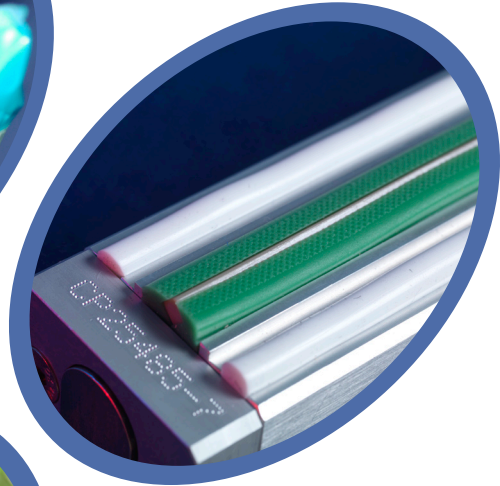


**Quick Pulse Heat
Sealing**





Company Overview

Ceetak Ltd is the UK's leading designer and supplier of heat sealing technologies for flexible packaging across all industries.

Established for over 30 years, our Bedford based HQ features the facilities to design, build and test heat sealing technologies for our wide range of customers.

With 4 key technologies - Low Voltage Heat Sealing, Profiled Die Heat Sealing, Continuous Rotary Heat Sealing, and our latest development - Quick Pulse Heat Sealing; we can adapt these core technologies to find the perfect sealing solution for practically any material designed into a packaging production line.

Our latest technology; Quick Pulse Heat Sealing (QPH), offers considerable benefits from an economic and environmental point of view. By retrofitting QPH technology to packaging machinery the end result is a stronger, hermetic seal ensuring products are kept fresh, and at least a 10% reduction on the amount of film used.

Our Quick Pulse Heat Sealing technology is used throughout many industries; from fresh fruit, vegetables and salad bagging; to snacks, crisps and confectionary, and to more testing packaging environments such as frozen products.



Technical Support & Quality Assurance

We are approved to ISO9001:2008 and ISO14001:2004 and offer a free on-site survey by our experienced engineers to recommend the best heat sealing technology solution for your particular application.

Using the latest SolidWorks, AutoCad, FEA simulation programmes and years of knowledge and expertise, we provide a full design service; from initial design concept, to building components. Ceetak can also assist in equipment installation, customer training and maintenance support.

Call 01234 832200 today to speak to one of our dedicated Application Engineers to discuss how Quick Pulse Heat Sealing Technology can be utilised on your packaging production line.



An introduction to reducing film packaging waste

The packaging industry is constantly looking for ways to reduce the amount of packaging used, reduce manufacturing costs and at the same time extend product life and improve product quality for consumers.

110,000 tonnes of flexible film are used every year in the UK across a variety of product sectors ranging from fresh salad and vegetables, to confectionary, crisps and bakery products. If each sector reduced their amount of film packaging used by 25%, a saving of 27,500 tonnes would be achieved, resulting in a carbon saving of 25,500 tonnes.

Additionally, Quick Pulse Heat Sealing technology helps to increase the shelf life of fresh produce. Each year over 1.5 million tonnes of fresh fruit and vegetables are thrown away by UK households due to deterioration. By increasing shelf life and minimising landfill waste, QPH technology has significant environmental benefits.

Product Category	Estimated weight of film used annually
Confectionary	15,000 tonnes
Crisps, snacks & nuts	26,000 tonnes
Baked goods & biscuits	25,000 tonnes
Salad bags & fresh vegetables	5,000 tonnes
Other; including dried food, pizza, pulses etc	15,000 tonnes
Other	24,000 tonnes
Total	110,000 tonnes

Source: WRAP (Waste & Resources Action Programme) case study



Introduction to traditional film sealing and it's disadvantages

Crimp sealing has been used for sealing flexible film packaging on automated packaging machines since they were first invented. The process involves using a wide-profiled seal jaw, typically 15mm wide, to apply heat and pressure for a controlled time to activate the surface layer of the packaging film.

Crimp sealing jaws cannot make hermetic seals on thin polymer films because the metal jaws are too rigid and do not apply uniform pressure across the width of the seal. The film is not compressed evenly where film thickness varies in the sealing process (e.g. where there are random creases in the seal pack, or where layers of film overlap on the back seal of packs). This results in the film suffering from thermal distortion and it develops pinhole leaks.

The crimp sealing process is also problematic: polymer slowly builds up on the jaws (due to lack of temperature control which leads to overheating and burning of material) which if not cleaned regularly causes the film to stick to the jaw.

This causes rippling in the seal area, and ruins the appearance of the pack, as well as impairing the integrity of the seal. Any material that touches the constantly heated jaw is burnt on and has to be removed by wire-brushing. Frequent cleaning and maintenance is required for optimal performance as film product commonly gets trapped in the knife slot and builds up over time, eventually impeding the jaw movement.

Quick Pulse Heat sealing and it's advantages

QPH sealing technology is a cyclic system which can be used on all thermoplastic films and incorporates a unique seal bar and anvil design to create a narrow width, patterned seal for material savings with superior performance characteristics.

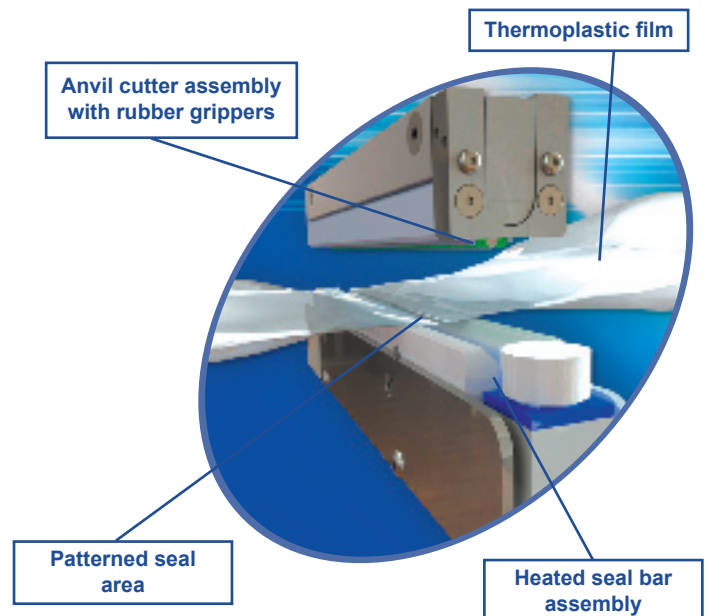
The first stage of the QPH sealing system is the cut and seal phase. The jaws close on the film and the desired temperature of the heated bar is reached and maintained by a designated temperature controller. This is held for the required duration and then removed.

The second stage is the cooling phase of the process. The temperature of the patterned sealed area (again monitored by the temperature controller) is cooled rapidly by a stream of water through the sealing bar. The rapid heating and cooling process takes only milliseconds and this facilitates fast cycling times and increases output.

By reducing the temperature of the sealed area, the system ensures that the weld is not weakened during handling (as is possible if left to cool naturally).

This seal is typically 1-1.5mm wide, showing a film material saving of approximately 10% against traditional crimp seals on the cross seal alone. The QPH sealing system ensures that heat and pressure are applied evenly across the sealing surface creating a completely fused, hermetic seal.

The unique blade and anvil design of the QPH system minimises cleaning and maintenance. The heat of the blade is carefully maintained and controlled, therefore film material is rarely burnt onto the equipment (as is common with crimp sealing jaws).

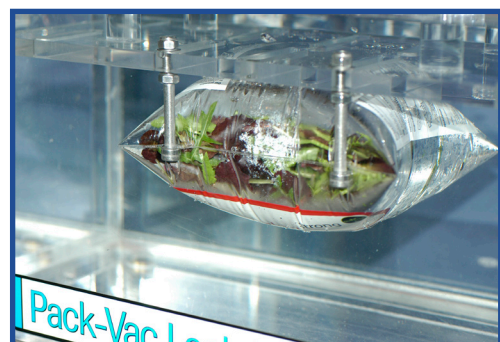


Testing the integrity of the QPH seal

During development trials, the QPH seals were subjected to pressure testing in a vacuum immersion tank - in all cases the QPH samples were proved to be superior to crimp seal versions.

In a typical crimp seal, there are usually multiple air leaks found at between 0.2-0.3 bar pressure (shown in the picture bottom left at 1 mbar). In the QPH sealed bags the mode of failure is for the seal to burst; there are no micro leaks (shown in the picture, bottom right at 2 mbar).

The degree of vacuum that a sealed pack will withstand depends on the size of the pack, the volume of the contents and the headspace volume, therefore direct comparisons between products are not possible. It has been found however that QPH packs generally withstand more than double the vacuum of a crimp seals.





QPH - Extending the shelf life of fresh produce

Fresh produce respires from the moment it is harvested until the end of its shelf life and there are different levels of respiration rate sensitivity depending on the product. For example, some leaf varieties such as Iceberg and Cos lettuce are highly sensitive to oxygen, whereas many baby leaf varieties such as rocket and young spinach are not.

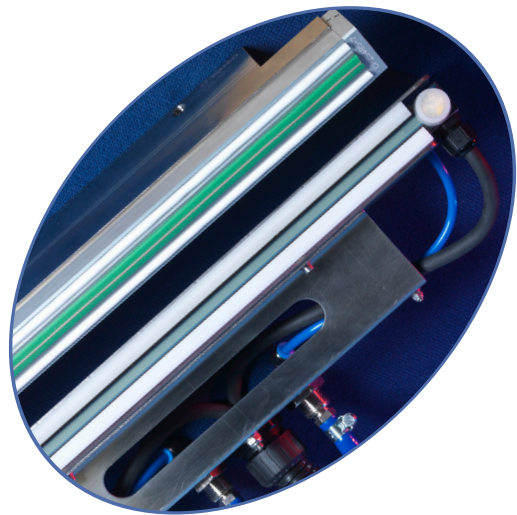
In order to maximise the shelf life, it is necessary to use a variety of breathable films to control the oxygen and carbon dioxide levels in the headspace of the sealed bags. Leaking seals allow the oxygen from the atmosphere into the bag. This promotes further respiration, producing more carbon dioxide and shortening the life of the product. When crimp seals inevitably leak, the control of the atmosphere within the bag is lost or severely compromised - the film is no longer controlling the shelf-life of the produce and the product deteriorates.

The image top right shows two bags of iceberg lettuce purchased fresh from a large supermarket chain. One of the bags has been re-sealed using QPH technology and one has been left with its original crimp seal. The image bottom right shows the two bags of iceberg lettuce after 3 days. The difference between the freshness of the salad that has been re-sealed using QPH (compared to the original crimp seal) is plainly obvious.



Summary of QPH benefits

- Uses less material - 10% film saving compared to conventional crimp sealing
- Reduced maintenance costs and downtime and long service life
 - QPH technology is easily retrofitted to existing machines and is IP65 rated
- Creates strong, durable and completely hermetic seal
- Increases shelf life of fresh product by up to 3 days
- Capable of making pillow packs and block-bottom gusseted bags
- Corrosion resistant components suitable for a wide variety of factory conditions



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