hydraulically operated film advance mechanism pulls the film and board(s) into the Laminator and withdraws the previously laminated board(s) from the vacuum chamber. Nip rollers at the end of the machine provide uniform tension across the film width.

- A vacuum interlock system monitors the vacuum during each cycle and prevents the start of another cycle if vacuum levels are too low for adequate lamination.

- An infra-red temperature sensor system measures and displays the temperature of the boards as they emerge from the vacuum chamber.

- Large temperature gauges are located on the side of the unit for easy monitoring of the platen temperatures.

- A vacuum gauge on the side of the unit allows easy monitoring of the vacuum levels.

- Over-temperature sensors in each platen cut off power to the heaters in the event of a heater circuit malfunction.

- An electric motor tilts the heavy upper platen for quick and easy access to clean the rubber diaphragm and inspect both platens.

C. SAFETY

1. LAMINATOR SAFETY FEATURES

- **Emergency Stop Switches**: Palm-actuated switches are located on top of the Laminator side rails at the entrance and exit ends of the unit.

- **Enclosed Controls**: All electrical, vacuum, hydraulic and pneumatic controls are enclosed within the Laminator panels for operator safety. Exposed compressed air lines are shielded in metal braid.

- **Insulated Panels**: The top cover of the unit is insulated from the heat of the vacuum chamber to protect the operator from contacting hot surfaces.

2. SAFETY INSTRUCTIONS

In addition to the general precautions in the beginning of each section, important safety recommendations are interspersed throughout this manual.

- **WARNING**

  These messages, in boldface type, emphasize potential personal safety hazards.

- **CAUTION!**

  These messages refer to potential equipment damage.

- **NOTE:**

  These messages convey special information or emphasize a particular instruction.

D. SPECIFICATIONS

1. CRATED DIMENSIONS L x W x H

SMVL-300:	121 x 53 x 74 inches (3073 x 1346 x 1880 mm)
Platen Crate:	30 x 34 x 12 inches (762 x 864 x 305 mm)
SMVL-330:	152 x 53 x 74 inches (3886 x 1346 x 1880 mm)
Platen Crate:	34 x 39 x 12 inches (864 x 991 x 305 mm)

2. SHIPPING WEIGHT

SMVL-300:	1815 lb. (823 kg.)
Platen:	117 lb. (53 kg.)
SMVL-330:	2165 lb. (982 kg.)
Platen:	185 lb. (84 kg.)

3. LAMINATOR DIMENSIONS L x W x H
(Figure II-1)

- Basic Laminator

SMVL-300:	113 x 41 x 63 inches (2860 x 1035 x 1600 mm)
SMVL-330:	146 x 42 x 63 inches (3700 x 1075 x 1600 mm)

- Width when upper film supply roll is in loading position.

SMVL-300:	75 inches (1900 mm)
SMVL-330:	76 inches (1940 mm)

- Length when exit tray is fully extended.

SMVL-300:	130 inches (3310 mm)
SMVL-330:	163 inches (4150 mm)

4. FEED & EXIT TABLE HEIGHT

BOTH MODELS: 37.5 inches (950 mm) Minimum

(Adjustable leveling feet)

5. LAMINATOR WEIGHT

SMVL-300:	992 lb. (450 kg.)
SMVL-330:	1235 lb. (560 kg.)

6. ELECTRICAL

230 Volts AC ± 15%, 3-phase, 50/60 Hz

SMVL-300:	24.7 amps
SMVL-330:	31.7 amps

NOTE: Other export options are available.

7. COMPRESSED AIR

BOTH MODELS: 1 cfm at 60 psi (1.7 m^3/hr at 414 kPa [4.0 bar])

8. VACUUM

BOTH MODELS: Built-in Vacuum Pump.

9. EXHAUST (VACUUM PUMP)

BOTH MODELS: No specific flow rate is required; negative pressure is required to avoid restricting air flow from the pump.

Pump Connection Size: 1.25-inch female NPT

10. MAXIMUM BOARD SIZE

SMVL-300:	21-1/4 x 24 x 0.200 inches* (540 x 610 x 5 mm thick)
SMVL-330:	30 x 24 x 0.200 inches* (762 x 610 x 5 mm thick)

*Includes circuit height and any board warpage.

11. THROUGHPUT RATE

BOTH MODELS: One to two cycles per minute.

NOTE: The number of boards per cycle depends on the size of the boards and of the lower platen.

12. RECOMMENDED WORK SPACE

BOTH MODELS: Three feet (1 meter) on all sides.