

**READ ALL PRECAUTIONS & INSTRUCTIONS CAREFULLY  
BEFORE OPERATING LAMINATOR**

Setup  
Instruction  
Operation  
Lamination  
Maintenance

# **Digital 42/60 Laminator**

**Model Number D-423/D-603**

## **Operation Manual**

# **SAFETY PRECAUTION**

**DO NOT OPERATE THIS MACHINE UNTIL YOU HAVE READ AND FULLY UNDERSTOOD THE FOLLOWING SAFETY PRECAUTIONS.**

1. Never operate this machine without reminding yourself that a big laminator is a powerful and potentially dangerous tool. If misused, used carelessly, or used without observing the rules of safe operation, very serious injury can result.
2. Never operate this machine without all guards, housings, safety shields, stop switches or other safety devices in place and fully operational.
3. Never operate this machine unless you have been fully trained and have received and understood all operating instructions. Make sure you know how the machine works and how it is controlled.
4. Never operate this machine if it is not working properly or if you notice any abnormality in its performance.
5. Never tamper with, rewire, or bypass any control or safety device on this machine.
6. Always keep all parts of your body clear of the laminating rollers, pull rollers, and heated surfaces of the laminator when the power is on.
7. Remember that even after the machine has been turned off for some time, the laminator's heated parts, and adjoining parts, can remain hot enough to burn you.
8. Never attempt to clean the heated areas, laminating rollers, or pull rollers while the power is on.
9. Never remove the machine housing or attempt any kind of maintenance without disconnecting power to the unit.
10. Always be sure all persons are clear of the machine before advancing or reversing the pressure rollers, especially when multiple operators or observers are present.
11. Never wear loose clothing, ties, jewelry or any item, which could be caught in the rollers or machinery when operating the machine. Operators with long hair must put their hair up before running the machine.
12. Always keep your hands clear of any slitter mechanism or blade except when the power is off and you intend to adjust the mechanism or change a blade.
13. Because casters raise the center of gravity and the increase risk of tipping, use casters only when the machine needs to be moved. Use a minimum of two people. Move slowly, and avoid any obstructions. Remove the casters when the machine is in its proper position.

**NOTICE TO EMPLOYER: A copy of these safety precautions must be given to all operators, set-up personnel, maintenance people, and supervisors of this machine. A copy should also be hung on the machine readily accessible and visible to the operator. Additional copies are available upon request.**

**IMPORTANT: Where a language barrier or insufficient schooling would prevent a person from reading and understanding these safety precautions, you should either translate this information or have it read or interpreted to the person, and get assurance that it is understood.**

**IMPORTANT:** Remember that you cannot use heat lamination on thermal paper, such as typical fax paper, because it is activated by heat and will turn black. Be careful about laminating anything that will be affected by heat. For example, the colors in crayon drawings may run together or be smeared, especially if the crayon layer is heavy. Light crayon drawings may not be affected, but test an expendable sample of any item that may not laminate well.

Remove paper clips and staples because they can damage the rubber rollers.

Do not laminate one-of-a-kind documents unless you are sure of your laminating skills and can afford to damage or ruin the document.

Do not laminate valuable items such as stamps, baseball cards, autographs, or other collectibles because the value of such items can be destroyed by lamination. Collectors generally value these items only in their original state.

*IMPORTANT: Éviter de plastifier du papier thermosensible, comme le papier de télécopieur, puisqu'il noircira sous l'effet de la chaleur, et enlever les trombones et les agrafes qui risquent d'endommager les rouleaux de caoutchouc. Prendre certaines précautions avant de plastifier des articles susceptibles de réagir à la chaleur comme les dessins au pastel dont les couleurs baver et se mélanger, surtout si la couche de pastel est épaisse. Les pastels en couche mince peuvent ne pas réagir, mais, en cas de doute, il est préférable de faire un essai avec un échantillon perdu.*

*Ne pas plastifier les documents importants dont il n'existe qu'un seul exemplaire, à moins de bien maîtriser la technique de plastification.*

*Ne pas plastifier non plus les articles de collection comme les timbres, les cartes de baseball, les autographes ou autres, qui peuvent perdre leur valeur pour les collectionneurs s'ils ne sont plus dans leur état d'origine.*

*IMPORTANTE: Recuerde que no puede laminar papel térmico, tal como el papel de fax típico, ya que es activado por el calor y se tornará negro. Retire también cualquier sujeta-papeles o grapa, puesto que pueden danar los rodillos de goma. Evite laminar cosas sensibles al calor, por ejemplo, los colores de dibujos hechos en lápiz de pastel pueden no ser afectados, pero ensaye con alguna muestra descartable, en los ítemes que podrían no laminarse bien.*

*No lamine ningún documento único, a no ser que esté muy seguro de sus habilidades de laminador y pueda permitirse arruinar el documento.*

*No lamine artículos de valor, como estampillas, tarjetas de béisbol, autógrafos, u otros coleccionables, ya que su valor puede ser destruido por la laminación. En general, las coleccionistas valoran este tipo de artículo en su estado original.*

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## 1-0 INTRODUCTION

The Digital laminator is designed to provide quality lamination of a wide range of papers and materials up to 1/2-inch thick using film up to ten mil thick. Common applications include, but are not limited to maps, digital imaging, packaging, posters, instructional aids, signs, presentation materials, photographs, copies (B&W or color), prints, flyers, promotional sheets and many other items.

Options include a release liner take-up, a roll feed, and a *ThermoGlide™* assembly (42" only). A slitter assembly, which is also optional, must be factory installed. The stand and casters are standard on the both the Digital 42 & 60.

To assure the best performance from your new laminator, please follow the safety, installation, operation, and maintenance instructions in this manual. Read the manual before using the laminator, keep the manual with the machine, and periodically review the instructions. The manual also contains warranty and parts information.

We take this opportunity to thank you for selecting the Digital laminator and to assure you of our commitment to your satisfaction with our products.

As you unpack your new laminator, please complete the following information. Always have this information ready when calling.

Dealer Where Purchased \_\_\_\_\_

Installation Date \_\_\_\_\_ Serial # \_\_\_\_\_

**WARNING:** High temperatures are present and care should be exercised in operating the laminator.

**MISE EN GARDE:** *La machine à plastifier produit beaucoup de chaleur et on doit l'utiliser avec prudence.*

**ADVERTENCIA:** *El plastificador produce temperaturas muy altas; tenga cuidado al utilizarlo.*

**WARNING:** The laminator should not be operated without the plexiglass safety shield.

**MISE EN GARDE:** *Ne pas utiliser la machine à plastifier sans son écran protecteur en plexiglass.*

**ADVERTENCIA:** *No utilice el plastificado sin tener el protector de plexiglass en su lugar.*

Ledco, Inc.

4265 North Main Street  
Hemlock, NY 14466







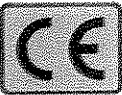

Fax: 585-367-2978  
Phone: 585-367-2392

Web: [ledcoinc.com](http://ledcoinc.com)  
E-mail: [ledco@ledcoinc.com](mailto:ledco@ledcoinc.com)

# 1-1 SAFETY SYMBOLS

## Glossary Of Symbols

## Part #

- |    |   |   |        |
|----|---|---|--------|
| 1. |    | Hand Crush/Force from Above               | Lab35  |
| 2. |    | General Danger                            | Lab52  |
| 3. |    | Arm Entanglement                          | Lab51  |
| 4. |   | Cutting of Fingers or Hand/Straight Blade | Lab54  |
| 5. |  | Hand Entanglement/Chain Drive             | Lab36  |
| 6. |  | International/Hot Warning                 | Lab100 |
| 7. |  | Electrical Hazard                         | Lab 43 |
| 8. |  | CE European Electrical                    | Lab06  |
| 9. |  | International Ground                      | Lab79  |

## 1-2 FEATURES & BENEFITS

Your new laminator has several standard features that set it apart from other models.

- **Variable speed.** The laminator operates at any speed up to 25 feet per minute. Thicker films are generally applied better at mid-range to lower speeds, while 1.5 mil films should be applied at mid-range to higher speeds.
- **Ease of cleaning.** The silicone rubber rollers and the teflon-coated heat shoes of the laminator should be cleaned regularly. The heat shoes on the Digital laminator swing away in seconds, making it far easier to clean the laminating rollers and the heat shoes.
- **Attached safety shield.** The polycarbonate shield is clear so operators can see their work. It does not conduct heat so they'll be protected from hot areas. It is fixed to the feed tray and the machine will not run if the feed tray and safety shield is not in place.
- **Lamination pressure.** The rubber rollers are spring-loaded and preset to ensure correct and even lamination pressure. The pressure is easy to adjust if required when performing routine maintenance.
- **Feed tray pressure strip. (Heat Shoe Model Only)** This strip on the front of the feed tray holds images flat as they go into the laminator, making it easier to handle the lightweight papers sometimes used in digital imaging.
- **Supply roll tension controls.** Supply roll tension is easy to adjust by simply tightening or loosening the tension control knobs on the supply roll mandrels.
- **Ease of maintenance.** The Digital laminator is made to last. However, some items on a laminator do wear out. Even the high-quality silicone rubber used in the rollers will lose flexibility over time. Extensive use may wear out the rollers, or an operator may cut a roller by accident. Rollers and other key parts can be changed quickly without disassembling the frame.
- **Reverse.** The reverse switch can be invaluable to help avoid problems or clear misfeeds.
- **Right and left adjustable feed guides.**
- **Silicone rubber laminating rollers.** The rollers are flexible enough to provide a good edge seal and firm enough to offer a good surface seal. A high silicone content insures a much longer average roller life.
- **Very strong steel cores.** These prevent roller flexing and insure uniform pressure across the width of the laminate, giving you the best quality lamination available in a medium-duty commercial machine.

- **Controls to open and close the laminating rollers.** The controls make threading easier and allow even heating of laminating rollers during warm-up.
- **100% Made in the U.S.A.**

## 1-3 OPTIONS

- **Roll feed tray** When laminating a very long item such as a banner, it is just about impossible to feed it in perfectly straight by hand. By rolling it up on an empty laminating film roll core and putting that core on the roll feed assembly, laminating the longest item becomes relatively easy. The roll feed assembly is especially helpful for the owners of poster printers, plotters, banner makers, and other digital output devices.
- **Slitter assembly** Retractable slitters save an enormous amount of cutting time by trimming away side scrap during the lamination process. The two heads can be adjusted independently with great precision, even while the laminator is running. (Must be factory installed).
- **Release liner takeover** Many cold laminating films and other materials with pressure-sensitive adhesives have release liners that must be removed just prior to applying to a graphic or substrate. This option is motor-driven and controlled with a clutch to automate the release liner removal.
- ***ThermoGlide*™** replaces the standard heat shoe with a series of heated idlers for quieter, frictionless movement of the film into the laminating rollers. (Available on the 42" laminator only).

*ThermoGlide* is a trademark of Graphic Laminating, Inc., and Ledco, Inc.



## 1-4 SPECIFICATIONS

	42	60
Max laminating width	42"	60"
Speed	0-30FPM	0-20FPM
Laminating roller diameter	3"	3"
Supply roll core size	3"	3"
Recommended film	up to 10 mil	up to 10mil
Max laminating thickness	1/2"	1/2"
Max film roll diameter	10"	10"
Dimensions	53L26H34W	71L39H43W
Shipping Dimensions	71L39H43W	91L39H43W
Weight/shipping weight	500/800lbs	880/1200lbs
Motor	1/4 HP D/C	1/4 HP D/C

### Standard heat shoe machine:

Electrical (single-phase)	208-240V 50/60 Hz 30 amps	208-240V 50/60 Hz 40 amps
Electrical 3 Phase	208-240V 13 amps	208-240V 18 amps
Electrical connector	NEMA L6-30P	NEMA L6-50P
Heater	5200 watts	7400 watts

### 42" ThermoGlide machine:

Electrical (single-phase)	208-240V 40 amps 50/60 Hz
Electrical connector	NEMA L6-50P
Heater	7800 watts

## 1-5 PRINCIPLES OF OPERATION

The Digital laminators operate by pulling film with a thermally activated adhesive over a heat source and into a set of laminating rollers. Film from the supply rolls passes over heat shoes to activate a polyethylene adhesive layer on the film. It then passes through rubber rollers to apply pressure and bond the film to the item being laminated. The adhesive is pressed into the ink and fibers on the surface of the paper.

The strength of the lamination bond can be checked by cutting a large "X" on the surface of a laminated sample with a sharp blade. Use the tip of the blade to pry up one corner of the "X". Grab that corner and pull up the film. Ink and/or paper fibers coming up with the layer of film indicates a good adhesive bond.

If the film comes up too easily, with no ink or paper, the lamination was probably done at too low a temperature. Check the instructions that may have come with your laminating film and/or the lamination temperature chart in section 5-5.

Please note that when doing an X-test on glossy (coated) paper, a good X-test will pull up ink only. The film should not come up easily. When laminating material that is not glossy (uncoated), the paper is often more fibrous and a good X-test will yield ink and paper fibers coming up with the film.

## 1-6 LAMINATING FILM

Most thermal laminating film consists of two layers: a base of polyester and an adhesive layer of polyethylene. The polyester layer forms the harder outer surface of the film and does not melt at laminating temperature. It provides rigidity and protection for your laminated items. The greater the polyester content, the higher the level of protection, rigidity and luster. The polyethylene layer melts at laminating temperature and bonds the film onto the subject material under the pressure of the laminating rollers. As an X-test demonstrates, the adhesive is pressed into the paper and fills irregularities in the surface.

The proportion of polyester and polyethylene in a film is usually described with numbers. For example, a "1-2" film consists of one mil of polyester and two mils of polyethylene. The first number refers to the base layer. The second number refers to the adhesive layer. A mil is 1/1000 of an inch.

Since polyester is the more costly of the two types of plastic generally used in laminating film, a "3-2" film will cost more than a "2-3" film. Both are 5-mil films but the "3-2" version will seem a little thicker on a piece of laminated material because it will be slightly stiffer. Thermal laminating films are available in many different base/adhesive combinations. Five mil film, for example, can be found in 1-4, 2-3, 3-2 and 4-1 combinations.

In the US laminating trade, the generally accepted practice is to describe two-sided lamination, or encapsulation, by the thickness of one layer of film. For example, "3-mil lamination" should refer to lamination with two layers of 3-mil film. If you are buying or selling laminating film or lamination services, please make sure both parties understand the film descriptions being used. There is a huge variety of thermal laminating films available to suit many different kinds of application. Here are some of the more commonly used "special" film types or film additives:

- film with low-melt adhesives, also known as co-polymer films; these often have better clarity and are less likely to curl or ripple
- matte films to eliminate glare or to accept printing or writing; many suppliers offer films with both glossy and matte finishes
- film with UV inhibitors to protect colors in the laminated material from fading in sunlight
- thermal film that has a pressure-sensitive adhesive and a release liner on its outer side; for example, a poster with this material laminated on the back could easily be mounted without fasteners or tape
- "liner films" with a protective liner on the top outer surface...after a piece of material has been laminated, trimmed, packed, and shipped, the person using the material can remove the protective liner revealing a surface perfectly free of dust, scratches or abrasion

- opaque or colored films for the back side of a lamination; these can form a border for a laminated piece
- iridescent clear films for special visual effects
- permanently waterproof films for outdoor, underwater, or special applications; the most common thermal laminating films are made with water-based primers and will eventually de-laminate if continually exposed to water or weather; truly waterproof films are made with special primers

Rolls of film may be purchased in different widths. The size of the laminator is the only limitation to the width of the film rolls you can use. Make sure the upper and lower roll widths are the same, and are aligned with each other.

When installing film, always center the rolls of film on the supply roll mandrels.

Because it does not hold heat well, 1.5 mil film can be the most difficult gauge of film to use. A standard 1.5 mil film will run at about 310 °F, while a 3 mil film with the same adhesive type will run at 280 °F. Even when applied at 310 °F, the 1.5 mil film will not adhere as consistently as the 3 mil film applied at 280°F, or a 5 mil applied at 250°F. For many applications, 5 mil film does a much better job of protecting and enhancing items.

Ten mil film is suggested for those applications that need the most protection and rigidity. Seven mil films are also available.

Rolls of film are sometimes spliced. Most film suppliers will mark a splice with colored tape. This way, you can see the splice as a “dash” of color on either end of the roll. If you spot a spliced roll in advance, you can put it on the top supply roll mandrel in order to see the splice coming more easily and avoid putting material under the splice. Or you could put it on the bottom roll if you plan to be laminating items that will never be seen from the back side.

## 1-7 WARRANTY

This laminator is guaranteed against defects in material and workmanship for a period of two years after date of shipment. Defective parts will be replaced without cost within the warranty period, provided the laminator has not been abused, altered or operated contrary to instructions. Ledco, Inc. shall not be liable for any alternations or repairs except those made with its written consent.

This obligation under warranty shall not extend to the following:

- The adjustment or replacement of parts which are the normal responsibility of the owner. For example, rubber rollers, heat shoe coatings, scratched or chipped paint, loose fasteners (screws, nuts, etc.), or other items that show wear under normal use; i.e. "normal wear parts."
- Normal operating adjustments to heat, speed, tension, etc.
- Parts that are not manufactured by Ledco, Inc.. If the individual manufacturer warrants these items, their warranty is, in turn, passed on to the original purchaser of the laminator. Ledco, Inc. does not incur any obligation or liability as a result of the warranties, which are the sole responsibility of the appropriate individual manufacturer.

Any laminator that proves defective during the warranty period may be returned to Ledco, Inc. unless it is decided that the necessary repairs can be made during a service call. Notice of the defect should be submitted in writing or by phone to Ledco before any steps are taken to repair or return the machine. Phone: 585-367-2392 Fax: 585-367-2978

If the machine is returned, the following should accompany it.

- Customer name, address and phone number
- Written particulars regarding the malfunction
- Date of installation
- Serial number of the machine.

<p><b>K RETURNS MUST HAVE A RETURN AUTHORIZATION NUMBER ON THE OUTSIDE OF THE SHIPPING CONTAINER.</b></p>
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Send all returned equipment freight **PREPAID** to:  
Ledco, Inc., 4265 North Main Street, Hemlock, NY 14466

If your machine needs servicing after the warranty has expired, please contact your dealer. Ledco, Inc. does offer technical support if your dealer is unable to assist.

This warranty is expressly in lieu of all other warranties expressed or implied. This includes the warranties of Merchantability and Fitness For Use and of all other obligation or liabilities of Ledco, Inc.. Ledco neither assumes nor authorizes any other person to assume it for any other obligation or liability in connection with the sale of this laminator except as provided for above.

Further, this warranty will not apply to any machine or part thereof which has been damaged as a result of an accident or as a result of the abuse, misuse, or neglect of the machine. The warranty is also void if the laminator has been altered or repaired by any other than an authorized repair facility or dealer. If you have any questions about this warranty, contact:

Ledco: Phone: 585-367-2392 Fax: 585-367-2978

## 2-1 UNPACKING AND INVENTORY

The laminator arrives fully assembled, except that some parts such as feed trays and fan assemblies may be packed off the machine to avoid shipping damage. Upon arrival, inspect the unit immediately and thoroughly using the packing list that accompanies the shipment. Please follow these steps to correct any problem with your shipment. Ledco, Inc. cannot accept any responsibility for damage or loss unless you notify us within ten days of receipt of shipment and follow these procedures:

**BREAKAGE OR DAMAGE:** It is imperative that any shipping damage is reported and a claim is filed with the delivering carrier immediately upon receipt of damaged shipment. The procedure for reporting damage depends on the method of shipment. Please note damage on bill of lading.

**FREIGHT, EXPRESS, or TRUCK DELIVERY:** According to the contract terms and conditions of the carrier, the responsibility of the shipper ends at the time and place of shipment. The carrier then assumes full responsibility for the shipment.

1. Notify Ledco **IMMEDIATELY**.
2. Hold damaged goods with container and packing for inspection by the examining agent. Ledco will arrange the inspection.
3. **DO NOT RETURN ANY GOODS TO LEDCO PRIOR TO AUTHORIZATION BY LEDCO.**
4. Submit a copy of the inspector's report to Ledco. Ledco will file the claim with the carrier. Ledco will replace your machinery if necessary. You will be credited for the damaged machinery when the claim is processed.

### **SHORTAGE:**

1. Check the packing list notations. The apparent shortage may have been marked as an intentional short-shipped (back-ordered) item.
2. Reinspect the container and packing material, particularly for smaller items.
3. Make certain that unauthorized personnel prior to complete unpacking did not remove the item and inventory.
4. Call us and send immediate written notification of the shortage.

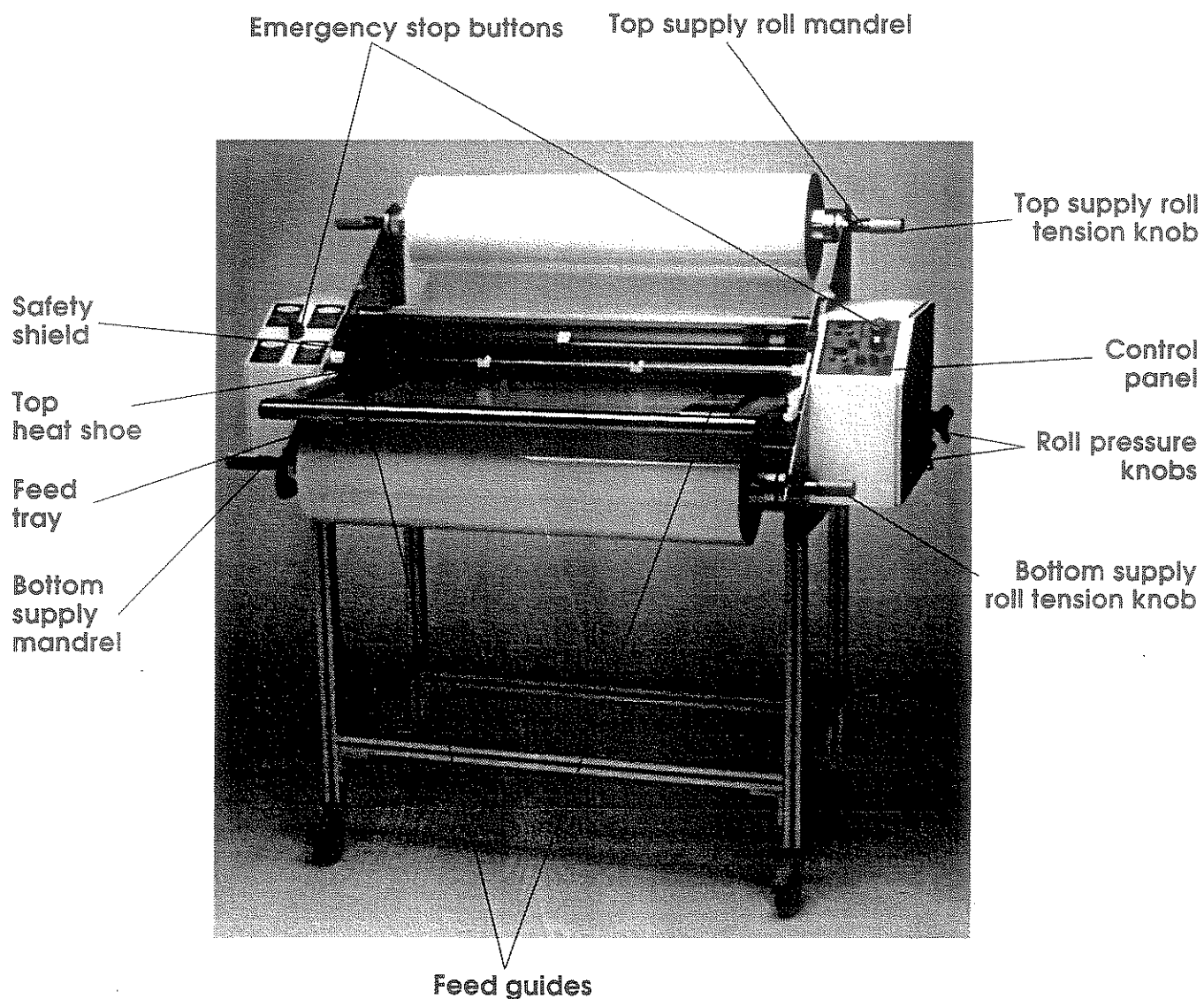
### **INCORRECT SHIPMENT:**

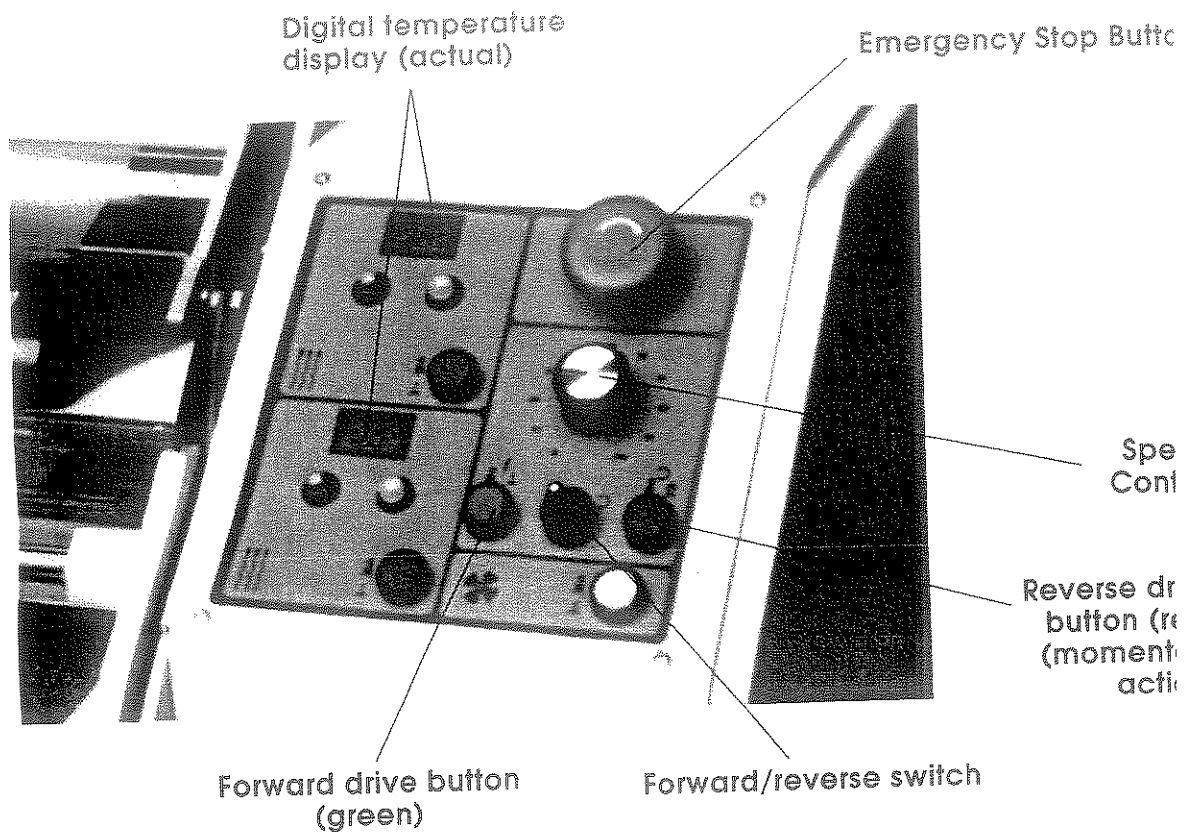
1. If the material you receive does not correspond with your order, notify Ledco immediately. Include the order number and item(s).
2. Hold item(s) until return instructions are received.

**RETURNS: DO NOT RETURN DAMAGED OR INCORRECT ITEMS UNTIL YOU HAVE RECEIVED SHIPPING INSTRUCTIONS AND AN AUTHORIZATION NUMBER FROM LEDCO.**

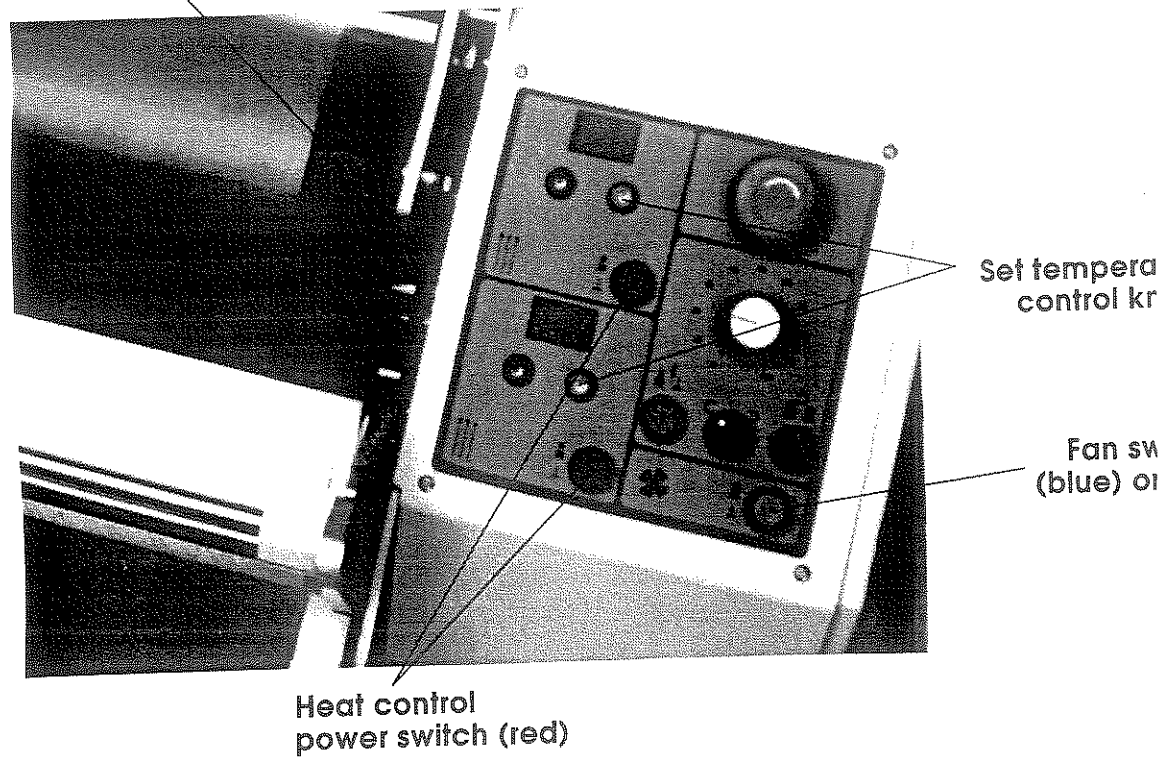
### 3-1 PRODUCT ILLUSTRATIONS & NAMES OF PARTS

The photos below and on the following pages identify major components and operating controls. Refer to them as you study the installation, operating and maintenance procedures described in this manual.

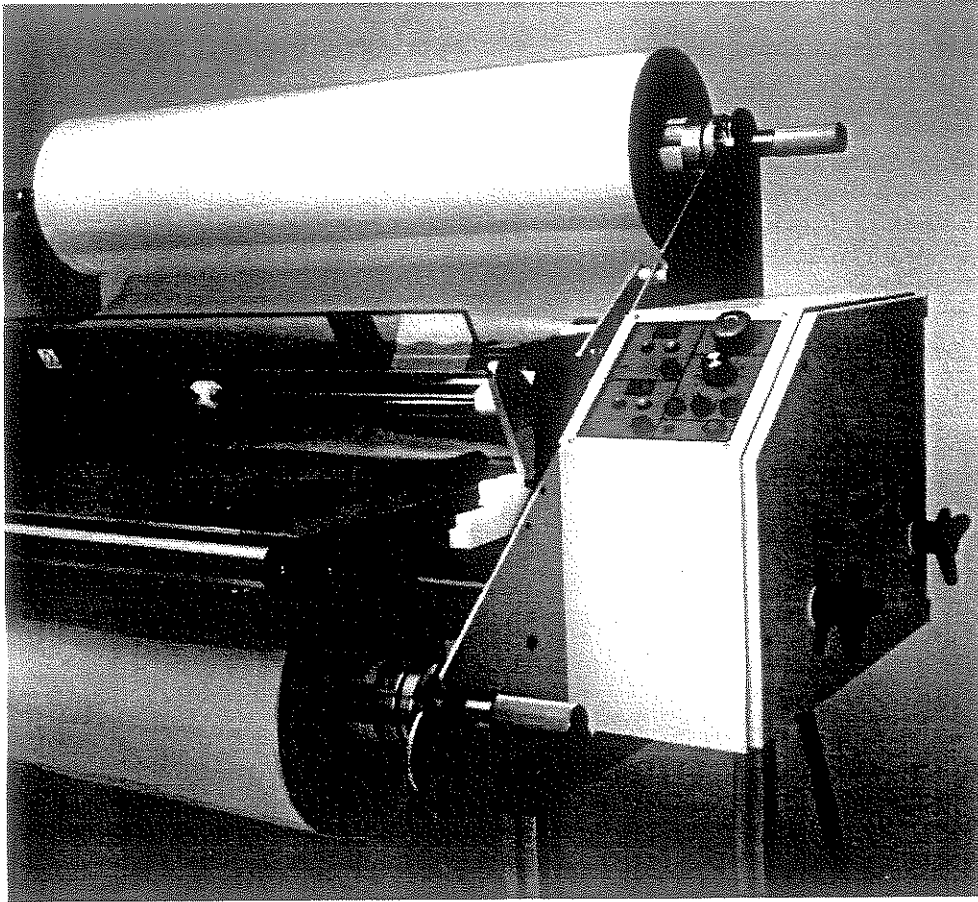




Standard heat shoe





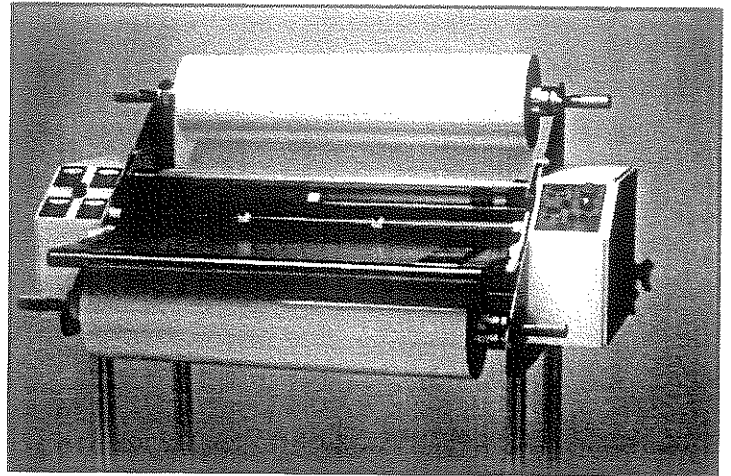


**Side panel must be closed and screwed shut for machine to operate**

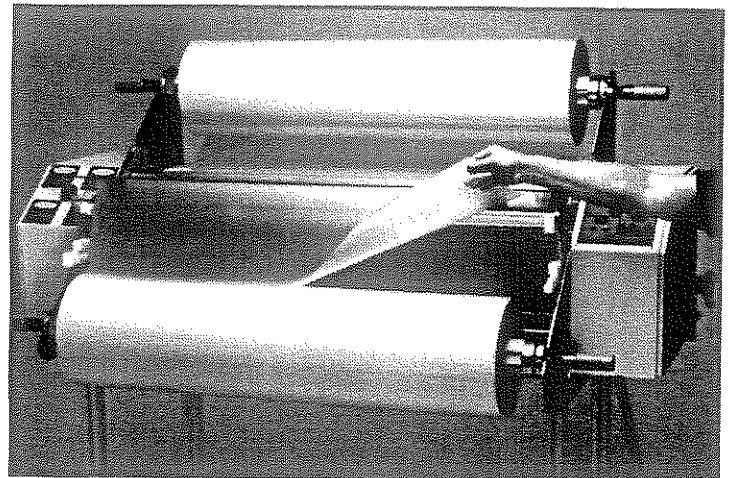
## 5-2 Threading the Laminator

1. Although this machine can be threaded cold, most operators feel it's easier to thread while it is warming up or already hot. Remove the supply roll mandrels and the feed tray. The supply roll mandrels are now ready to be loaded with film.

(There are four 3" diameter stop collars included with the machine. These components are designed to help you conveniently align your top and bottom rolls of film, and can be used to hold your film rolls in place if necessary.)



2. Slide a roll of film onto the top supply roll mandrel. Center the roll on the mandrel and place the mandrel in the top bracket. This is a job best done with two people, even if the roll of film is not very heavy. With a person holding each end of the mandrel, it is easy to put both hexagonal fittings into their respective brackets. Make sure they are both fully seated. Attempting to load the film on the laminator by yourself may result in a back strain or other injury.



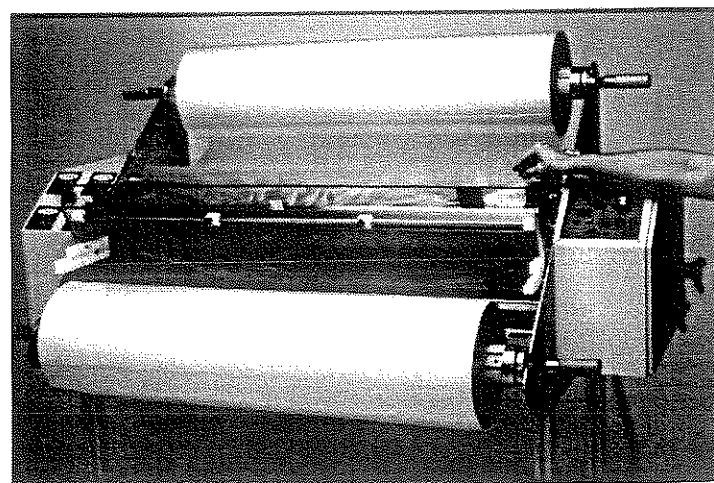
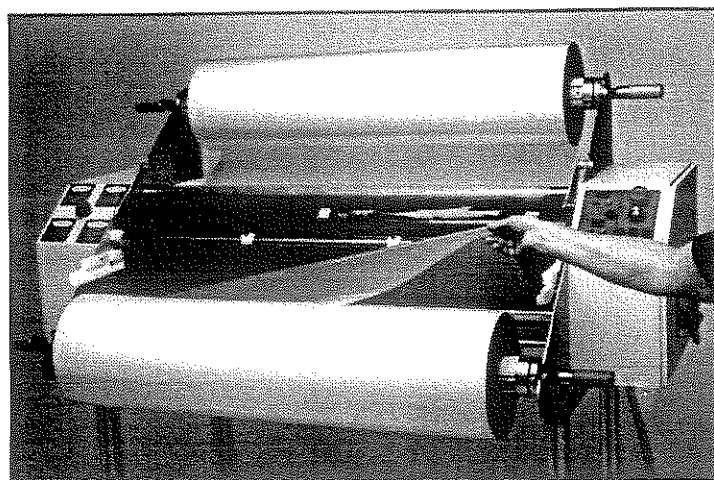
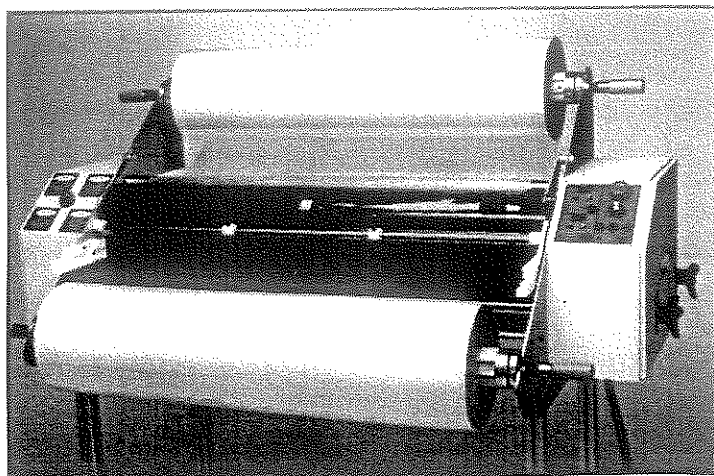
**Make sure the dull side of the film is facing up and the shiny side is facing the heat shoes during the threading.**

3. Review the threading diagram one page over. **Remember, the shiny side of the film must always go against the shoe. The dull (adhesive) side must face away from the shoe.**

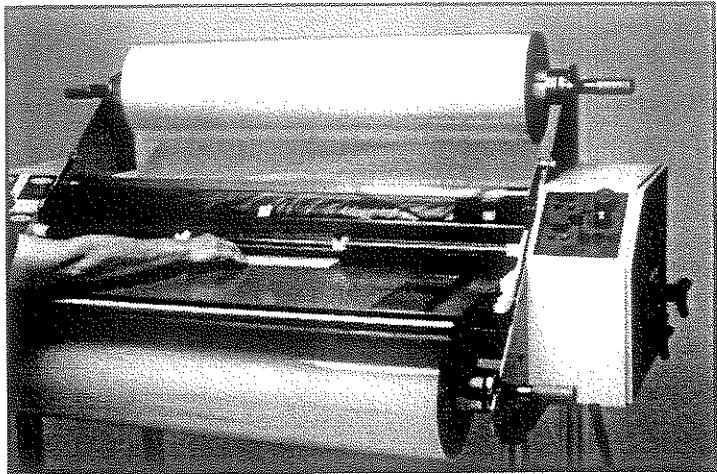
With the top roll of film centered on the mandrel and the shiny side facing down, pass the film under the lower idler, over the top idler, and then drape it over the top heat shoe. You are now ready to load the bottom supply roll mandrel.

4. Load the bottom roll of film onto the mandrel in the same manner as the top roll. **Remember, the shiny side of the film must always go against the shoe. The dull (adhesive) side must face away from the shoe.** Make sure the two rolls are aligned with each other before going to the next step. Pass the web under the idler bar near the bottom heat shoe. Use extreme care if the heat shoe is already heated up. Pull the bottom web up and drape it over the top web. When the machine is hot, the two webs will stick to each other. If threading while cold, use tape to hold the bottom web in place.

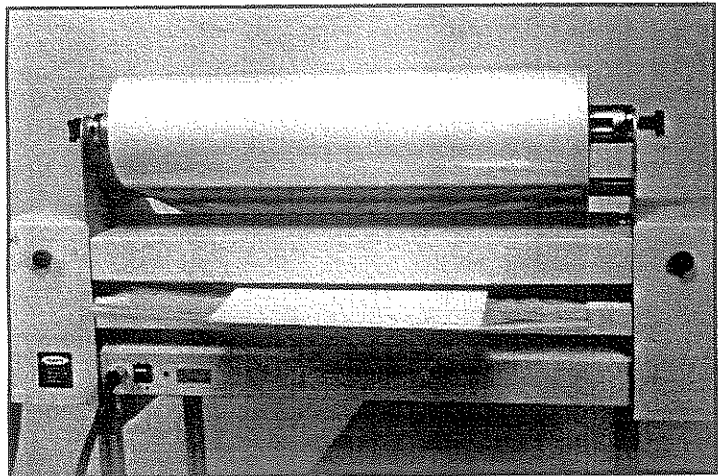
5. With both rolls threaded and installed in their respective brackets, unwind the top and bottom supply rolls about a half-turn each. This will provide enough slack in the web to allow the feed tray to slide on easily.



6. Slide the feed tray into position. Position the safety shield forward toward the heat shoe. Remember the drive will NOT engage without the feed table and the safety shield in their proper positions.



7. Make sure there is still enough slack in the web. Close the laminating rollers with the two large knobs on the right side of the unit. With the film draped over the two heat shoes, and melted or taped together, push one edge of the threading card between the heat shoes so that the film is firmly positioned against the laminating rollers. Make sure the rubber rollers are in the closed position. If a threading card is not available, any piece of card stock or poster board will work.



8. Push the forward drive switch. If the film and the card are in the nip (the point where the laminating rollers meet) the film and the threading card will start into the laminator and will pass through both sets of rubber rollers. When the threading card has cleared the back of the machine, press the STOP switch.

**CAUTION:** The laminator is designed to be run with the operator directly facing the control panel and feed tray, not at an angle or from the side of the machine.

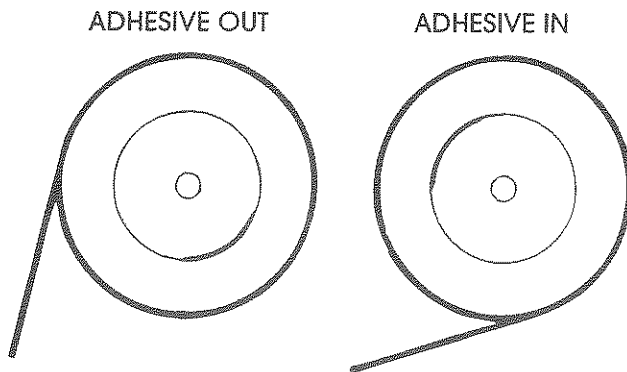
For operator safety, the safety shield must be in position over the upper heat shoe when the machine is ON, or when the drive switch is in the forward position.

## 5-3 Film Threading Diagram

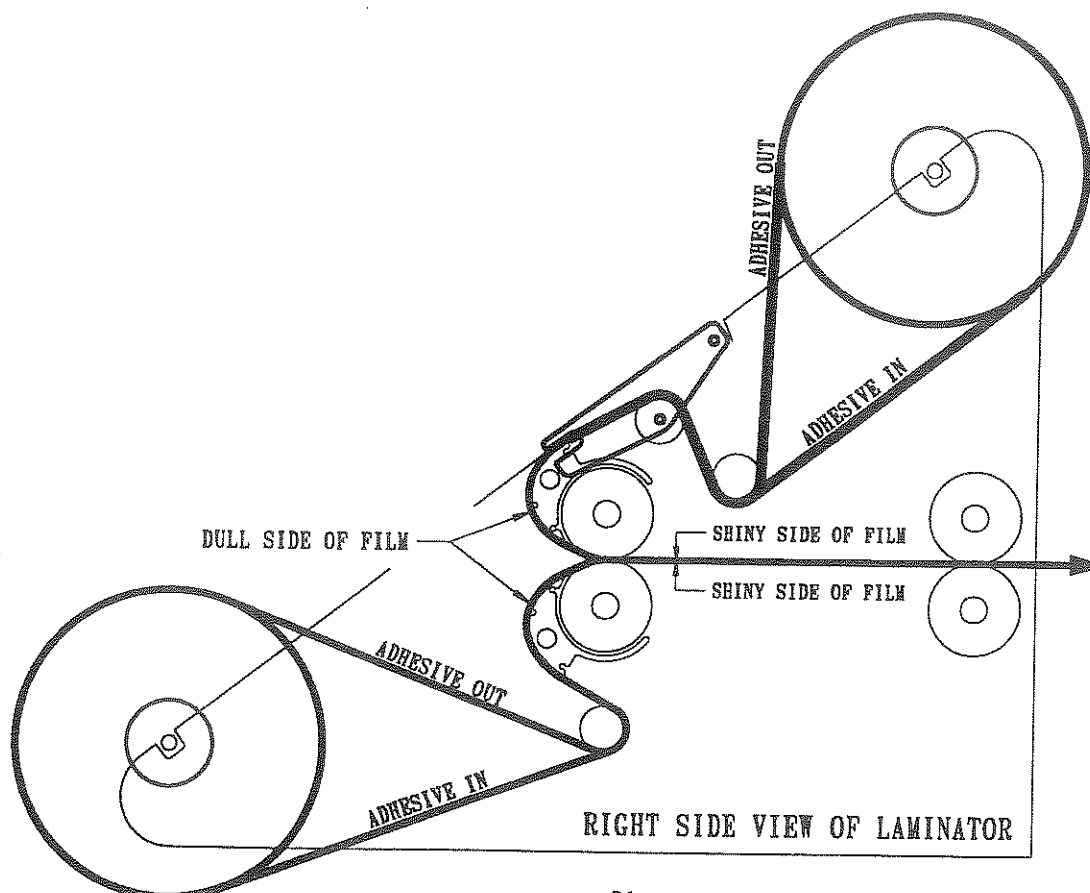
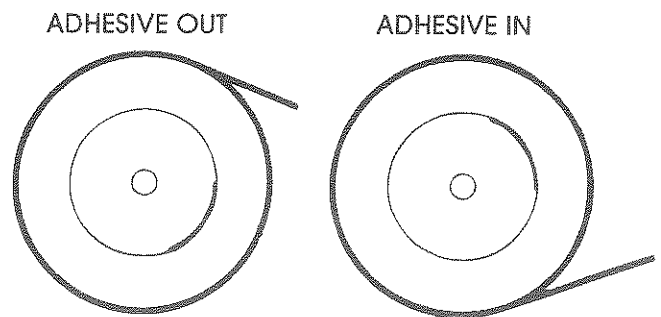
For easy loading and threading of the laminator, please follow these two steps:

1. Place the film on the supply roll mandrel as shown in the drawings below and to the right. The position of the supply roll tension knob may vary.
2. Place the loaded supply roll mandrel on the machine as shown in the picture. The polyester side (usually the shiny side) of the film must go against the heat shoe. The polyethylene side (the dull side) of the film must face the operator.

RIGHT SIDE VIEW OF  
TOP SUPPLY ROLL



RIGHT SIDE VIEW OF  
BOTTOM SUPPLY ROLL



## 5-4 LAMINATING

1. If the machine is not already on and warmed up, first make sure the power cord is plugged in. Turn on the machine and set the temperature for whatever film is being used.
2. The laminator will be ready to operate in about 20 minutes.

**WARNING:** Never permit the temperature to exceed 310° Fahrenheit while film is threaded and the laminator is not running. The film could disintegrate and require cleaning and rethreading of the machine. When it is necessary to laminate at temperatures in excess of 310° – such as for poster board when using 1.5 mil film – pull some excess film off the film supply rolls to provide slack so the film is not tight against the heat shoes while the machine is heating. This will keep the film from melting when the laminator is not advancing film.



3. The laminating rollers can be kept hot when the laminator is not in production by opening both sets of rollers. Put the drive direction switch in forward and turn on the speed control to the minimum position. This allows the laminating rollers to turn and get evenly heated while the machine is warming up. Evenly heated rollers contribute to the quality of the lamination because this eliminates the chance for imperfections in the finished lamination caused by “cold spots” on the laminating rollers.
4. Position the feed guides if needed for precision feeding. You will get the best results by centering items in the web of film.
5. Check and balance the supply roll tension on both rolls. Start by loosening both knobs until there is no pressure on the springs. Tighten each knob until it just begins to press on its spring. For a preliminary adjustment, put three or four turns of tension on each knob.
6. Turn the fans on using the rotary switch located next to the master power switch on the back of the machine. Fans should be utilized when laminating with films 3, 5 mil or thicker.
7. Once the machine has come up to temperature, you are ready to make final adjustments of the supply roll tension. With the heat ON, the rollers CLOSED, push the FORWARD button.

Watch the film as it passes over the heat shoes. If there is some waviness in the film at the leading edge of both shoes, supply roll tension is perfect. The leading edge would be the top of the top shoe and the bottom of the bottom shoe, the edges that first contact the film. If there is no waviness in the film at all, there is



too much supply roll tension. Loosen both knobs a small amount and check again.

If the waviness or wrinkling extends into the laminating rollers, tension needs to be increased. Always keep the amount of tension the same on both rolls. Waviness that extends across 10 to 30 percent of the shoes indicates acceptable supply roll tension.

8. When starting the machine to begin lamination, let at least 10 inches of film go through the rollers before inserting the items to be laminated. This takes out slack in the film and removes the cooler strip of film that forms just in front of the nip when the laminator is not but film is not being advanced. This also removes any areas of film with excess adhesive that may have pooled just beneath the shoes.

Examine the film coming out the back of the machine. If bubbles or wrinkles appear in the film, this means there is not enough tension to draw the film tight and smooth over the heat shoes. Turn the tension control knobs clockwise to increase the tension.

If the film is stretching, and gets narrower as it goes across the shoes, supply roll tension is much too high, and the temperature setting may also be too high for that film.

Film that is 1.5-mil thickness requires very little tension.

REMEMBER TO TURN BOTH THE TOP AND BOTTOM TENSION CONTROL KNOBS THE SAME AMOUNT TO KEEP TENSION THE SAME ON TOP AND BOTTOM ROLLS. If the film curls up or down after it leaves the machine, read the above section on supply roll tension again and readjust the supply roll tension on both rolls.

If the tension appears balanced, but you notice waves or ripples toward the center of the web of film as it comes out the back, the temperature may be too high or the lamination speed may be too fast for that film. These waves in the film are called "heat wrinkles". These heat wrinkles are formed when the film has not cooled enough before coming out the back of the machine. For the best results, the film should be cooled below melt temperature while it is pulled tight and perfectly flat between the laminating rollers and the pull rollers. If it gets out the back of the machine while still at or above melt temperature, heat wrinkles can form. The major reason for fans on a laminator is to cool the film, not to cool the machine.

9. A unique feature of the laminator is the provision for driving both top and bottom pull rollers and laminating rollers. This feature provides an even distribution of heat on a continuous basis to the laminating rollers prior to startup, or when laminating production is temporarily halted.

10. The laminator is designed to operate with the operator directly facing the control panels and feed tray assembly.

## 5-5 RECOMMENDED TEMPERATURE SETTINGS

Your first source of information about recommended film application temperatures and operating characteristics should be your film suppliers. If you do not know the source of your film, or if the supplier cannot provide the information, please use the following table as a guide.

**FILM MELT TEMPERATURE CHART (ALL FAHRENHEIT)**

FILM TYPE	FILM THICKNESS		
	1.5-1.8-mil	3 mil	5-10 mil
<b>Monopolymer</b>	310°-320°	280°-290°	270°-280°
<b>Low-temp (copolymer)</b>	300°-310°	220°-270°	220°-260°
<b>Ultra-low temperature</b>	230°-280°	180°-270°	180°-260°

Several important notes about this chart:

1. Your film vendor must have the primary responsibility for providing information about the film that you are using.
2. This chart is to serve as a general guide when better data is not available.
3. If your film vendor cannot provide this and other information about the film you are using, it may be difficult to achieve good results.
4. When laminating heavy posters or other thick items with 1.5 to 1.8 mil films, some additional heat may be required to get a permanent bond. Never exceed 340 degrees.
5. While offset printed materials may be laminated at the lower ends of the above ranges, inkjet and other output from digital printers may require the upper end of the range in order to get a good bond.
6. See 1-6 LAMINATING FILM for more information.



### Cooling Fans:

The cooling fans are used during lamination with 3-mil, 5-mil, 7-mil, and 10-mil film. The fans cool the plastic as it leaves the laminating rollers and before it enters the pull rollers. As mentioned earlier, the fans prevent heat wrinkling and help insure lamination that is smooth and flat. The pull rollers on a laminator turn a little faster than the laminating rollers, insuring that the film is perfectly flat while it is being cooled.

**NOTE:** It is possible that variances from recommended temperature settings may be necessary due to material thickness, ambient temperature, humidity or the quality or thickness of the material being laminated.

Please note the wide range of temperatures listed, especially for heavier films. This does not mean any film that thick can be run anywhere within the given range. There are "standard" or high-temperature and "low-melt" or low-temperature versions of all film thickness. Some low-melt films work at lower temperatures than others do. It is important you buy your film from a vendor who can tell you the following additional information about any film you choose:

- the thickness
- the clarity
- suggested melt-temperature range
- polyester/polyethylene content
- how well the adhesive will stick to the kinds of images you'll be protecting and enhancing

Temperatures may exceed 310° when laminating poster board or other thick items with 1.5 mil film on a continuous basis, but when the machine is stopped, turn the heat off if the setting is in excess of 310°. **Never set the heat above 350° with film in the laminator. Temperatures over 300° are not needed except with 1.5 mil film. Film that is 3 mil or thicker is generally run at 280° or less.**

## 6-4 Simultaneous Laminating and Mounting

There are several different ways to simultaneously mount and laminate. The one preferred by most experienced users, especially those in digital imaging, is to hot laminate while mounting with a pressure-sensitive adhesive at the same time. The advantages of pressure-sensitive mounting for digital imaging applications are covered Section 5-7

Section 5-7 of this manual also details how to coat your foam core or other mounting board with a layer of pressure-sensitive adhesive. OR you can buy board already coated with an adhesive and its release liner.

Cut a piece of your pre-coated substrate (mounting board) slightly larger than your image. Peel back about 4 inches of the release liner on the edge that will be put into the laminator first (leading edge).

Use that exposed adhesive to position and align your image on the board. Being careful to keep the leading edge of the image aligned and wrinkle-free, smooth it down onto the exposed adhesive. The image does not need to be trimmed to final size first, since finish trimming of board and image will be done together after laminating.

When the laminator is threaded and up to temperature, put the leading edge of the board with its image under the feed strip on the leading edge of the feed tray. The feed strip should lift easily to accommodate substrates up to 1/2 inch thick. The laminator should be set 10 or 20 degrees hotter than what you would use on that film for standard laminating. The fan should be turned off.



Keep the board in that position. Do not let it advance far enough to touch the shoes yet. Make sure the laminating rollers are closed and locked. The pull rollers should be closed but not locked. Start advancing the film. Once the film that was resting on the shoes has been advanced, push the board squarely into the nip.

Hold onto the release liner. Do not let the release liner go under the safety shield. The curl of the release liner will help keep the image off the board until it gets close to the laminating nip.

Laminating both sides of the item helps save the setup time that would be wasted in preparing the machine for one-sided lamination. Other problems with one-sided lamination are detailed in section 5-7.

Another advantage of laminating both sides of foam core and some other substrates is that it minimizes the curl that those substrates are subject to over time.

No adjustment of the laminating rollers is required. Because they are spring-loaded, they will open appropriately for any board up to 1/2" thick. When using 1/2" thick substrates, close laminating rollers, but do not lock them.

After the lamination is complete, trim the board and its now resident image to the finished dimensions.

Final finishing steps may include edge grippers for hanging, many types of framing, edging with plastic U-channel, or putting a leg on the back in the case of countertop displays.

## **5-7 COLD APPLICATIONS**

### **Cold Mounting**

The Digital 42/60 is designed to be a cold laminator and mounting device as well as a hot laminator/mounter.

There are many different methods and sequences for laminating and mounting, but the most common procedure used with digital images is to first hot laminate and then cold mount. Cold adhesives adhere better and more reliably than dry mount (hot) adhesives when it comes to the various plastics, coated papers, and coated mounting boards often used in digital imaging.

The DI-42/60 can be used to apply adhesive film to mounting boards. Boards can also be purchased pre-coated with pressure-sensitive adhesive and a release liner.

Most rolls of adhesive have a single release liner. This release liner goes against the top laminating roller of the machine. The heat shoe can be swung out of the way so that the liner and adhesive do not touch it. If the stop pins prevent the shoe from completely clearing the web, they may be pulled out with a pair of pliers. The top shoe brackets can then rest on the ends of the pull roll guard. This will not affect your Ledco warranty

However, it is not essential that the heat shoe be moved for this application, since it is the release liner side of the product which touches the shoe. If this work is run after a hot laminating job, the heat left in the shoes helps the adhesive to flow. It is not necessary to allow the machine to cool.

Cold laminators are one-sided laminators with very few exceptions. Most hot laminators encapsulate or coat both sides. When laminating only one side, you must not allow exposed adhesive to go into the machine. Make sure the material

being coated is at least as wide as the roll of film. Overlap pieces or use scrap paper between pieces to keep adhesive off the rollers.

Thread the machine by putting a large piece of scrap paper or cardboard through the open rollers. Stick the adhesive to this threading card, close the rollers, and begin to laminate. Keep feeding scrap paper so that the adhesive does not start a wraparound on the rollers.



Adjust the unwind tension to remove any wrinkles from the material. Do not use any more tension than needed or you may stretch the material.

Begin to feed the mounting boards, butting each up against the one ahead. Cut the boards apart with a utility knife on the back end



Once your boards are coated, or if you buy them pre-coated, you are ready to mount any graphic. There are many methods for sizing and trimming, but most operators pick a board slightly bigger than the graphic and trim board and graphic together after mounting.

Peel back about two inches of the release liner on one end of the board. Use this exposed adhesive to position the laminated graphic on the board. Slide the positioned end of the board into the laminator, holding the graphic up with one hand. Pull off the release liner before it goes into the nip. Pick up the mounted item at the back of the machine. Trim away the unwanted portions of the graphic and the board at the same time.

For information on simultaneous laminating and mounting, see the previous section of this manual.

### **Cold Laminating**

Cold laminating is less likely to be used than hot in most digital imaging applications for several reasons:

- Cold laminating does not allow true encapsulation
- It does not offer the same degree of permanent protection
- Cold films are several times as costly as hot films
- Items to be laminated on two sides must be run through the machine twice, so labor is at least doubled

Cold films are better for certain applications, such as overlaminating vinyl. Films for protecting images printed on vinyl should be made of vinyl themselves so that the flexibility of the vinyl substrate is not impaired. Polyester films are not recommended over vinyl because of the stiffness.

If a very flexible, conforming substrate is not required for the application, an image is better printed on paper than on vinyl.

When cold laminating, the threading process is similar to that described above for mounting adhesives. One difference is that outside surface of the film goes against the top laminating roller, while the adhesive side of the film should be facing the operator. The release liner should be taped to an empty core on the release liner takeup attachment.

When laminating only one side, you must not allow exposed adhesive to go into the machine. Make sure the material being coated is at least as wide as the roll of film. Overlap pieces or use scrap paper between pieces to keep adhesive off the rollers.

Thread the machine by putting a large piece of scrap paper or cardboard through the open rollers. Stick the adhesive to this threading card, close the rollers, and begin to laminate. Keep feeding scrap paper so that the adhesive does not start a wraparound on the rollers.

Adjust the release line takeup tension so that the release liner is pulled away from the film just after it goes under the idler bar.

Adjust the supply roll unwind tension to remove any wrinkles from the material. Do not use any more tension than needed or you may stretch the material.

Begin to feed the images, overlapping them or running scrap paper between them. Be careful not to allow exposed adhesive to go into the rollers to avoid wraparounds.

The roll feed option can be used in two ways with cold overlaminating. A roll of printed material (one long image or many images) can be put on the roll feed mandrel for lamination in one non-stop process. Or a roll of inexpensive "release" paper can be run under the whole process to keep exposed adhesive out of the nip while laminating a series of pieces.

For those customers who need cold lamination exclusively, Ledco manufactures the Econocraft line of pressure-sensitive machines 25 to 50 inches wide. They can handle substrates up to 5/8" inch thick and as wide as the particular machine.

## 5-8 PREVENTING AND SOLVING PROBLEMS

Please read this section before you have a problem.

**PROBLEM:** Wrinkling of the material as it goes into the laminating rollers. This problem usually occurs when laminating an item that has been folded, rolled, bent or wrinkled.

**SOLUTION:** Make sure the leading edge of the item being laminated is laying flat and is inserted parallel to the laminating rollers.

It is sometimes essential to smooth out an item as it passes over the feed table and through the rollers to ensure an even lamination without wrinkles. Smooth from the center of the item, back toward the trailing edges. Once the item starts to feed, you may also pull back and to the sides on the corners of the trailing edge.

If material has been rolled up, take the curl out of it on a table edge before laminating. If some curl remains, it may be helpful to insert the item with the curl down so the leading edge is pressed against the feed tray until just before the nip.

**PROBLEM:** Wrinkling of the film around the material being laminated.

**SOLUTION:** This is normal and inevitable on any laminator, especially with thicker material. These wrinkles will be trimmed away with the scrap, so they do not affect appearance. Because the rollers are being held apart by the paper or cardboard, they cannot pull equally on the plastic around the paper. This creates wrinkles that tend to look like the bow waves of a boat, radiating out through the clear part of the web from the sheet of material.

**PROBLEM:** When two pieces of material are laminated side by side, the plastic adheres to one piece but not the other.

**SOLUTION:** To get maximum efficiency from the film rolls, you can feed several items into the laminator side by side. However, wrinkling can occur if these items are of unequal thickness, because the laminating rollers are lifted off the thinner items by the thicker items. When laminating items side by side, it is important to arrange them so that the thickness is the same.

**PROBLEM:** Wrinkling of the plastic on a laminated piece of material.

**SOLUTIONS:** Make sure you have enough supply roll tension to take the wrinkles out of the film before it gets past the heat shoes. (see supply roll tension, section 5-4)

Make sure the film is threaded properly (see threading the laminator, section 5-3). The most frequent operator error is threading the film under the bottom stabilizer bar instead of under the bottom idler bar. The threaded film should not touch the bottom stabilizer bar. When the bottom web of film is threaded around the

stabilizer bar instead of the idler bar, the film will tend to wrinkle and often will not adhere. The top side of the item will not be affected.

**PROBLEM:** Film gets wrapped around the pull rollers.

**SOLUTION:** While threading the film cold, the loose ends of the unlaminated web are particularly susceptible to "wrap-around". To minimize this, pull the threading card after it emerges from the pull rollers until the film clears the exit table. Use caution when first starting to laminate, being careful that the thin, unlaminated web does not get caught in pull rollers or laminating rollers.

If "wrap-around" does occur while the laminator is cold, you can easily correct it by reversing the direction of the rubber rolls, permitting the laminator to release the film from the rolls.

**PROBLEM:** Film gets wrapped around the laminating rollers while the machine is hot.

**SOLUTION:** Leaving the heat on so that the adhesive does not harden, follow the following steps.

**WARNING:** Be very careful not to touch the heat shoes when the machine is hot.

**MISE EN GARDE:** *Ne pas toucher les sabots chauffants lorsque la machine est chaude.*

**ADVERTENCIA:** *No toque las zapatas calefactoras cuando la máquina está caliente.*

1. Remove the feed tray.
2. Cut the film on the top and bottom, just in front of the idler bars.
3. Loosen the film from the heat shoes and grip the two loose ends, holding them together.
4. Turn the drive switch to the reverse position.
5. Turn on the drive at a very low speed and allow the laminator to back out the film that is wrapped around the rolls. Pull the film off the roller.

**WARNING:** Keeping the machine in reverse may cause a reverse wrap-around if the film is not getting pulled off the roller. You may need to pull on the film with a lot of force while stopping and starting the drive.



**MISE EN GARDE:** *Si l'on appuie trop longtemps sur l'interrupteur de marche arrière, le film risque de s'enrouler dans l'autre sens. Appuyer par à-coups sur l'interrupteur et vérifier le résultat chaque fois.*

**ADVERTENCIA:** *Apretar mucho tiempo el interruptor de marcha atrás puede causar bobinado inverso. Apriételo brevemente, luego suéltelo y observe el resultado. Apriételo nuevamente si se requiere más marcha atrás. Pare si nota que el plástico hala hacia atrás, volviendo sobre los rodillos.*

**WARNING:** Do not try to cut the plastic off the roller with a knife or other sharp instrument. You will end up cutting the rubber rollers and turn an inconvenience into a major repair bill not covered by warranty.

**MISE EN GARGE:** *Ne jamais tenter de dégager un film enroulé en le coupant avec une lame tranchante. Vous entaillerez le caoutchouc des rouleaux, ce qui occasionnera des frais majeurs de réparation qui ne sont pas couverts par la garantie.*

**ADVERTENCIA:** *No intente separar el plástico del rodillo cortando con un cuchillo u otro instrumento filoso. Terminará cortando los rodillos de goma y convertirá una incomodidad en una cuenta de reparaciones mayor, que no está cubierta por la garantía.*

If this method does not work, let the machine fully cool. Remove the heat shoes and cut the wrap-around off the roller with a small pair of scissors, working the point and the cutting edges away from the rubber to avoid damaging the roller. Then clean the rollers per the instructions in section 7-4.

**PROBLEM:** Not noticing that the rolls of film are almost used up (one roll of film always runs out before the other.)

**WARNING:** If the film is run through the laminator without being matched to an opposing film, the adhesive exposed to the rubber rollers will stick to the laminating rollers and create a world-class wraparound. This type of wraparound is difficult to clear because the film adheres to the roller and to itself for the entire length of the accumulated film on the roller. It's best to clear this right away, before the adhesive hardens. Follow the steps above to clear.

**MISE EN GARDE:** *S'il n'y a qu'un film dans la machine, le coté adhésif, qui se trouvera contre le rouleau de plastification, y adhérera, ce qui provoquera un enroulement "monstre: très difficile à défaire puisque le film adhère d'abord au rouleau, puis à lui-même à mesure qu'il s'enroule. Il faut agir rapidement avant que la colle durcisse. Procéder de la façon indiquée ci-dessus pour régler le problème.*

**ADVERTENCIA:** *Si el plástico de uno de los rollos de abastecimiento pasa por el plastificador sin ser igualado por una película de plástico del rollo opuesto, el adhesivo expuesto a los rodillos de goma adherirá a los rodillos de laminación y causará un bucle monumental. Este tipo de bucle es muy difícil de deshacer porque el plástico adhiere tanto al rodillo como a sí mismo, a lo largo de toda la longitud de la película de plástico acumulada*



*sobre el rodillo. Es mejor deshacerlo inmediatamente, antes de que endurezca el adhesivo. Siga los pasos indicados más arriba para lograrlo.*

**SOLUTION:** To avoid this problem, stop the laminator before either roll runs out, cut the webs of film, and remove the two near-empty rolls of film and then rethread new rolls. When putting film on a laminator, always use two rolls of matched length and width.

Experienced users may leave the pieces of film remaining over the shoes and in the rollers to help thread the new film. When the machine is warm, the ends of the new rolls can be easily tacked to the already threaded pieces because the adhesive layer facing outwards will be sticky. Be careful not to burn yourself on the heat shoes.

**PROBLEM:** Film is not properly adhered or starts to come off sometime after lamination.

**SOLUTION:** Unless there is something wrong with the film, this problem comes from film being run at too low a temperature. Check the heat setting on the laminator. (see recommended temperature settings, section 5-5). If the film is not sticking to the item, it is likely that more heat is required.

If you are using 1.5 mil film, this problem can occur if you are running the machine too slowly. Because 1.5 mil film is thin and therefore loses heat easily, it can cool off too much between the heat shoes and the roller nip if it is run too slowly.

If you are running thicker films, you may have the problem if you try to go too fast. In this case, the thicker film may not have enough time on the heat shoes to reach its adhesive melt temperature. Thicker films may be run at low speeds with no problem.

When laminating posters or other thicker material with 1.5 mil film, the paper itself can absorb enough of the heat from the film to drop the adhesive below its melt temperature. The film may start to come off immediately or it may start to fall off after a few days. The solution here is to run the work at a higher temperature. About 320° to 340 °F will usually do the job.

Sometimes you may see film detach from an item along one edge (the edge that was put in first). This happens when the material is put all the way into the nip before the machine is started. The area of film between the shoes and the nip can cool off too much while the machine is idle. The adhesive may not be hot enough to stick.

The way to prevent this is to let a few inches of film go though before putting in sheets to be laminated. This serves other purposes, besides ensuring the front edge of the piece will be properly sealed. It gives the machine a chance to take up the slack that develops in the film whenever the machine is stopped, and it prevents the following problem as well:

**PROBLEM:** A laminated item comes out with a large “oily” spot on or near the leading edge.

**SOLUTION:** It's not oil that causes this effect, but excess adhesive. When a machine is left heated but idle for a few minutes or longer, the adhesive from the film over the shoes can form droplets if material is put in immediately. This excess adhesive saturates an area of paper, creating what looks like an oily spot. The solution, as mentioned above, is just to let a few inches of film go through before feeding in your work.

Anytime you are laminating unfamiliar or costly items, it is a good idea to start with an expendable sample or test piece. Laminating a test piece first gives you an indication of the results you'll get and also takes care of any pooled adhesive.

**PROBLEM:** A milky, hazy line about an inch wide appears periodically across the width of the web immediately after initial warm-up. (section 5-4, step 3).

**SOLUTION:** The rollers are not evenly heated, and the cold side of the rollers is preventing the adhesive from melting. When warming up the machine, keep the rollers open and keep the forward drive on at low speed.

**PROBLEM:** The machine produces a continuous squealing noise when laminating.

**SOLUTION:** To a certain extent, it is normal for some laminating film to squeal as it is pulled over the heat shoes under tension. This noise is produced via the same principles that make a violin squeal. Some of the compounds put on film to keep it from sticking to itself seem to act like resin on the bow of the violin -- they enhance the noise.

To minimize squealing, run the laminator with the least amount of supply roll tension that will do the job of removing wrinkles from the web of film. Make sure you are not using a higher temperature than needed and clean the heat shoes periodically (see section 7-3). If the noise gets really objectionable, use a different type or different brand of film.

**PROBLEM:** The laminated material seems to have a pitted surface or irregular surface that does not match the texture of the paper being coated.

**SOLUTION:** This is usually caused by adhesive build-up or dirt on the rubber rollers, but may be caused by any matter stuck to the rollers, such as a piece of paper. Inspect the rubber rollers and if they need cleaning refer to section 7-4.

Cuts or other damage to the rubber rollers, especially the laminating rollers, can also cause irregularities in the surface of the film. The pull rollers are identical to the laminating rollers and could be substituted if still in good condition.

**PROBLEM:** The film shrinks as it passed over the heat shoe (known as "necking" in the laminating trade).

**SOLUTION:** Reduce the heat and/or the supply roll tension. The film is not shrinking so much as it is being stretched by excess heat and tension, causing the web to get narrower as it is pulled over the shoes.

**PROBLEM:** No power is getting to the laminator.

**SOLUTION:** Make sure there is power at the electrical outlet being used, and make sure both ends of the power cord are firmly engaged. There are fuses inside the laminator, but dead outlets and loose power cord connections are the most common causes of this problem.

**PROBLEM:** Wavy or rippled sections in the laminate, especially toward the center of the web.

**SOLUTION:** These "heat wrinkles" are caused by excess temperature and/or speed for the film being used. Slow down the motor and/or use a lower appropriate temperature for that particular film.

**PROBLEM:** General haziness or cloudiness in the film after lamination.

**SOLUTION:** Increase the temperature. That cloudiness is a function of incomplete adhesion. On a variable speed machine loaded with thicker film, it may be that the film is being run too fast and is not getting enough time on the heat shoes.

**PROBLEM:** Bubbles in the center of the web and/or film not sticking to the center of an item.

**SOLUTION:** This problem can be caused by excessive laminating roll pressure. Putting too much pressure on the laminating rollers actually decreases pressure in the center of the web.

The other likely cause of this symptom is worn rollers. For example, if hundreds of thousands of 18-inch wide sheets are laminated on a 38-inch machine, the center of the rollers can get worn down more than the ends of the rollers. In this situation, the laminating rollers should be replaced. The rollers worn in this way are not suitable for use as pull rollers.

For problems not listed here, contact your Ledco Dealer. If the Dealer doesn't know the answer, please ask the dealer to contact Ledco and get back to you.

You are also welcome to contact us directly with any problem at 585-367-2392. Because of the potential volume of support calls, we do encourage the use of the dealer network as much as possible.

## 6-1 INSTRUCTIONS FOR OPTIONS

### 6-2 RELEASE LINER TAKE-UP

This mechanism provides for the use of cold (pressure sensitive adhesive or PSA) laminating films that require removal of a release liner during application.

1. Place the release liner takeup on the top of the machine so that the motor is on the right side. Plug into a 110 outlet.
2. Place an empty laminating film roll core onto the release liner take-up.
3. Load the PSA film onto the top supply roll mandrel. Center the core of film.
4. Feed the film, adhesive and liner side up, over the first idler bar and under the second idler bar. Separate the release liner from the film at a corner using two pieces of tape.
5. Apply the edge of the adhesive side of the film to a piece of scrap paper as wide as the film.
6. Attach the release liner with tape to the empty core now on the release liner take-up. Roll the liner unto the core until it is taut.
6. Place the drive switch into the forward position and increase the speed control until the rollers are turning slowly. Turn on the switch for the "take-up". Adjust the tension as the liner goes through the machine. The film and the liner should separate just past the second idler bar. Now observe the rear of the machine to ensure that the scrap paper and the film are exiting correctly. If a "wrap around" condition exists, simply switch the drive into reverse and press the reverse jog switch until the film unwraps from the roll. To continue, switch the drive into forward and assist the leading edge of film/paper to exit the machine.



Scrap liner wound onto disposable core  
Scrap liner under tension  
Separation point  
Pressure sensitive web (adhesive exposed out)  
Optional underlayment paper web  
Right side view of laminator  
Digital 42 with release liner take up

## 6-3 ROLL FEED

When laminating very long items such as banners it is just about impossible to feed it in perfectly straight by hand. With the roll feed mandrel, laminating the longest item becomes relatively easy. The roll feed mandrel is especially helpful for the owners of poster printers, plotters, banner makers and other digital output devices.

### To laminate with the roll feed:

1. Roll up the item on an empty laminating film roll core making sure it's not telescoped. This insures it is rolled up perfectly straight.
2. Place the core on the roll feed mandrel. It doesn't matter if the image is face up or not, since both sides of the item will get the same lamination. Adjust for moderate amounts of unwind tension with the tension knob.
3. Feed the leading edge of the item under the feed assembly idler bar into the nip rollers just as if you were feeding an individual sheet. If you have enough blank paper ahead of the image portion of the item, cut the leading edge to a blunt point. This makes it easier to feed the item in without wrinkling.

An optional technique is to feed a sheet of scrap paper into the nip as a leader. Stop the leader when there is about two or three inches remaining outside the safety shield. Place the banner edge on the edge of the leader and tape it securely. Then start to laminate.



#### 6-4 *ThermoGlide 42"*

When warming up the *ThermoGlide* unit, keep the rollers closed and barely creeping. This will run off 8"-10" of film but it is highly advantageous to evenly warm the idlers. This will help to eliminate potential film waste from unevenly heated idlers. When running a *ThermoGlide* machine set the *ThermoGlide* temperature 40°-50° hotter than the bottom heat shoe.

Upon initial start and warm up, a good deal of temperature overshooting is to be expected. A twenty minute time frame will help stabilize the heating process and thoroughly heat the rubber rollers and/or *ThermoGlide* heat shoe assembly.

## 7-1 MAINTENANCE

**DANGER:** Always use extreme caution when performing maintenance on your machine! Always make sure the machine is unplugged and that there is NO power to the machine when working on or cleaning any part of the unit.

Use extreme caution to avoid Hot Surfaces, which may remain hot for a period of time even if there is NO POWER to your machine.



Use extreme caution to avoid pinch points at the nip of rubber rollers.

**NEVER** have rubber rollers turning while performing maintenance to your machine.



**NEVER** wear loose clothing, ties or jewelry (which may become entangled in gears or rubber rollers) while performing maintenance on your machine.



**MISE EN GARDE:** La prudence est de mise lorsque l'on effectue l'entretien de cette machine.

*S'assurer que le cordon d'alimentation est débranché et que la machine est mise hors tension avant de toucher à des pièces internes.*

*Prendre garde aux surfaces chaudes. Ces surfaces demeurent chaudes longtemps après que le courant a été coupé.*

*Tenir les doigts et les objets loin des rouleaux de caoutchouc. Ne jamais faire tourner les rouleaux pendant l'entretien de la machine.*

*Ne jamais porter de vêtements amples, de cravate ou de bijoux, etc. (ces articles peuvent être happés par les engrenages ou les rouleaux de caoutchouc).*

**ADVERTENCIA:** sea extremadamente cuidadoso siempre que realice tareas de mantenimiento en su máquina.

*Asegúrese siempre que la máquina está desenchufada y que no hay NINGUNA energía aplicada a la misma mientras esté trabajando con partes internas de la máquina.*



*Sea extremadamente cuidadoso en evitar superficies calientes, que pueden permanecer calientes durante cierto tiempo, aún después de estar cortada la corriente.*

*Tenga sumo cuidado en evitar puntos de constricción en las pasadas de los rodillos de goma. Nunca tenga los rodillos de goma en movimiento mientras realiza trabajos de mantenimiento en su máquina.*

*Nunca vista ropa suelta, corbata o joyas (que pueden ser atrapadas por engranajes o rodillos de goma) mientras está realizando trabajos de mantenimiento en la máquina.*

## **7-2 GENERAL CLEANING**

Cleaning the laminator daily or weekly will help prevent dirt or adhesive build-up on the rubber rollers and heat shoes and will improve the performance of the unit.

## **7-3 CLEANING THE HEAT SHOES**

During normal use, excess adhesive from the film will often cling to the heat shoes, especially near the edges. Film coating powders can also build up on the shoes, and will tend to increase friction between the film and the shoes. This type of build-up may not be visible, and it may adversely affect lamination in a number of ways. Film squealing loudly as it passes over the shoe can sometimes be a symptom of this problem.

Some films naturally tend to squeal, with or without coating powder build-up, but cleaning the shoes usually helps reduce squealing and helps prevent more serious problems.

To clean the shoes, heat the machine to full laminating temperature to soften the adhesive. Put on oven mitts or heavy gloves to protect your hands. Using a clean, soft, dry cloth, gently rub the adhesive or other contaminants off the shoes. Never use any abrasive material or rub too hard on the shoes, because you may remove the Teflon coating.



You may dampen your cleaning cloth with soapy water or a mild water-based cleaning solution, but make sure you carefully insulate your hands from possible steam burns if you do this. The steam formed when water hits the hot surface can penetrate both the cleaning cloth and your gloves.

## **7-4 CLEANING THE RUBBER ROLLERS**

Both the laminating rollers and the pull rollers need regular cleaning. Collectively these are referred to as the rubber rollers. The upper heat shoe on the laminator swings away in seconds, making it far easier to clean the laminating rollers.

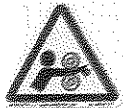
To clean the laminating rollers:

1. Remove the film from the laminator and allow the machine to heat up with the rollers open and turning slowly. By getting the laminating rollers hot, it will be easier to remove any adhesive built-up on the rollers.
2. Turn off the master power switch and unplug the machine.
3. Using a potholder or oven glove, lift the top heat shoe up and back and then lower it onto the stop pins or the top of the pull roll cover (if the pins have been removed).



Loosen the two bolts that hold up the bottom heat shoe and lower the bottom shoe. This will expose both rollers so they can be cleaned much more easily than if the heat shoes were in the way.

**WARNING:** Never clean the rollers while they are turning. While turning, the rollers may catch your fingers and cause injury, or they may catch your cleaning materials and damage the laminator. Unplug the power cord while cleaning the rollers or performing other maintenance on the machine. Turn the rollers by hand.



**MISE EN GARGE:** Ne jamais nettoyer les rouleaux pendant qu'ils tournent afin d'éviter de se blesser et d'empêcher que le produit de nettoyage n'endommage l'intérieur de la machine. Débrancher le cordon d'alimentation avant le nettoyage ou tout autre travail d'entretien. Nettoyer d'abord la partie apparente des rouleaux, puis, à l'aide de la commande de marche arrière, les faire tourner de façon à pouvoir en nettoyer toute la surface.

**AVERTENCIA:** Nunca limpie los rodillos de goma mientras estén girando. Al estar girando, los rodillos pueden atrapar sus dedos y lastimarlos, o pueden atrapar sus artículos para limpieza y danar el plastificador. Desenchufe el cordón eléctrico mientras está limpiando los rodillos, o realizando otras tareas de mantenimiento en la máquina. Gire los rodillos por mano.

Clean the rubber rollers with a mildly abrasive cleaning pad such as a white Scotch Brite (Trademark of 3M) pad which may be purchased in the household section of your grocery store (the green pads are too abrasive). Use "COOL CLEAN" to clean the rollers (available through your local LEDCO dealer). Rub

firmly but do not scrub the rollers vigorously as this might mar the surface. Do not use sharp metal objects or steel wool as these will also mar the rollers.

The pull rollers should also be cleaned in the same manner. Turn off the machine and turn the rollers by hand. Be sure to reposition and secure the upper heat shoe before beginning to laminate.

## 7-5 LUBRICATION

**Drive Chain** Drive chain and sprockets on all models should receive a light coat of gear lube or heavy grease (preferably lithium grease) after each 1000 hours of operation.

