

**Immediate Attention.**

Evergreen quality and knowledge comes with US-based technical support and parts for your efficiency. We look forward to working with you to achieve high productivity in-plant and high-quality, safe and convenient product for your customers.

**Call us at 319-399-3200**

Because of the constant improvement program at Evergreen Packaging, specifications are subject to change without notice.



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**ELL® (Extended Long Life)  
Filling Technology for  
Gable Top Cartons**

*The Machines That Capture Freshness*



# Keep Your Customers Coming Back For More

**Freshness sells. Consumers who discover appealing flavor and appearance inside a carton will return to buy again. And again.**

Today, you share the shelf with a staggering number of juice and dairy products – and one unappealing experience can send a shopper to the package next door.

That's why processors like you around the world rely on Evergreen™ packaging machines to maintain the quality you put inside on day one.

Innovative, reliable, energy efficient and expertly engineered – Evergreen's Extended Long Life (ELL®) technologies are made **to protect your shelf power.**



## Value-Building Efficiency

### What does ELL do for you?

- Increase plant efficiencies through longer production runs
- Increase sales at retail; longer pull dates encourage more facings at retail
- Drive brand building
- Reduce product returns from expired short-term pull dates
- Reduce distribution costs; larger, more efficient deliveries possible

Evergreen packaging machines are recognized worldwide for their accurate fills, assuring added value for both consumer and processor.

Evergreen ELL filling technology also reflects Evergreen's commitment to energy conservation, helping you realize your sustainability goals. As for operator efficiency, a single person can oversee the operation of one or more machines.

## Designing Longer Life ... from the start

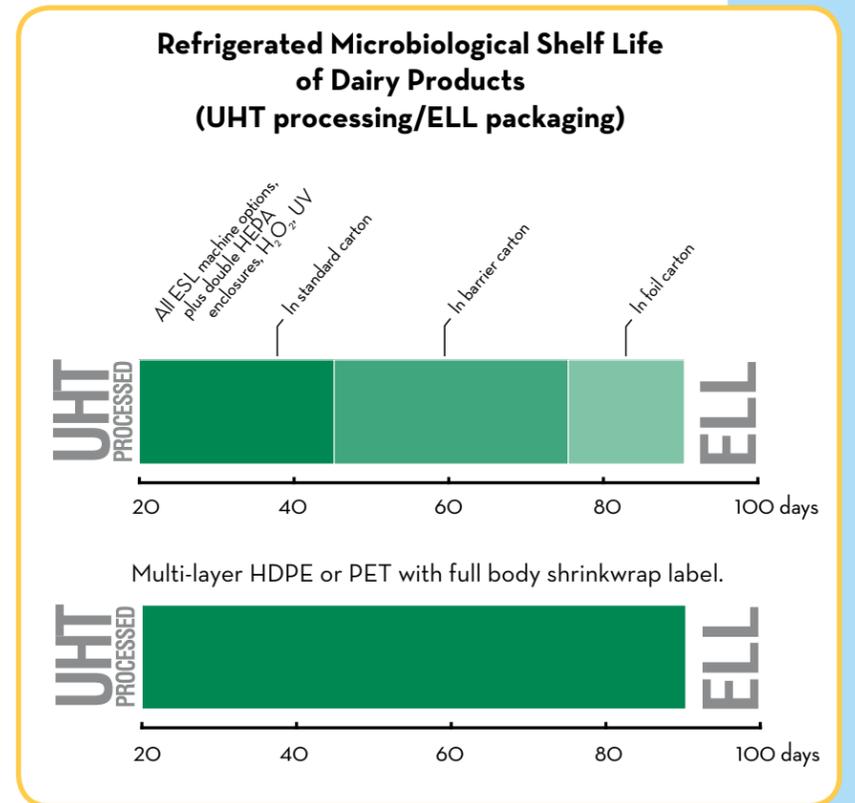
Evergreen ELL machines represent the state-of-the-art in sanitary packaging design, helping **protect your product** from potential contamination.

Setting the global standard in machine uptime, Evergreen Packaging enables you to produce your products at the "lowest cost to the cooler".

Protection starts with a dedicated standard system of pressurized hot water (250° F/121° C) decontamination of product contact surfaces before operation. (Steam is an option.)

Product tanks, metering bowls and carton fill nozzles are time/temperature sterilized to the **same high standards as aseptic processing equipment.** Advanced HEPA\* air filtration, chemical sanitation and UV light decontamination systems, which create a "clean room" environment within machine enclosures, provide further protection, from post-pasteurization contamination.

\*High Efficiency Particulate Air



ELL packaging, combined with UHT processing of incoming product and packaging alternatives, helps maintain product quality start to finish.

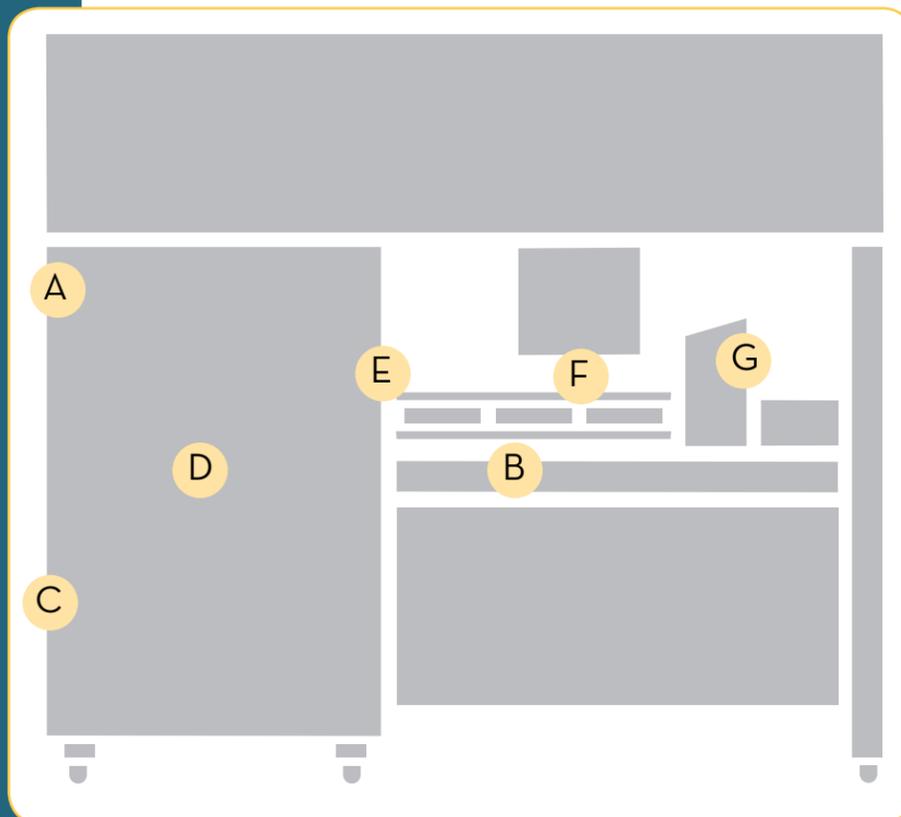




## The Gable Top ELL Packaging Process

Take a look at how ELL machines can help you achieve superior shelf life performance.

- A Controls (p. 5)
- B Clean-In-Place (CIP) (p. 6)
- C Infeed (p. 7)
- D Carton forming (p. 8 & 9)
- E Sanitizing (p. 10)
- F Filling (p. 14)
- G Sealing and discharge (p. 14)



## Total, Convenient Control

Conveniently located at the infeed, touch-screen computerized controls and monitors are straightforward and easy to use.

- **Simple** - monitor function status at-a-glance
- **Adaptable** - change fill volume or timing values at operating speeds without interrupting operation or compromising sanitation
- **Efficient** - run two different carton sizes simultaneously on quart/liter machines
- **Handy** - Changeover manual carton stops and rail height from infeed area
- **Flexible** - view maintenance function text in operator-selected languages\*

For convenience, operational sequences such as CIP and start-up are automated and can be selected as single functions. Air system monitors are found on the HEPA units. And for safety, machine stop controls are located all around the machine.

\* Languages to be specified at time of order





## Thorough, Hands-Free Clean-In-Place (CIP)

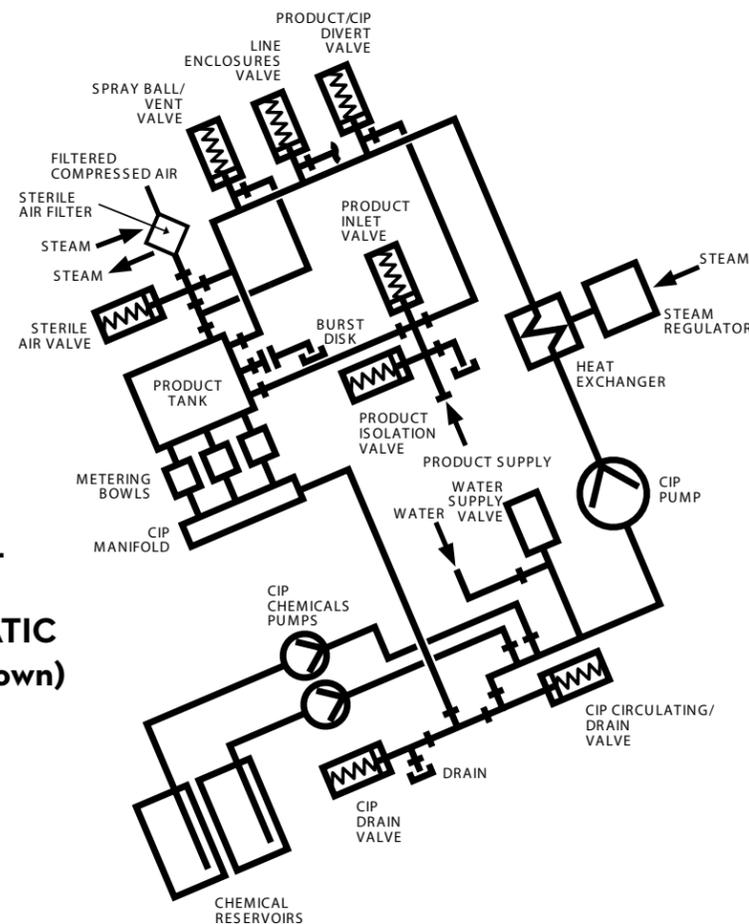
To keep your product as safe as possible, all ELL machines are equipped with dedicated, automated Clean-In-Place (CIP) systems. Each system provides a heat exchanger, pump and controls with all interconnecting piping.

The CIP system effectively cleans all parts of the fill system, except screen tips, resulting in automatic and labor-saving sanitation – with no daily hand cleaning of fill bowls required. Everything from chemical injection, fresh water flush and thorough CIP system draining occurs on-schedule, according to your pre-defined need.

To reduce wear, only those parts to be cleaned or sterilized are cycled during CIP/SIP (Sterilize-In-Place).



**TYPICAL CIP SCHEMATIC (EQ-5 shown)**



## Gentle, High-Capacity Carton Infeed

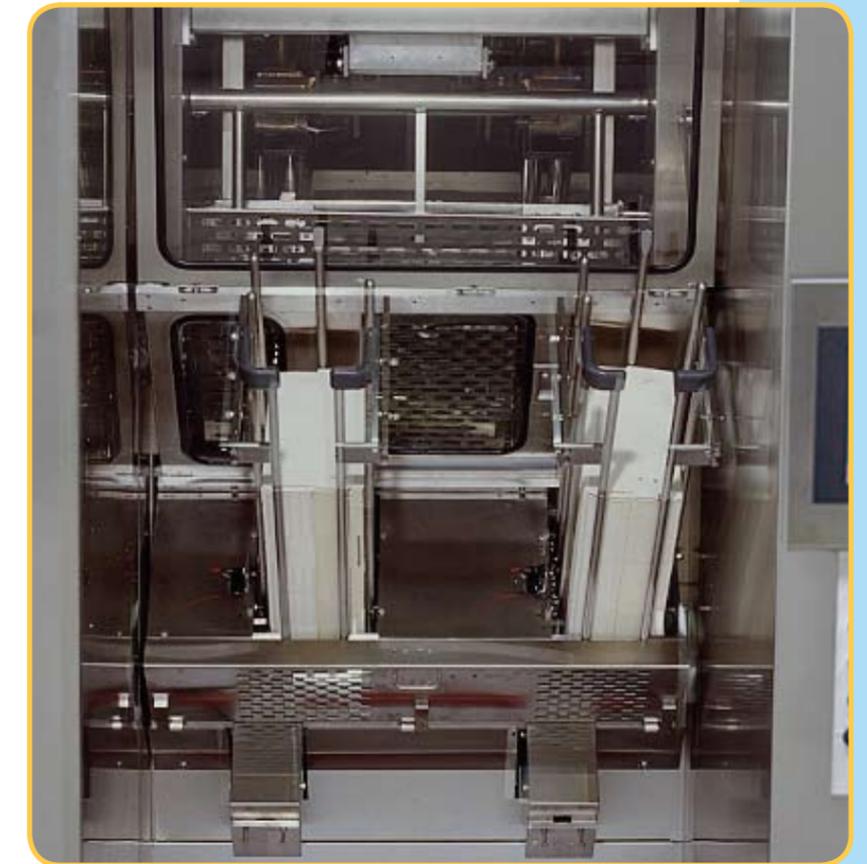
Machine controls, monitors and high-capacity carton magazines at the infeed let your operator oversee the entire filling operation – while keeping the infeed magazines loaded.

Each magazine feeds an independent form, fill and seal line. This not only provides longer dwell times at sanitizing, filling and sealing stations, but gentler product handling prevents liquid sloshing – even at maximum rated speeds.

On quart and liter machines, you can:

- make carton size changes in seconds
- run two different carton sizes simultaneously
- adjust manual carton stops from infeed without contaminating form, fill or seal sections
- change carton stops automatically through machine controls

A positive flow of HEPA filtered air throughout the infeed area maintains a clean room atmosphere and prevents plant air from entering the machine.





## Durable, Sanitary Carton Forming

Carton blanks are opened, squared and positioned onto mandrels for bottom forming. The mandrels are made from high quality, chemical resistant materials and their design improves the flow of cooling fluid.

To prevent potentially contaminating condensation from forming on the mandrels, a semiautomatic system adjusts the coolant temperature to just above the ambient air dew point. The computer intermittently sprays sanitizing solution on carton contact surfaces before they enter the filling section to maintain a contamination-free environment.



## Consistent, Leak-Proof Bottom Sealing

To save energy costs, maintain product temperature and reduce distortion, bottom ovens heat carton flaps in a selective pattern that permits a proper seal and increases carton strength. While pneumatic pressure assures consistent seals, “dams” apply extra pressure to potential leak paths. Machine reliefs allow for folded layers of paper.

To complete the seal, low pressure extends the sealers against the heated flaps; high pressure maximizes closure as the polyethylene cools and bonds the flaps in place.

Should an oven fail, the machine automatically stops infeeding cartons until the temperature is restored and the infeed switch reset. If the machine stops, the ovens automatically retract from cartons and a knife of filtered air blows between carton and oven, eliminating risk of fire.



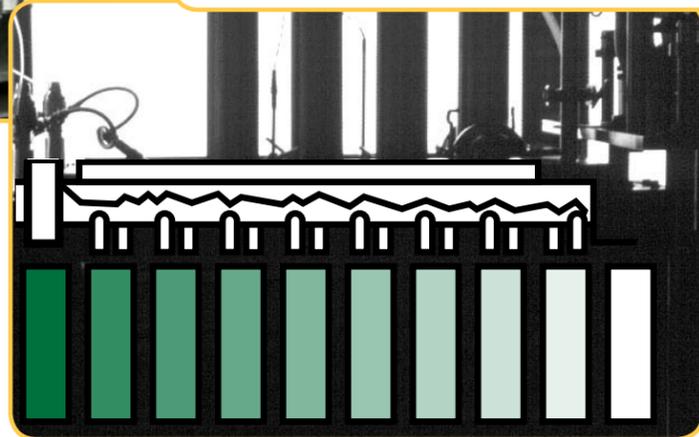
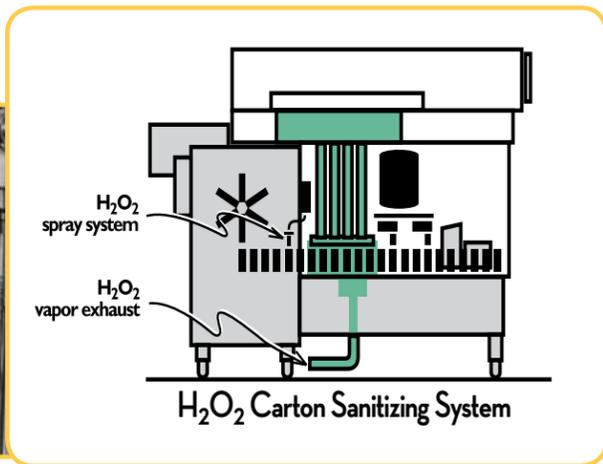
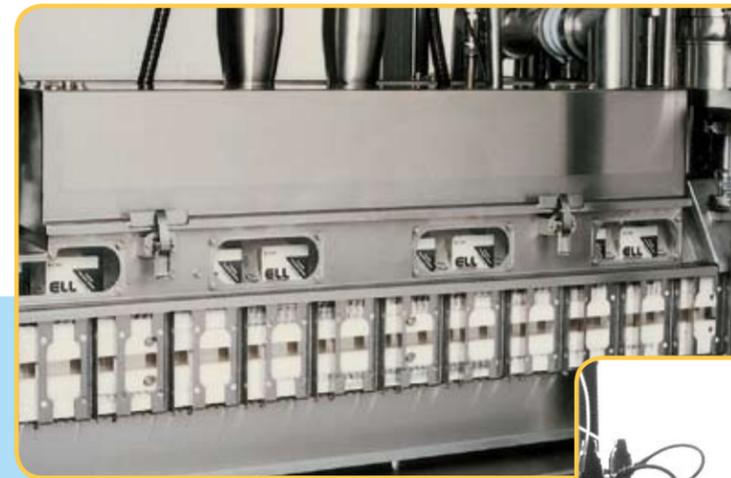
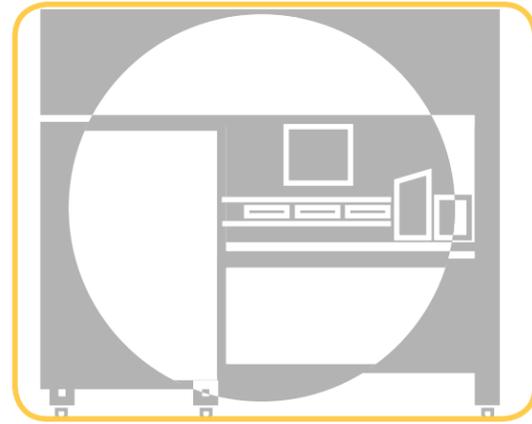
# Automatic, Proven Carton & Machine Sanitization

For improved sanitation, the ELL auto-sanitizing system fogs mandrels and sprays top breakers and fill line enclosures on a customer-set cycle. Manual reset assures operator safety.

Before cartons enter the fill section, stationary nozzles spray their interiors with an atomized mixture of filtered air and hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) preheated to 120° F (48.9° C). There is a separate system for each fill line.

In the sanitizing chamber, nozzles blow hot, sterile air into the cartons, raising H<sub>2</sub>O<sub>2</sub> temperature to its maximum bactericidal effectiveness. Heated air continues until the H<sub>2</sub>O<sub>2</sub> vaporizes to residual levels below the FDA-required maximum limit of 0.5 PPM.

**This performance has been validated by independent laboratory studies and satisfied customers.**



H<sub>2</sub>O<sub>2</sub> sanitization and evacuation sequence.

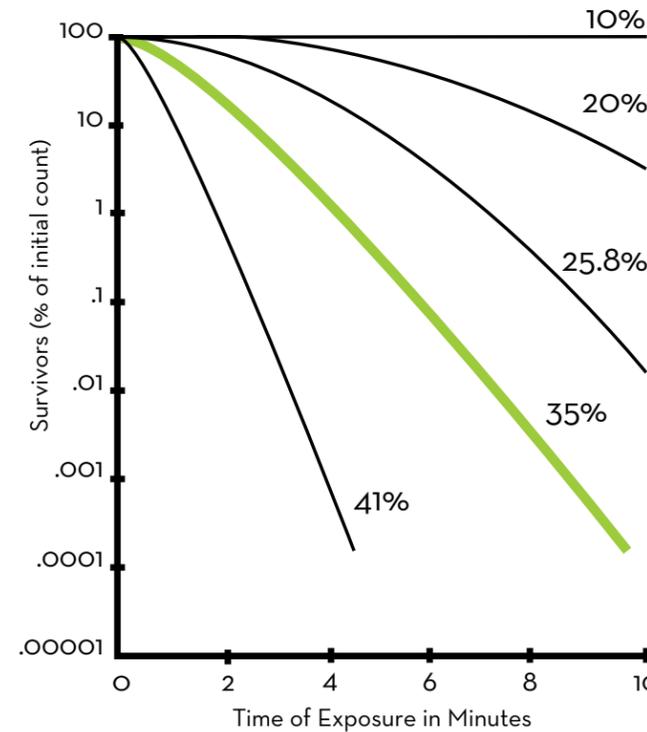
# Effective H<sub>2</sub>O<sub>2</sub> Exposure

Simply spraying H<sub>2</sub>O<sub>2</sub> does not assure total sanitization. As Chart A illustrates, the sporical properties of H<sub>2</sub>O<sub>2</sub> depend upon its concentration. As concentration increases, so does its effectiveness. Likewise, its temperature at incorporation influences effectiveness (Chart B).

**ELL machines utilize H<sub>2</sub>O<sub>2</sub> at optimum concentration and high temperature**, as both charts indicate. The resulting logarithmic reduction of microorganism has been documented as a "4D kill", with some users reporting effectiveness approaching "6D".



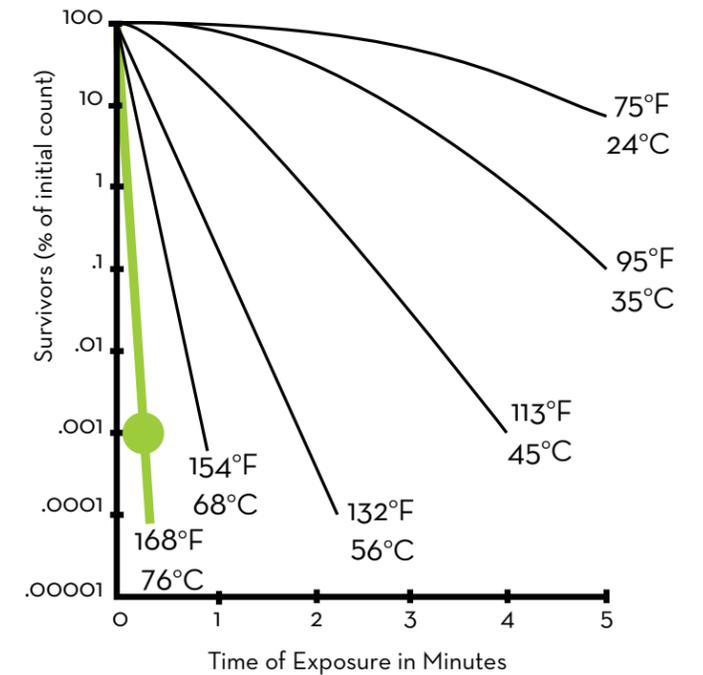
Chart A



Effect of H<sub>2</sub>O<sub>2</sub> concentration on survival of *B. subtilis* var. *globilii* spores at 75° F (24° C).

Evergreen packaging machine concentration shown in green.

Chart B

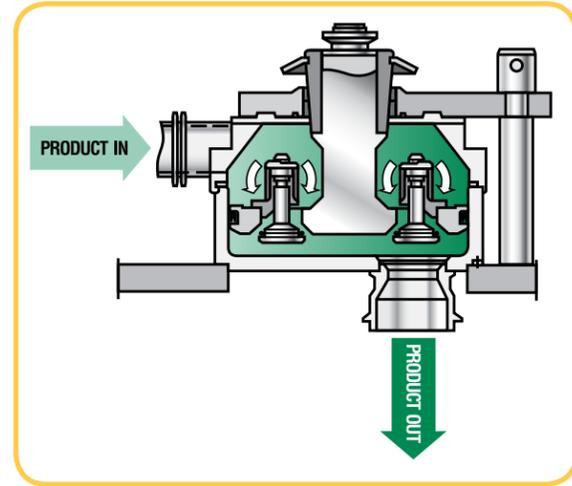


Effect of temperature on survival of *B. subtilis* var. *globilii* spores at 25.8% H<sub>2</sub>O<sub>2</sub>.

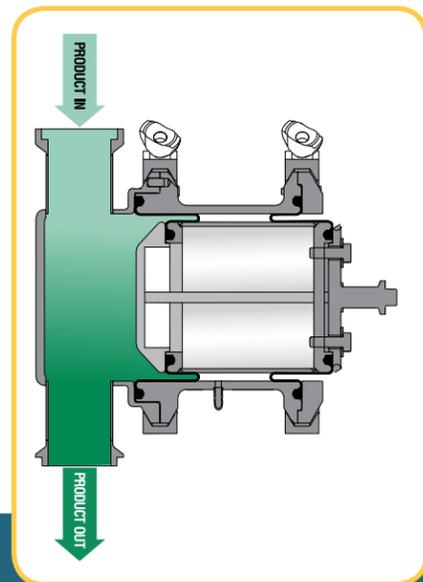
Evergreen packaging machine temperature shown in green. Dot indicates Evergreen's excellent sanitization practice.

# High-Hygienic Fills

Extended life is made possible by a filling system employing positive displacement product valves with hermetically sealed metering bowls. Sterile air occupies head space in the product tank for additional protection.



The positive displacement metering system of most ELL machines utilizes a product-to-product hermetically sealed metering bowl. Product floods the area surrounding the fill valves and piston. By preventing air from entering, this decreases the chance of product contamination and reduces foam caused by air entering the product.



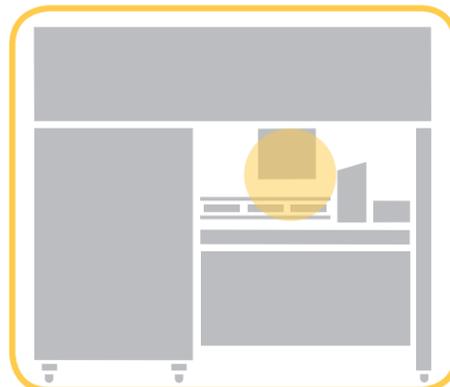
A double diaphragm, self-draining, hermetically sealed metering bowl system is used on the most recently developed fill machines. A diaphragm system consists of a double diaphragm, with vacuum in between, which separates the product to be filled from the outside environment.



# Accurate Filling

After auto-sanitized breaker stations pre-form top flaps and cartons are decontaminated, filling begins via **precision positive displacement valves**, the heart of the ELL filling system. The positive displacement metering system prevents introduction of air that could contaminate product or cause foam. And as with all Evergreen machines, if there's no carton, there's no fill.

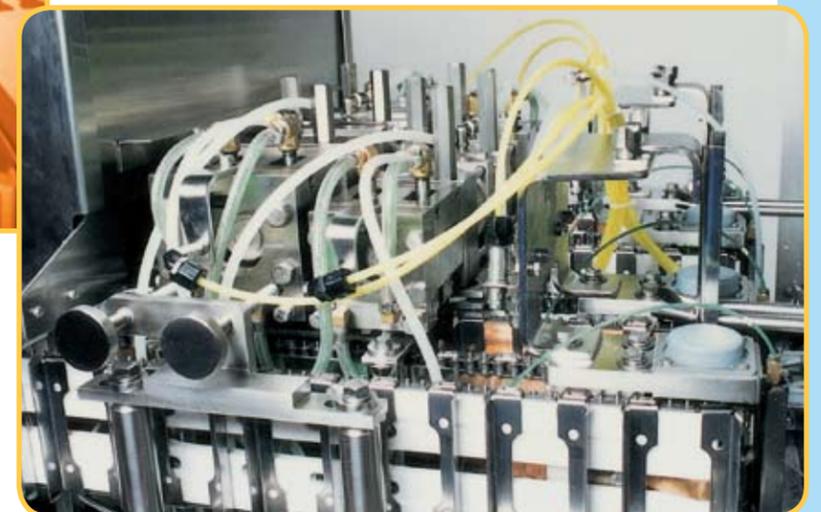
An automatic system keeps the product tank filled to operating capacity. Should the level fall below operating norms, the system shuts off carton infeed until the level is reestablished and the operator initiates a safe restart.



# Secure Top Sealing

Evergreen's **leak-free, easy-to-open top seals** are due to a closed pneumatic sealing system. Air utilized by the sealing system is exhausted outside the machine enclosures.

With cartons held securely in conveyor pockets, the polyethylene coating on the top flaps is activated by heated air in a selective pattern that saves energy. A two-step process using high-compression sealing jaws contributes to improved shelf life. It also permits pressure-embossed pull dates or other alphanumeric coding in the sealed tops.



Evergreen's pressure management top sealing system.

# Two Self-Contained “Clean Room” Enclosures

The environmental design goal of ELL packaging machines is maximum protection from product contamination under worst-case plant environments.

To achieve this, each machine is engineered as a self-contained “Double Clean Room” with HEPA filtration, incinerated air, and germicidal ultraviolet lamps (Diagram A).

Diagram A

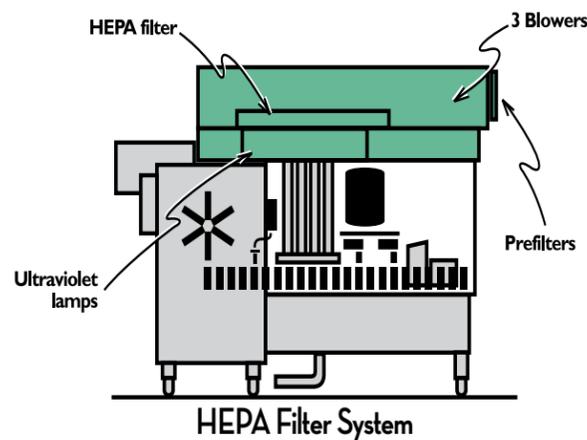
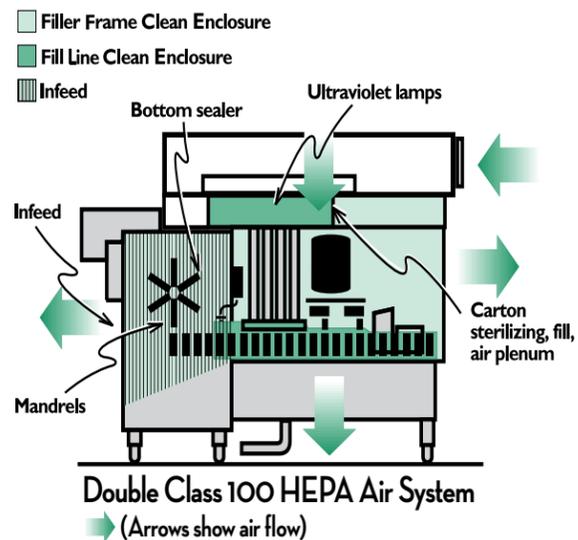


Diagram B



Outside air is drawn through pre-filters and the HEPA filter, which remove 99.97% of all particles of 0.3 micron size and larger. This provides a Class 100 cleanliness level to all vital sections. (Most common bacteria/spores are larger than 0.3 micron in size.)

The resulting decontaminated air is supplied to the packaging operation under positive pressure and exhausted from the machine to prevent entry of plant or operator contamination.

In reality, ELL machines have **Double Class 100** HEPA air systems – one within the other (Diagram B). The filler frame clean enclosure isolates the entire packaging operation with a pressurized, vertical, laminar flow of HEPA sterile air. The fill line clean enclosure, located inside the filler frame enclosure, further isolates carton sanitizing, filling and top sealing functions. The filler frame, enclosed by stainless steel and shatter-proof sanitary-grade plastic, receives a change of HEPA filtered air 12 times per minute. Operators can access most areas without compromising machine hygienic status. **The need to re-sanitize occurs less often, increasing total machine efficiency.**

A separate HEPA filter unit supplies treated air to the fill line clean enclosure by means of a plenum equipped with two germicidal ultraviolet lamps, rendering the surfaces free of harmful germs. Air within the fill line clean enclosure also is changed 12 times each minute.

The air to the line enclosures has a higher positive pressure than in the filler frame clean enclosure. This permits the operator to make adjustments to the top breaker, fill mechanism and top seal jaws, including date, without contamination or the need to stop production and re-sanitize.

**Everything about our ELL filling technology** is designed to help your products retain their flavor and appeal for a longer time – whether milk, juice, eggs or other liquid foods. We know you put in the selling points of taste and nutrition. We'll protect those assets on their way to market and into the consumer's hands.

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