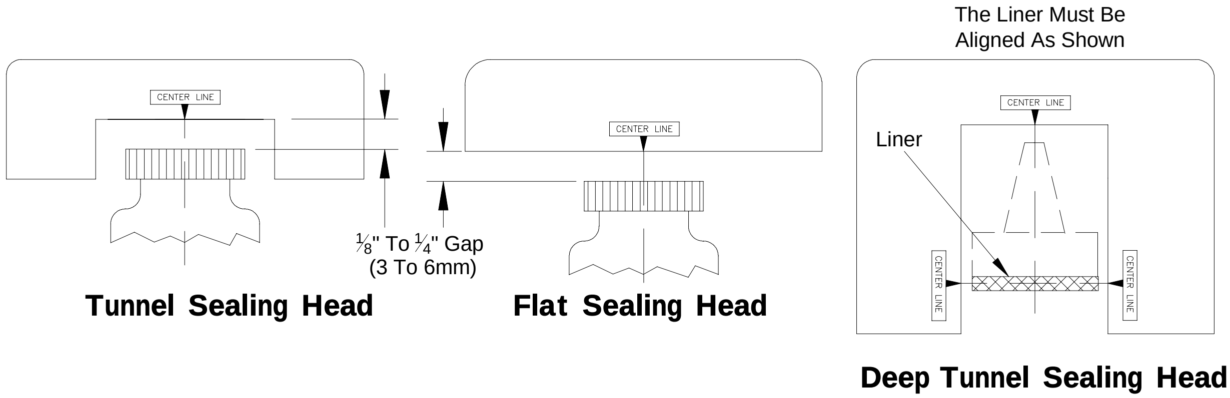
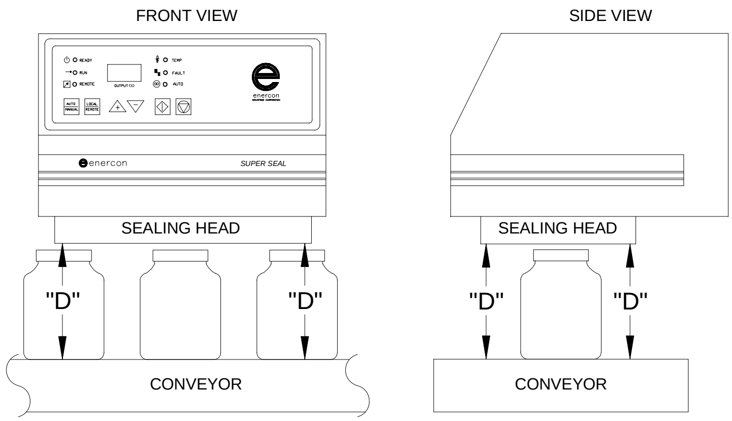
Cap Sealer Set-Up and Application Tips

Sealing Head Alignment





NOTE: "D" (DISTANCE) MUST BE EQUAL SIDE TO SIDE AND BACK TO FRONT ABOVE CONVEYOR FOR OPTIMUM PERFORMANCE OF SEALING HEAD.

Note: Super Seal Power Supply is shown, but alignment requirements pertain to all Enercon Cap Sealers.

Sealing Head Alignment Quick Set-Up

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.

Set-Up Information

We recommend that a record be kept of the set-up 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 product run on a given piece of equipment.

1. Ensure the unit is set up properly and the sealing head is at the correct height, centered, and is parallel over the product path.

2. Ensure the conveyor speed is set properly for the product being tested.

3. Ensure the container and caps are free of defects and are compatible with each other. Also check to ensure the torque is correct for the cap size being used.

4. Start unit and set the Output % at minimum and run a single container. Check the container for a seal.

5. If no seal was achieved, increase the Output % in increments of 10% until a partial seal is achieved, increment by 1-2% until a complete seal is achieved. If a partial seal was achieved, increase the Output % in increments of 1-2% until a complete seal is achieved. 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. 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 product 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.

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 products, as well as troubleshooting to help determine if you have a package or equipment problem.

Helpful Induction Sealing Application Information

1. **Pressure** - Even, uniform pressure on the induction liner over the entire land area of the container is required for a good seal. Important contributors to the establishment of the appropriate amount of pressure include the amount of on torque pressure, thread design, and closure design.

2. **Heat** - Heat is the active ingredient in the induction sealing process. Too much heat can be as counterproductive as too little. Trial and error will lead you to the appropriate power settings for your various applications. In addition to your power settings, selection of the proper induction coil design, proper set-up and coil alignment are also very important.

3. **Time** - The induction liner must spend a sufficient amount of time under the induction coil to properly melt the bonding polymer to the land area of the closure. As a general rule, the faster your process speed becomes the higher your power setting will have to be in order to establish a proper melt and create a good seal.

4. **Closures** - Closures must be designed to accommodate the type of induction liner you intend to use. The thread style and pattern on the closure must be compatible with those on the container. The closure must create an even, uniform pressure on the induction liner over the entire land area of the container. The closure should be properly sized to fit the container neck and robust enough in its construction to avoid distortion when it is applied.

5. **Containers** - The thread style and pattern on the container must be compatible with those on the closure you choose. The land area of the container must be flat and smooth. Ridges or saddles on the land area will lead to weak seals. The best seals are achieved when the land area is 85 mils wide or wider. The neck area and the land area of the container should never be chemically treated or flame treated. Such treatment will inhibit the bonding of the liner to the container.

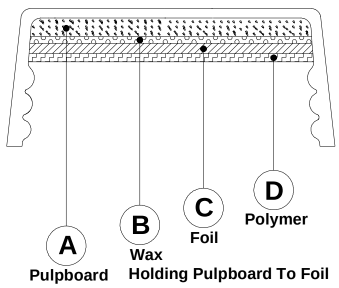
6. **Induction Liner** - Induction liners have been developed for almost every possible application. They have a wide range of characteristics and capabilities. Always remember that the sealing polymer on the liner must be compatible with the material your containers are made of and capable of creating the type of seal you wish to achieve. The O.D. of the liner must be appropriate for the closure and the container you are using. The liner should be free of wrinkles or impurities and should be centered in the closure.

7. **Sealing Coil** - As is true for induction liners, sealing coils have been developed for almost every possible application. They can be as simple as a hand-held, manually operated coil or as sophisticated as a conveyor mounted, high-speed system. The function of the induction coil is to create an electromagnetic current, called an eddy current. The eddy current is induced into the foil portion of the induction liner thereby heating the liner and making the sealing process possible. Choosing the appropriate induction coil for your application requirements is very important.

APPLICATION TIPS

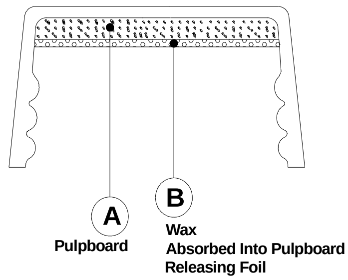
SYMPTOM	PROBABLE CAUSE
1. **Partial weld, weak weld or no weld.**	• Weak Induction field - low power. • Improper induction coil height. • Insufficient exposure time – too much speed. • Insufficient on torque. • Incorrect induction liner. • Oversized liner with overhang related problems. • Saddles, ridges or flashing on the land area. • Chemical or flame treatment of the container neck or the land area. • Undersized land area – too narrow. • Induction equipment failure.
2. **Excessive removal torque on a one piece liner**	• Excessive exposure - high power/low speed. • Liner too large - overhang wedged in threads • On-torque to high d. Closure and container threads not compatible. • Product in contact with liner during sealing process.
3. **Excess removal torque on a two piece liner.**	• Insufficient exposure – low power/high speed. • Improper coil height. • Insufficient hot-melt adhesive. • Hot-melt adhesive too cold when applied. • Liner undersized - pulp backing bonded to container. • Excessive on-torque. • Product in contact with liner during sealing process
4. **Scorched or burned pulp backing**	• Excessive exposure - high power/low speed. • Container stalled under induction coil. • Closure not fully torqued - no heat sink effect from container. • Incorrect alignment of the induction coil – not parallel, centered and level to the closure.
5. **Very low removal torque**	• Insufficient on-torque. • Excessive power applied degradation of pulp backing. • Excessive on torque – threads stripped.

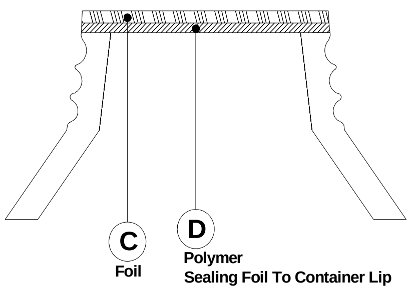
Liner Types



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:

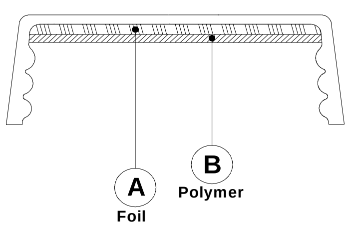
1. The foil is heated to a temperature that will allow the polymer to melt and flow.

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.

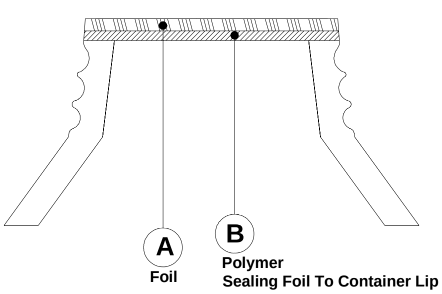
4. The polymer cools and hardens creating the hermetic seal.

Note: Retorquing of Multilayer Liners is not required for a good seal, but may be desired for cosmetic purposes. Ensure the Retorquing equipment is located far enough down stream of the sealer to ensure the laminate has hardened before entering the retorquing equipment.



Single Piece Liners

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



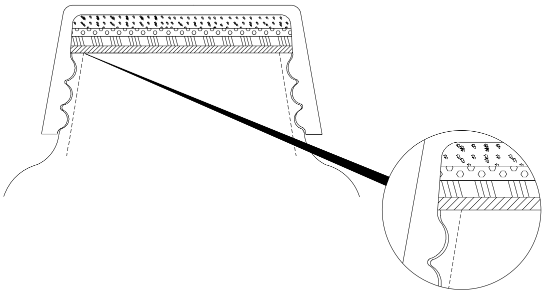
When a single piece liner passes through the induction field of the sealing head the following occurs:

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

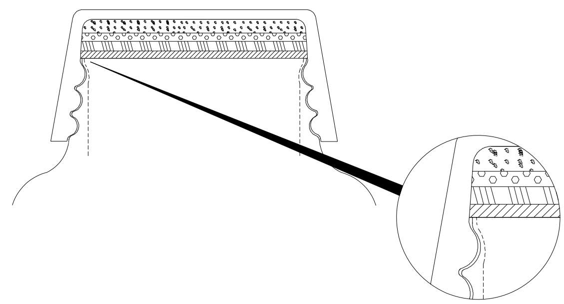


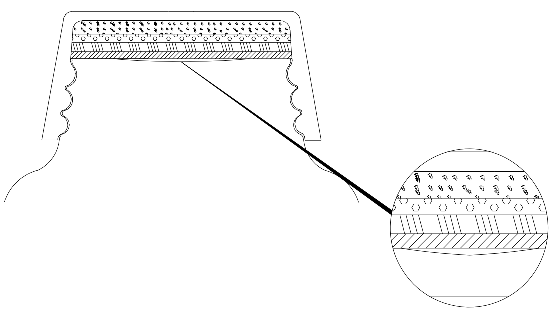
Good Container Lip/Liner Contact

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

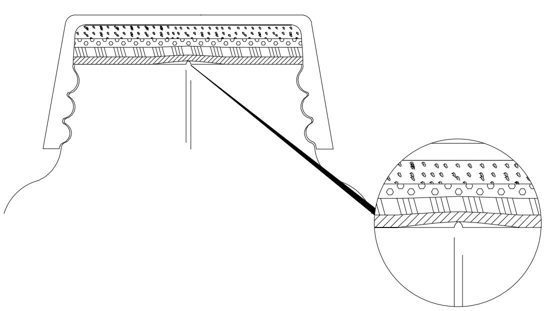
A thin or weak land area can cause poor contact between the liner material and the container lip. When the land area is too thin there may not be enough rigidity in the land area to support the pressures and heat required for a good seal.





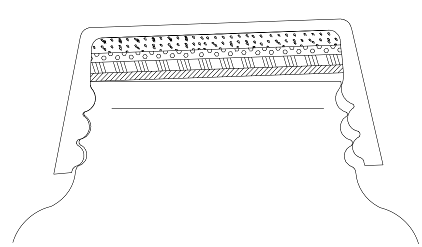
Container Lip Deformations

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 saddles on the land area, as well as a gap caused by a protrusion, is shown. These defects can be detected on the container land area before the container is capped.



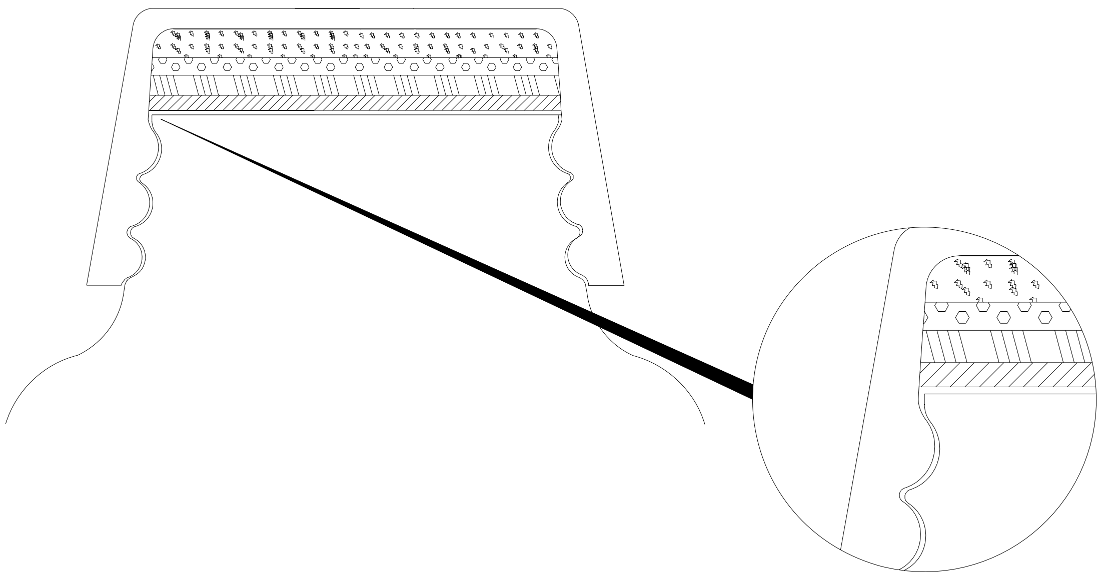
Cocked Cap

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 Issues

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.



Torque Requirement Table

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)		

Note: The listed torque levels are a general guideline only, check with your cap / liner manufacturer for specific requirements of your package.

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 2-piece 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, or line speeds too high, 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 2-piece 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 2-piece liners the pulp board 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.