

UNION ROLLER COATERS -- SERIES # 45

UNION Series No. 45, Model A Roller Coater

DATE:

SERIAL NO.:

INDEX

THE UNION TOOL CORPORATION

1144 N. DETROIT STREET
(STATE ROAD 15 NORTH)
WARSAW, INDIANA 46580

Phone: 574/267-3211

Fax: 574/267-5703

Email Address: info@uniontoolcorp.com

Website Address: uniontoolcorp.com

IMPORTANT

PLEASE READ OPERATING INSTRUCTIONS CAREFULLY

DEFINITELY DO NOT START THE UNION COATER UNTIL ALL ROLLS ARE MOVED AWAY FROM EACH OTHER AND THE PICK-OFF FINGERS ARE MOVED AWAY FROM THE ROLLS.

THIS IS EXTREMELY IMPORTANT.

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INTRODUCTION

Before operating this machine, **two things must be checked**. First of all, the coater was shipped with the doctor rolls and coating rolls separated. Double check to be sure the rolls are all set apart and the pick-off fingers are not touching the rolls. Check between the rolls to ensure that there are no foreign objects between the rolls. Serious damage to the rolls or the machine may occur if these points are not checked and corrected before operation. Careful reading of these instructions will ensure you satisfactory operation.

The UNION Series #45 Roller Coaters (as with all Union Coaters) are engineered for applying accurately controlled liquid coatings onto various substrates or web materials. Coating materials being applied by **UNION ROLLER COATERS** include glues, solvent based coatings, resinous adhesives, hot melt adhesive, drawing lubricants, paint, oil, wax, sizing, plastics, or virtually any liquid material to almost any flat surface. Special problems in the coating field have been successfully worked out by The Union Tool Corporation's engineering staff. Hot Melt Coaters, Reverse Coaters, Vertical Coaters, Web Coaters and modification of the standard coaters are all part of our specialty. Material Handling of Sheets (Feeders & Stackers), Laminators, Unwinds, Rewinds, Lay-up Stations and Conveyors are just part of our ability to provide a complete package to our customers.

UNION Roller Coaters can be designed to be compact and require less floor space. This allows for more operating area for other possibilities. These roller coaters are sturdily built, operator friendly, and are constructed with safety as a priority. UNION Roller coaters eliminate the human error so often found in spray coatings or hand coating. There is virtually 100% usage of the coating material. Only the material left in the coater at time of clean-up is not used for coating. Union coaters provide cleaner operation with little waste.

The Union Tool Corporation is proud to be one of the first and foremost Manufacturers of roller coaters today. Long years of experience in this field guarantees long and satisfactory service to the user of our equipment. If you or someone you know has coating applications or special machinery problems, why not contact our Sales Department and let us help solve your problems. They are ready and willing to help you at no cost or obligation.

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UNCRATING

The roller coaters are mounted on skids and normally crated for shipment after a testing of the machine at the factory. The testing is normally done with the customers materials and the customer being present. This helps ensure customer satisfaction. The crating is fastened to the skids and must be removed first. Care should be taken as the staples or nails may cause damage to the coater or the people uncrating the coater. Remove the skids next, taking care that the machine is not upset. A packing list accompanies each machine and is attached to the upper roll assembly or to the crate. Care should be taken when opening this package as it contains important information such as a description of the coater, Sales Order # and Job Order #.

The location of the machine should be on a solid, level surface. Mounting holes are provided in the "feet" of the machine so that the coater may be bolted to the floor once it is leveled. To level the coater, use a spirit level on the lower coating or back-up roll. The lower coating or back-up roll is used because it does not move in most coaters. Fasten the coater securely to the floor to ensure a stable running coater.

CHECKING MACHINE

After uncrating, make a visual check of the coater to ensure there has been no damage to the coater during shipment.

Before attempting to start the coater, **move all rolls away from each other**. Even steel or chrome plated rolls that contact with each other may cause a galling action and will soon ruin the finish of the rolls if allowed to continue to operate in this manner.

Check the infeed table assembly to be sure it is not touching the rolls. Check the pick-off finger assembly to be sure all the fingers are moved away from the lower coating roll or back-up roll. Make sure these fingers are all solidly fastened. Serious damage to the roll face may occur if the fingers are allowed to engage the lower coating roll or back-up roll.

Check and/or tighten all bolted pieces on the coater. Jarring and jolting around during shipment may have caused loosening of parts or assemblies, and these things should be checked before operation.

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CHECKING MACHINE *(Continued)*

A copy of the electrical print has been provided in the disconnect box. The power drop should be installed by a qualified electrician according to the print. Any wiring to corresponding equipment should be made at the same time. With the safety reversing drum in the neutral position, the disconnect switch should be moved to the "On" position.

With all guards and covers in position, either use the reversing safety control or the push-button to momentarily activate the power to the rolls and auxiliary motors. Check the rotation of the rolls and any auxiliary equipment. With the safety control in the forward position, the "A" , "C" and "B" model coaters will have the upper coating roll and upper doctor roll rotating in a direction that would take coating material to a nip formed by the coating roll and doctor. The rotation **must** be checked prior to filling the coater with coating material.

This manual is supplied with a great deal of information. This includes an assembly drawing, electrical drawing, pneumatic drawing (if applicable) and a complete bill of material. In addition, specific information on component parts are also provided. Please place this manual in a safe place for both operator and maintenance reference.

GENERAL INFORMATION

The following information will help you familiarize yourself with the UNION Roller Coater and its working parts. Refer to the drawing of the Union Roller Coater as you read. A sequence of operations follows this information.

1. **Vertical Adjustment Assembly** -- This assembly raises and lowers the upper roll assembly to accommodate various thickness of stock and to allow a perfect nip between the upper and lower coating rolls. Generally, this upper roll assembly is the only one that requires vertical adjustments; however, in special cases the lower roll assembly has been made adjustable. These rolls should never be allowed to be forced together so as to cause damage the surface of the rolls. A **handwheel** located at one end of the coater connects two gear box arrangements and is the means of operating this assembly. Turning this handwheel in the direction as indicated by the tag will adjust the gap between the upper coating roll and back-up or lower coating roll. This assembly is mounted on top of the machine at the end housing and includes a coupling to allow the top roll to be adjusted parallel to the bottom roll within a thousandth of an inch. Pull the spring loaded portion of the coupling back and either turn the single handwheel or turn the shaft to move either side independently.

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GENERAL INFORMATION *(Continued)*

Extreme fine adjustment is accomplished by the hex nuts on the lower end of the elevating screw. The least amount of tension on these screws means the less chance of damaging the rolls should a varied thickness of stock or any foreign object pass through them.

Pressure springs located around the adjusting screws permit an uneven thickness of stock or foreign objects, in limited sizes, to pass through the rolls without serious damage to the faces of the rolls. When installing new rolls, care should be taken that this spring is firm in its position on the screw shoulder and screw lift bracket. The gear mechanisms are fully enclosed for protection. This vertical adjustment assembly is tied in with the upper roll assembly slide blocks. These slide blocks are contained on the machined surface of the housings by lengthy gib assemblies. A standard opening of 4" is provided with all machines; with special provisions, an opening of more than 4" can be provided.

2. **Seal Plates** -- Seal plates are mounted at the roll ends forming a trough with the doctor and coating roll to hold the coating material. These seal plates are provided in three different types of materials. The materials are Teflon, UHMW and a babbit faced casting. Adjusting nuts on the special supporting studs are used to press the spring loaded face of the seal plate up to the roll ends. This eliminates dripping while the machine is in operation. These plates should not be forced tightly against the roll ends but just "snugged" up enough to close the trough ends without any dripping. A short period of operating time "wears in" the face of the seal plate to the roll ends.

These seal plates are mounted on the upper and lower roll assemblies on the Model "A" coaters, the Model "B" and "C" coaters, on the upper roll assemblies only, and on the standard Model "D" they are usually not necessary.

3. **Location of the heavy-duty, anti-friction, self-aligning ball bearing units (which contain the roll journals)** -- This self-aligning feature ensures a precise degree of accuracy obtainable in alignment of the rolls yet does not bind them. This feature also allows removal or installation of the rolls without binding. These units are all equipped with grease fittings, proper lubrication should be part of the maintenance procedure as describe in the information provided by the vendor. This information is included with the manual. Self-aligning seals in these units effectively keep grease in and prevent entry of dirt regardless of alignment. Care should be taken not to over fill the bearing so as not to damage the seal of the bearings.

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GENERAL INFORMATION *(Continued)*

4. **Doctor Roll Adjustment Assembly** – The movement of the doctor roll in relationship to the coating roll governs the thickness of the coating and is controlled by this mechanism. The unifeed single handwheel or the hand knobs located at either the infeed or offbearing end of the machine (depending on the model of coater) are used to move the doctor roll bearing slide plates, to which the doctor roll is mounted, in and out from the coating roll. These slide plates are machined to slide freely within the containment of the full length gib plates. A finely threaded screw is utilized to slide this bearing plate. This screw is located through a graduated collar to give you a precise degree of accuracy and control when turning the hand knob. The unifeed is normally supplied with a mechanical digital indicator (optional) to give a precise reading of the position doctor roll in relationship to the coating roll. This whole assembly is mounted on the upper bearing plates on Models “A”, “B” and “C”. The Model “D” is a bottom coater and this assembly is mounted to the housing ends, as is the lower assembly on the Models “A” and “B”.

The Model “A” doctor roll hand knob adjustments or single handwheel unifeed are located at the top infeed side and the bottom offbearing side. In the “B”, “C” and “D” Models, these adjustments are located all on the infeed side. The graduated collar used with the hand knob is marked into ten equal parts and one mark turning of the knob would give approximately .005 of an inch adjustment. The clockwise movement of the hand knob means moving the doctor roll toward the coating roll and a counterclockwise movement will move the doctor roll away from the coating roll.

5. **Coating Rolls** -- These rolls apply the coating material to your stock. In the case of a top and bottom coater, these rolls are coating rolls. In either a top or bottom coater, the roll opposite the coating roll would be referred to as a backup roll. These rolls are the same diameter in any case. On the Series #45 coater the standard coating roll diameter of 8-3/4”.

Various designs of rolls can be made to fit the standard coaters, such as deburring rolls, brush rolls, squeegee rolls, heated or cooled rolls, in addition to the coating rolls. In some instances strip rolls have been incorporated into the roller coaters.

Heated rolls are sometimes a “must” due to the fact that the glue being applied must be kept at a warm temperature. Hollow journals, equipped with rotary joints, provide a means of circulating water or steam through the rolls. This feature, with a heater and circulating pump, makes a unit that ensures a better coating application if heat is required.

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GENERAL INFORMATION *(Continued)*

ROLL COVERING: The coating rolls can be chrome plated steel, neoprene, gelatin, Thiokol, Buna N, aluminum, or covered as required. The exact covering is determined by the type of coating material being applied. Tests done by the rubber covering supplier usually determine the exact rubber compound to use. Sharp materials or burrs should never be run through the rubber rolls. This may cut and gouge the roll face so that it will not give a satisfactory coating. Rolls are sometimes spirally or longitudinally corrugated, depending on the type and amount of material used for coating. Generally, a smooth ground and polished roll will handle most material and apply the desired amount of coating film to the material being run.

6. **Doctor Roll** -- This roll is of a smaller diameter and is used to control the film thickness of the coating material, on the coating rolls, accurately and without variation. The doctor roll diameter on the Series #45 is 6-1/2". Most applications require the doctor roll to be driven, turning at a slower speed than the coating rolls. Other cases allow the doctor roll to be idle or turning at the same surface speed as the coating rolls. In the application of some drawing compounds, lacquers, paints, and synthetic coatings the roll is required to be locked. The doctor roll is independently controlled by separate knob adjustments on either end of the rolls and is micrometrically adjusted by a turn of the hand knobs or unifeed as called out in the doctor roll adjusting assembly. This operation controls the nip between the doctor roll and coating roll, thereby controlling the desired coating film thickness. Both rolls are usually driven and one is not required to drive the other. A galling action between the coating and doctor rolls takes place if the rolls are working against each other, where there is no overriding clutch assembly, thereby wearing down the rolls unnecessarily. Steel rolls are protected by an adjustable stop, installed at the factory, to protect from these rolls engaging.

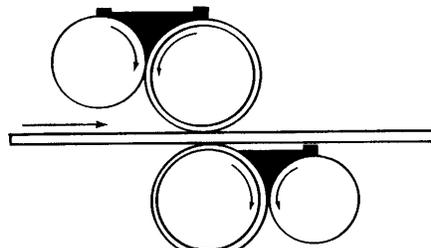
The doctor rolls are also spring loaded to compensate for any foreign object or material having to pass through the crotch formed by the two rolls.

ROLL SET-UP: Roll positions designate the type or model of machine designed by UNION. On the Model "A", which is a top and bottom coater, both upper and lower coating rolls are crotch fed. That is, the coating material is held in a crotch or trough formed by the doctor roll and coating roll and contained on the ends by seal plates. On the Model "B", which is also a top and bottom coater, the top roll is crotch fed, whereas the lower roll is fed by the coating roll picking up the coating material from a pan and doctored off to a desired thickness. The Model "C" is a single top coater and is crotch fed like the Model "A". The Model "D" is a single bottom coater and is pan fed (note illustrations).

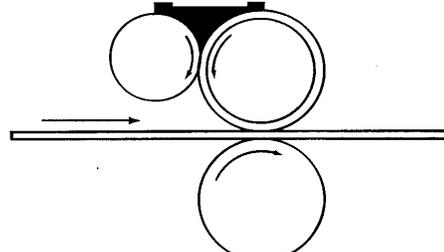
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GENERAL INFORMATION (Continued)

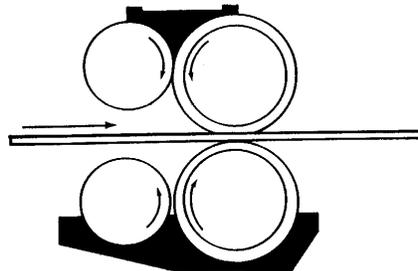
ROLL ARRANGEMENT



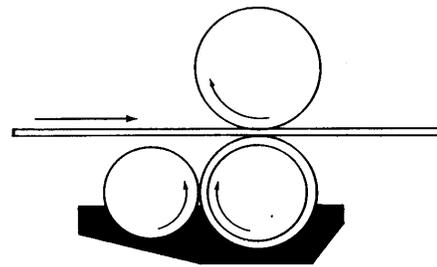
**Double Coater
Model A**



**Single Top Coater
Model C**



**Double Coater
Model B**



**Single Bottom Coater
Model D**

LOWER PAN: On the Model "B" and "D" machines, the lower pan is used to feed the coating roll. The coating material is picked out of the pan and doctored off to the desired thickness. The pan is mounted on the spacer pipes or slides below the lower roll assembly. This pan can be raised slightly and removed for cleaning purposes. The pan has a drain plug in the bottom and removing the pan each time the machine is cleaned is unnecessary.

The coating material is held in the crotch formed by the doctor roll and coating roll. However, before attempting to fill the crotch, the doctor roll must be adjusted in so that the coating material does not fall through the crotch. Theoretically, to set a starting gap between these rolls, the solid content of the coating material should be known. The desired dry film thickness of finish should be known. Knowing these two things, the gap between the rolls can be set by multiplying the desired dry finish thickness by what percent of the solid content of the coating material is of 100%. For example: say the solid content of the coating material is 50%, the desired dry film finish thickness of the coating is to be .002", and the solid content of the coating material (50%) is ½ of 100%, therefore, 2 x .002 is .004, or the necessary setting of the gap between the rolls.

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GENERAL INFORMATION *(Continued)*

Another example: solid content - 20%, 20% is 1/5 of 100%, therefore, $5 \times .002 = .010$, necessary setting between the rolls. This may not give you the predetermined dry finish thickness because not all of the coating material passing through the gap will be deposited on the stock being run; therefore, a small adjustment of the doctor roll away from the coating roll may be necessary to give you the desired dry finish thickness. The second method is to stop the coater and move the doctor roll against the coating roll. The coating material may now be put into the crotch and the doctor roll adjusted for the desired coating weights. Various methods of feeding the crotch have been worked out to the operators' satisfaction. Some have a gravity feed tank for manual filling, yet others may need a pumping unit which can be purchased as "optional" equipment.

7. **Adjustable Sheet Metal Infeed Table** – This table is provided for easier feeding of material into the coating roll assemblies. It is set at a slightly lower plane than the coating roll to ensure a good, even coat, even in the event of a warpage in the material being run. This table can easily be removed for a thorough cleaning of the machine.
8. **Pick-off Finger Assembly.** A series of adjustable pick-off fingers are mounted on a cross support bar to ensure positive pick-off of material being run. This pick-off assembly is located on the offbearing side of the UNION Roller Coater. This assembly can also be removed easily and quickly for cleaning, as is the infeed table.
9. **Location of the Drive Unit** -- The standard drive unit on the Series #45 2 HP, 220/440 volt, 3 phase 60 cycle. A variable speed drive is available with a speed ratio of 3 to 1, or, for example, 30 to 90 l.f.p.m. Any variable of speed can be worked into your application. With the addition of optional equipment, such as conveyors, etc., drive units may alter from the standard setup; these alterations in proper horsepower, voltage and R.P.M. will be taken into consideration at the time of ordering. Proper wiring should be checked so there is no damage to this drive unit. Perhaps you may be required to have explosion-proof controls and this may be obtained as optional equipment. Horsepower, voltage, phase, cycle, and R.P.M. are all plainly marked on each unit.

MACHINE SHOULD BE GROUNDED FOR THE SAFETY OF THE OPERATOR.

All basic coaters are chain driven and are thoroughly guarded to protect the operator. These guards should all be in place during operation.

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GENERAL INFORMATION *(Continued)*

- 10. Heavy gauge steel - Box Housings** -- The drive chain is contained under the end covers with access holes for lubrication fittings provided. These end housings are joined by tie rods, conveniently spaced to form a solid structure to hold the working parts in perfect alignment.

On the preceding page, Figure # shows the pick-off finger assembly. A series of adjustable pick-off fingers are mounted on a cross support bar to ensure positive pick-off of material being run. This pick-off assembly is located on the offbearing side of the UNION Roller Coater. This assembly can also be removed easily and quickly for cleaning, as is the infeed table.

DO NOT REMOVE OR ADJUST THIS ASSEMBLY WHILE MACHINE IS RUNNING.

The pick-off finger assembly should be moved only when the machine is stopped. Serious roll damage could occur if these fingers are allowed to engage the coating roll.

Figure # shows the UNION safety stop/reversing drum. This safety feature incorporates a release handle or cable running the full width of the machine on both the infeed and offbearing side of the coater. The safety stop/reverse feature incorporated into our coaters has been one of the strongest features, as far as operator safety, in our machines. In the event of an emergency, the operator may push or pull the safety cable or bar and instantly the powered rolls will stop and/or reverse; thus preventing injury to the operator or serious damage to the machine.

SEQUENCE FOR OPERATION

After properly checking the machine as previously outlined, a setup for operation may be started. Thorough reading and reference to the drawings will help you in this matter. Please be aware that the majority of coaters manufactured by the Union Tool Corporation are custom built specifically for a customer and the needs of a specific operation. The following are basic steps for roller coaters in general. The options and features of your coater may alter these instructions. Please be aware of the features of your specific coater.

1. Set gap between the upper coating roll and the backup roll or lower coating roll. This height is adjusted through the vertical adjustment assembly.

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SEQUENCE FOR OPERATION *(Continued)*

2. Use doctor roll adjustment for control of coating thickness. This should be done before coating material is placed in the coating head and possibly again after coating material in the crotch. The mechanical digital indicator or graduated collars will assist with reference numbers for a repeatable setting.
3. Fill crotch or pan with coating compound. (Note seal plate section for dripping.)
4. Turn on machine, let run until coating compound evens out over coating roll. Doctor roll adjustment may have to be slightly set for an even coat.
5. Test run material until satisfactory coating is obtained.
6. The gap between the coating roll and backup roll or lower coating roll should be tight enough to achieve complete coverage across the complete surface to be coated. Too tight a setting and excess will appear on the trailing edge of the substrate or squeeze out at the edges of the web or substrate will be evident. Too light a setting and you will see uncoated areas on the surface of the substrate to be coated.
7. make the final doctor roll setting for the amount of coating to be applied.

CLEANING THE COATER

The cleaning of the coater is **very, very** important and should be done **carefully** and **thoroughly**. Every coater should be cleaned whenever it will be idle for a period longer than the usable life of the coating material (at least once daily).

Regardless of the roll configuration of the coater, there are basic steps to take in cleaning the coater. If you are operating a top side coater only (Model "C"), the coating head (upper coating roll and doctor roll) must be raised either using the single handwheel top control or air cylinders if your coater is so equipped; to a distance of approximately 3.500". With the coater turned off, the clean-up pan, which has been provided, should slide between the upper coating head and the back-up roll. The clean-up pan will be supported by the infeed table and offbearing pick-off fingers or on brackets provided.

The upper doctor roll should be moved to a position against the coating roll just as you would if you were trying to apply a thin coating.

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CLEANING THE COATER *(Continued)*

By using the reversing drum, the coater should be reversed. This will allow the coating material to be moved from the upper nip to a position where the excess will fall into the clean-up pan.

After a brief period (approximately 30 seconds) the coater should be put back into the forward position. Raise the guard that guards the coating head and carefully pour or spray clean-up liquid into the crotch between the doctor roll and the coating roll. This guard is interlocked and will drop power to the coater. This can be done manually or by pouring clean-up liquid into the sump tank and utilizing the pump if the coater is so equipped. Close the guard and activate the coater. Allow the rolls to rotate for several minutes to allow the clean-up liquid to thin the coating solution.

By using the reversing drum, the coater should again be reversed. This will again allow the coating material to be moved from the upper nip to a position where the excess will fall into the clean-up pan.

Repeat the flushing of the coating material with the cleaning liquid until the coating and doctor rolls are clean.

Stop the coater and back the doctor roll away from the coating roll. Use the reversing drum to jog the rolls backward slightly. The excess will appear as a line across the coating and doctor roll which can be wiped away with the clean-up liquid.

DO NOT WIPE THE ROLLS WHILE THEY ARE ROTATING.

After cleaning, the rolls **must** be left apart until the machine is to be used again. If the rolls are left together when the machine is idle for any length of time, "flats" might occur. This will show up as a heavy line of coating due to a compression set on the rubber coating or doctor roll.

PROCEDURE FOR REMOVING COATING AND DOCTOR ROLLS

- a) Remove seal plates;
- b) Remove "end" covers on both housings; These are usually screwed in position.
- c) Remove chain and sprockets from rolls to be replaced;
- d) Loosen roll bearings (4 bolts per bearing) and collars which hold bearings in place;
- e) Slide bearings toward center of roll along journal; Keep the roll supported by overhead hoist and straps. Care should be taken not to damage the roll face or the steel journals while removing the roll.
- f) Shift the roll toward one end housing and tilt opposite end out;
- g) Shift entire roll out of machine;
- h) Installation of the roll is simply the reverse procedure of the above.

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LUBRICATION

Lubrication of the machine has been checked at the factory during the testing period. However, a double check of the lubrication points should be taken as now is a good time to check the lubrication points before operation. The lubrication points include roll bearings, idler sprocket bearings, and the drive unit. Proper grease fittings have been provided on all the bearings. Lubrication instructions for lubricating the bearings are provided by the manufacturer and are supplied in the manufacture information section of the manual.

The gear box should also be checked. Lubrication instructions for lubricating the gear box are provided by the manufacturer and are supplied in the manufacture information section of the manual.

A regular check of all lubrication points will ensure longer and more satisfactory service of this machine.

OPTIONAL EQUIPMENT

Various pieces or forms of optional equipment are available with the basic units. This may be infeed and/or offbearing conveyors or possibly a circulating pumping unit. Variable speed transmissions can also be added to allow a feeding rate of 3 to 1 ratio or, for example, from 30 to 90 l.f.p.m. Perhaps you have a heating or cooling problem, this can also be taken care of with the purchase of optional equipment.

At times, reverse coating is the best method of providing an even, smooth flow of coating material; at a small cost a standard coater can be provided with necessary drive units to accomplish either straight-through or reverse coating.

CONVEYORS

Conveyors are another item that may be incorporated into either coater, infeed and/or offbearing conveyors (of the neoprene belt type or mesh belt type) are available at a small cost. Perhaps a conveying system through the coater would be better suited for your application; this can also be built into the coater.

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CIRCULATING PUMP

If your machine is furnished with a circulating pumping unit (which can be purchased as option equipment), this will pump a steady flow of coating material from the sump pan to the necessary crotches, depending on the model of the machine. A bypass and valve regulate the amount of coating material needed. For drawing off the coating material into a container, roll supply valve is shut off and drain valve opened. The pressure feed on the pump can be adjusted by a pressure regulator mounted on the bronze pump which is driven by the pump motor. **Screw in for more pressure, screw out for less pressure.** Check the feed valves before using the pump; make sure all valves are open to permit compound to flow from the sump pan to the crotches.

CASTERS

Machines can be equipped with casters to facilitate movement of the machine from place to place. A locking mechanism can also be provided to prevent the machine from moving around after positioning for operation.

Proper care and maintenance of your UNION Roller Coater will ensure long lasting and satisfactory service.

We hope you are as proud to use UNION equipment as we are to build it!