

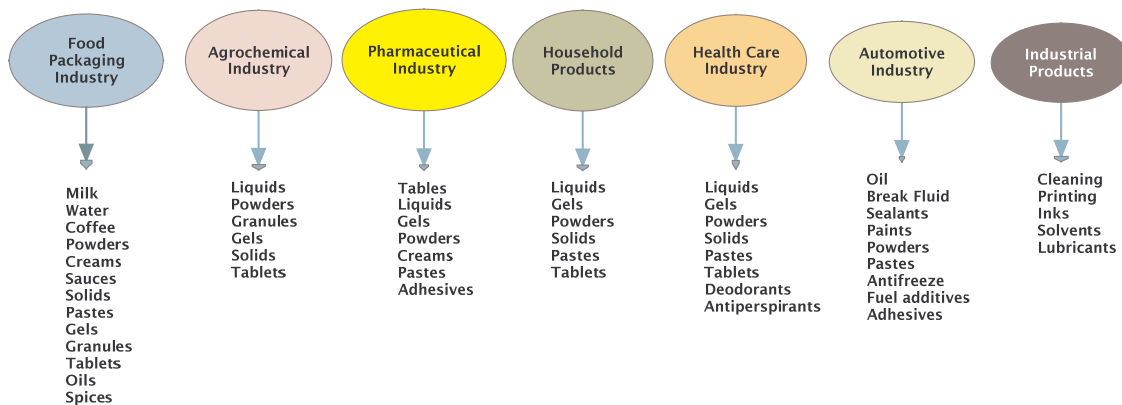


WHY FOIL?

Ever wondered why foil sealing of containers on certain products is generally accepted by the manufacturing industry as part of the packaging process and yet other products are rejected?

The aim of this white paper is to evaluate product lines that should be considered for the hermetic Cap and Foil process, the benefits and the cost savings that can be achieved.

Industry Sectors appropriate for Foil Sealing applications:



What does Heat Sealing do?

Induction Heat Sealing or Cap Sealing, as it is widely known, is a very straight-forward process:

- Heat is applied to an aluminium foil to melt the facing material on the foil to the neck of a container to create an Hermetic Seal.
- Once the neck of container is sealed hermetically, product cannot leak out and germs cannot get in.
- The seal is Air Tight, Strong yet Flexible - It can withstand:
 - Mechanical pressure
 - Atmospheric pressure change
 - High or Low temperature variation
 - Moisture / particle abuse
 - Vibration

Unlike the ‘*cap to container closing system*’, the Foil Seal uses physics to its advantage, with a welded or peelable seal that is robust yet flexible and prevents leakages. Thus, foil sealing a product has revolutionised the previously arduous and complex journey of a product from manufacturer to the customers shopping basket and its final destination.

To make an induction sealing production line application successful and profitable, it is necessary to pay attention to some of the simple guidelines:

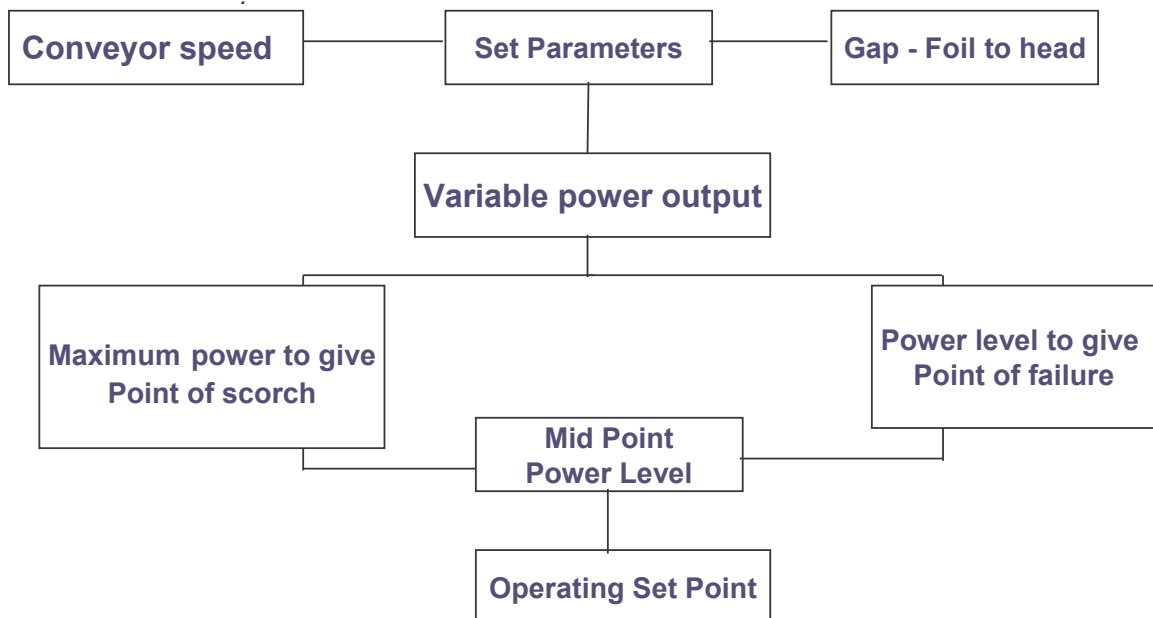
Set-up an ‘OPERATING WINDOW’

- An operating window establishes the optimum sealing settings.

There are three main variables:

- **Time:** generally ‘known’ as this is determined by the conveyor speed.
- **Pressure:** this is established by the applied torque From the capping machine.
- **Heat:** is determined by finding the point at which there is a slight seal to the point where one detects scorch or overheating.

Between these points is the ‘WINDOW’ and the larger the better!



- For the Induction cap/contact Sealer the information required is:
 - Power required
 - Time needed
 - Proximity to foil available

- **For the production line:**
 - Conveyor Line speed in metres per minute
 - Conveyor type, height/Width/Guide rails steel or not
 - Operating in Hazardous Area or not
 - Bottle Centres
 - Bottle Foot Print

- **For the components being used**
 - Cap:
 - Diameter
 - Type of plastic/metal
 - Applied torque/Release torque required
 - Standard screw cap or not
 - Pressure sensitive or not (CRC – child resistant closure)
 - Seal being used in the cap or closure (single piece/multi/foil only)

- **Bottle/container:**
 - Type of plastic/glass/board/single/multilayer
 - Height & Agreed Tolerance plus & minus in mm
 - Foot print
 - Neck type flat/rounded/knife edge
 - Volume in litres
 - Ullage (air gap at top, or not, or is it overfill?)

- **Product:**
 - Flammable or not Hazard or not
 - Liquid/paste/gel/granule/powder/tablet/cream/oil
 - Fill temperature: hot / cold / ambient
 - Storage required

- **For the Capping Machine and Filler:**
 - Use Good Quality Machines for a guaranteed 100% perfect seal.
 - Top quality machines and components equals top quality performance!

Benefits of Foil Sealing

The Food Industry is still the largest market for foil sealing applications, with thousands of different types of products and requirements.

In the UK the biggest market is Fresh Milk and over the past 15 years the Dairy Companies have taken advantage of foil sealing resulting in:

- Reduction in cap weight by getting rid of the tear band and bore seal.
- Easier transition through the capping process, supply chutes, cap grippers, and torque heads, etc.
- Reduction in bottle weight - by thinning down the neck and shoulder of the bottle - savings of between 3%-7% can be achieved.
- Less CO² emissions in the manufacture of the bottle and cap.
- Reduction in the carbon footprint with the delivery vehicles.
- Stop oxidation, reduce rejects, stabilize products
- The bottle is easier to crush down and takes less room in the Recycling Bin.
- Secure – Tamper Free – Longer Shelf Life!

The process offers so many advantages and with the precision of induction and the strength of the seal, spillages are a thing of the past, hygiene is increased, security is heightened which prevents tampering, the shelf life of the product is extended – the FRESHNESS IS SEALED IN!

The end result is:

- Easy to use
- No mess
- No fuss

Exactly what the customer wants!

This is what happened in the Milk Industry!

Case Study:

Milk Industry : 'early adopters' of hermetic foil sealing

This is only the beginning!

The UK milk industry is supplying a phenomenal 2.8 billion plastic bottles of milk every year to the major supermarket outlets!

However, some 15 years ago, they were incurring 1.5% - 2% wastage, approximately 56 million litres of milk through cap leakage occurring during the production and transportation processes.

As well as the milk wastage, there was 3,300 tons of plastic wastage – the equivalent of **103 MILK TANKERS!!**

The effect of this wastage together with tougher competition, fuel and energy costs spiralling, it was beginning to impinge on their profits.

It was clear that an alternative closure was required – hence the development of the hermetically sealed cap and foil.

WHAT A DIFFERENCE A FOIL MAKES!

- Since adopting Foil sealing, scrap is now 0.5% or less per annum.
- **A cost saving of 56 million litres milk and 3,300 Tons of plastic bottles every year.**

Conclusion

Over the past 15 years that the milk industry has adopted the Cap Sealing policy it has resulted in:

- reduced costs of 2.5%
- increased profits by 1.5%
- returns and scrap down by 2%

PROFITS UP – SCRAP DOWN

Enercon Industries – April 2008

Note: See Appendices for more examples of Sealing applications

Future of Foil

Over the years many industry sectors have found a way to use foil sealing - not necessarily for the cost savings to be made, but the vast gains to be made in reducing cap and bottle weight.

Mainland Europe has been slow to embrace the benefits of foil sealing. However, with increasing pressure from the EU and individual governments' mandates to reduce carbon footprint, there has been a huge demand from manufacturers, packaging designers and major retailers to understand the benefits of foil sealing their products.

Foil sealing goods allows the manufacture to deliver a product solution that provides an environmental benefit to its customers, such as:

- Energy Conservation and improved efficiency
- Systems that provide the ability to reduce CO² emission and carbon foot-print in the packaging line.
- Systems that help the process packer to reduce packaging materials, increase recycling capability.
- Systems that will through reliability:
 - reduce scrap
 - improve
 - lower the unit cost of products.

In summary, the forecast for foil sealed products across Europe is excellent! The call to reduce CO² emissions, energy output and packaging weight, means that the opportunity to develop the foil seal business is immense, with growth predictions of 25%-30% over the next 3 years.

Richard Bull
Managing Director



BOTTLED WATER – EUROPE

Over 11 billion plastic bottles are produced in Europe every year!

The bottled water industry has recently been criticized for the amount of plastic used in each container.

Recent trials carried out by the Unipac Corporation reveals how much PE and PET can be saved by applying a foil seal to the bottle.

For example:

- **500ml bottle can be reduced by 2.54 grams**
- **This is achieved by thinning the neck and shoulders of the bottle**
- **And removing the tear band and bore seal of the cap**
- **Currently, resulting in a 3% reduction in plastic**
- **The cost of the foil seal is amortised in the PE and PET savings and does not affect the recycling capability of the container.**

Conclusion

Because a seal is so durable and flexible, the container and its closure can be reduced in weight resulting in a reduction of transport costs, improving storage and transit conditional and of course reducing waste material – a much greener option.

For more information on this research and the application please email: info@enerconind.co.uk



WHY FOIL? PRODUCT APPLICATIONS

Packaging is a major consideration for all manufacturers of capped products and an important part of the planning process from the time of conception until it reaches the consumer – listed below is a cross-section of a few products that have benefited from foil sealing:

- ▶ **Foil seal Peanut Butter?** **Will not dry out and crack**
It is important that air does not get into the pack prior to purchase as oxidation will take place. Therefore the cap must remain air-tight during storage or transit.
- ▶ **Foil seal a Hand Cream Jar?** **Oxidation is reduced dramatically and the product no longer requires the plastic shive on top to hide the crusty cream.**
Also stops friendly tampering!
- ▶ **Foil seal Sauces?** **Keeps flavours fresh, colour true, reduces oxidation, extends shelf life.**
Keeps germs out, no leakage and limits aggressive tampering.
- ▶ **Foil seal Solids?** **Will not dry out quickly, Colour longevity and reduced oxidation levels.**
- ▶ **Foil seal Pastes?** **Drying out and cracking reduced dramatically and increases shelf-life.**
Stops friendly tampering!
- ▶ **Foil seal Gels?** **No leakage, No mess on container lid, Extends shelf-life, Colour retention.**
- ▶ **Foil seal Granules?** **Keeps product air-tight, reduces oxidation - keeps flavours fresh and subsequently keeps out moisture, oxidation, loss of smell/taste, longer shelf life.**
- ▶ **Foil seal Tablets?** **Oxidation and moisture reduced, creating stable environment for storage and transit Stops tampering!**
- ▶ **Foil seal Oils?** **All the previous benefits apply.**
Fitting a foil seal to hot or cold fill, will eliminate any chemical reaction that would have occurred over a period time by just using a plastic cap.
- ▶ **Foil seal Spices?** **An air-tight container keeps flavour in - bugs and germs out. Retains its colour!**