# CHEMINSTRUMENTS

# HOT ROLL LAMINATOR

# MODEL HL-100, HL-101

# OPERATING INSTRUCTIONS

# PRODUCT DESCRIPTION

The ChemInstruments Hot Roll Laminator is a state of the art laboratory scale pressure roll laminator. Many of the features were formerly only available in larger floor models. The Hot Roll Laminator will aide you in the production of quality laminations and provide you with essential information when scaling up to pilot trials with your product.

The unit has the following features:

- Hard coat anodized, Teflon coated aluminum top pressure roller.
- Top heated roller is pressure controlled with an easy to read dial indicator.
- Bottom drive roll is covered with 80-durometer-silicone rubber.
- Variable speed control of the drive rolls in both forward and reverse directions.
- Easy to use Fenwal temperature controller
- Safety features include a trip wire, which lifts the pressure roller.
- Another safety feature is the emergency stop switch that will stop the drive roller.

Optional features include:

- Air piston gap adjusters
- Chrome plated steel pressure roller (HL-101)
- Tension unwind upgrade
- Second face stock unwind stand
- Pneumatic foot control valve
- Driven heated pressure roller
- Heated bottom drive roller
- 240 VAC

Upon receipt of a new ChemInstruments Hot Roll Laminator, there are some steps that should be followed in setting up the unit. Following these steps will help to extend the life of the laminator and also aide in achieving superior laminations.

# UNPACKING

ChemInstruments has made every effort to ensure that the HL-100, HL-101 arrives at your location without damage. Check the unit for any damage that might have occurred in shipment. Very little damage has been experienced in the past, however, make sure that no air lines have been disconnected and that the top roll has not been scratched. Check all packaging material carefully for individually wrapped accessories. If any damage did occur during transit, notify the **carrier** immediately.

# ASSEMBLY

Before laminating any samples, follow this procedure to set up the Hot Roll Laminator:

## LOCATION

The laminator should be set up on a bench, which allows access to both the front and back of the machine. Some users have found a cart useful in reaching the front and back and also allow the unit to be mobile. Whether on a permanent bench top or a cart the weight of the unit ( **160 to 185 lbs.** ) must be considered.

## INSTALLATION OF THE UNWIND STAND

Be sure the roll unwind bar is seated correctly in the mount. If a tension unwind has been selected be sure the pressure plate is positioned over the pin. (See Photo 1)

## ASSEMBLY

- Carefully remove the kraft paper from the laminating rolls.
- Attach the incoming airline to the machine.
- This requires a female quick disconnect. Set the laminator's air pressure regulator at 40 PSI for a midpoint starting pressure.
- Plug the Laminator into a 120 VAC outlet or 240 VAC if requested as an option.
- The laminator will draw 12 – 15 amps. Check the amp maximum for the circuit and be sure other electrical devices on the same circuit do not cause an overload.
- Remove the wooden blocks between the rollers
- Press the red UP button to raise the pressure roll and remove these blocks.
- With the optional gap adjusters create a gap by turning the middle portion of the air pistons in clockwise direction. The gap adjusters can be used to create a gap between the rollers when the machine is not in use. The gap adjusters can be used to assure the top pressure roll is not resting on the rubber covered silicone roll when not in use. This will prevent an indentation or flat spot from occurring on the rubber covered roller. (See Figure 1)

**IMPORTANT - Save these blocks and insert them between the rollers when the unit is not in use! This will prevent an indentation or flat spot from occurring on the rubber covered drive roll..**

The unit is now set up for laminating see Temperature Controller Operation for heating instructions.

## KEY COMPONENTS ( See Figure 1, Figure 2)

- GAP ADJUSTERS
- AIR PISTONS
- SAFETY TRIP WIRE
- HEATED PRESSURE ROLL
- RUBBER DRIVE ROLL
- AIR PRESSURE REGULATOR
- EMERGENCY STOP SWITCH
- HEATER CONTROLLER
- QUICK AIR CONNECT
- BEARING
- FINISHED LAMINATION
- LAMINATING PLATFORMS

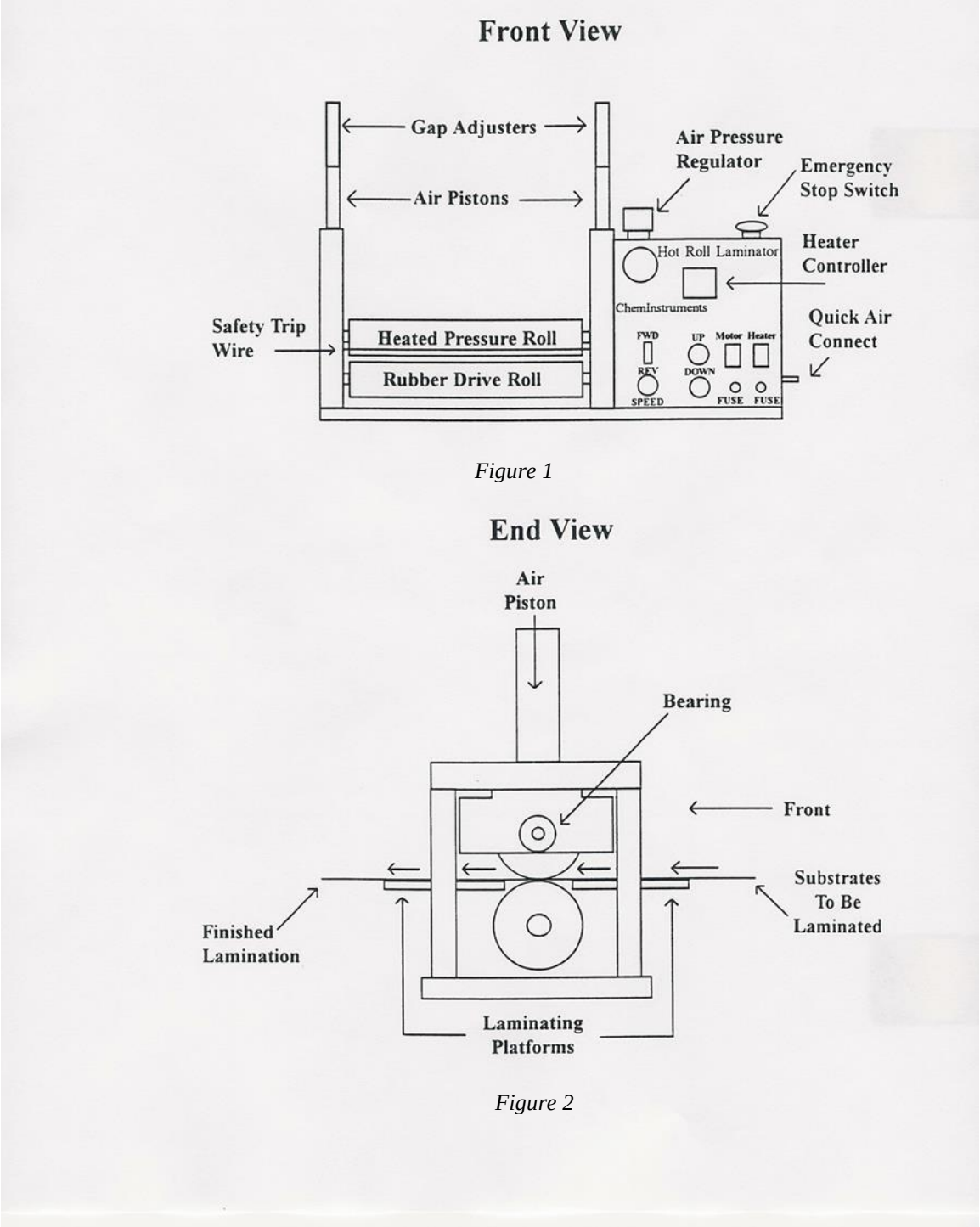



*Figure 1*

*Figure 2*

# SAFETY FEATURES

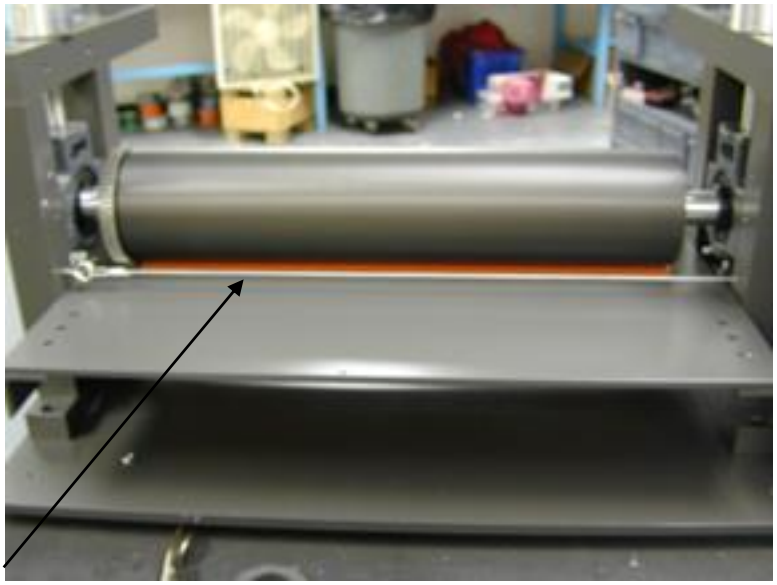
The Hot Roll Laminator should be considered as any other piece of laboratory equipment. The safety features will not prevent injury. The safety devices will raise the top roll or stop the drive roll instantly. The objective is to prevent using these features.

Tuck in ties and roll up sleeves. Loose clothing can be pulled into the laminating rolls and cause severe injury.

Remove rings and watches. These will only increase your injury if caught in the laminator.

## TRIP WIRE

Located in front of the top laminating roll, when activated this will cause the pressureroll to rise allowing trapped articles to be freed. Test the trip wire by lowering the pressure roller and moving the trip wire.( See Photo 2)



Trip Wire

*Photo 2*

## EMERGENCY STOP BUTTON

This will stop the drive roll from turning in either direction. It WILL NOT release the pressure, but can prevent further entrapment. To test turn the motor to the ON position, push down on the red button. The switch should remain locked. Check to be sure the bottom drive roll has stopped. Turn the switch in the clockwise direction to restart the motor. (See Photo 3)

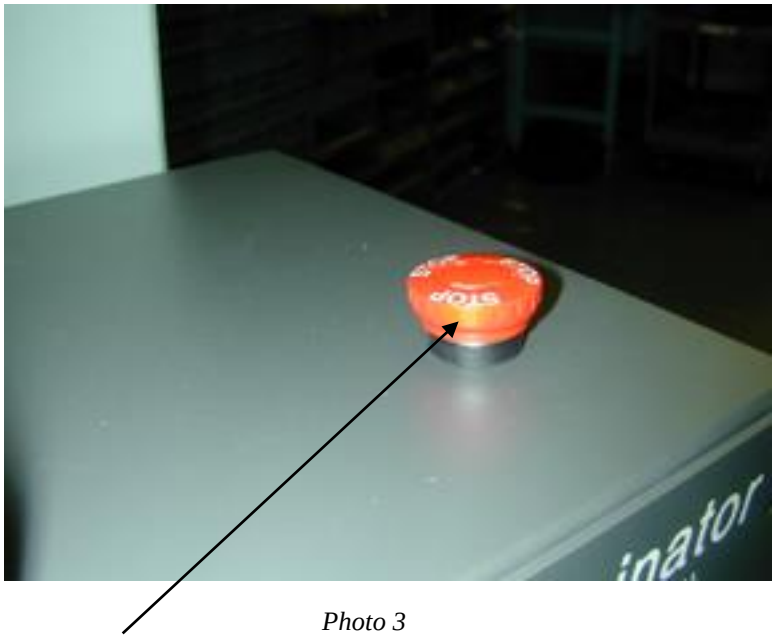



*Photo 3*

# TEMPERATURE CONTROLLER OPERATIONS

The heating controller is set and tested at the factory before shipment. Auto tuning has been performed at 250° F. It is ready to begin operating as soon as the HEATER switch is turned on. (See Photo 4)


*Photo 4*

Allow the unit 45 minutes to one hour to fully stabilize to the set temperature. This also applies when changing temperatures. Fenwal Manual Enclosed.

To change the temperature set point:

- Press the SET/ENT button
- The brightly lit number is the number that will be changed. Use the left arrow button to select the number you would like to change.
- Use the up and down arrows to change the number.
- Once the new set point (SP) has been entered press the SET/ENT button again to save the new value. If the set enter button is not pushed the controller will continue at the previous temperature.

- When no buttons are pressed for a period of one (1) minute, the controller returns to normal operating mode automatically. Press SET/ENT again to continue changing the set point if desired.

**CAUTION Once the heater is turned on, the internal temperature will rise very quickly. The 45 minutes mentioned above is the time for full roll temperature stabilization, not the time needed for the pressure roll to come up to temperature!!**

**DO NOT TOUCH THE TOP PRESSURE ROLL AFTER HEATER IS TURNED ON!!**

# OPERATION

## THEORY OF OPERATION

ChemInstruments Hot Roll Laminator canm hot laminate product samples on a laboratory bench top. The features included in the HL-100/101 provide control to consistently reproduce samples that are ready for testing.

**BEFORE OPERATING THE LAMINATOR, SEE PAGE 8 FOR SAFTEY PRECAUTIONS.**

## LAMINATING PROCEDURE

- Raise the pressure roller (Red UP button), turn temperature controller on and allow the temperature to stabilize.
- Set the speed as necessary for your material. Turn the motor OFF after the speed is set.
- IF the motor will not run, reset the red emergency stop switch on top of the unit. Turn the outer top portion of the red button clockwise. The switch is not set when it is in the up position. To use the emergency stop, push straight down on the button. This will stop the motor and keep it stopped until the switch is reset. (See page 7) for full safety instructions.

- If the material is in roll form place it on the unwind stand with the heat activated side up and the uncoated side to the roll. Thread the material over the idler roll and through the pressure nip gap. Place the other material under heat-activated substrate.
- If you are working with hand sheets lay one on top of the other and place one end of the assembly in the pressure nip gap. Check to be sure the coated side is between the sample substrates.
- After the material is positioned to be laminated, push the DOWN green button and turn the motor to the ON position.
- As the sample moves through the laminating nip, it may necessary guide the sample over the rear sample platform.
- Turn the motor to the OFF positions. Press UP (red) button to release the pressure.
- Replace the wooden blocks between the roller shafts when the machine is longer in use. Do not allow the rolls to rest together. This will cause flat spots to develop on the rubber roll.
- Remove the incoming air pressure hose from the right side of the machine.

# OPTIONS

**See page 2 for options, which have been selected on this unit.**

## GAP ADJUSTERS

To create a gap turns the middle section of the air piston clockwise.

- To create a specific known gap place feeler gauges between the rollers. For the best results use 2 sets of feeler gauges (sold separately). Place the gauges at about 6 inches in from each end of the rolls.
- Continue to adjust the air cylinders until the feeler gauges are close-fitting in the nip.
- Replace the wooden blocks or create a gap to prevent the rolls from resting together when the laminator is not in use.

## CHROME PLATED STEEL PRESSURE ROLL (HL-101)

- The top pressure roll is chrome plated not the standard Teflon coated aluminum. This will create smoother laminations when working with thin gauge films.
- The chrome plated roll has been installed at the factory and is ready for use.

## TENSION UNWIND

- The tension unwind consists of a core insert with a spring-loaded blade that prevents the face stock from turning and a pressure plate brake.
- Load the material over the open end of the core insert. Center the material over the spring loaded blade. Place the material in the unwind holders, be sure the pressure plate is aligned over the stop pin.
- to increase the tension loosens the setscrews on the large nut on the pressure plate. Then turn the large nut clockwise. Once the right tension has been established tighten the setscrews.
- Many films require tension to prevent wrinkles from forming.

## SECOND FACE UNWIND

- This is located below the standard face unwind.
- When using this feature the materials are fed through the back of the nip and over the front sample platform.

## PNEUMATIC FOOT CONTROL

- This is for the pressure or the motor but not both at the same time.
- This feature allows the user to lower the pressure roller while holding samples in place.
- Extreme caution should be taken when using this feature to assure that only the sample is near the nip when lowering the pressure roll. (See page 7 for safety issues).

## DRIVEN HEATED PRESSURE ROLL

- This feature uses gears on the bottom roll and the top heated roll. These cause both rolls to turn simultaneously.

- The gear located on the left shaft will engage when the pressure roll is lowered to meet with the bottom rolls gear.

### HEATED DRIVE ROLL

- The bottom driven roll is independently heated with a second temperature controller. Care should be taken when heating the rolls.
- Each controller is marked for the roll it is heating.
- See page 10 for temperature controller operation.
- Maximum recommended temperature is 400$^{o}$.

## MAINTENANCE

The ChemInstruments Hot Roll Laminator should provide many years of trouble-free service. However, some maintenance may be necessary. The preceding troubleshooting chart describes some of the most likely problems and their causes. The following are the maintenance procedures:

**ALWAYS UNPLUG THE UNIT BEFORE OPENING UP THE CONTROL BOX! ELECTRIC SHOCK MAY OCCUR!**

### TIGHTENING BELT

1. Remove the six screws holding the faceplate.
2. Remove the four screws holding the side panel.
3. **Carefully** pull these two panels away from the control box. **Make sure not to pull any wires or air hoses loose!**
4. Loosen the four (4) motor mount screws.
5. Pull the motor to tighten the belt.
6. Tighten the motor mount screws.
7. Replace the front and side panels.

## AIR CONNECTIONS

1. Find the source of the leak, then disconnects air pressure from the unit.
2. The tubing is very flexible and is pushed onto a small barb at each connection. This connection should never leak, but it may.
3. Cut the tubing off the barb.
4. Cut off any bad section of the tubing.
4. Push the tubing back onto the barb.

## SAFETY TRIP WIRE ADJUSTMENT

1. If the pressure roller will not lower when the green DOWN button is pressed, the safety trip wire may need adjustment.
2. Push or pull the wire to verify there are two audible "clicks;" one as the wire is pushed and the other as it is released.
3. If there is no clicking, loosen the eyebolt on the left side of the safety trip wire by loosening the set nut, and then turning the eyebolt counter-clockwise.
4. Adjust this so there is a clicking, and the pressure roller operates correctly.
5. Hold the eyebolt securely and tighten the set nut on the eyebolt.

From time to time the rolls may need to be cleaned. The laminating platforms can be moved to allow easier access to the rolls. To do this, loosen the black plastic thumbscrews, slide the platform, and then re-tighten the thumbscrews. **ALWAYS CLEAN ROLLS WITH HEATED ROLL AT ROOM TEMPERATURE!!!** Mineral spirits may be used to clean both of the rolls. *Do not use toluene, as it will damage the rubber roll.* Do not clean the rolls while they are moving, and always clean the pressure roll while it is in the "up" position. Do not scrape the pressure roll with any objects! Use only a soft cloth and mineral spirits to clean this roll.

If you have any questions regarding the maintenance or the operation of your Hot Roll Laminator, or need to order replacement parts, feel free to call ChemInstruments at 513-860-1598, Monday - Friday from 8:00 AM to 5:00 PM EST. Or you may fax us at 513-860-1597.

# TROUBLESHOOTING

| Problem | Probable Cause | Procedure |
|---|---|---|
| Motor switch not lit. | Machine not plugged in. | Plug machine into 120 VAC outlets. |
| | Blown fuse. | Replace with a 2-amp time delay fuse. |
| Heater switch not lit. | Machine not plugged in. | Plug machine into 120 VAC outlets. |
| | Blown fuse. | Replace with a 15-amp fuse. |
| Rollers do not turn. | Motor speed set at zero. | Increase motor speed. |
| | Gear belt loose. | Tighten gear belt. (SEE BELOW - A) |
| Air hose leaks. | Loose connection. | Repair connection. (SEE BELOW - B) |
| Pressure roller will not lower. | Safety trip wire sticking. | Adjust safety trip wire. (SEE BELOW - C) |
| No air pressure. | Airline not connected. | Connect machine to compressed air line. |