

A collage of fresh produce including spinach, blueberries, and lemon slices. The image is split vertically: the left side has a blue tint and shows spinach, blueberries, and broccoli, while the right side is white and shows lemon slices, blueberries, and dill.

# Smart MAP Solutions for Fresh Produce

Laser microperforation, gas control and packaging technology

*Extending freshness across the value chain*

**PERF**TEC

# About PerfoTec

A Dutch company with 20+ years of experience, pioneering technologies that extend shelf life, maintain freshness and reduce waste of fruits, vegetables and flowers.

EXPERIENCE

**20+**

years pioneering  
MAP  
technology

COUNTRIES

**40+**

Active on every  
continent across  
diverse markets

INSTALLED BASE

**300+**

Sites worldwide  
ensuring local  
impact

REACH

**Global**

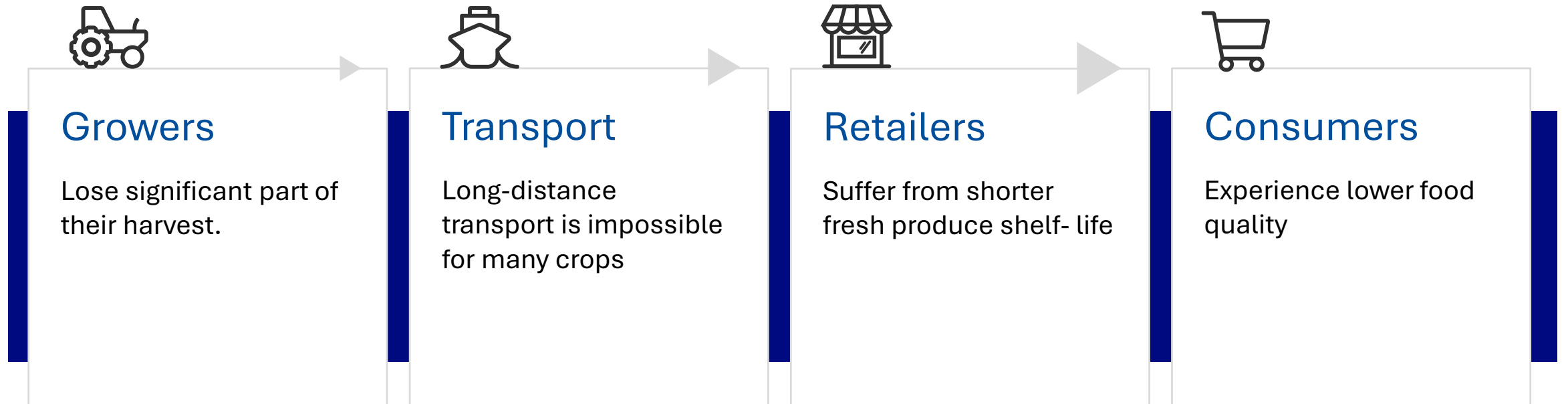
growers,  
packers, retailers  
worldwide

FOCUS

**MAP**

Modified  
Atmosphere  
Packaging

Nearly **45%** of fresh produce is wasted, generating **3.6B tons** of CO<sub>2</sub>e annually — up to 10% of global emissions.



# The Produce Industry Has a Packaging Problem



## Excessive Food Waste

**Only 53 of every 100 fruits produced reach consumers.**  
Producers lose harvest, transport is limited, shelf life is short.

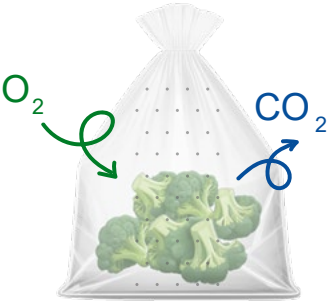
## Lack of Precision

Blanket packaging solutions ignore produce-specific needs, leading to suboptimal preservation and higher waste

## Supply Chain Disconnect

Packaging happens too late — bulk-shipped produce is exposed to damage long before it reaches the store.

# What is Modified Atmosphere Packaging?



*MAP helps slow down the breathing of fresh produce, keeping it fresh and alive for longer.*

# WHAT MAP DOES

MAP fine-tunes the natural gases inside the package to slow respiration and preserve freshness.

## Slows Ripening

so produce arrives in peak condition.

## Controls Humidity

to prevent condensation and mold.

## Extends Shelf Life

without preservatives or refrigeration changes.

## Cuts Food Waste

across the supply chain.

### WHERE TRADITIONAL MAP FALLS SHORT

Standard MAP films are not tuned to each product's respiration rate. The result

**Condensation** that damages cartons and the product itself.

**Mold growth** from trapped moisture and high CO<sub>2</sub>.

**Uneven ripening** and inconsistent shelf life across batches.

**One-size-fits-all** — berries, leafy greens and stone fruit each need different gas balances.

# How PerfoTec Technology Works

An integrated process to optimize your MAP packaging — from measurement to perforation.

## Measure Respiration

Determine each product's respiration rate with the Fast Respiration Meter.



## Integrate Data

Process automatically to define optimal packaging parameters per application.



## Laser Microperforation

Apply precise perforations in the film, tuned to the product.



## Optimize Packaging

Each pack gets the exact pattern for ideal gas balance and maximum shelf life.

# Laser Solutions

*Precision laser systems for every operation —  
from compact lines to high-volume production.*



# Laser Microperforation for MAP Packaging

PerfoTec laser technology creates ultra-precise microperforations in packaging film, allowing each product to receive the exact gas exchange it needs to stay fresh for longer.

## Technology Highlights



**Precise microperforations**  
for optimized O<sub>2</sub> and CO<sub>2</sub> balance



**Real-time camera monitoring**  
for consistent perforation quality



**Automatic adjustment**  
based on product, route, and climate conditions



**Connected with the PerfoTec Hub**  
for data-driven packaging performance

# Multi Head Laser System

**10**

*laser heads (max)*

**1.6**

*Max width (m)*

**450**

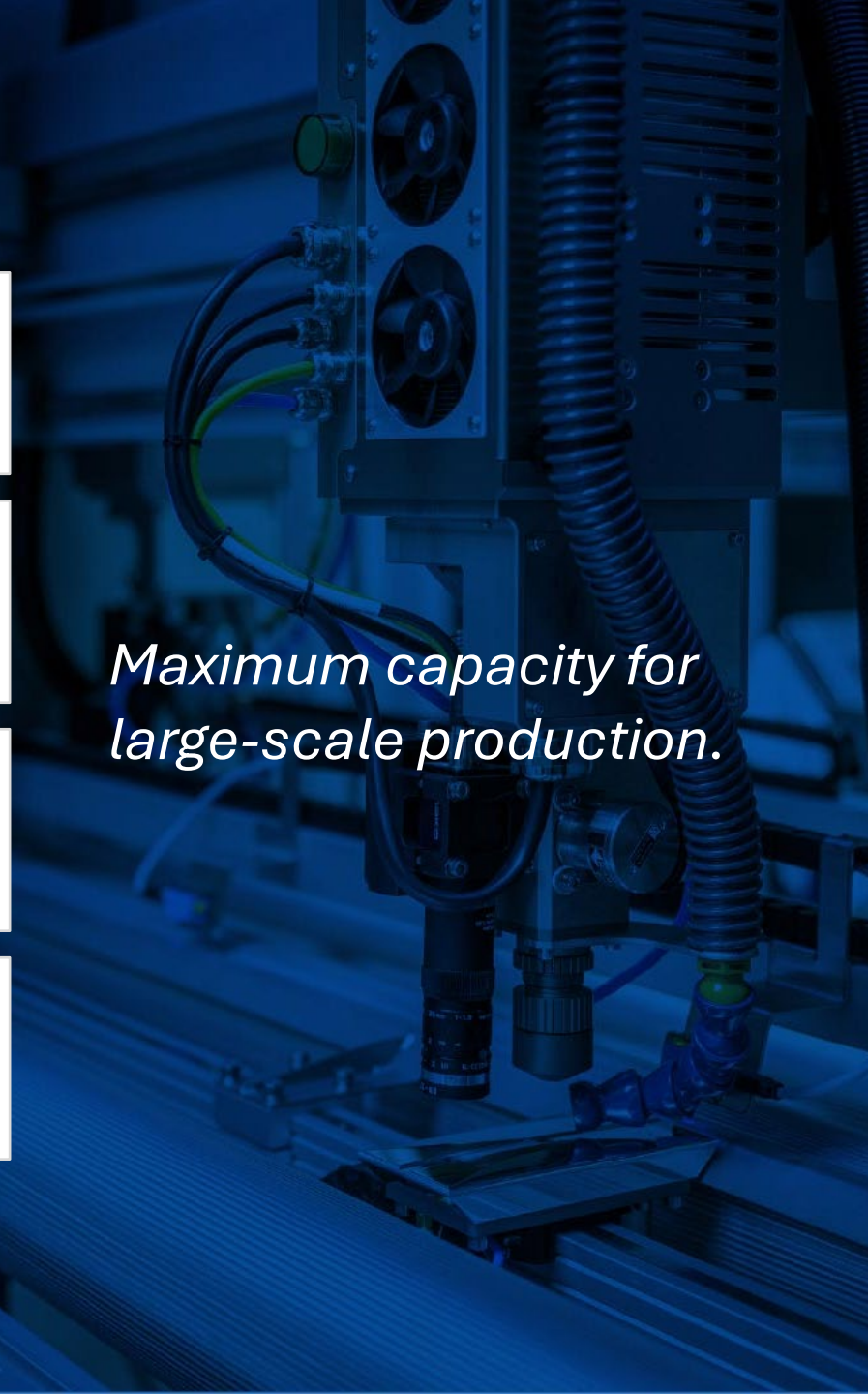
*speed (m/min)*

**50–200**

*perforation range ( $\mu\text{m}$ )*

*Maximum capacity for large-scale production.*

Built for high-volume operations that demand maximum productivity, flexibility and process control.





## Standard Laser Model

### **User-Friendly**

Simplified software package, ideal for entry-level users

### **Seamless Integration**

Built-in screen for straightforward operation

### **Efficiency Boost**

Quick 2-minute changeover time between productions

## Advanced Laser Mode

### **Comprehensive Control**

Full command with Online PerfoTec platform

### **Total Transparency Complete**

traceability and production reports

### **Ease of Use**

Laser scoring feature for easy-tear packaging

## Expert Laser Model

### **Unmatched Precision**

Most precise laser on the market

### **Micro-Perforation Mastery**

Capable of creating 50-micron holes

### **Industry Leader**

Highly sought after by the salad industry for its superior performance

# Why NanoPerf Stands Out

50 $\mu$



## Precision Perforations

A traditional 110-micron hole is nearly five times larger in area than a 50-micron hole.



## Tailored Oxygen Flow

Matches the exact respiration needs of delicate produce, preventing spoilage from too much or too little oxygen.

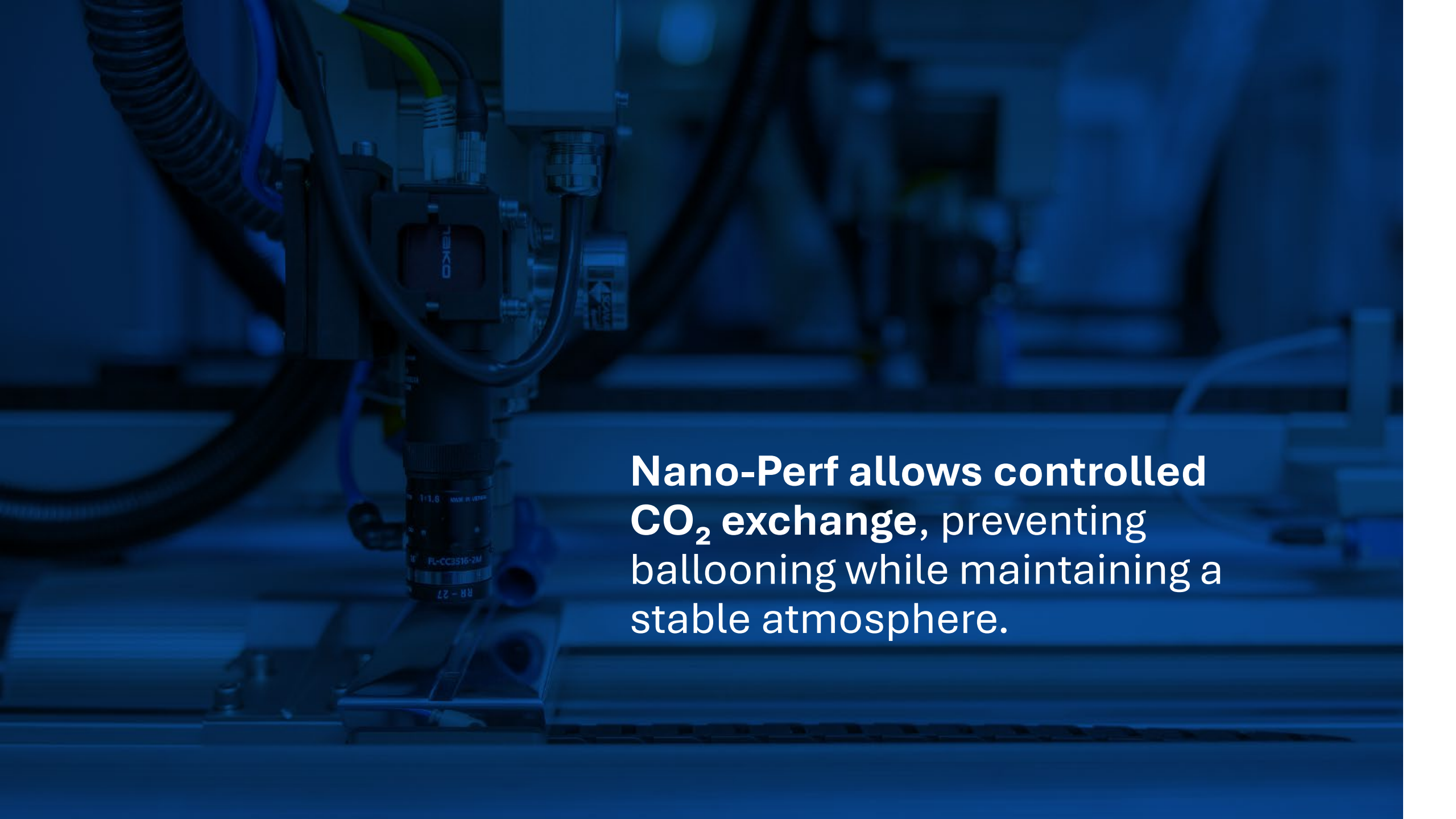


110 $\mu$



## Superior Quality Protection

Reduces oxidation, browning, softening, and microbial growth, keeping produce fresh and visually appealing longer.



**Nano-Perf allows controlled CO<sub>2</sub> exchange**, preventing ballooning while maintaining a stable atmosphere.

# Compact Laser System

Efficiency and accessibility for growing operations.



**2**

*laser heads*

**450**

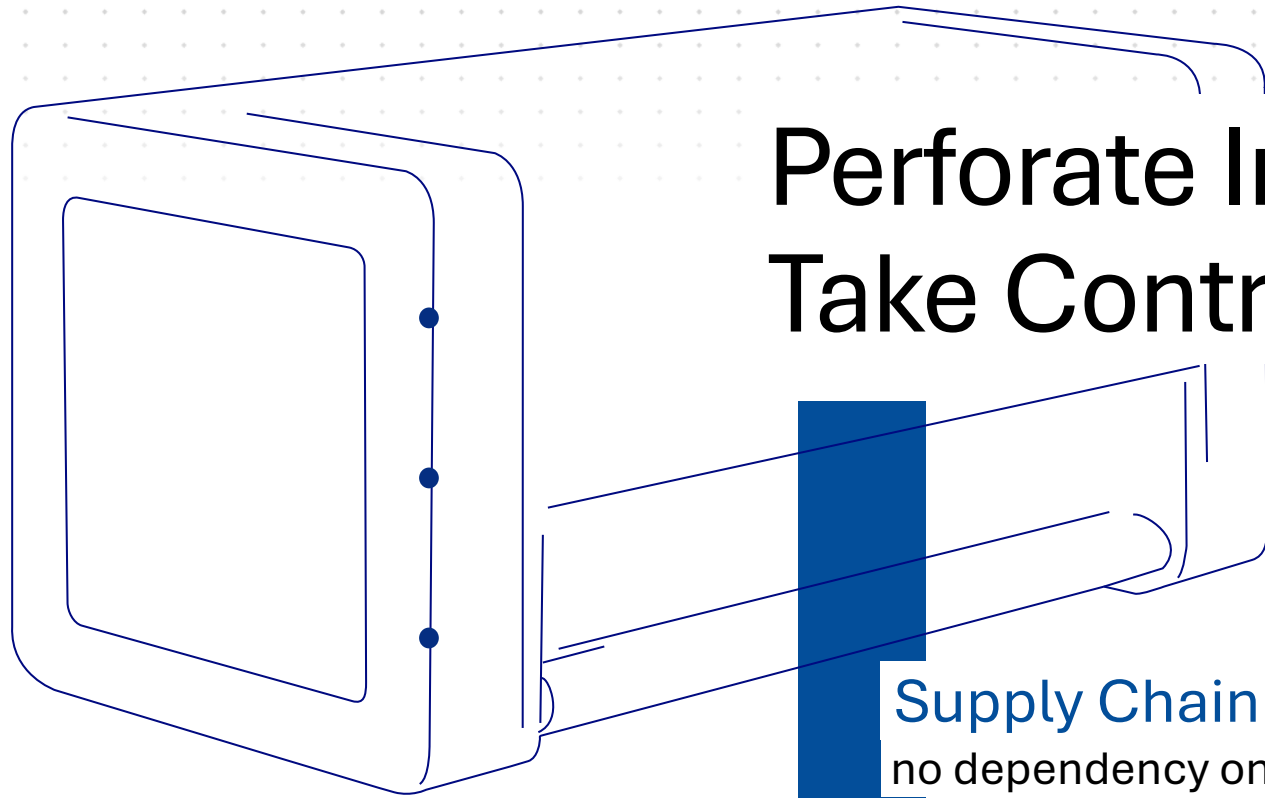
*speed (m/min)*

**50–200**

*perforation range ( $\mu\text{m}$ )*

- Entry-level access to professional microperforation technology
- No large setup required
- Integrates into compact rewinders and slitters
- Ideal for small to medium production volumes





# Perforate In-House. Take Control.

## Supply Chain Independence

no dependency on external pre-perforated film suppliers

## Lower Cost Per Meter

reduced cost vs. buying pre-perforated film

## Full Quality Control

flexibility and consistency over OTR specifications

# In-Line Laser System

Direct microperforation in your packaging line.



2

*laser heads (max)*

85

*Max width (cm)*

50–150

*perforation range (μm)*

*Built to integrate directly into packaging processes — ideal for fresh-produce packers needing real-time MAP control.*

- Direct integration with **vertical, horizontal and thermoforming** machines — no extra processes.
- Operates in **dry and wet conditions** — perfect for fresh-food applications.
- Up to 2 laser heads, widths to 85 cm and 50–150 μm perforation tuned to each line.

# Atmosphere Control & Optimization

*The science behind every perforation pattern.*



# Fast Respiration Meter

Precise respiration data — the foundation of effective MAP packaging.

Defines the exact microperforation pattern and gas levels per product.

Precise O<sub>2</sub> and CO<sub>2</sub> measurement for both perforation and gas-mix tuning.

Cuts validation time dramatically vs. traditional methods.



RESULTS IN

4 hours

# O<sub>2</sub> Control System

Stable, accurate gas levels — even through line stops and restarts.



*Optimal Gas Levels*

## <0.5%

### Superior precision

Deviations under 0.5% — guaranteed stability and repeatability.

## 24/7

### Continuous operation

Stable performance even during line stops and restarts.

## Plug-in

### Easy integration

Drops into existing packaging lines without disrupting operations.

# MAP Packaging

*MAP that travels — from packhouse to far-away shelf.*



# PerfoTec Liner

## Extended Shelf Life

*For long-distance transport and storage*



## Best Bulk Transport Solution

Robust material suitable for long storage & transport

## Atmosphere Control

Regulates gas and humidity levels

## Sustainable

TüV Certified, OK Industrial Compostable

The **PerfoTec Liner** is an eco-friendly packaging material designed to help fresh produce stay fresher for a longer time.

# PerfoTec Pallet Cover

Humidity management for  
every pallet



## High WVTR

Precise WVTR control evacuates  
excess water vapor.



## Laser precision

Micro-holes selected for the respiration  
rate of a specific fruit variety.



## Automatic stabilization

The system itself maintains the ideal  
level of O<sub>2</sub> and CO<sub>2</sub> inside the pallet.

# Zero operational barriers



# VALUE CHAIN IMPACT

*Benefits Across the Whole Chain*

*THE BIG ADVANTAGE*

**Better arrival quality, fewer claims,  
higher end-customer satisfaction.**



## Growers & Packers

- Minimizes markdowns and shrink
- Maintains premium appearance
- Prevents water loss and weight loss
- Unlocks higher margins on existing volumes



## Retailers

- Extends shelf life across the category
- Cuts food waste and shrink at store level
- Improves on-shelf appearance
- Lifts sell-through and category margin



## Transport

- Preserves freshness over long sea-freight routes
- Reduces reliance on costly air freight
- Lowers logistics cost per unit shipped
- Cuts CO<sub>2</sub> emissions across the supply chain



## Consumers

- Consistently fresher, better-tasting produce
- Higher quality at point of purchase
- Drives repeat purchases and brand loyalty
- Reduces in-home food waste

VALUE CHAIN IMPACT

# Benefits Across the Whole Chain

For more information on how PerfoTec can revolutionize your packaging process, contact us today!

**We'd Love to Hear from You!**

 +31 (0) 297 255 554

 [salesupport@perfotec.com](mailto:salesupport@perfotec.com)

 [perfotec.com](http://perfotec.com)