



To watch a brief video on induction sealing basics please click on the play button above.

To see the rest of the Handbook's tips and techniques please scroll the document or use the bookmarks provided.



# Why Enercon?

## *Variety*

Enercon Has The Largest Range Of Air-Cooled Induction Cap Sealing Systems Available In The Industry Today, With 8 Models And Multiple Configurations To Suit Your Specific Needs.

### *Air-cooled Systems*

<i>Table Top</i>	<i>Conveyor Mount</i>	<i>Specialty / Capless</i>
Auto Jr.	Super Seal™ (SS50 – SS100)	Pneumatic Jr.
Super Seal™ Jr.	Super Seal™ Deluxe	Rotary / Indexing
	Super Seal™ Max	Pressure Belt

### *Tunnel Sealing Head Design*

Enercon's unique tunnel sealing head design (offered as standard for 53mm closures and smaller) increases electromagnetic power coupling into the foil, resulting in greater sealing efficiency. This greater efficiency permits faster line speeds at an equal power level.

### *Outstanding Service*

Enercon stands behind our equipment and customers with 24-hour technical assistance, rapid parts shipment, as well as loaner and exchange programs. Our worldwide network of representatives provides local expertise both before and after the sale. For immediate assistance online go to: [www.enerconind.com/support](http://www.enerconind.com/support).

## **Selecting the Right Induction Sealing System**

### *Questions to Answer*

<i>With Cap</i>	<i>Capless</i>
<ol style="list-style-type: none"> <li>1. Type of Product?</li> <li>2. Temperature of Product?</li> <li>3. Size of Container?</li> <li>4. Container Material?</li> <li>5. Diameter of Cap?</li> <li>6. Style of Cap: Child-Resistant, Dispensing, Snap Cap, Standard Flat, Push/Pull, Flip-Top?</li> <li>7. Liner Material?</li> <li>8. Conveyor Speed (Feet or Meters per Minute)?</li> <li>9. Is Wash Down Required?</li> </ol>	<ol style="list-style-type: none"> <li>1. Type of Product?</li> <li>2. Temperature of Product?</li> <li>3. Diameter of Container Opening?</li> <li>4. Size of Container?</li> <li>5. Container Material?</li> <li>6. Liner Material?</li> <li>7. Inline, Rotary or Indexing Production Line?</li> <li>8. Line Speed (Bottles per Minute – Rotary &amp; Indexing, Feet or Meters per Minute – Pressure Belt)?</li> </ol>

## **Induction Sealing Rules Of Thumb**

Glass containers with dry product can always be sealed. Check with your inner seal supplier when sealing liquids in glass.

The induction sealing process is still effective when liquid product is on the container lip, with the exception of some liquids on glass containers.

The operating frequency of the power supply determines the heating pattern of the electromagnetic field. Higher frequency results in heat concentration on the outside edge of the inner seal, which is beneficial for the one-piece type liners. As the frequency is lowered, the heating tends to be more uniform across the inner seal. This is desirable for a wax-bonded type 2-piece inner seal.

Electromagnetic radiation of the type and power level used is not harmful to humans.

# *Service Options*

## *Startup Made Easy*

Enercon offers a discounted Startup service for our customers who are unfamiliar with the installation and use of induction cap sealing equipment.

As part of the service, an experienced Enercon Field Service Engineer will review your cap sealer installation, making sure that everything has been done correctly. Or, if you prefer, the Field Service Engineer can supervise your installation of the cap sealing system.

Once your cap sealing system is up and running, the Field Service Engineer will provide hands-on training for your operators, as well as training on routine preventive maintenance and troubleshooting for your maintenance personnel.

## *Preventive Maintenance*

Routine Preventive Maintenance is at the heart of every successful manufacturing operation. Our experience over the past 30 years has shown that an aggressive preventive maintenance program is the best insurance against downtime. Solid periodic maintenance will also prolong the life of your equipment. We have in place a preventive maintenance program, our PMV service, which is designed to give you that insurance.

At a discounted rate we will supply a Field Service Engineer who will review all of your Enercon equipment. In addition to ensuring that your Enercon induction cap sealing systems are tuned up and performing correctly, our Field Service Engineer will provide hands-on training for your operators and maintenance personnel. He will also identify critical spare parts which should be a part of your maintenance inventory and help you refine your ongoing maintenance program.

To learn more about our Startup and Preventive Maintenance visits, contact Paul Reed at (262) 255-6070, or e-mail him at [preed@enerconmail.com](mailto:preed@enerconmail.com). He is ready to tell you more about these valuable programs and provide you with a comprehensive pricing package.

## *Field Service*

In conjunction with our Startup and PMV service, Enercon also provides emergency field service that gets consistently high ratings from our customers in the packaging industry. When a problem cannot be resolved by your maintenance department we will provide a Field Service Engineer to come to your plant and repair your equipment.

With extensive hands-on experience and direct access to our Engineering Department, our Field Service Engineer will ensure that the problem you are experiencing is resolved. He will also determine if anything else in the system may require repair.

For more information on Field Service visits contact Paul Reed at (262) 255-6070, or e-mail him at [preed@enerconmail.com](mailto:preed@enerconmail.com).

## *International Service*

Check with your local representative for the availability of International Field Service.

# *Laboratory Policies And Procedures*

## *In-House Testing*

Enercon's Induction Cap Sealing Laboratory can help you determine the proper sealing head and power rating, as well as test the suitability of your cap, bottle and liner material for your particular application. The lab has available every model, power rating and sealing head that Enercon manufactures, in order to duplicate actual production line conditions accurately.

Equipment research and development, and applications testing, are continuously conducted in the laboratory. This is an important element in Enercon's commitment to supply you with technological leadership in the constantly changing packaging industry.

## *Induction Cap Sealing Trials*

Enercon's Induction Cap Sealing Laboratory is equipped with a conveyor and tachometer to reproduce your line speed requirements accurately. The laboratory is also equipped with all of the current production models of cap sealing equipment, as well as all of the standard and specialty sealing heads produced by Enercon.

Tests can be performed on all sizes of containers and caps, from a small tube to a 2-gallon jug, with caps from 5mm to 120mm and larger. As a result of our cooperation with the leading liner material manufacturers, the laboratory also has a supply of practically all liner materials that are available. Therefore, we can work with the liner material you have already selected or refer you to the liner material manufacturers who can help you select the material that is best for your application. The laboratory is also equipped with a Pack-Vac Leak Detector and a torque meter. The Leak Detector can accommodate all but the largest containers, for testing the hermetic seal strength, and the torque meter allows the testing of the application and removal torque.

*COST:* There is no charge for the test itself. We do request that you contact our Sales Department for an RCN (Return Control Number) and send your samples to our facility freight prepaid. Let us know if you would like your samples returned to you.

*RESULTS:* You are welcome to visit our facility and observe the running of your sample. We will arrange to have your samples available at the time you wish to visit. Typically the visit would last three to five hours, usually from 9 a.m. until 2 p.m., with a break for lunch. You will be given a demonstration of the procedures followed for your sample. After a thorough discussion of your application, you are welcome to take a tour of the facilities and meet with members of our engineering staff to answer any technical questions you may have.

*DATA SHEET:* If you are unable to visit, the results of your sample will be forwarded to you. Any questions you may have are welcomed by our Sales Engineers.

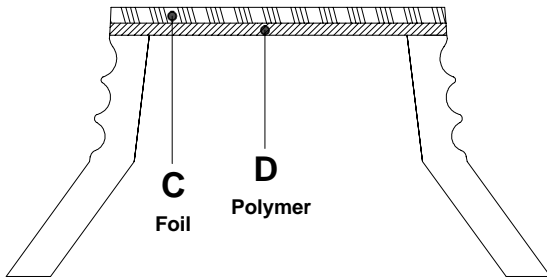
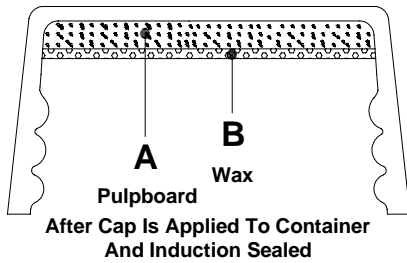
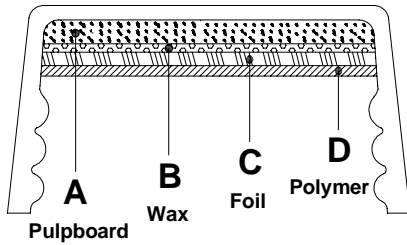
*TIME:* Your sample will be tested in a timely manner, generally within one to two weeks.

## Seal Problem Troubleshooting Tips

<i>Symptom</i>	<i>Probable Cause</i>	<i>Possible Solution</i>
<i>Partial seal, weak seal, no seal.</i>	<ul style="list-style-type: none"> <li>a. Insufficient power from sealer, conveyor too fast or power set too low.</li> <li>b. Improper coil height.</li> <li>c. Insufficient application torque.</li> <li>d. Induction liner incompatible with the bottle material.</li> <li>e. Bottle neck finish has been treated with flame, corona, or chemically.</li> <li>f. Imperfections in container finish, land area.</li> <li>g. Product is touching liner, heat sink effect.</li> </ul>	<ul style="list-style-type: none"> <li>a. See Page 11 for Operating Window Setup Procedure.</li> <li>b. See Page 10 for Sealing Head Alignment.</li> <li>c. See Page 8 for Suggested Application Torque.</li> <li>d. Contact your supplier, or send samples for testing.</li> <li>e. Contact your supplier.</li> <li>f. See Page 7 to help identify problem, contact container manufacturer.</li> <li>g. Check the fill level of product.</li> </ul>
<i>Seal extremely difficult to remove (1-piece liner).</i>	<ul style="list-style-type: none"> <li>a. Power from sealer set too high.</li> <li>b. Conveyor speed is set too slow.</li> </ul>	<ul style="list-style-type: none"> <li>a. See Page 11 for Operating Window Setup Procedure.</li> <li>b. Ensure line speed is correct. See Page 11 for Operating Window Setup Procedure.</li> </ul>
<i>Cap extremely difficult to remove (2-piece liner).</i>	<ul style="list-style-type: none"> <li>a. Insufficient wax melt, conveyor speed too fast or output power set too low.</li> <li>b. Improper coil height (too high).</li> <li>c. Excessive application torque.</li> <li>d. Foam liner material welds to polymer in induction liner.</li> <li>e. Product touching liner, heat sink effect.</li> </ul>	<ul style="list-style-type: none"> <li>a. See Page 11 for Operating Window Setup Procedure.</li> <li>b. See Page 10 for Sealing Head Alignment.</li> <li>c. See Page 8 for suggested application torque.</li> <li>d. See Page 11 for Operating Window Setup Procedure. Material in cap and backing material on liner may be too compatible – contact your supplier.</li> <li>e. Check the fill level of product.</li> </ul>
<i>Burnt Cardboard Liner.</i>	<ul style="list-style-type: none"> <li>a. Excessive power from sealer, conveyor too slow or power set too high.</li> <li>b. Bottles back up under sealing head.</li> <li>c. Insufficient application torque.</li> <li>d. Gap between liner and container lip caused by defect in container.</li> </ul>	<ul style="list-style-type: none"> <li>a. See Page 11 for Operating Window Setup Procedure.</li> <li>b. See Page 10 for Sealing Head Alignment, check for cocked cap. Do not stop conveyor while unit is still running.</li> <li>c. See Page 8 for suggested application torque or contact your supplier.</li> <li>d. Contact your supplier.</li> </ul>
<i>Low or no removal torque.</i>	<ul style="list-style-type: none"> <li>a. Insufficient application torque, closure not securely applied.</li> <li>b. Excessive application torque, threads of closure stripped.</li> <li>c. Void created when wax is absorbed into pulpboard.</li> </ul>	<ul style="list-style-type: none"> <li>a. See Page 8 for suggested application torque.</li> <li>b. See Page 8 for suggested application torque.</li> <li>c. Contact your Sales Manager to discuss possible solutions.</li> </ul>
<i>Pinholing.</i>	<ul style="list-style-type: none"> <li>a. Excessive power from sealer, conveyor too slow or power set too high.</li> <li>b. Product may be attacking liner, if pinholes occur well after a good seal has been confirmed.</li> </ul>	<ul style="list-style-type: none"> <li>a. See Page 11 for Operating Window Setup Procedure.</li> <li>b. Contact your supplier or send samples for testing.</li> </ul>
<i>Pinwheel effect on liner.</i>	<ul style="list-style-type: none"> <li>a. Retorquing too soon after induction sealer.</li> <li>b. Wax was not absorbed into pulpboard completely.</li> </ul>	<ul style="list-style-type: none"> <li>a. Move Retorquing equipment further downstream from sealer.</li> <li>b. See Page 11 for Operating Window Setup Procedure.</li> </ul>

# Liner Types

Before Cap Is Applied To Container  
And Induction Sealed



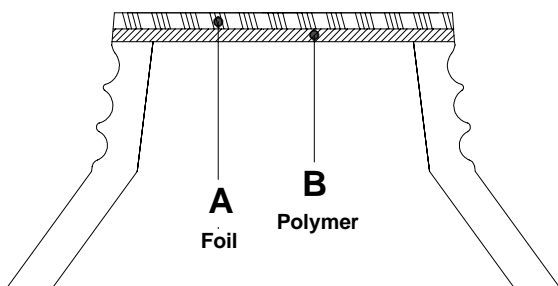
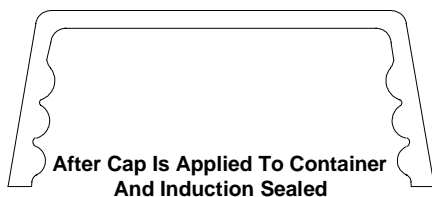
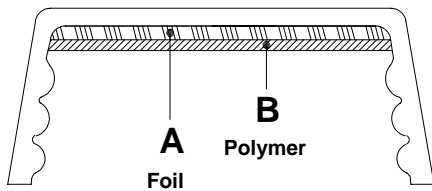
## Multilayer Liners

Multilayer liners consist of 4 basic components, as shown.

When a multilayer liner passes through the induction field of the sealing head the following occurs:

1. The foil is heated to a temperature that will allow the polymer to melt and flow.
2. The polymer flows around the land area of the container filling any voids.
3. The wax is melted and absorbed into the pulpboard, or similar absorbent material.
4. The polymer cools and hardens creating the hermetic seal.

Before Cap Is Applied To Container  
And Induction Sealed



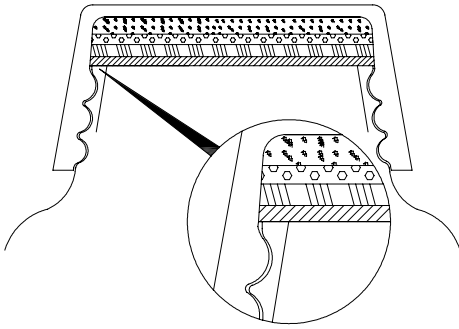
## Single-Piece Liners

Single piece liners consist of 2 basic components, as shown.

When a single-piece liner passes through the induction field of the sealing head the following occurs:

1. The foil is heated to a temperature that will allow the polymer to melt and flow.
2. The polymer flows around the land area of the container filling any voids.
3. The polymer cools and hardens creating the hermetic seal.

# Cap / Container Issues

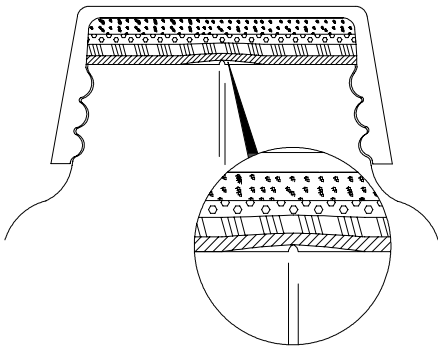
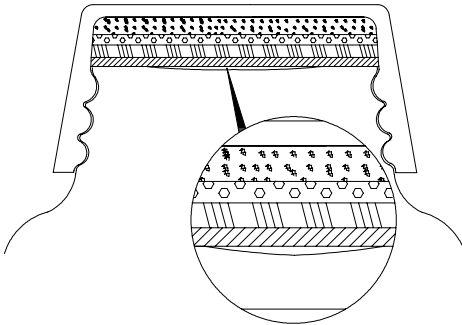
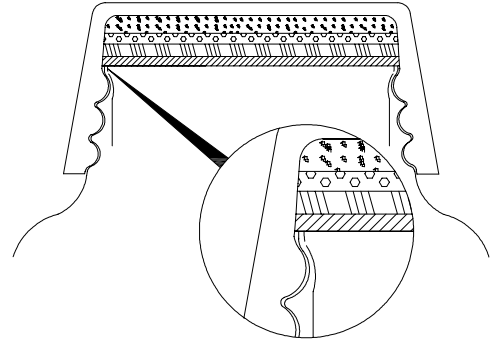


## *Good Container Lip/Liner Contact*

Good contact between the liner material and the container lip is very important. This goes hand in hand with the amount of torque applied, but can be a problem even when the torque levels are good. The land area of the container should be wide enough and rigid enough to support the pressures and heating required for a good seal.

## *Poor Container Lip/Liner Contact*

A thin or weak land area can cause poor contact between the liner material and the container lip. When the land area is too thin there may not be enough rigidity in the land area to support the pressures and heat required for a good seal.

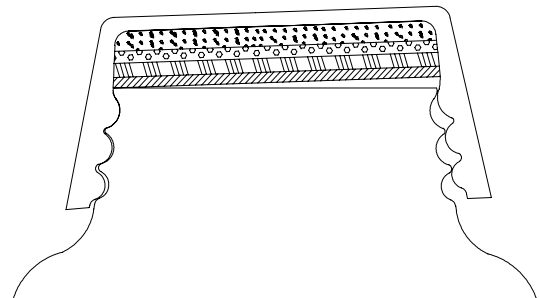


## *Container Lip Deformations*

Gaps between the land area and liner material can be the result of any number of problems, from mold imperfections to container material issues. Regardless of the cause, any gap between the liner and container land area may cause overheating and failure of the seal. A gap caused by fall away of the land area, as well as a gap caused by a protrusion, is shown. These defects can typically be detected on the container land area before the container is capped.

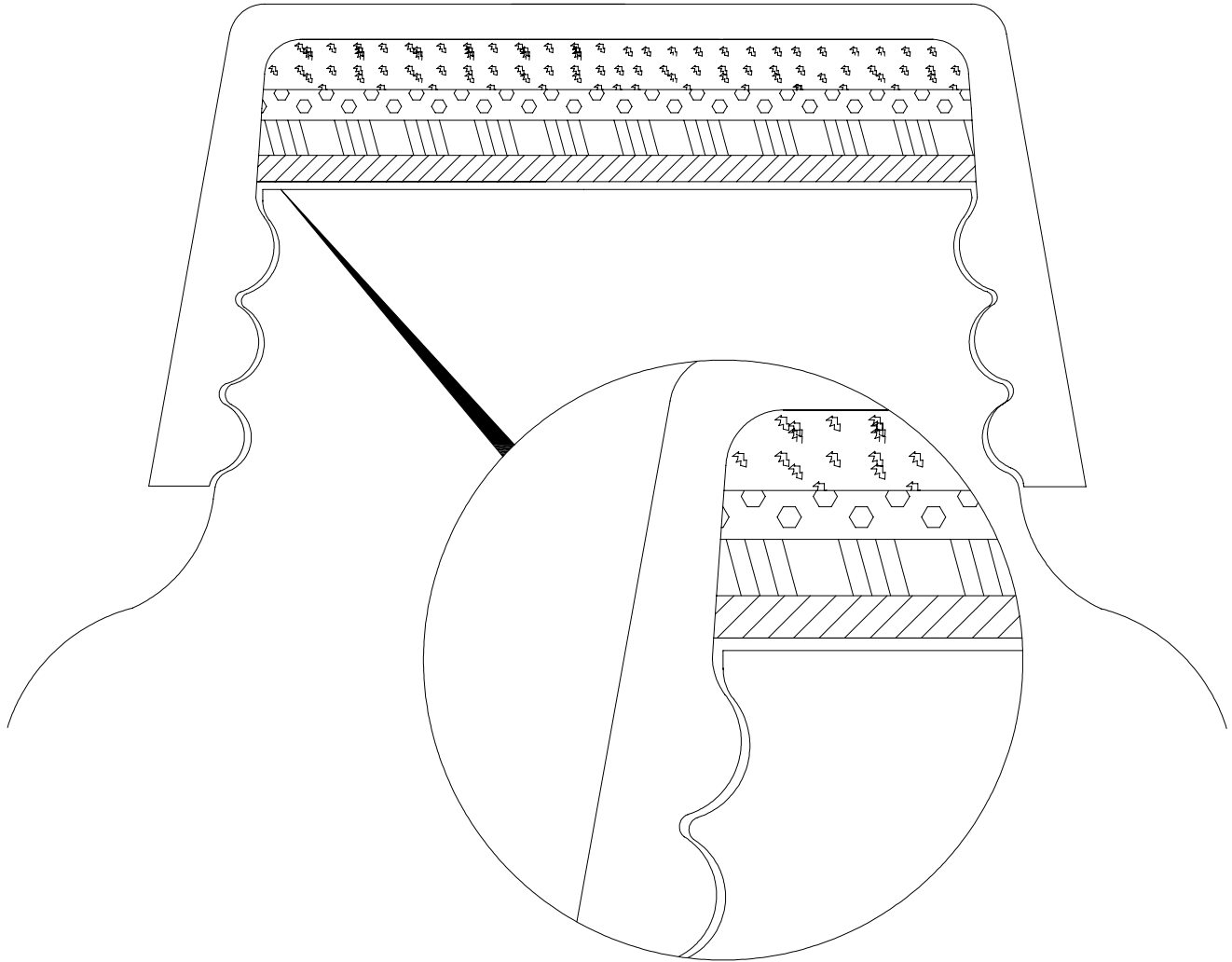
## *Cocked Cap*

A cocked cap is usually due to a problem with the capping process or a cap or container problem. The gap created can cause overheating and the cap itself may actually jam the container under the sealing head causing the liner to overheat severely.



# Torque Requirements

One of the most common causes of poor or inconsistent sealing is an improperly torqued cap. Whether the torque is too low or too high, the end result is usually an air gap between the lip of the container and the liner material. This air gap will usually cause overheating of the liner, but at the very least will create a gap too large for the polymer to fill. The following table is provided as a general rule of thumb for determining the torque required for your cap size. For exact torque requirements, contact your cap manufacturer.



Cap Size	Torque	Cap Size	Torque
15mm	6-9 in./lbs (.68-1nm)	53mm	21-36 in./lbs (2.37-4.06nm)
18mm	7-10 in./lbs (.79-1.13nm)	58mm	23-40 in./lbs (2.59-4.51nm)
20mm	8-12 in./lbs (.9-1.35nm)	63mm	25-43 in./lbs (2.82-4.85nm)
22mm	9-14 in./lbs (1-1.58nm)	70mm	28-50 in./lbs (3.16-5.65nm)
24mm	10-16 in./lbs (1.13-1.8nm)	83mm	40-60 in./lbs (4.51-6.78nm)
28mm	12-18 in./lbs (1.35-2.03nm)	89mm	45-65 in./lbs (5.08-7.34nm)
33mm	15-25 in./lbs (1.69-2.82nm)	100mm	50-70 in./lbs (5.65-7.90nm)
38mm	17-26 in./lbs (1.92-2.93nm)	110mm	52-73 in./lbs (5.87-8.25nm)
43mm	18-27 in./lbs (2.03-3.05nm)	120mm	55 -75 in./lbs (6.21-8.47nm)
48mm	19-30 in./lbs (2.14-3.38nm)		



# Liner Issues



## **Good Seal**

A good seal will have good adhesion for the entire circumference of the bottle opening. Wrinkling will be at a minimum and on multilayer liners the cap will have no darkening that would indicate overheating.



No discoloration indicates proper output level.



## **Poor Seal**

When the output is too low, line speeds too high, or the sealing head misaligned the liner material will not adhere properly to the lip of the bottle. This can range from a seal that lets go under light pressure to no adhesion to the lip of the bottle. On multilayer liners there may also be swirling of the liner due to poor wax absorption into the backing material.



## **Overheated Seal**

When the output is too high, or line speeds too slow, overheating of the liner will occur. The liner will often wrinkle badly, melt into the lip of the bottle, and give off a burned smell. The burned smell can also contaminate your product. On multilayer liners the pulpboard will show signs of discoloration or burning, depending on the severity of the overheating.



Darkening or burning indicates output level needs to be lowered.



## **Easy-Peel Liners**

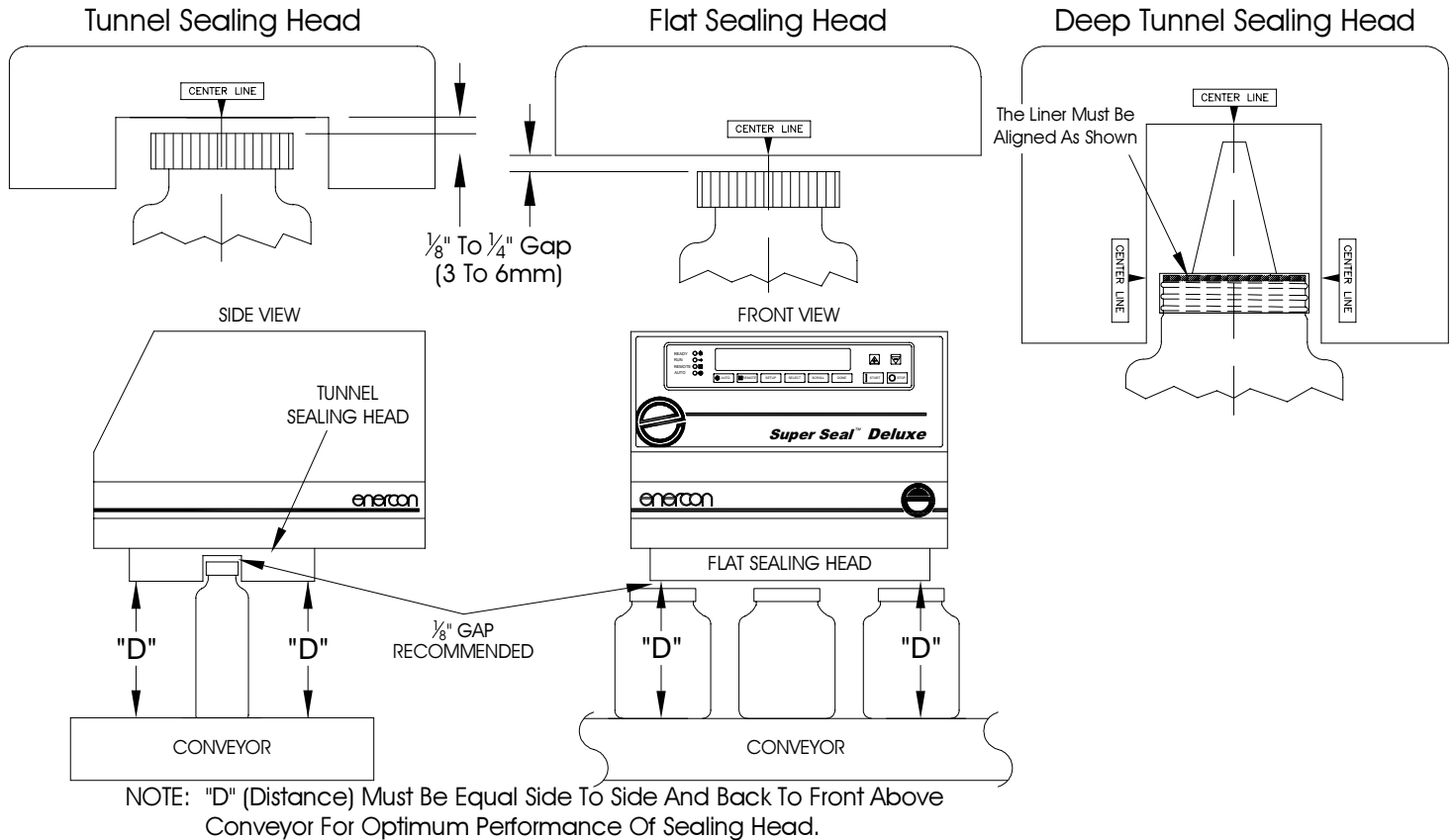
Easy-peel liners seal tightly to the lip of the bottle, but allow for a clean peel from the bottle.

## **Tamper-Evident Liners**

Tamper-evident liners seal tightly to the lip of the bottle, but leave part of the liner on the lip when opened. This is used to show evidence that the bottle has indeed been opened.



# Sealing Head Alignment



## Sealing Head Alignment Quick Setup

- Step 1: Level and center Sealing Head over conveyor or product.
- Step 2: Fill 2 containers with product to duplicate production weight.
- Step 3: Place one container at each end of the Sealing Head.
- Step 4: Place a proper thickness gauge on top of each cap.
- Step 5: Lower the Sealing Head onto the gauge. The fit should be snug with no change to gap when the gauge is removed.
- Step 6: Align guide rails to ensure the containers enter and exit the Sealing Head properly centered.

Note: The "1" Sealing Head should be initially set up like the Flat Sealing Head and then skewed to the proper position for the cap size being sealed. Ensure there are no metal guide rails located beneath the sealing head.

## Setup Information

We recommend that a record be kept of the setup information for each product run with your Cap Sealer. This information helps ensure consistent and accurate change over between products. This information also helps troubleshooting of sealing issues if they arise. The Miscellaneous Section in your manual contains a table for recording this information.

# *Operating Window Setup Procedure*

As with any piece of equipment it is important to know your Cap Sealer's operating parameters. The following is a step-by-step explanation of how to determine the Operating Window for each package run on a given piece of equipment.

1. Ensure the unit is installed properly (refer to your Operations Manual) and the sealing head is at the correct height, centered, and is parallel over the conveyor (refer to Page 10).
2. Ensure the conveyor speed is set properly for the package being tested.
3. Ensure the container and caps are free of defects (refer to page 7) and are compatible with each other. Also check to ensure the torque is correct for the cap size being used (refer to page 8).
4. Start unit, set the Output % to minimum and run a single container. Check the container for a seal.
5. If no seal was achieved, increase the Output % in increments of 5-10% until a partial seal is achieved, increment by 1-2% until a complete seal is achieved (refer to page 9). If a partial seal was achieved, increase the Output % in increments of 1-2% until a complete seal is achieved (refer to page 10). This is the minimum set point of the Operating Window.
6. Once the minimum set point is established, increase the Output % by 1-2% until the liner or cap show signs of overheating (refer to page 9). Decrease Output by 1% until the overheating is eliminated. This is the maximum set point of the Operating Window.
7. Now that the Operating Window is established test the package in the range of Output from minimum to maximum to determine at what Output % the best seal is achieved. This will be the production Output level.
8. Position and run a tightly grouped number of containers that will completely fill the Sealing Head. Verify the Output % on the meter remains constant and that the seal results are the same on all containers run.
9. Record the Minimum/Maximum Output % of the Window, Production Output %, Line Speed, Cap, Liner and Container information for future reference. Your Operations Manual includes a Production Information table for this purpose.
10. Repeat all steps for each package run on the equipment.

This information is a useful tool that helps decrease the time required for changeover between packages, as well as troubleshooting to help determine if you have a package or equipment problem.

## Super Seal™ Troubleshooting Tips

<i>Symptom</i>	<i>Cause</i>	<i>Solution</i>
<b>AUTO</b> LED Lit and Output Only 25%	<ol style="list-style-type: none"> <li><b>AUTO</b> Mode Option Not Included With Unit.</li> <li>Unit Waiting For 0-10V Signal From PLC.</li> </ol>	<ol style="list-style-type: none"> <li>Switch To <b>MAN</b> Mode.</li> <li>Provide 0-10V Signal.</li> </ol>
Display Dim Or Flickers While Unit Is Running.	<ol style="list-style-type: none"> <li>Output Capacitor Cable Incorrectly Routed.</li> <li>Output Capacitor Body Isolated From Ground.</li> </ol>	<ol style="list-style-type: none"> <li>Loosen Nut Securing Wire #48, Rotate Wire Away From Display Board.</li> <li>Snug Capacitor Mounting Hardware The Solder Plugs On All Capacitor Bodies Read Shorted To Base Plate.</li> </ol>
Unit Runs But <b>RUN</b> LED Is <u>Not</u> Lit.	<ol style="list-style-type: none"> <li>The Output Level Is Below The Adjustable LSI Set Point (If Unit Has A Stack Light It Will Flash Red).</li> </ol>	<ol style="list-style-type: none"> <li>Refer To Your Operations Manual To Ensure LSI Setpoint Level Is Set Properly.</li> </ol>
<b>REMOTE</b> LED Lit And None Of The Buttons Function.	<ol style="list-style-type: none"> <li>Improperly Installed Control / Display Board.</li> <li>Failed Control / Display Board.</li> </ol>	<ol style="list-style-type: none"> <li>Reinstall Control / Display Board Ensuring All Buttons Depress And Release Properly.</li> <li>Repair / Replace Control / Display Board.</li> </ol>
<b>TEMP</b> LED Is Lit.	<ol style="list-style-type: none"> <li>Ambient Temperature Too High.</li> <li>Dirty / Failed Cooling Fan.</li> <li>Failed Temperature Sensor.</li> <li>Failed Control / Display Board.</li> </ol>	<ol style="list-style-type: none"> <li>Ensure Ambient Temperature <math>\leq 104^{\circ}</math> F/<math>40^{\circ}</math> C.</li> <li>Clean / Replace Cooling Fans.</li> <li>Check / Replace Sensor.</li> <li>Repair / Replace Control / Display Board.</li> </ol>
<b>FAULT</b> LED Is Lit	<ol style="list-style-type: none"> <li>Failed Inverter.</li> <li>Failed Power Connector Board.</li> <li>Failed Control / Display Board.</li> <li>Input Voltage Too Low – 208 VAC Or Lower Input Voltage On A 240 VAC System.</li> </ol>	<ol style="list-style-type: none"> <li>Perform Inverter Ohm Checks, Replace Inverter.</li> <li>Repair / Replace Power Connector Board.</li> <li>Repair / Replace Control / Display Board.</li> <li>Step Up 208 VAC Using Buck/Boost Or Input Transformer Or Supply Input Voltage From A 240 VAC Source.</li> </ol>
<b>AUTO</b> LED Lit With No Control Over Changing Function.	<ol style="list-style-type: none"> <li>Failed Control / Display Board.</li> <li>Improperly Installed Control / Display Board.</li> </ol>	<ol style="list-style-type: none"> <li>Repair / Replace Control / Display Board.</li> <li>Reinstall Control / Display Board Ensuring All Buttons Depress And Release Properly.</li> </ol>
Display Stops Flashing, And Shows A Solid 00 On Output.	<ol style="list-style-type: none"> <li>Interlocks Not Satisfied.</li> <li>Defeat Plugs Or Sensors Not Connected.</li> <li>Failed Inverter.</li> <li>Open Output.</li> <li>In Remote Mode – Waiting On Remote Start Command (<b>REMOTE</b> LED Is Lit).</li> </ol>	<ol style="list-style-type: none"> <li>Check Interlocks / Connections.</li> <li>Ensure Defeat Plugs / Sensors Are Installed Properly.</li> <li>Perform Inverter Ohm Checks, Replace Inverter.</li> <li>Check Output Wiring To Output Caps, Ct And Sealing Head.</li> <li>Change To Manual Mode Or Provide Remote Start.</li> </ol>

## Super Seal™ Max / Super Seal™ Deluxe Troubleshooting Tips

<i>Symptom</i>	<i>Cause</i>	<i>Solution</i>
VFD Display Does Not Light Up	<ol style="list-style-type: none"> <li>Circuit Breaker / Input Voltage.</li> <li>Ribbon Cable.</li> <li>Failed Display Board.</li> <li>Failed Control Board.</li> </ol>	<ol style="list-style-type: none"> <li>Turn Breaker On And / Or Ensure Proper Input Voltage.</li> <li>Reconnect / Replace Ribbon Cable.</li> <li>Repair / Replace Display Board.</li> <li>Repair / Replace Control Board.</li> </ol>
Ready Indicator Lit, But Dim.	<ol style="list-style-type: none"> <li>Low Input Voltage.</li> <li>Control Board.</li> </ol>	<ol style="list-style-type: none"> <li>Ensure Proper Voltage Is Supplied.</li> <li>Repair / Replace Control Board.</li> </ol>
Output Fluctuates (More Than 2%).	<ol style="list-style-type: none"> <li>Sealing Head Coupling Into Nearby Metal.</li> <li>Inadequate Input Power.</li> <li>Sealing Head Connections.</li> <li>Failed Control Board.</li> </ol>	<ol style="list-style-type: none"> <li>Remove / Isolate Metal.</li> <li>Ensure Input Power Is Correct And Steady.</li> <li>Ensure Sealing Head Is Connected Securely.</li> <li>Repair / Replace Control Board.</li> </ol>
Inverter Fault.	<ol style="list-style-type: none"> <li>Inverter</li> <li>Control Board.</li> </ol>	<ol style="list-style-type: none"> <li>Replace Inverter.</li> <li>Repair / Replace Control Board.</li> </ol>
Temperature Fault.	<ol style="list-style-type: none"> <li>Over Temperature.</li> <li>Cooling Fan.</li> <li>Temperature Sensor.</li> <li>Control Board.</li> </ol>	<ol style="list-style-type: none"> <li>Check Ambient Temperature.</li> <li>Clean / Replace Cooling Fan.</li> <li>Check Wiring / Replace Temp. Sensor.</li> <li>Repair / Replace Control Board.</li> </ol>
Over Current Fault.	<ol style="list-style-type: none"> <li>Sealing Head.</li> <li>Output Capacitors.</li> <li>Output Current Transformer.</li> <li>Loose Wiring.</li> </ol>	<ol style="list-style-type: none"> <li>Repair / Replace Sealing Head.</li> <li>Replace Output Capacitors (All Caps).</li> <li>Repair / Replace Output Current Transformer.</li> <li>Tighten / Replace Wiring.</li> </ol>
Interlock Fault	<ol style="list-style-type: none"> <li>Open Interlock.</li> </ol>	<ol style="list-style-type: none"> <li>Close Interlock, Install Defeat Connector.</li> </ol>
System Error Message	<ol style="list-style-type: none"> <li>System Has Experienced An Internal Error.</li> </ol>	<ol style="list-style-type: none"> <li>Refer To Operations Manual For System Error Description.</li> </ol>
Communication Error Message	<ol style="list-style-type: none"> <li>Ribbon Cable.</li> <li>Display Board.</li> <li>Control Board.</li> </ol>	<ol style="list-style-type: none"> <li>Reconnect / Replace Ribbon Cable.</li> <li>Repair / Replace Display Board.</li> <li>Repair / Replace Control Board.</li> </ol>

NOTE: For symptoms not listed on table contact Enercon Industries Customer Service (262) 255-6070.

# Compak™ / Compak™ Convertible / Integral II / Early Super Seal™ Troubleshooting Tips

<i>Symptom</i>	<i>Front Panel LEDs</i>	<i>Meter</i>	<i>Bd LED</i>	<i>Seal</i>	<i>Cause</i>	<i>Solution</i>
<b>FAULT</b>	STANDBY FAULT	00	N/A	No Seal	1. Water Hoses Reversed. 2. Low Water Pressure. 3. Pressure Switch. 4. Failed Control Board.	1. Swap Hoses. 2. Check Water Level And Strainer. 3. Check Wiring / Replace Switch. 4. Repair / Replace Control Board.
<b>GEN</b>	STANDBY GEN	00	Lit	No Seal	1. Failed Inverter / Chopper. 2. Failed Control Board. 3. Failed Output Capacitor. 4. Failed Sealing Head. 5. Failed Output Leads.	1. Replace Device And Gate Leads. 2. Repair / Replace Control Board. 3. Replace All Capacitors. 4. Replace Sealing Head. 5. Replace Output Leads
<b>TEMP</b>	STANDBY TEMP	00	N/A	No Seal	1. Insufficient Cooling Water Or Air Flow. 2. Failed Temp Switch. 3. Failed Control Board.	1. Check Water System And Cooling Fan. 2. Replace Temp Switch. 3. Repair/Replace Control Board.
Power Supply Will Not Start	None	00	N/A	No Seal	1. Input Power Missing. 2. Ribbon Cable. 3. Failed Circuit Breaker. 4. Failed Control Board. 5. Failed Membrane Switch.	1. Check Voltage Source. 2. Connect / Replace Ribbon Cable. 3. Replace Circuit Breaker. 4. Repair / Replace Control Board. 5. Repair / Replace Membrane Switch.
Power Supply Will Not Start	STANDBY	00	N/A	No Seal	1. Interlocks Not Satisfied. 2. Failed Membrane Switch. 3. Failed Control Board. 4. Miswiring In Power Supply.	1. Check Interlocks / Connections. 2. Repair / Replace Membrane Switch. 3. Repair / Replace Control Board. 4. Correct Wiring.
Power Supply Will Not Start	STANDBY	02 to 06	Lit	No Seal	1. Failed Inverter / Chopper. 2. Failed Control Board.	1. Replace Failed Device. 2. Repair / Replace Control Board.
Power Supply Will Not Start	STANDBY	07 to 12	Lit	No Seal	1. Defective Output Capacitor.	1. Replace All Output Capacitors.
Unable To Achieve Full Output	STANDBY RUN	25% to <100	Lit If Limit Is Met	May Not Be Affected	1. Sealing Head Coupling Into Nearby Metal. 2. Inadequate Input Power. 3. Failed Output Leads. 4. Failed Control Board.	1. Remove / Isolate Metal. 2. Correct Input Power. 3. Replace Output Leads. 4. Repair / Replace Control Board.
Meter Fluctuates	STANDBY RUN	25% - 100% But Fluctuates Under Load.	Not Lit	Intermittent	1. Overloading System. 2. Inadequate Input Power. 3. Failed Output Leads. 4. Failed Control Board.	1. Increase Spacing Of Bottles. 2. Correct Input Power. 3. Replace Output Leads. 4. Repair / Replace Control Board.
Meter Fluctuates	STANDBY RUN	25% - 100% Fluctuates At Set Point.	Not Lit	Not Affected	1. Failed Membrane. 2. Failed Control Board.	1. Replace Membrane. 2. Repair / Replace Control Board.
Intermittent Seals	STANDBY RUN	25% - 100%	Not Lit	Intermittent	1. Sealing Head Alignment. 2. Liner / Container Compatibility Problem. 3. Torque Problem.	1. See Page 16 For Sealing Head Alignment. 2. Verify Liner / Container Compatibility. 3. See Page 9 For Torque Listings.
Unit Drops Out Intermittently	STANDBY RUN (intermittent)	25% - 100% & 00%	Not Lit	Intermittent	1. Stall / Backup Sensor. 2. Interlocks. 3. Failing Output Leads.	1. Reset / Replace Sensor. 2. Check Interlocks. 3. Replace Output Leads.

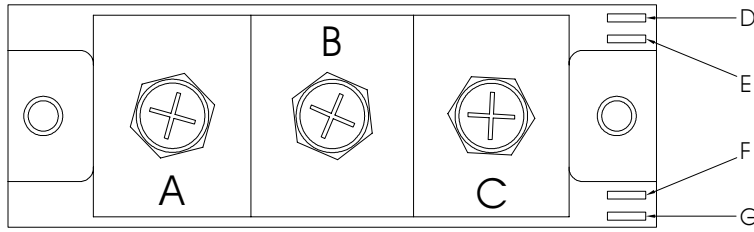
*NOTE: For symptoms not listed on table contact Enercon Industries Customer Service (262) 255-6070.*

# Compak™ Jr. / Auto Jr. / Super Seal™ Jr. Troubleshooting Tips

Symptom	Cause	Resolution
<i>Front Panel Is Blank With Power Applied</i>	<ol style="list-style-type: none"> <li>1. Sealing Head Connection (SSJr Only).</li> <li>2. Power Cord Condition.</li> <li>3. Voltage Missing at Outlet.</li> <li>4. Fuse Open.</li> <li>5. Ribbon Cable Condition.</li> <li>6. Control Board.</li> <li>7. Power Board.</li> <li>8. Internal Wiring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Fully Seat Sealing Head Connector.</li> <li>2. Replace / Reconnect Power Cord.</li> <li>3. Correct Issue At Outlet.</li> <li>4. Replace Fuse.</li> <li>5. Reconnect / Replace Ribbon Cable.</li> <li>6. Repair / Replace Control Board.</li> <li>7. Repair / Replace Power Board.</li> <li>8. Correct Replace Wiring.</li> </ol>
<i>Front Panel is Lit But Unit Doesn't Cycle Or Run</i>	<ol style="list-style-type: none"> <li>1. Sealing Head / Unit Connection (CJr Only).</li> <li>2. Connector Pins Damaged (CJr &amp; SSJr).</li> <li>3. Trigger Switch (CJr &amp; SSJr).</li> <li>4. Proximity Sensor (AJr Only).</li> <li>5. Remote Start Contact (SSJr Only).</li> <li>6. Ribbon Cable Condition.</li> <li>7. Control Board.</li> </ol>	<ol style="list-style-type: none"> <li>1. Securely Set Locking Ring.</li> <li>2. Repair / Replace Pins / Connectors.</li> <li>3. Repair / Replace Switch.</li> <li>4. Properly Adjust / Align or Replace Sensor.</li> <li>5. Repair / Replace N.O. Momentary Contact.</li> <li>6. Reconnect / Replace Ribbon Cable.</li> <li>7. Repair / Replace Control Board.</li> </ol>
<i>Timer Cycles When Power Is Turned On</i>	<ol style="list-style-type: none"> <li>1. Trigger Switch (CJr &amp; SSJr).</li> <li>2. Proximity Sensor (AJr Only).</li> <li>3. Remote Start Contact (SSJr Only).</li> <li>4. Control board.</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair / Replace Switch.</li> <li>2. Properly Align, Adjust, Or Replace Sensor.</li> <li>3. Repair / Replace N.O. Momentary Contact.</li> <li>4. Repair / Replace Control Board.</li> </ol>
<i>Timer Counts Down Properly, But Sealing On LED Is Not Lit</i>	<ol style="list-style-type: none"> <li>1. Sealing Head / Unit Connection (CJr Only).</li> <li>2. Sealing Head Connection (AJr Only).</li> <li>3. Connector Pins Damaged (CJr Only).</li> <li>4. Inverter Device (CJr &amp; AJr Only).</li> <li>5. MOSFETS (SSJr Only).</li> <li>6. LED</li> <li>7. Control Board.</li> <li>8. Power Board.</li> </ol>	<ol style="list-style-type: none"> <li>1. Securely Set Locking Ring.</li> <li>2. Ensure Coil Connection Is Good.</li> <li>3. Repair / Replace Pins / Connectors.</li> <li>4. Replace Failed Inverter.</li> <li>5. Replace Failed MOSFET.</li> <li>6. Replace LED.</li> <li>7. Repair / Replace Control Board.</li> <li>8. Repair / Replace Power Board.</li> </ol>
<i>Unit Runs And Seals But FOIL PRESENT LED is Never Lit (CJr &amp; AJr)</i>	<ol style="list-style-type: none"> <li>1. Foil Present LED Circuit Not Set Properly.</li> <li>2. Sealing Head / Unit Connection (CJr Only).</li> <li>3. Connector Pins Damaged (CJr Only).</li> <li>4. LED</li> <li>5. Control Board.</li> </ol>	<ol style="list-style-type: none"> <li>1. *Adjust Foil Present Circuit.</li> <li>2. Securely Set Locking Ring.</li> <li>3. Repair / Replace Pins / Connectors.</li> <li>4. Replace LED.</li> <li>5. Repair / Replace Control Board.</li> </ol>
<i>Unit Runs And Seals But MISSING FOIL is Always Lit (SSJr Only)</i>	<ol style="list-style-type: none"> <li>1. MISSING FOIL Circuit Not Set Properly.</li> <li>2. Control Board.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust MISSING FOIL Circuit.</li> <li>2. Repair / Replace Control Board.</li> </ol>
<i>Unit Runs Properly and Both LED's Function, But No Seal is Achieved</i>	<ol style="list-style-type: none"> <li>1. Missing Liner Material In Cap.</li> <li>2. Sealing Head / Cap Alignment.</li> <li>3. Container And Liner Compatibility.</li> </ol>	<ol style="list-style-type: none"> <li>1. Only Use Caps With An Appropriate Liner.</li> <li>2. Ensure Proper Centering And Gap.</li> <li>3. Contact Your Supplier.</li> </ol>
<i>Input Power Must Be Cycled Off And On Repeatedly To Seal (AJr Only)</i>	<ol style="list-style-type: none"> <li>1. Proximity Sensor.</li> </ol>	<ol style="list-style-type: none"> <li>1. Properly Align, Adjust, Or Replace Sensor.</li> </ol>
<i>F01 – F07 Error Message Is Displayed (SSJr Only)</i>	<ol style="list-style-type: none"> <li>1. Causes For Each Code Vary.</li> </ol>	<ol style="list-style-type: none"> <li>1. Contact Enercon Industries Customer Service.</li> </ol>

\*Some Compak™ Jr's Will Be Adjusted w/Pot Inside Unit, While Other Units Cannot Be Adjusted. These Can Be Identified By The Lack Of Foil Indicator Adjustment Hole In The Front Panel. (CJr = Compak™ Jr. / AJr = Auto Jr. / SSJr = Super Seal™ Jr.)

# Inverter / Chopper Ohm Checks



Chopper Will Have D & E Shorted Together.

Meter Hook-Up	VOM (Rx1)	DVOM (Diode)
(+) A to (-) B	Open	Open
(-) A to (+) B	$\approx 20\Omega$	.4 V
(+) A to (-) C	$\approx 20\Omega$	.4 V
(-) A to (+) C	Open	Open
(+) B to (-) C	$\approx 40\Omega$	.8 V
(-) B to (+) C	Open	Open
(+) D to (-) E w/Gates Disconnected	Slight Deflection, Then Open	Open
(+) G to (-) F w/Gates Disconnected	Slight Deflection, Then Open	Open

- Any "Zero" ohm reading constitutes a bad Semiconductor.
- Apply an extremely thin film of thermal compound.
- Securely mount devices, torque mounting bolts to 30 inch-pounds or 3.39 N-m.
- Gate leads **MUST** be replaced with devices.

## Maintenance List

### Daily Checks

- Water Level\*
- Coil Alignment

- Options Function
- Output Range

### Monthly Checks

- Check Strainer\*
- Blow Out Unit\*\*
- Clean Radiator\*
- Check Output Cables / Sealing Head\*

- Test Interlocks
- Check / Clean Fans\*\*
- Inventory Spare Parts

\*Applies to Water Cooled Equipment Only.

\*\*Use LP Air

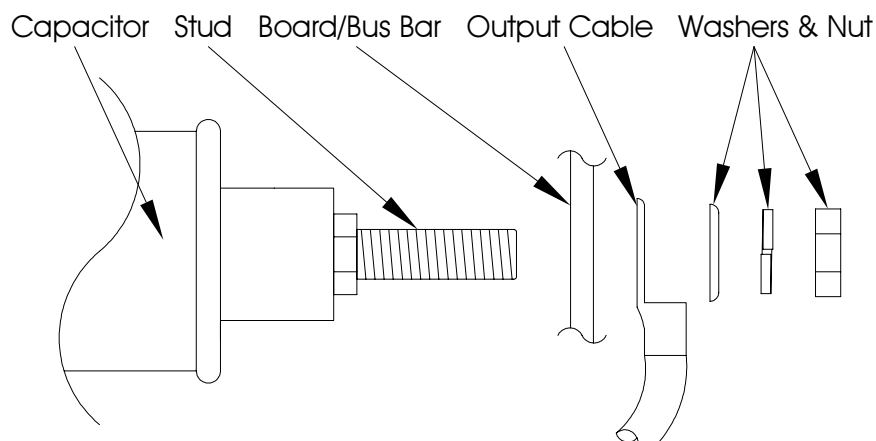
## Quarterly Checks

	Date Performed	Performed by
<i>March</i> Flush Unit*		
<i>June</i> Vinegar Flush Unit * Check Connections		
<i>September</i> Flush Unit*		
<i>December</i> Vinegar Flush Unit * Check Connections Oil Fan Motor		

# Oil Filled Output Capacitor Replacement

Some Enercon Cap Sealers use oil filled output capacitors that are mounted in banks of 2 to 4 capacitors, some with single banks others with multiple banks. Regardless of the configuration of your Cap Sealer there are several guidelines to adhere to when replacing capacitors on your system. Use the following guidelines to ensure your replacement capacitors are installed properly.

1. Whenever an output capacitor fails in a bank it is recommended that all the capacitors in that bank be replaced at the same time. Since the failure of one capacitor can stress the remaining capacitors in that bank another failure may occur in a relatively short period of time.
2. Once the old capacitors are removed ensure the mounting surface is clean and any Nomex insulating material is in good shape (not all Cap Sealers have a Nomex insulator). Clean the mounting surface and replace any damaged insulators as required.
3. The *Super Seal™ 50, 75 & 100* Cap Sealers have gasket material that is used for spacing of the mounting plate(s). This allows air flow across the body of the capacitors as well as allowing expansion when heating occurs. When installing the mounting plate(s) to the capacitor bank, only tighten the holding screws or acorn nuts until the gasket material just begins to compress. **DO NOT OVER TIGHTEN** as damage may occur to the capacitors.
4. The *Compak™* Cap Sealers use a strip of gasket material to keep the capacitors from sagging at the studs. This also allows air flow around the capacitors as well as expansion when heating occurs. If the gasket material is damaged, or sticks to the old capacitors when they are removed, install new gasket material onto the base plate beneath the capacitor bank.
5. The *Super Seal™ Max, Super Seal™ Deluxe, Compak™ Convertible* and *Integral II* Cap Sealer models use brackets for mounting the output capacitors. The *Super Seal™ Max* and *Super Seal™ Deluxe* also have a circuit board mounted to the studs for monitoring the output. These brackets and boards provide the proper spacing of the capacitors and should be reinstated in the same configuration, replacing only the capacitors. **DO NOT OVER TIGHTEN** brackets to the capacitor body as damage may occur to the capacitors.
6. Reinstall all wires and bus bars onto the same points on the capacitors, or boards, that they were removed from, this ensures the Cap Sealer's operating frequency will remain the same. Refer to your system's operations manual for the configuration of your particular output capacitor bank.
7. Reinstall the washers, lock washers and ¼ - 20 nuts onto the capacitor studs and torque the nuts to **20 in. lbs (2.26 Nm)**, **DO NOT OVER TORQUE** the nuts as this may damage the internal connections to the studs of the capacitor.





# Water System Flush

*Note: These Procedures are only applicable to water-cooled systems.*

A system flush is one of the most important steps you can take in maintaining your equipment. We recommend flushing your system quarterly, alternating between fresh water and vinegar flushes. The fresh water flush is easily accomplished by simply removing the old water from your induction sealer and replacing it with fresh distilled water. The vinegar flush may require scheduling during a period of down time and will require the following materials.

- ◆ One to five gallons of white vinegar
- ◆ One to five gallons of distilled water (water savers only)
- ◆ Wet/dry vacuum to remove water (water savers only)
- ◆ Acid pump (city water)
- ◆ Five gallon plastic pail (city water only)
- ◆ Low-pressure air supply
- ◆ Goggles or safety glasses
- ◆ Rubber gloves

Once the required materials are together use the following steps to perform the vinegar flush.

1. Remove all power from the system, following all safety procedures.
2. Remove all covers to gain access to the water tank.
3. Drain water using the wet/dry vacuum, acid pump or other equipment. Remove output hose and blow LP Air through the unit, reattach hose. City water systems: blow air through the unit.
4. Fill the water tank with vinegar. City water systems: connect acid pump to the inlet side of the water path, run outlet hose to pail and fill pail with vinegar.
5. Restore power to water saver.
6. Turn on water saver and let run until vinegar is distributed through system. City water systems: operate acid pump until vinegar is returned to the pail.
7. Let stand for 20 to 30 minutes.
8. Repeat Steps 6 and 7 for two to three hours.
9. Repeat Steps 1 through 3 to remove vinegar.
10. Repeat Steps 4 through 6 using fresh water to flush vinegar. City water systems: reattach unit to city water.
11. Repeat Steps 1 through 3 on water savers to remove fresh water. Fill water tank with distilled water and replace all covers making sure that the system is in a safe operating condition. If water may freeze, use a 60/40 mixture of ethylene glycol. DO NOT USE ANTIFREEZE.

## Pump Pressure Adjustment

Replacement Procon pumps for our standard water saver systems are shipped set at the manufacturer's pressure setting, typically 60 psi. When a replacement pump is installed in your water saver system it may require the pressure be adjusted to match the pressure setting of your original pump. The following is a detailed explanation of how the pressure is set on these pumps. *Refer to page 30 for pump parts breakdown.*

1. On the pump you will find 2 acorn nuts. The large nut covers the strainer and the small nut covers the Pressure Set Screw. Remove the small acorn nut using a  $\frac{3}{4}$  " open end wrench or socket.
2. The Pressure Set Screw is slotted to allow setting the pressure using a standard screwdriver. Turn the set screw clockwise to raise the pressure and counterclockwise to lower the pressure. In most cases you will need to lower the pressure on replacement pumps. Final pressure should be 10 – 15 psi on older systems and 30 – 35 psi on newer systems.
3. Reinstall the small acorn nut onto the Pressure Set Screw, ensure that the pressure does not increase as you tighten the acorn nut, and tighten using a  $\frac{3}{4}$  " open end wrench or socket.

Your pressure should now be set and your system ready to be placed back into production. If you have any problems or further questions on this procedure please contact Enercon Industries Customer Service Department (262) 255-6070.