Ledco HS-30 Thoroughbred Laminator

Instruction Manual

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READ ALL PRECAUTIONS & INSTRUCTIONS CAREFULLY
BEFORE OPERATING LAMINATOR

Setup
Instruction
Operation
Lamination
Maintenance

Industrial Series Laminators HS-30 "Thoroughbred"

Operation Manual

June 2003

IMPORTANT: Don't laminate one-of-a-kind documents unless you are sure of your laminating skills and can afford to damage or ruin the document. Don't 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 kinds of items only in their original state.

Remember that you cannot laminate thermal paper, such as typical fax paper, because it is activated by heat and will turn black. Also remove paper clips and staples because they can damage the rubber rollers. 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.

IMPORTANT: Éviter de plastifier du papier thermosensible, comme le papier de télécopieur, pusqu'll noircira sous l'effet de la chaleur, et enlever les trombones et les agrafes gul 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 malitriser la technique de plastification. Ne pas plastifier non plus les articles de collection comme les trimbres, 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 tipico, 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 ìtemes 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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1-1 INTRODUCTION

The **HS-30 ("Thoroughbred")** is designed to provide quality lamination of a wide range of papers and materials up to ½-inch thick using film up to 10-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, ID cards, and many other items.

Options include extra slitter heads and a footage counter.

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. This manual also contains information regarding your warranty. Additional copies are available from the manufacturer.

We take this opportunity to thank you for selecting a LEDCO 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 utilizaro.

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 E-mail: ledco@ledcoinc.com

1-2 FEATURES & BENEFITS

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

- **Intelligent heat controllers** simultaneously display both the set temperature and the actual temperature. The microprocessor-based control quickly learns to anticipate the heat demand of each job and keeps the actual temperature within a few degrees of the set temperature.

- **Laminating and pull rollers** are covered with quality silicone rubber for superior release, higher lamination quality, and easier cleaning.

- **Swing-away upper heat shoe** can easily be hinged upwards to facilitate cleaning or replacing the laminating rollers. Both the upper and lower heat shoes are teflon-coated.

- **Built-in 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.

- **Forced air cooling with chill rollers** are essential when running thicker films because the lamination needs to be cooled properly to get good results. The laminate web is cooled both top and bottom with fan forced air and also with the infinitely positionable chill rollers.

- Easy access **controls** are conveniently located and grouped for effective operation.

- The **safety guard** is built into the upper heatshoe assembly to make sure it will safeguard the operator when laminating.

- The **precision feed tray** has moveable left and right side quides for accurate alignment of laminated subjects to the slitter knives.

- **Very strong alloy steel roller 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

- **Footage counter** enables accurate measurement of film usage.
- **Additional slitter heads** permit multiple-up trimming.

1-4 SPECIFICATIONS

Max laminating width	30"
Speed	0-65FPM
Laminating roller diameter	2 ½"
Supply roll core size	3"
Recommended film	up to 10mil
Max laminating thickness	½"
Max film roll diameter	22"
Dimensions	45"L 19"H 38"W
Shipping Dimensions	56"L 56"H 57"W
Weight/shipping weight	385/800 lbs.
Motor	¼ HP DC
Electrical (single-phase)	220V 50 amp single phase (3 phase optional) 9,850 watts
Electrical connector	NEMA 6-50P

1-5 PRINCIPLES OF OPERATION

The Ledco 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 the 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

- 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. Both top and bottom rolls should be in alignment so that the adhesive is not exposed to either lamination roll. Thicker films take less heat to laminate than thin film. Thinner film as less heat retention than thicker films. The subject being laminated can cool the laminate on these films before the adhesive has had a chance to adhere to the inkjet paper. See Temperature Chart in section 5-5.

Ten mil film is suggested for those applications that need the most protection and rigidity, 7-mil film is 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.

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.

- 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: 800-937-9293 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.

☞RETURNS MUST HAVE A RETURN AUTHORIZATION NUMBER ON THE OUTSIDE OF THE SHIPPING CONTAINER.

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: 800-937-9293 Fax: 585-367-2978

2-1 UNPACKING AND INVENTORY

The laminator arrives fully assembled except for 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 and will replace your machine if necessary. You will be credited for the damaged machine 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. Re-inspect the container and packing material, particularly for smaller items.
3. Make certain that unauthorized personnel did not remove the item and inventory prior to complete unpacking.
4. Call us and send immediate written notification of the shortage.

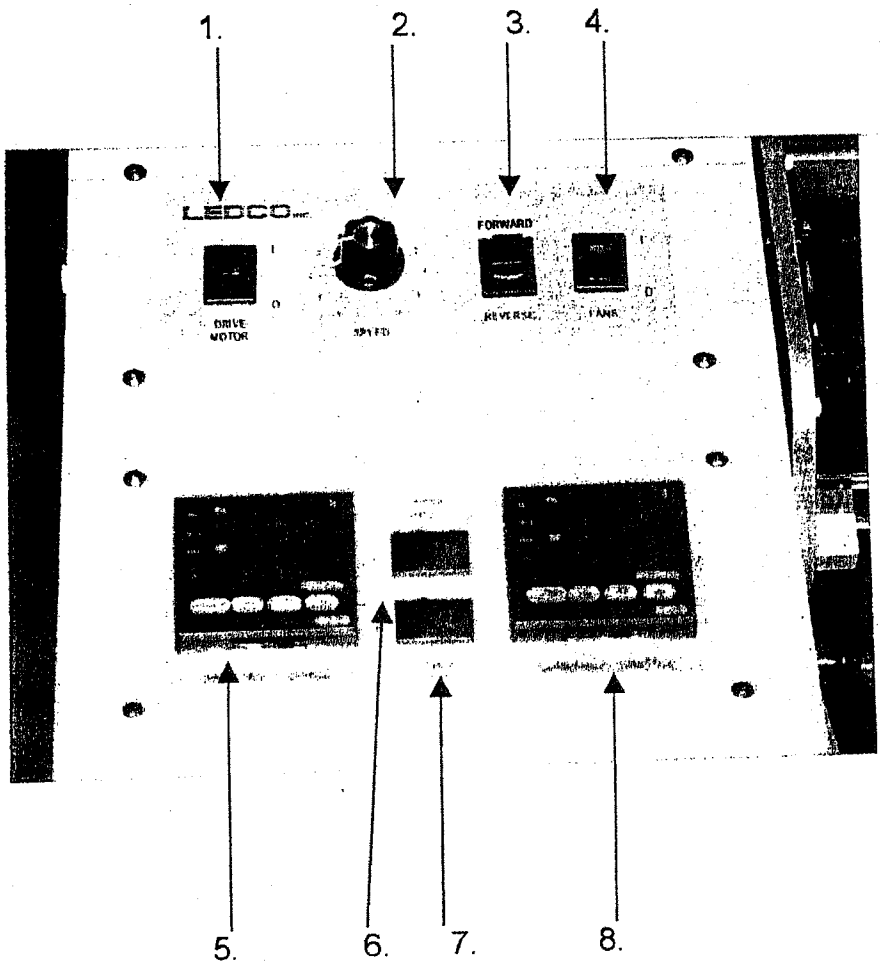
INCORRECT SHIPMENT:

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

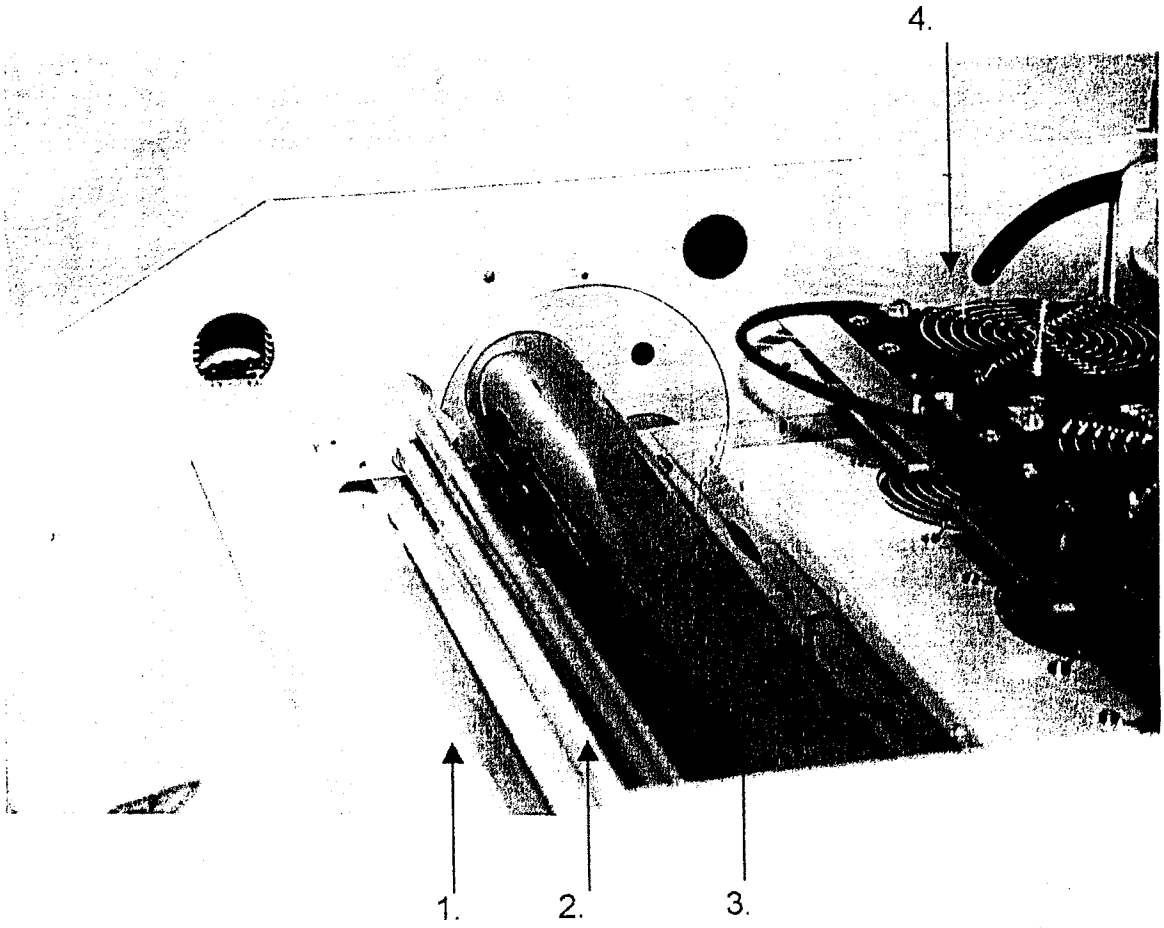
RETURNS: DO NOT RETURN DAMAGED OR INCORRECT ITEMS UNTIL YOU HAVE RECEIVED SHIPPING INSTRUCTIONS AND AN AUTHORIZATION NUMBER FROM LEDCO.

3-1 PRODUCT ILLUSTRATIONS & NAMES OF PARTS

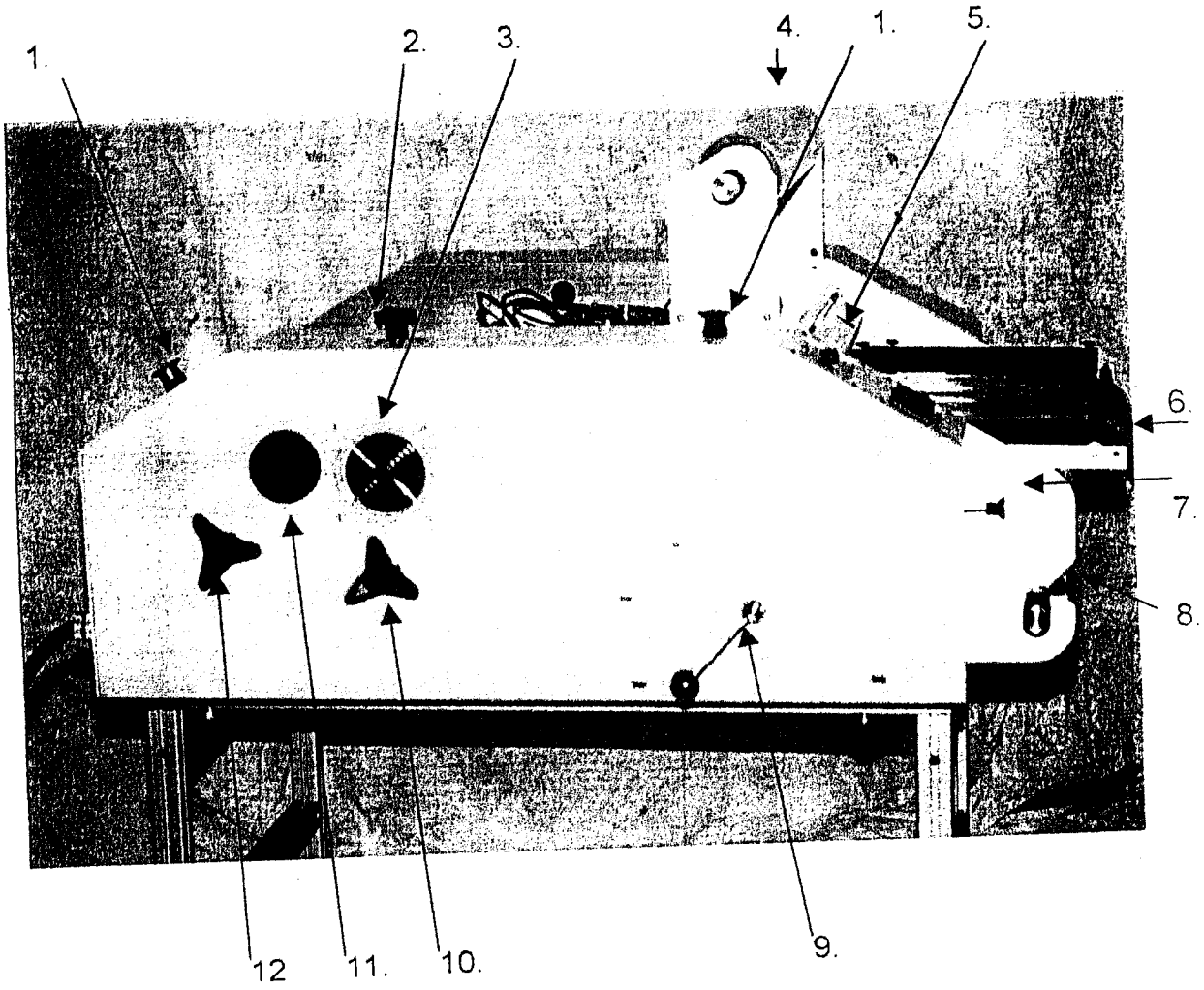
The photos below and on the following pages identify major components and operating controls. Refer to them as you study the installation, operating and maintenance procedures described in this manual. The power switch on The High Speed 25 is on the back of the machine.



1. Drive power switch with indicator
2. Drive Speed Dial
3. Forward/Reverse selector
4. Fan switch with indicator
5. Upper heat controller
6. Upper heat power switch
7. Lower hear power switch
8. Lower heat controller



1. Pull roller anti-wrap guard
2. Slitter knife holder
3. Chill roller
4. Upper fan assembly



1. Emergency stop switch
2. Chill roll position lock handle
3. Chill roll air intake grill
4. Upper supply roll mandrel
5. Safety shield
6. Precision feedtray
7. Slitter control knob
8. Lower supply roll mandrel
9. Laminating roller cam handle
10. Chill roll position selector
11. Slitter adjustment handwheel
12. Pull roller cam handle

4-1 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 or laminating and 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. Use casters only when the machine needs to be moved because casters raise the center of gravity and increase the risk of tipping. 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.

5-1 SET-UP & OPERATION

With the laminator on an unobstructed, level surface perform the following checkout before threading the machine with film.

1. Remove all packing straps, rubber bands, tape, and plastic ties from the machine. Remove the protective paper from the safety shield. Unwrap and put in the feed tray sections. Remove the protective paper from the safety shield. Remove the protective material from the slitter blades. Be careful to keep your hands away from the blades.

2. Make sure the master switch (at the back of the unit next to the power cord), the heat switch, fan switch, and the drive switch are turned off.

3. Connect the machine to a 220V single–phase power source of at least 50 amps (or appropriate 3 phase power source).

4. Turn on the master switch. Turn the heat power switches to the ON position. Both heat controllers should go on. The upper window of each unit displays set temperature; the bottom window actual temperature.

5. Push the "SET/ENT" key on each controller to change the set temperature. The up and down arrow keys will now adjust the set temperature. Push the left arrow key to highlight the tens position of the set temperature. The up and down arrows will now change the set temperature by tens. Continuing to push the left arrow key shifts the number position to be changed to hundreds and then back to ones and so on. (See photo in section 5-6)

   The highest common temperature setting for this machine would be 320° F with a standard 1.5 mil film. For the vast majority of applications the temperature should never be set higher than 350° F. For 3 to 10 mil low-temperature films the temperature would be in the 200-260° F range. Once the new set temperature is displayed push the "SET/ENT" key once to enter it. The set temperature will be held until it is changed again, even if the unit is turned off and on. Turn the heat power switches off.

6. Turn the fan switch to the ON position, you should hear the fans begin to operate. Turn the fan switch off.

7. The laminating and pull rollers are shipped in the open position. Turn the levers on the left side of the unit to close the laminating and pull rollers. Open and close both sets of rollers several times. Notice that starting from the "open" position there is first a "closed" position and then a "closed & locked" position for laminating.

Both rollers must be in the "closed & locked" position for laminating. Leave the rollers open if you are not going to thread the machine now. Always shut down or ship the machine with the rollers open. Close the rollers if you are about to thread the machine.

8. Turn the drive direction switch to the FORWARD position and turn the drive power switch on. The pull rollers and the laminating rollers should rotate. Turn the drive power switch off.

Unless you are going to thread the laminator now make sure all power switches are off, including the master switch on the back of the machine.

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 (If adequate protection from heat sources is provided). Remove the supply roll mandrels and the feed tray. The supply roll mandrels are now ready to be loaded with film. The film is usually wound with the adhesive side "in" on the rolls of film.

(There are 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. **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. **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 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 tubes near the bottom heat shoe (see diagram). 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. NOTE: The lower web idler may be moved further away from the lower heatshoe by disengaging the (2) knurled knobs in the lower idler assembly and pulling the entire assembly toward the operator's position. This will allow more room for initial threading. Once threaded, be sure to place the idler assembly back into it's original position and lock the (2) knurled knobs.

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.

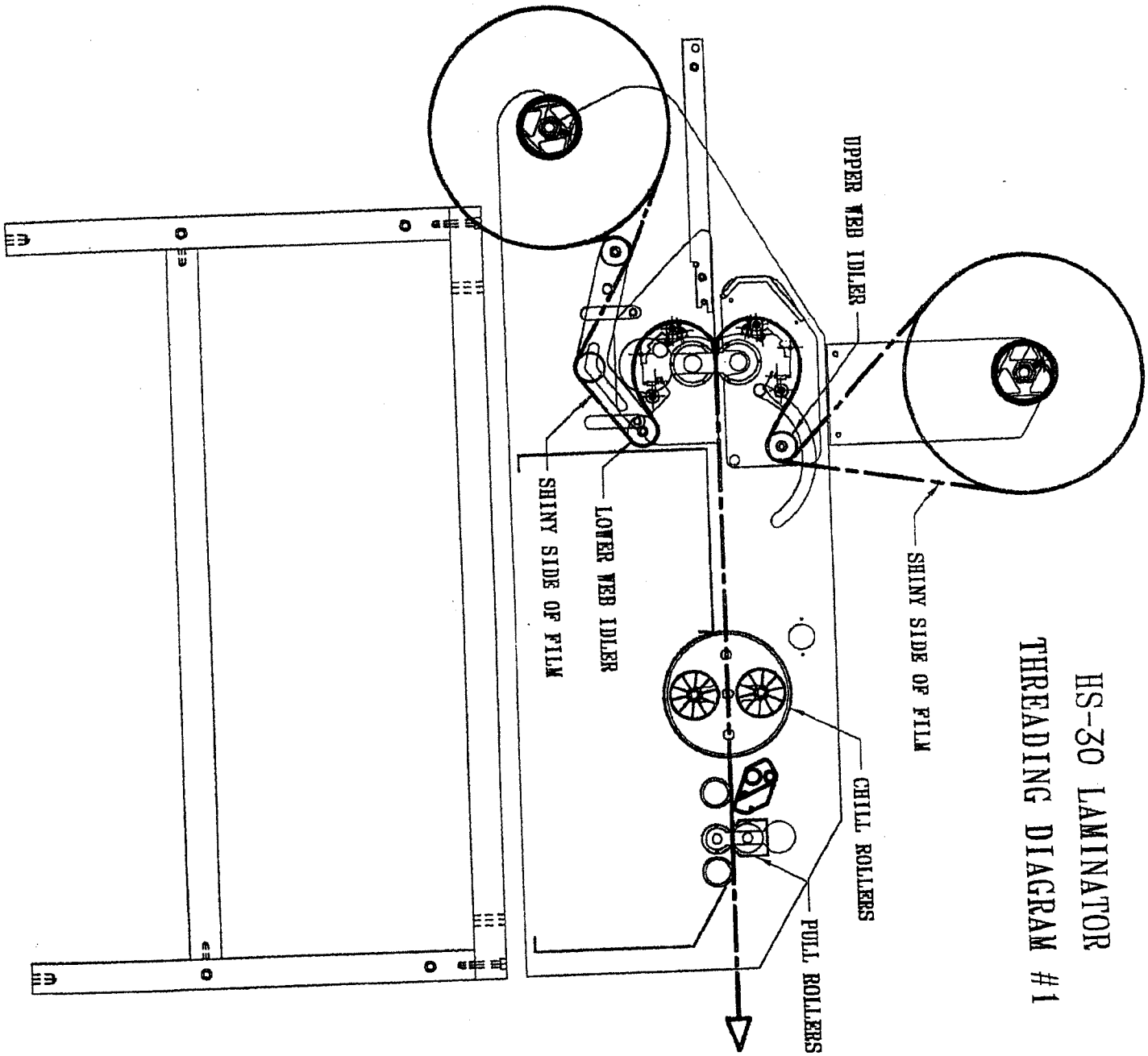
7. Make sure there is still enough slack in the web. Close the laminating rollers with the two levers on the left side of the unit. With the film draped over the two heat shoes and melted or taped together, push one edge of the threading card between the heat shoes so that the film is firmly positioned 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 the laminating rollers, between the two chill rollers, under the slitter knife holders, and through the pull rollers. When the threading card has cleared the back of the machine switch off the drive switch.

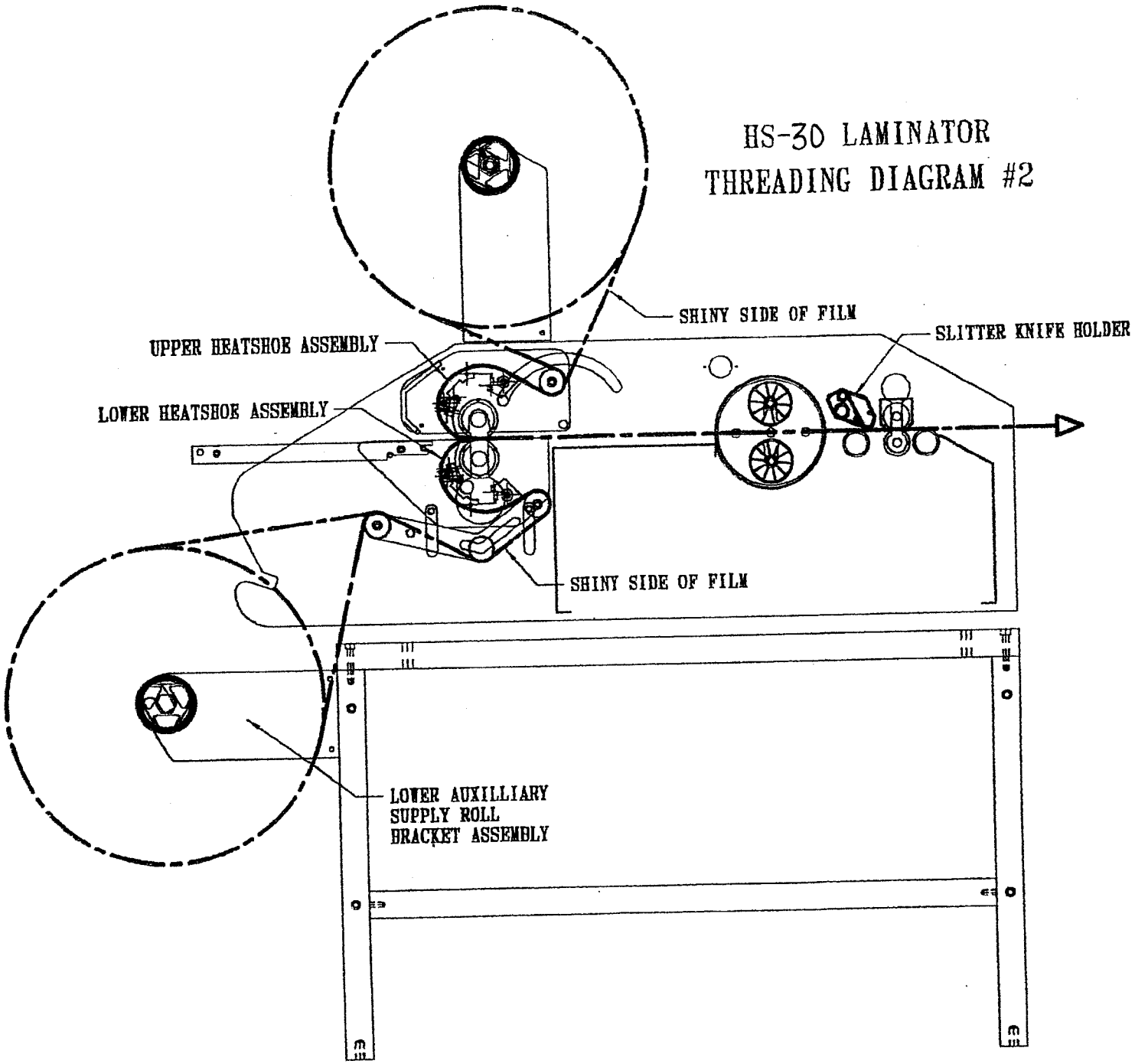
9. The HS-30 ("Thoroughbred") is provided with an integrated chill roller system to allow the laminate web to be cooled more efficiently by direct contact with chilled aluminum tubes, thereby allowing faster lamination speeds to be achieved. The chill roller assembly may be rotated into many positions to accommodate different film thicknesses and substrates.

Generally speaking, thicker films require being in contact with the rollers just enough to quench the heat from the web while thin films can be "wrapped" completely around both chill rollers and run at very high speeds. The chill rollers can be rotated by loosening the small black locking knob on the upper left machine housing. Then rotate the black "3-lobed" handle on the left side of the machine clockwise to the desired position of film "wrap". Tighten the locking knob firmly. If slack in the web is required simply feed extra web through the machine. Stop the drive, open the pull rollers, and repeat the procedure.

5-3 Threading diagrams



HS-30 LAMINATOR
THREADING DIAGRAM #2



5-4 SUPPLY ROLL TENSION AND OTHER ADJUSTMENTS

1. Now adjust the supply roll tension. First loosen all four supply roll tension knobs then tighten them (turn clockwise) until they just begin to press on the springs. Another ¼ to ½ turns (one turn equals 360° rotation of the knob) of tension on all four knobs is usually sufficient for 1.5 or 3 mil film. More tension is required for 3-mil or heavier films. More tension is also required as the width of the film increases.

The best way to do the fine adjustment or readjustment of supply roll tension is to observe the film going over the shoes while the drive is on. Turn on the drive, both laminating and pull rollers must be closed and locked. Adjust the speed to match the expected lamination work.

If the supply roll tension is too loose some wrinkles can be observed at the leading edges of both shoes. Lines of air may also be observed between the film and the shoes at the leading edges. The visual effect caused by air between the film and the shoes is known as "waterfalling." If some wrinkles and/or a waterfalling effect extend about 1/3 of the way across both shoes from the leading edges toward the trailing edges, the supply roll tension is close to "perfect" for most jobs.

(The leading edge of the top shoe is the top edge. The leading edge of the bottom shoe is the bottom edge. The trailing edges of both shoes lead into the "nip", where the two laminating rollers come together.)

If the film is going over both shoes without any wrinkling or waterfalling, supply roll tension is too high. If the wrinkling is extending into the nip, supply roll tension is too low. Supply roll tension is not an absolute adjustment, the acceptable range of tension settings is fairly wide. If little wrinkling or waterfalling is visible on the leading edges tension could be reduced a little. If the wrinkling or waterfalling is extending to the trailing edges tension could be increased a little. Make sure that top and bottom rollers have about the same tension.

2. What we call the "drape test" is an effective way to evaluate supply roll tension simply by examining the laminate. Run about two feet of film out the back of the machine. Cut the web of film at the exit point. Hold the two corners of the film on the side where it was cut away from the laminator with the bottom side facing you. Let it drape straight down.

- If the film hangs perfectly straight and flat, or if there's a small amount of curl in one of the bottom corners, the supply roll tension is set about right.

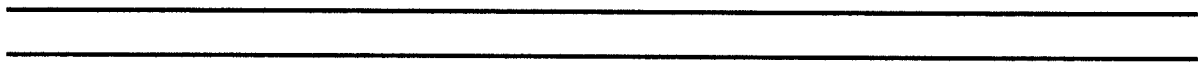
- If the bottom edge is curling toward you, there is too much tension on the upper supply roll mandrel.

- If the bottom edge is curling away from you, there is too much tension on the lower supply roll mandrel.

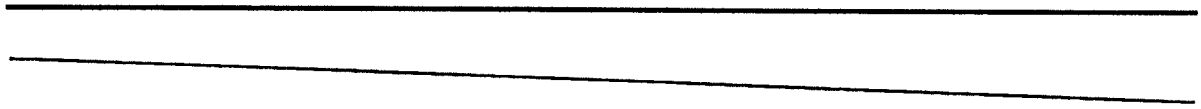
- If the two bottom corners are curling in opposite directions, supply roll tension is too high on both top and bottom.

Both novice and experienced operators of laminators tend to use too much supply roll tension. The best amount of supply roll tension is the least amount that will do the job.

3. Stop the machine for approximately fifteen seconds to allow the laminating rollers to leave an indentation on the plastic web known as a "dwell line". Allow this "dwell line" to pass through the pull rollers so that it can be observed. The "dwell line" should be approximately 1/4" wide at each edge of the web of plastic and possibly a little narrower in the center. It should look similar to this:



If the laminating rollers are not balanced properly the "dwell line" will look something like this:



Apply additional pressure as required. Repeat the above test to see if the rolls are balanced properly.

5-5 LAMINATING

1. Turn on the power and the heaters.

- Set the temperature. The small green output light will be displayed on the heat controller while the machine is warming up, approximately twenty minutes.

- When the two heat indicators are at the desired temperature the machine is ready to laminate.

- Open both sets of rollers.

- Put the drive direction switch in forward and turn on the drive. 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.

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° F such as for poster board - 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.

MISE EN GARGE: Ne jamais laisser la température dépasser 310° F lorsque le film est chargéet que la machine n'est pas utilsée, car le film risque de fondre, auquel cas il faudrait nettoyer la machine et procéder à nouveau au chargement du film. Lorsqu'il est nécessaire d'utiliser une température de plastification supérieure à 310° F (160° C), par exemple poure plastificer des affiches, tirer un peu plus de film pour lui donner du mou de manière a ce qu'il ne soit pas tendu sur les sabots chauffants. On emplechera ainsi que le film fonde lorsqu'il n'advance pas.

ADVERTENCIA: No permite que la temperatura exceda los 310° F (160° C) mientras el plástico está cargado y el plasatificador no está en uso. El plástico puede desintegrarse, lo que requeriria limpiar y recargar la máquina. Si es necesario laminar a temperaturas más elevadas que 310° F, como cuando se lamina cartón para carteleria, hale un exceso de pelicula del rollo de abastecimiento para proveer huelgo, evitando que la película quede muy agretada contra las zapatas calefactoras. Evitará asi que el plástico se derrita el periodo de tiempo en que la pelicula no está avanzando.

2. During warm up the actual temperature will sometimes overshoot the set temperature by more than a few degrees. When lamination is begun the actual temperature may initially drop below the set temperature. Unless these temperature swings are extreme there is no cause for concern.

The heat controllers each contain an intelligent microprocessor which gauges the heat requirements of any job being run on the laminator. The microprocessor adjusts the power to the heat shoes to keep the actual temperature steady and close to the set temperature. This process of gauging and adjusting the heat takes a few minutes. The actual temperature will become more stable as you continue to laminate.

3. Add or remove feed tray sections. Position the two side sections for the work to be performed. You will get the best results by centering items in the web of film.

4. Check the supply roll tension per the instructions in the previous section. Make sure the top and bottom supply rolls have about the same tension.

5. Once the machine has come up to temperature you are ready to laminate. Close the pull rollers first then close the laminating rollers. Adjust the film speed as required. Once the film starts to move, watch as it passes over the heat shoes. Allow any wrinkling to clear out before inserting material to be laminated. Each time you stop the advance of film, whether by opening the rollers or turning off the drive, slack will form in the web of film. It will take a few inches of film to get the slack and the resulting wrinkles past the shoes.

6. Examine the film as it exits the machine. If there are bubbles or wrinkles in the film it could mean there is not enough tension to draw the film tight and smooth over the heat shoes. It could also indicate that the rollers are not closed.

7. As mentioned earlier in this operators' guide, many users tend to use too much supply roll tension. Some film such as 1.5 mil requires very little tension. Here are some indicators that you might have excessive supply roll tension.

- usually loud squealing (many films will squeal a little)
- necking (the web of film gets narrower as it goes across the shoe)
- no waterfalling or wrinkling anywhere on the shoe... the film is perfectly smooth and tight across the surfaces of both shoes (please see the previous section on adjusting supply roll tension).

If the film curls up as it leaves the machine, loosen the top supply roll mandrel (turn counterclockwise) and/or tighten the bottom supply roll mandrel (turn clockwise).

If the film curls down after it leaves the machine tighten the top supply roll mandrel (turn clockwise) and/or loosen the bottom supply roll mandrel (turn counter-clockwise). In making these adjustments make sure that top and bottom supply roll tension are kept about equal.

8. When running films of 3 mil or above turn the fans on before beginning to laminate. "Waves" or "ripples" that run through the center of the laminated web are usually caused by forgetting to turn on the fans or setting too high a temperature for the film being used.

"Heat wrinkles" are formed when the film as 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. This machine is equipped with a directional switch: forward/neutral/reverse. Turn to the forward position to laminate or to reverse as required. The manufacturer recommends the drive switch be used to stop the laminator rather than the neutral position of the directional switch. To remove anything which may become lodged between the rubber laminating or pull rollers, remove the feed tray assembly and open rollers. Switch control to reverse if required.

10. 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 and ensures smooth driving of the laminate web through the machine.

The laminator becomes capable of accepting thick materials without roll slippage because the top and bottom rollers are driven. Driven rollers also minimize the "curling effect" in the finished lamination by providing balanced power to the laminating and pull rollers.

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

For operator safety the upper heat shoe guard, an integral component of the heatshoe assembly, MUST BE IN ITS DESIGNATED POSITION when the temperature of the heat shoes is in excess of normal room temperature or when the drive switch is in the forward position.

5-6 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
Monopolymer	310°-320°	280°-290°	270°-280°
Low-temp (copolymer)	300°-310°	220°-270°	220°-260°
Ultra-low temperature	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° F.

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.

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 to insure 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 and thickness of the material being laminated. The speed of the machine is also a factor.

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.**

5-7 SLITTER OPERATION

1. The slitters on the HS-30 can be moved independently from the sides of the machine even while lamination is in progress. The slitter heads are mounted on a steel bar with an adjusting knob on each side of the machine. The slitters must be positioned manually. Additional slitters may be ordered.

2. To engage the slitters pull out the slitter knob on the lower control panel (left side) while the film is being slowly advanced.

3. When using the slitter the items being laminated must be fed into the machine squarely or the slit edges will not be parallel with the edges of the items. The edge seal or edge trim will be uneven if the leading edge of each item is not fed at right angles to the edges of the web of film.

4. The slitter knife holders are designed to accept "hooked" style knife blades. Experience tells us that this style of blade causes less curling on the edges of slit lamination. We recommend using these blades as supplied, however if so desired another type of standard utility knife blade may be used so long as it is securely held by the knife holder assembly. Please keep in mind that performance or functionality may be hampered.

5-8 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.

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. Be 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 ½ 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 the proper 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. 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. They are spring-loaded and will open appropriately for any board up to ½" thick. When using ½" thick substrates, close the 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, framing, edging with plastic U-channel, or putting a leg on the back in the case of countertop displays.

There is pressure sensitive laminating film now available that will enable you to easily and inexpensively laminate and mount. The Durafilm #12-PS (pressure sensitive) laminating film has a thermal film on one side and a pressure sensitive film with a removable liner on the other.

Laminate your image with the film of your choice on the front (or back) and Durafilm #12-PS on the other side. The result is a laminated piece with a liner on one side. Under the liner is an aggressive or removable adhesive (be sure to designate which you want when you order). Simply peel off the clear, plastic liner and mount the image to any smooth surface.

- Saves time... laminates and adheres in one easy step

- Saves money...
  - No need to purchase expensive pressure-sensitive mounting media with adhesive already applied.
  - No need to purchase and apply transfer adhesives.
  - Eliminate the expense and risk of shipping delicate, bulky mounting board by shipping a rolled, laminated image that can be mounted to any smooth surface upon arrival.

- Provides flexibility and ease of use...
  - Film runs on any thermal laminator
  - Film offers a pressure-sensitive back for convenience in field installation.
  - Laminating the image first provides a stable print for ease in mounting.
  - Removable adhesive version of Durafilm #12-PS makes great counter mats & window graphics.

5-9 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.

Make sure the film is threaded properly. 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 a "wrap-around" does occur while the laminator is cold you can easily correct it by reversing the direction of the rubber rollers. This permits the laminator to release the film from the rollers.

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

SOLUTION: Leave the heat on so that the adhesive does not harden and 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. Carefully 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 arriére, le film risque de s'enrouler dans l'autre sens. Appuyer par á-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 reparation 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 esta cubierta por la garantia.

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 6-4.

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: trés difficile à défaire puisque le film adhère d'abord au rouleau, puis à lui-meme a mesure qu'il s'enroule. Il faut agir

rapidement avant que la colle durcisse. Procéder de la facon 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 pelicula de plastico 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 dificil de deshacer porque el plastico adhiere tanto al rodillo como a sì mismo, a lo largo de toda la longituh de la película de plastico 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 (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.

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 6-3). 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 6-4. 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 as 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. The 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 or 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 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 roulequx de caoutchouc. Ne jamais faire tourner les rouleaux pendant l'entretien de la machine.

Ne jamais porter de vetements amples, de cravate ou de bijoux, etc. (ces articles peuvent etra happés par les engrenages ou les roulequx de caoutchouc).

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

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

Sea extremadamente cuidadoso en evitar superificies 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 peuden ser atrapadas por engrenajes o rodillos de goma) mientras está realizando trabajos de mantenimiento en la máquina.

6-2 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.

6-3 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. Disconnect the laminator from its power source. Put on oven mitts or heavy gloves to protect your hands. Use a clean, soft, dry cloth and 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.

6-4 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 easier 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.

5. Using the handle in the center of the safety shield, lift the top heat shoe up and swing it backwards until it stops.

WARNING: Never clean the rollers while they are turning because 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'empecher 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, a' l'aide de la commande de marche arriére, les faire tourner de facon 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 pad (Trademark of 3M) which may be purchased in the household section of your grocery store (the green pads are too abrasive). Use mildly soapy water to clean the rollers. 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.

6-5 LUBRICATION

Drive Chain The 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.

Roller Guide Bushings Place two or three drops of light machine oil at each end of the roller journals on the edges of the bronze guide bushings. The oil will seep in between the bushing and journal and reach the roller journal rotating surfaces evenly and completely covering them with oil.