

The Union Tool Corp.

**UNION HOT MELT
ROLLER COATER
MANUAL**

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INTRODUCTION TO THE UNION HOT MELT MANUAL

This manual was prepared for “standard” Union Hot Melt Roller Coaters. Union Tool provides standard machines as well as special machines for your particular application. This manual provides “in-general” information on our standard equipment. Some of the information may not pertain to your particular machine, but will provide you with a general overall lubrication and maintenance guide as well as troubleshooting.

Should your company or operator have any questions regarding this manual, please do not hesitate to contact the Union Tool Corporation, Technical Sales Department at 574/267-3211. Our hours are 8:00 A.M. through 5:00 P.M. Eastern Standard Time – Monday through Friday.

SAFETY

SAFETY INTRODUCTION:

Here you will find safety guidelines for use with Union Tool equipment. These guidelines apply to anyone working with Union Tool equipment, including operations and service personnel. These guidelines are repeated throughout the manual, along with specific warnings and cautions not included here. These safety guidelines cover:

- **Safety during Installation;**
- **Safety during Operation;**
- **Safety during Servicing;**
- **Safety when using Hot Melt Adhesives and Reactive Materials;**
- **What to do if Molten Material comes in contact with the skin.**

Failure to follow these recommendations may result in personal injury from burns or electrocution and/or equipment and property damage.

SAFETY DURING INSTALLATION:

- Electrical:**
1. A protective electrical ground connection to a reliable earth ground is essential for safe operation. Without one, all accessible conductive components (including knobs and controls that appear insulated) can render an electric shock.
 2. A disconnect switch with lockout capability must be provided between the power source and the equipment.
 3. The power supply wire gauge and insulation must be sufficient to meet the temperature and power requirements.
 4. Only fuses of the correct type voltage rating and current rating should be used. Refer to the Union Tool wiring diagram equipment parts list for fuse recommendations. Using incorrect or non-recommended fuses can present a fire hazard.

Pneumatic: Union Tool has installed a lockout, three-way, manual valve in the air supply line to the filter/regulator. This valve makes it possible to relieve air pressure and lock out the pneumatic system before undertaking maintenance or repairs.

SAFETY (Continued)

SAFETY DURING OPERATION: **DO NOT** operate Union Tool equipment under the following conditions:

1. Near volatile or otherwise explosive gases or materials.
2. Without the covers, panel and safety guards properly installed.
3. At atmospheric temperatures below 20°F (-6°C) or above 120°F (50°C).
4. In drafty areas with the coating rolls unshielded from the draft. Rapid heat dissipation due to air movement across the rolls may cause operational problems.
5. **NEVER** use Union Tool equipment as a ladder or stepping stool.

SAFETY DURING SERVICING:

1. **DO NOT** perform internal service or adjustment on any equipment unless another person capable of rendering first aid and resuscitation is present.
2. Only qualified personnel should service Union Tool equipment.
3. To avoid personal injury, never touch exposed connections and components while power is ON. Dangerous voltages exist at several points in the equipment.
4. Disconnect, lock out and tag external electrical power before removing protective panels or replacing electrical components.
5. Remove all jewelry (rings, watches, etc.) before servicing equipment.
6. If possible, stand on a rubber mat when servicing Union Tool equipment. **DO NOT** work on equipment if standing water is present. Avoid working in a high-humidity atmosphere. Cover exposed terminals and work areas with rubber sheeting to avoid accidental contact while the power is **ON**.
7. Always wear safety glasses, protective gloves and long-sleeved protective clothing to prevent injury from hot applicator parts, splashed hot melt adhesive and hot machine surfaces.

SAFETY (Continued)

SAFETY WHEN USING HOT MELT ADHESIVES AND REACTIVE MATERIALS:

Hot Melt Adhesives:

1. Use extreme care when working with molten materials. They solidify rapidly at high temperatures and present a hazard. Severe burns can occur if the molten materials come in contact with the skin. Even when first solidified, they are still hot.
2. Always wear protective clothing and eye protection when handling molten material or working near equipment containing hot melt adhesives.
3. Always be sure the work area is adequately ventilated. Avoid prolonged or repeated breathing of solvent vapors.

Reactive Materials:

When using reactive materials in this system, do not set the operating temperatures of the coater without first consulting the adhesive manufacturer and the Material Safety Data Sheet (MSDSs) concerning the storage, handling and use of these materials. Failure to follow the recommendation in the MSDS can lead to personal injury. If equipment is not operated in compliance with MSDS recommendations, Union Tool reserves the right to refuse service for this equipment.

IF MOLTEN MATERIAL COMES IN CONTACT WITH THE SKIN:

1. **DO NOT** try to remove the molten material from the skin.
2. Immediately immerse the affected area in cold, clean water. Keep the affected area immersed until the material has cooled.
3. **DO NOT** try to remove the cooled material from the skin.
4. Cover the area with a clean, wet compress.
5. In cases of severe burns, look for signs of shock. If shock is suspected, have the patient lie down, use blankets to preserve body heat and elevate the feet several inches.
6. Call a physician immediately.

INSTALLATION

Your Union Tool Hot Melt Coater is easy to install.

1. Remove the coater from the skid. The coater is very heavy so please make a note of the shipping weight and use the proper equipment. Lift from the bottom of the frame. Be sure that the lift forks are against the frame when lifting the coater from the wooden skid.
2. Place the coater in the chosen position.
3. Level the coater.
4. Hook up air exhaust to the 8" air duct opening on top of the coater. The amount of exhaust required is 500 to 1000 c.f.m., depending on the size of the coater.
5. Make the power drop to the disconnect box. The voltage should be clearly marked on the front of the disconnect box and on the electrical print inside the box.
6. Check rotation of the hot oil pump. The pump is marked as to the rotation of the pump, which is looking from the motor end of the pump, should be turning clockwise. Covers may have to be taken off to get a view of the pump rotation.
7. Make an air drop to the coater if the coater is equipped with a filter and regulator. **Please do not reduce the size of the lines of the air drop smaller than the supplied filter and regulator.**
8. Make a visual check between the coating rolls and doctor rolls; look for any loose objects that may have fallen between the rolls. Check the rotation of the coating and doctor rolls in the reverse mode. All guards and covers must be in position for the coater to operate.

EMERGENCY CLEANUP PROCEDURES

CLEANING UP HOT MELT ROLLER COATER PROCEDURES DURING POWER OUTAGES

Prior to having an actual power outage with adhesive in the machine, it would be best to have a "Plan of Action" ready so when it did happen everyone is prepared to handle the problem.

1. **Never assume that the power will come right back on.**
2. Once the adhesive starts cooling off it will start the curing processes. It is best to have a liquid cleaner ready so that you do not have to use the cleaner that would require heat to melt it.
3. The tool list would be a: Flashlight, Crescent Wrench, large pair of channel locks, rags, gloves, plastic scrapers, pair of needle nose pliers to break the chain, and Benzoflex 50 or Benzoflex 988sg (Liquid) for the liquid cleaner.
4. Follow all of the Lock-Out and Tag-Out procedures for safety; you do not want the machine to start or give you a problem during power up if the power were to come back on. You will want a lock on the electrical disconnect switch as well as on the pneumatic circuit.
5. You are going to remove or open the cover on the end of the machine that has the main drive chain to the coating rolls.
6. Once you have gained access to the drive chain, loosen up the spring tensioners and remove the springs. Then find the master link and remove the clip, then remove the drive chain.
7. Leave the coating roll(s) and doctor roll(s) together; using the large channel locks turn the coating roll on the roll journal or sprocket in reverse to take as much adhesive off of the rolls as possible. Once you have done that on the top roll, you can continue on and do that to the bottom roll until you get all of the adhesive off the rolls.
8. Pour the liquid cleaner into the machine and either try to rotate the rolls in the forward direction or begin wiping the rolls off using your trough for quantity of your cleaner to be in position. Once you have the rolls cleaned you may open the gap between the coating roll and the doctor roll making sure that all of the rolls are not touching each other.

PRODUCTS FOR CLEANING / MAINTAINING HOT MELT COATERS

1. Clean Up Materials / Plasticizer:

- A. Benzoflex #352 (for normal clean ups)
Note: Your Adhesive Company may also sell this same product.

EMERGENCY CLEANUP MATERIALS

Benzoflex 50 or Benzoflex 988sg (Liquid) for the liquid cleaner

Order from Chempoint 425-378-8582

Or

Eastman Chemical Co. Phone: 800-327-8626 x 2987

for distributor referral and questions about product

- B. Polyad Company
Product: Uniplex #260
Phone: 847-526-3322
- C. Dynaloy Inc. Dynaloy has a variety of urethane cleaning products.
Phone: 800-669-5709

2. Urethane Release Agent – Manufacturer is B & S Products Corp.

Product: Omniwax #1622

Phone: 574-537-0770

3. Pipe Sealant

Product: Loctite 567 PST

Contact: Local Vendor

4. Heat transfer oil for the machines heating system

Product: Petro-Therm

Contact: Local Vendor or call Petro Canada, Customer Service and ask for a distributor in your area – USA 1-888-284-4572.

NOTE: The Petro-Therm heat transfer oil is comparable with Mobiltherm 43 or you can use other heat transfer oils from other manufactures as long as there are comparable with the oils listed.

or

AS an alternative you can use Mobil Mobiltherm 43

Contact: Local Vendor or Mobil Oil, Customer Service and ask for a distributor in your area – Phone: 800-662-4525. Mobile Customer Service Department is very helpful and can tell you the location of their distributors.

PRODUCTS FOR CLEANING / MAINTAINING HOT MELT COATERS (Continued)

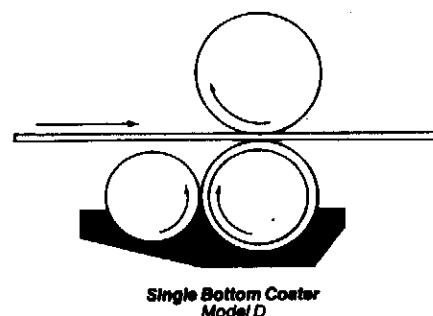
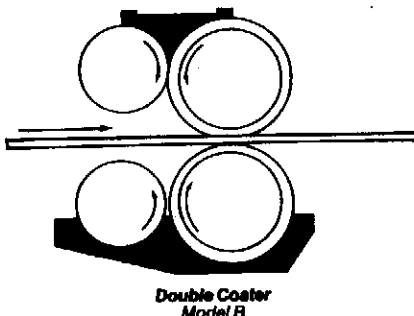
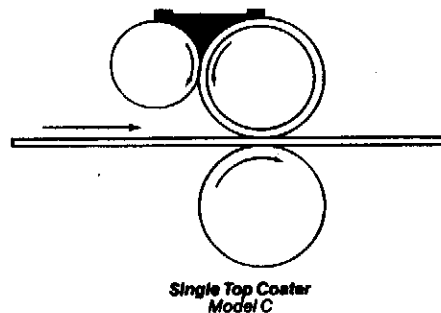
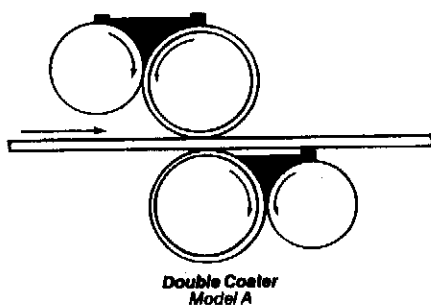
- 5. Mobil System Cleaner – Manufacturer is Mobil
Product: Mobil System Cleaner
Contact: Local Vendor or Mobil Oil, Customer Service – see above.
Note: The system cleaner is used in older or contaminated heating systems.

- 6. Oil for the Gear Box – Manufacturer is Mobil
Product: Spartan Synthetic EP 460 oil
Contact: Local Mobil Vendor or Mobil Oil, Customer Service – see above.

- 7. Grease for lubrication for bearings – Manufacturer is Dow Corning
Product: Dow Corning 41 or any good grade of grease with a temperature rating of up to 400° F.
Phone: Local Vendor.

- 8. Chain Lube – Manufacturer is Dow Corning
Product: C-40 High temp chain lube
Phone: Local Vendor.

This shows some of the different types of roll configurations used on Union Tool roller coating equipment.



PUSH-BUTTON CONTROL BOX (and their operations)

Note: The push button operation and layout is for the standard machines.

PB-2 Coater “**start**” push button will start the coating roll drive. The drive will start as long as the infeed and offbear clear lexan covers are in the closed position and the safety cable is in the forward or reverse position. Magnetic switches ensure that the covers must be in position for the coater to start.

PB-1 Coater “**stop**” button will stop the coating roll drive.

PB-4 Pump “**start**” button will start the hot oil recirculating pumping system. Should you press this button and the light does not stay, the selector switch SS-4 heater “**auto/ man**” may be in the auto position and should be in the manual position.

PB-3 Pump “**stop**” button will stop the hot oil recirculating pumping system. Should you press this button and the green start light does not turn off, the selector switch SS-4 heater “**auto/ man**” may be in the auto position and should be in the manual position. On most machines built after September 2001, the pump stop button will also reset the safety over-temperature controller. See Warning under MAINTENANCE FOR A UNION HOT MELT ROLLER COATER.

SS-2 Top-level selector switch controls the delivery of coating materials to the top coating head. If you turn the selector switch to the “**manual**” position, the delivery of coating materials will continue until you release the switch. Once the switch has been released, it will return to the “**off**” position. When the switch is turned to the “**auto**” position, it will remain in that position until it is manually turned to the “**off**” position. Once in the auto position, the level control photocell will automatically control the level of the coating material.

SS-3 Bottom level selector switch controls the delivery of coating materials to the bottom coating head. If you turn the selector switch to the “**manual**” position, the delivery of coating materials will continue until you release the switch. Once the switch has been released, it will return to the “**off**” position. When the switch is turned to the “**auto**” position it will remain in that position until it is manually turned to the “**off**” position. Once in the “**auto**” position the level control will automatically control the level of the coating material.

SS-1 Heater “**on**” and “**off**” selector switch. When the selector switch is in the “**on**” position will allow the heat to turn on when the pump is activated. When the switch is in the “**off**” position the heater will not heat.

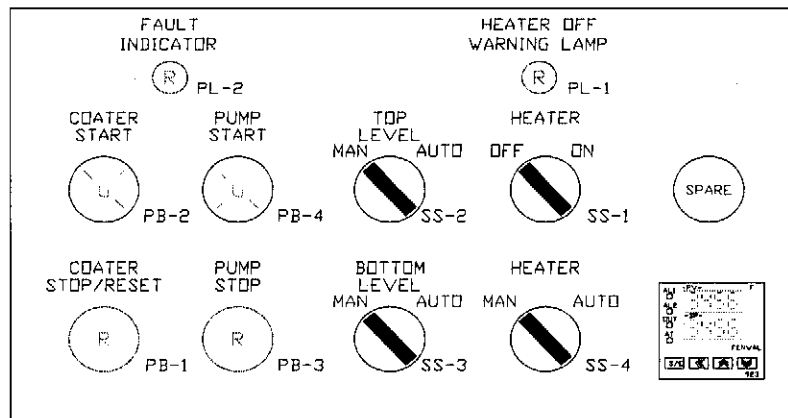
SS-4 Heater “**auto/man**” selector switch. When the switch is in the “**manual**” position, the pump must be activated manually. When the switch is in the “**automatic**” position the pump will start and stop automatically controlled by the 7-day timer.

PUSH-BUTTON CONTROL BOX (Continued)

PL-1 Pilot light heater off is a warning that the heater switch is in the “off” position and the machine will not heat up. This switch is normally used for maintenance.

PL-2 Pilot light fault indicator. This red light indicator is telling you that the coater drive has faulted and stopped. The reset to clear the fault is the coater stop button.

The temperature controller is a device that will control the temperature of the rolls. To change the temperature you must first press the “set/enter” button, then press the up or down arrow buttons until you raise or lower the setting to the desired temperature, then press the “set/enter” button.



HOT MELT ROLLER COATER START UP PROCEDURE

1. **HEAT ROLLS:** Oil heater and pump should be turned on to heat the rolls. When the temperature has reached the preset setting on the digital readout the coater is ready to start coating. Depending on the temperature of the location where the roller coater is located, heat up time could take approximately one hour or more depending on the size of the coater and temperature needed to coat with.

 2. **START ROLLS "FORWARD":** Either while the rolls are heating or after they are up to temperature, the coater may be started by engaging the "**start coater**" button. To ensure proper direction, make sure reversing the lever is in "**forward**" position.

 3. **ROLL ADJUSTMENTS:** Make the proper roll adjustments using the mechanical digital indicator for each adjustment. This includes the top vertical adjustment which controls the height of the top coating assembly should be set for thickness of parts being coated. Also, one or both doctor rolls should be set for proper coating weight or thickness.
- NOTE:** During this time the drum unloader should be placed in the heat up mode. The pump of the drum unloader should be in the "**off**" position.
4. **ADD ADHESIVE:** Only when the oil temperature has reached the preset temperature and roll adjustments have been made should adhesive be added to the roller coater. Only add adhesive when ready to coat parts.

HOT MELT ROLLER COATER **CLEAN-UP PROCEDURE**

1. The most efficient way to clean the coating head is to use as much adhesive within the rolls while coating product. Any adhesive left in the rolls when production is over will be wasted. Therefore, before the end of the production run, turn off the level controls on the roller coater so no more adhesive is added to the coater. The level controls may be run manually in order to add a small amount of adhesive if needed. This will help lower the amount of waste as much as possible.
2. If both coating heads (top and bottom) were being used, you do not need to move the top vertical adjustment. If only coating the top coating head was used, raise the top coating assembly to about 3"; stop the coater and insert the cleanup pan. The cleanup pan and catch pan may be lined with plastic or paper; this will make it easier to clean up when the adhesive and plastisizer (clean up material) have cooled and hardened.
3. If you are cleaning both the top and bottom coating heads, do not make any doctor roll adjustments. Stop the coater by moving the reversing switch to neutral and raise lexan hood for access on the backside of the coater. Remove the backside pick-off fingers hinge pin and hinge, which will open the pick-off finger table. Once the lexan hood is open, the machine will not be able to be started. The infeed table should also be hinged open during the cleaning of both coating heads. If the infeed table is not hinged open when the rolls are reversed, adhesive and or benzoflex may be deposited on the table.
4. Add cleanup material to one or both coating assemblies in between the doctor and coating rolls. Close the lexan hood and move the doctor roll against the coating roll, just as you would to apply a minimum coating. Start the roller coater in the forward position. Allow the cleanup material to revolve with the adhesive for several minutes. The coating roll will be cleaned by allowing this material to dissolve.
5. After several minutes, reverse the direction of the coating rolls by moving the reversing drum switch to reverse. This will allow all material between the rolls to be squeezed out from the bottom of the rolls into the cleanup pans or catch tray.
6. Repeat #4 and #5 approximately 3 times at which time all rolls should be clean of any adhesive and only have a residue of cleanup material on them.
7. After repeating #5 for the last time, be sure to adjust doctor roll away from the coating roll to ensure they are not touching. This may be done while rolls are still revolving. Leaving roll together will cause a flat spot on rubber coating rolls.

HOT MELT ROLLER COATER - CLEAN-UP PROCEDURE (Continued)

8. Once rolls are apart and clean, stop coater by engaging "**coater off**". Raise lexan hood and remove seal plates by pulling pins and lifting seal plate out. Gloves (high temp) will have to be worn when moving seal plates. With Gloves on, clean ends of the rolls and face of seal plates using heavy shop rags.
9. Wipe down roll face of each roll using clean shop rag to remove cleanup residue.
10. Lower lexan hood and close pick-off finger table using pin to lock table shut.

NOTE: Allow approximately 45 minutes for entire cleanup. Cleanup is most important to the function of this equipment.

MAINTENANCE CHECK LIST

1.	The two covers will need to be removed on the offbear end to gain access to the drive components.	<input type="checkbox"/>
2.	Remove the seal plates from the machine.	<input type="checkbox"/>
3.	The drive chain will need be removed from equipment as well as the doctor roll drive chain.	<input type="checkbox"/>
4.	All idler sprocket assemblies and coating roll and doctor roll bearings need be inspected as well as lubricated. Replaced as required.	<input type="checkbox"/>
5.	The drive chain needs be inspected and replaced as required.	<input type="checkbox"/>
6.	Tension springs on the chain drive will need to be inspected and replaced as required.	<input type="checkbox"/>
7.	If the balance of this part of the inspection has been completed, then reassemble.	<input type="checkbox"/>
8.	The single handwheel adjustment – this control will be lubricated as well as checked out for moving freely and will re-zero the mechanical digital indicator so it reads out correctly with the proper gap setting.	<input type="checkbox"/>
9.	The unifeed adjustment will need to be checked out for operation and wear as well. If any parts show ware replace as required. Check it for parallelism and make any adjustments as necessary and set the mechanical digital indicator to read out the gap setting for the opening of the roll.	<input type="checkbox"/>
10.	On A/D coaters – you will need to check out slide plates for the upper coating head assembly as well as the backup roll and lubricate the guides and make any adjustments to these motions as required.	<input type="checkbox"/>
11.	All motors will need to be blown off and cleaned up as much as possible, as well as the gearbox needs to be checked for the level of gear lube inside it.	<input type="checkbox"/>
12.	Heat the machine up to the operating temperature.	<input type="checkbox"/>
13.	Check the hot oil system for leaks.	<input type="checkbox"/>
14.	Check to make sure the safety over-temperature controller for the hot oil heater functions properly.	<input type="checkbox"/>
15.	Check the level control to confirm it is functioning properly.	<input type="checkbox"/>
16.	The hot oil sight gage will need to be cleaned.	<input type="checkbox"/>

YEARLY MAINTENANCE SCHEDULE		
1.	Follow the same procedures on the Maintenance Check List, as well as the following items.	<input type="checkbox"/>
2.	Drain the heat transfer oil from the hot oil recirculation system (see Note 1).	<input type="checkbox"/>
3.	Clean the heater, if necessary.	<input type="checkbox"/>
4.	Clean the screen in the hot oil recirculation system.	<input type="checkbox"/>
5.	Refill the system (see Note 1).	<input type="checkbox"/>
6.	The coater drive gearbox should be drained and replenished with fresh gear lube.	<input type="checkbox"/>
7.	All electrical connections on the main control panel will need to be checked out and tightened on the terminal stripes as well as the components inside the electrical box.	<input type="checkbox"/>
8.	Heat the machine up to the operating temperature. Check that all the rolls are heating up to temperature.	<input type="checkbox"/>
9.	Check system for leaks.	<input type="checkbox"/>
10.	Check to make sure the safety over-temperature controller for the hot oil heater functions properly (see Note 2).	<input type="checkbox"/>

Note 1: Please look at the Hot Melt Roller Coater Hot Oil System preventative maintenance.

Note 2: **WARNING**

CHROMALOX HEATER SAFETY OVER-TEMPERATURE CONTROLLER:

DO NOT set the temperature of the over-temperature controller above 525°F. **An improperly set over-temperature controller may cause a fire.** Carefully look at the front indicator as it reads out in Celsius as well as in Fahrenheit. This unit is located near the heater. Should your digital temperature controller at the pushbutton station go blank, you may push the small black reset button on the front of this safety over-temperature controller or the pump stop/ reset button . Once you have enabled the reset button on the face of this unit your digital temperature controller should power backup. If this safety over-temperature controller continues to trip out and needs to be reset, the hot oil system should be checked immediately. The cause of this over-temperature alarm may be either caused by a flow problem or the heater has sludge or carbon buildup on the heating elements. There is also a “Y” strainer/filter in the suction line below the expansion tank for the pump that can get plugged and slow down the oil flow through the heater causing an over-temperature condition. Please consult your owner’s manual for more information.

MAINTENANCE FOR A UNION HOT MELT ROLLER COATER

1. One of the first items to look for is to make sure there are 1" to 2" of oil in the sight glass in the expansion tank on top of the machine.
2. There is an air filter on the electrical control box that should be cleaned weekly.

Lubrication Guide: *(See Page 19 & 20 for Diagrams)*

NOTE: Follow the lockout and tag out procedures so no one will be injured while working on this equipment, locking out all the pneumatic and electrical connections to the machine.

- a) Open or remove the 2 covers on the offbearing side of the coater – the main drive for the coating rolls has 5 idler sprocket assemblies that need grease.
- b) There would also be 2 coating roll bearings as well as 2 doctor roll bearings.
- c) There are also 4 rotary union that may or may not require grease -- You will need to review the manual for that specific machine to determine if these rotary unions require any lubrication.
- d) Also, the electric motor has 2 grease zerts on them?
- e) There is also a gearbox that requires the oil level to be checked every time you service the machine and are greasing any of the bearings.
- f) On the opposite end of the machine there is the doctor roll drive that has 2 idler sprockets for each coating head assembly, so there would be 4 spots to grease on those idler sprockets as well as 2 coating roll bearings and 2 doctor roll bearings.
- g) In addition, there are rotary unions that may require lubrication as well.
- h) The other 2 spots on this machine to grease are the gearbox assemblies that move up and down the upper coating head for the different thickness of your products to be coated.

