Finally there's a lighter aseptic approach
Introducing a light revolution in aseptic packaging

Today there’s a new perspective on liquid food packaging. With its unique thin material and durable, lightweight construction, the Ecolean package saves resources as the package is made—rather than waiting until it’s been thrown away.

Now, the same environmental thinking can be applied to aseptic production.

As we introduce aseptic packaging, our ambition is to make it utterly reliable and at the same time easier for dairies and other liquid food companies to manage. For this reason, we’ve taken a somewhat different approach.

In the aseptic filling process, the food treatment, the filling equipment and the package need to form a contamination-free chain where risks are controlled or avoided. New to the industry is Ecolean’s choice of a dry, non-chemical alternative for the process of package sterilisation, which ensures that food contact surfaces are never exposed to any chemicals during manufacturing or filling. The sterilisation process is also separated from the filling machines and performed at our own production plants, where we can ensure controlled and monitored conditions.

With this in mind, let’s walk through the aseptic process steps. You will learn that the flexible, lightweight Ecolean package and its easy-to-grasp functions are not the only features developed through ingenious engineering.

Unfold and discover the new approach to the aseptic process.
Aseptic packaging is designed to protect liquid food from the source of production all the way to the consumer, with taste and texture as unaffected as possible. As such, it has many positive aspects. For one, aseptic packaging brings healthy, flavoursful and exciting food products to people all over the world. It can travel long distances and handle harsh environments – without the limitations of refrigerated distribution.

Ambient packaging also has a lower environmental impact, since no energy is needed to keep dairy products or other fresh beverages cool during distribution. Likewise, it involves less waste and less product spoilage.

It’s simple, really. Aseptic packaging preserves goods and conserves resources.
The material of each package is a multi-layer structure that protects the content. This structure, from the outside in, consists of 1) a strong, durable polypropylene layer with excellent printing properties 2) a mineral-filled polypropylene layer to provide stiffness and integrity 3) ethylene vinyl alcohol (EVOH) to protect against oxygen, 4) a carbon black layer to protect against light and 5) polyethylene as a dual sealing and food contact layer.

The packaging material is folded, shaped and sealed in proprietary Ecolean machines to produce roll stock of individual ready-to-fill packages. Each package is hermetically sealed and sterilised, and the process is monitored and traceable down to individual packages.

The finished rolls, which are shrink-wrapped for hygiene and distributed on pallets, can be transported and stored without special arrangements for temperature and humidity control.
Sterilising the inside of the package at the Ecolean production plant moves a considerable part of the aseptic process from dairies and other beverage companies back to Ecolean. The sterilisation is performed with electron beam treatment, which is a safe method with a low environmental impact. This process has no affect on material properties like strength or colour, nor does it generate any detectable odours. The package is sterilised throughout, and the irradiation process follows the ISO standard for medical products, thus ensuring defined package sterility levels.

The electron beam treatment is performed with a system of electron accelerators, which are in many ways similar to television tubes. Like a television image, the treatment is electrically generated and can simply be switched on and off. A heated tungsten filament generates free electrons, which are drawn away from the filament by means of high voltage and accelerated through a passage in a high vacuum. The resulting beam is rapidly moved sideways by a magnetic field to form a curtain of electrons that finally exit the accelerator through a thin titanium foil. The Ecolean® Air Aseptic packages are moved through this curtain to receive the required dose of radiation.
The Ecolean EL3 (shown in picture) and EL4 are modern filling machines with small footprints and high efficiency, designed for the aseptic filling of low and high-acid food products into Ecolean Air Aseptic packages. All process connections are isolated with steam barriers to ensure the full aseptic integrity of the product supply line, as well as that of the filling machine. To reduce manpower needs and downtime, the Ecolean aseptic filling machines feature not only automatic roll-change and material splicing, but also an advanced monitoring system and operator interface.

CIP (Cleaning In Place) is fully automated and requires no manual procedures. External cleaning is handled automatically, thanks to an integrated circulating cleaning system.
The aseptic valve cluster, the filling system and the CIP (Cleaning In Place) connectors are sterilised with steam – with no operator interaction or manual connection changes needed. The process efficiency of the SIP (Steaming In Place) is ensured by means of temperature monitoring in several locations.

It takes just over one hour for the filling machine to be sterilised and made ready for production, a process that is fully automated and recorded.

During this cycle, all chamber openings are closed and the chambers are filled with peroxide gas. The gas is produced from a small, pre-measured quantity of hydrogen peroxide, thus ensuring process efficiency without putting operators or the working environment at risk. After sterilisation, any remaining peroxide gas is removed by a catalytic converter.
PREVENTING RECONTAMINATION

An air system protects the filling chamber by creating a constant, positive flow of sterile filtered air from the chamber entrance and exit. The air is introduced in the critical area where the packages are open prior to filling and sealing. At the chamber exit, a separate airlock further reduces the risk of contamination from outside air. The air system is sterilised with peroxide gas along with the filling chamber itself, and its function is monitored by pressure differential measurements.

Two systems work together to protect the filling chamber from recontamination. As there is always a risk of the packaging material being contaminated on the outside during transport, storage and handling, the material is fed through a sterilisation chamber before it enters the filling chamber. A weak peroxide solution, working in synergy with UV light, efficiently kills any microorganisms in an instantaneous process that requires no holding time. Since the peroxide is completely decomposed by the UV light and the material is still sealed at this point, there is no risk of peroxide residues in the filled packages.
Package integrity is a crucial and integral part of any aseptic packaging system. It is defined by ISO 11607 as the unimpaired physical condition of a final package. Seal integrity is defined as the condition of the seal which ensures that it presents a microbial barrier to at least the same extent as the rest of the packaging. At Ecolean, monitoring systems for strength and integrity are an integral part of all steps in the production of ready-to-fill packages. At the food production facility, the packages should be checked after filling with established methods, e.g. dye penetration testing, electrolytic testing and seal tear-down.
A system that performs

The total performance of an aseptic packaging system depends on a multitude of small elements – not a single one of which may fail.

The design of the Ecolean Air Aseptic packaging system is based on proven standards for hygienic manufacturing. The technologies chosen are robust, proven and efficient. Each aspect of the process chain has been calculated and challenged, both separately and as part of the complete system.

We are confident that the Ecolean Air Aseptic system, with its unique combination of proven technologies, will perform to industry standards or better in terms of sterility acceptance levels and productivity. Given the opportunity, we look forward to proving it at your plant.