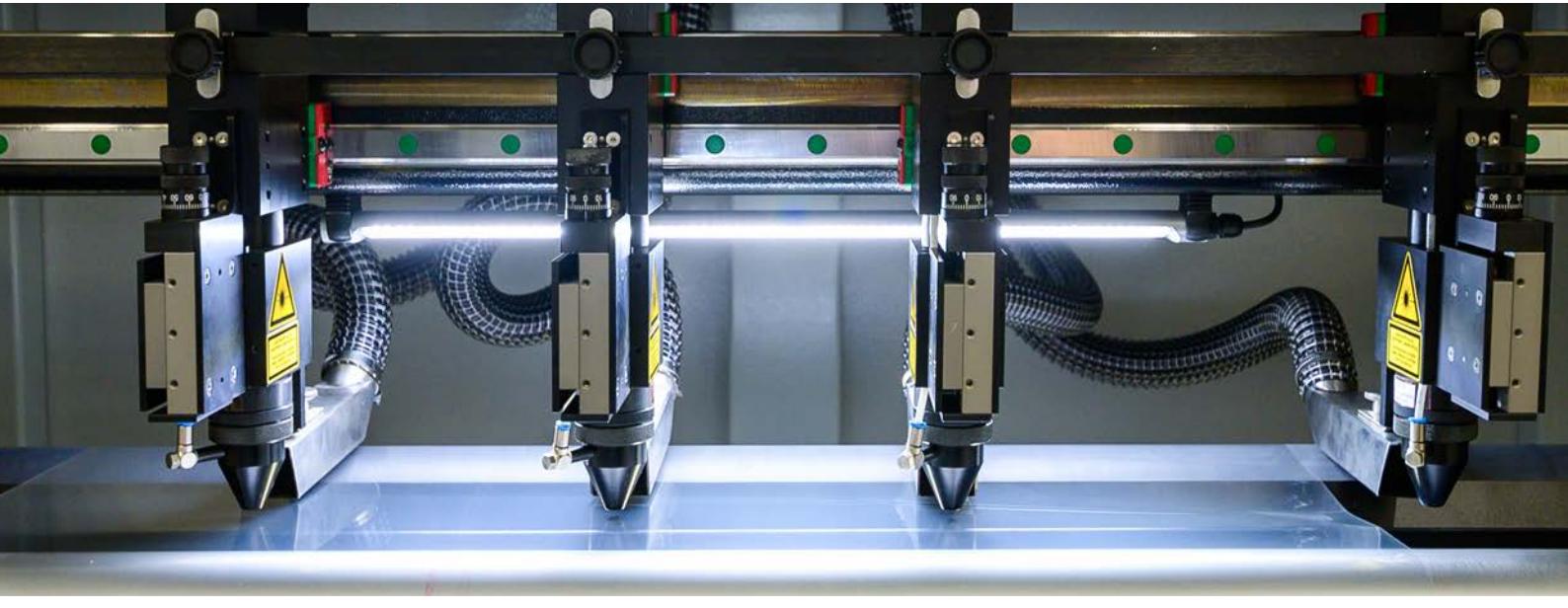


The Future of Packaging

Laser Solutions for Enhanced Packaging





The Key Technology for the Packaging Market



Buying decisions are strongly influenced by an eye-catching and attractive display presentation, as well as convenient product handling. Thus, converters are increasingly tasked to deliver innovative packaging solutions which keep them one step ahead of the crowd. And, since glossy, colorful printing is commonplace nowadays, new ways to differentiate packaging need to be found.

Laser-Optimized Packaging Makes Life Easier

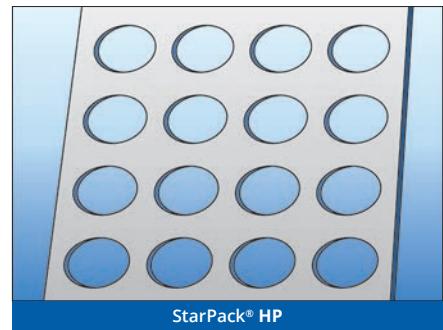
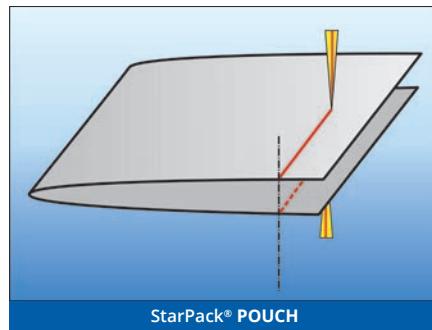
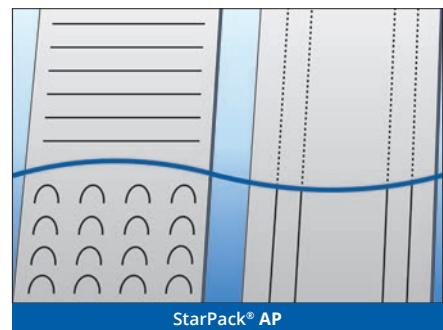
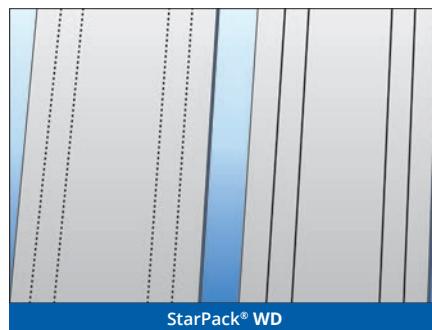
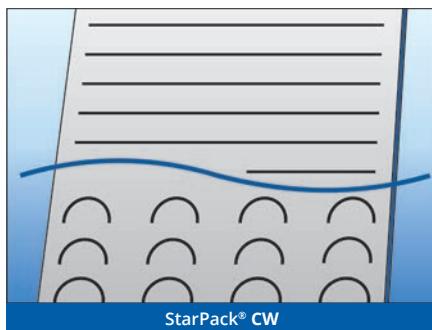
Buyers today expect more than just nice printing! Lasers are the key technology for the production of smart packaging having added value. For example, laser scribed, easy-opening packaging and laser perforated monolayer films for enhanced shelf life of perishable fresh food are already widely used in the food industry.

From Easy Opening to Modified Atmosphere Packaging

Laser-optimized packaging is simply better. There is no need to explain the benefit of a laser scribed easy tear line on a doypack, and not just for the increasing elderly population. There are other reasons for the use of micro-perforated pouches for salad and vegetables. In addition, controlled oxygen exchange considerably enhances perishables' shelf life, which also leads to less waste, reduces overall costs and helps to protect the environment.

**Discover how Coherent's
laser technology smartens
up your packaging!**

Leading Laser Solutions for the Packaging Industry – the StarPack® Line



With more than 52,000 systems installed worldwide, Coherent is a market and innovation leader for lasers and laser-based solutions for industrial materials processing. Whether it is cutting, welding, marking or surface treatment – whether it is a CO₂, fiber, solid-state, diode or ultra-short pulsed laser – Coherent offers the optimal laser technology today for the applications of tomorrow.

Coherent's expert CO₂ group is among the leaders for laser-optimized flexible packaging and partners with major packaging converters. Our comprehensive knowledge about packaging materials, gained during many years of experience, helps us design new tailored laser solutions. Laser processes for the packaging industry are developed in our own winding system and lab equipment. Customers are welcome to send material for testing and applications development.

The StarPack® Product Line

The StarPack product line provides a comprehensive range of capabilities for packaging and converting. Each StarPack model provides the basis for a tailor-made solution.

StarPack® CW

Cross web applications and free-form scribing

StarPack® WD

Web direction scribing and perforating in one process

StarPack® AP

Cross web and web direction in one system

StarPack® HP

High-power scribing and cutting of thick material

StarPack® Pouch

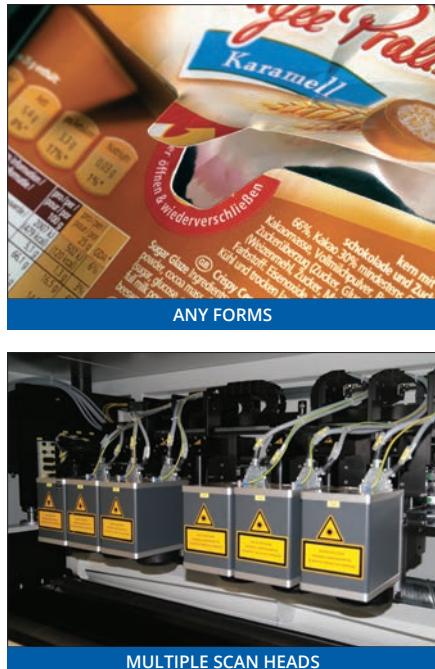
For integration in pouch making machines

StarPack® CW

Cross-Web Applications and Free-Form Scribing



StarPack® CW



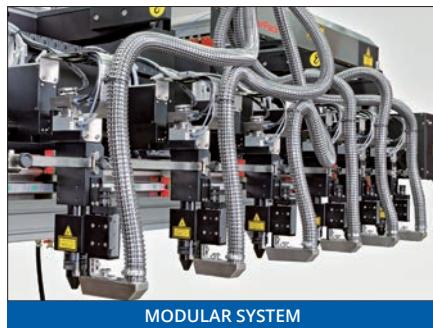
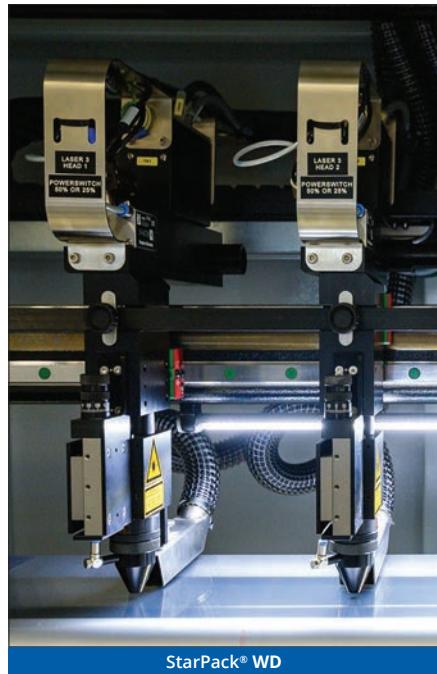
StarPack® CW systems are designed for selective scribing of packaging layers in the cross-web direction. This corresponds to the typical manufacturing process of bags and pouches. Beyond that, StarPack® CW systems can make arbitrarily shaped scribing lines, suitable for re-closable flaps or circular easy tear lines in the corners of packaging.

High-performance scanner heads with 2 or 3 axes offer extremely fast beam positioning over an enormous working field. The goal is subtle, visually unobtrusive scribe lines. Depending on the application, web width and other customer requirements, Coherent mounts up to 9 laser sources on a StarPack® CW system. Typically Coherent laser solutions are integrated into the slitter winder.

The sophisticated Coherent control software assures precise laser beam positioning and complete web movement compensation. The selective weakening of packaging layers is achieved by precisely controlling the laser energy. Three different wavelengths facilitate optimum matching with the absorption properties of the selected packaging film material.

StarPack® WD

Web Direction Scribing and Perforating Within One Process



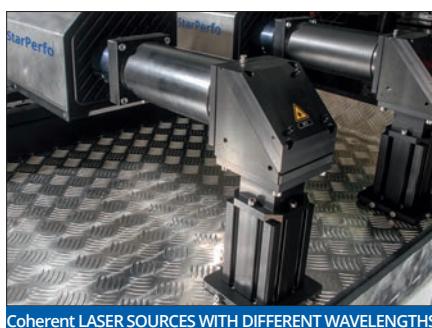
With up to 8 processing heads as a standard - more are available on request - StarPack® WD systems handle almost any web direction application. The main application area is the perforation of packaging films for fresh food to produce a controlled atmosphere within the packaging. Hole sizes for this type of application are in the range of 50 µm to 300 µm, depending on the material. Thanks to its newly developed control software, scribing and perforating can be combined in a single process!

The software allows the mixing of hole sizes, scribing lengths and patterns all at the same time. This enables straightforward, cost-efficient manufacturing of packaging for controlled atmosphere and easy opening functionality in the web-direction.

The StarPack® WD is designed to accommodate up to 2 laser sources as a standard - more are available on request. As with all StarPack® systems, scribing and perforating is synchronized with the package printing. For optimum processing of thick packaging films and demanding composite material at high web speed, the system can be equipped with Coherent's web movement compensation (WMC).

StarPack® AP

The Universal Solution



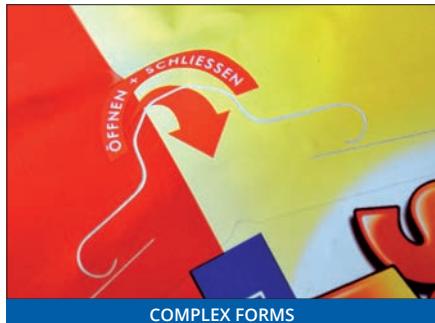
The StarPack® AP (All Purpose) is the packaging all-rounder, combining CW and WD functionality in one system. This makes it an ideal choice for complex manufacturing processes and for converters who want to be completely prepared for virtually any future customer requirements.

Each scribing and perforation application differs. Various components of a laser system have great influence on the characteristics of a scribe line or the size of a perforated hole: laser source, galvo scanner or laser optics. The StarPack® AP offers the entire range that modern laser technology can provide for the packaging industry.

Even different types of lasers can be integrated within one system. The StarPack® AP provides the basis for future all-round solutions that enable you to meet all customer needs.

StarPack® AP

The Entire Range of the Coherent Scribing and Perforating Knowhow in One System



COMPLEX FORMS



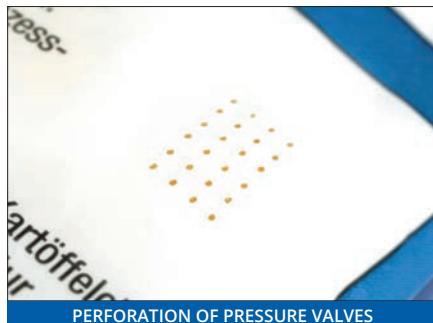
SIMPLE FORMS AT HIGHEST WINDING SPEED



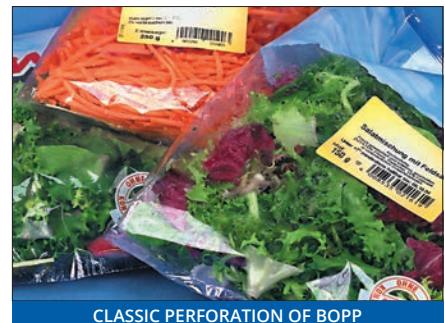
CLASSIC EASY-TEAR LINE



DOUBLE EASY-TEAR LINE



PERFORATION OF PRESSURE VALVES



CLASSIC PERFORATION OF BOPP

Complex Contours

Up to 9 lasers and scanning units enable highly-complex scribe lines at high web-speed.

Dual Easy-Tear Line

Precise double-spot focusing lenses are used for splitting the laser beam, resulting in dual easy tear lines which help to optimize easy opening.

Simple Shapes at the Highest Web Speed

High-end scanner heads scribe commonly used semi- and quartercircular opening lines at several hundred meters per minute.

Perforating of Pressure Valves for Microwaveable Packaging

Perforation of a row or small area of micro holes enables a valve-like functionality for microwaveable packaging. The steam which develops during preparation escapes through the tiny holes.

Classic Simple Easy-Tear Line

Especially single-portion sachets, e.g. for instant coffee (3 in 1), cross web scribing on the winder is necessary. Web speeds of up to 500 m/min are possible for this application.

Classical Perforation of BOPP

The StarPack® AP also handles the standard micro perforation e.g. of pouches for salads or vegetables. BOPP mono layer film is perforated with 3 - 8 µm holes. This enhances shelf life up to one week. Equipped with the innovative WMC module, perfect circular holes from 50 µm - 300 µm diameter – depending on the material – can be produced even at high web speed.

StarPack® HP



StarPack® POUCH



POUCH - BOTH SIDES SCRIBED



EASY OPENING OF PAPER TISSUE



StarPack® HP



CUTTING OF SINGLE PORTION TRAYS



CARDBOARD CUTTING

Compact Solution for Pouch Making Machines

This space-saving, compact system, designed for integration in pouch making machines, complements the range of laser systems for easy opening. It provides a solution for food producers who are looking for a laser scribing system that can be used directly after pouch forming or within the form fill and seal unit.

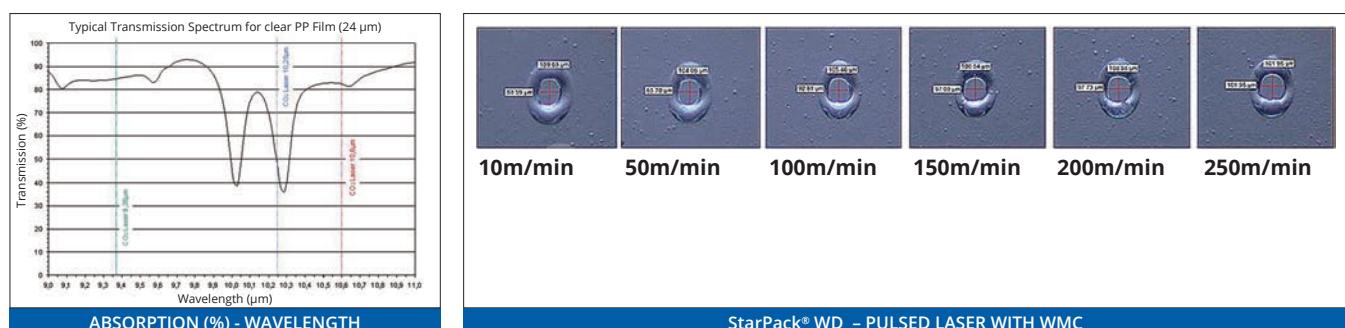
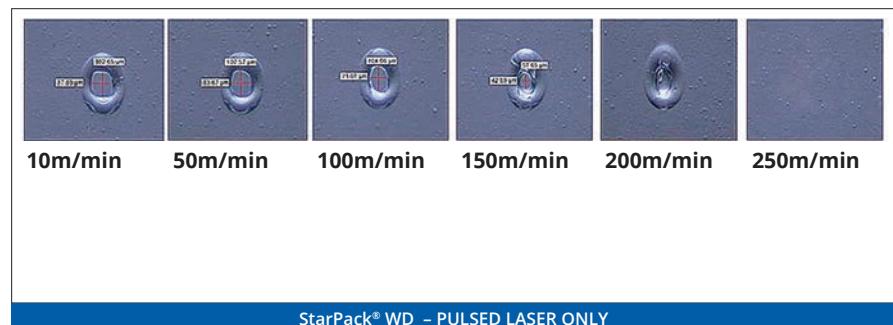
As web speed in pouch making systems is considerably lower than in slitter winders, 100 W of laser power is more than sufficient for optimum scribing results. StarPack® Pouch is the cost-efficient alternative, using low power laser sources, and also offers easy integration.

High-Power Scribing and Cutting of Thick Packaging Material

Cutting and scribing of thick packaging material, such as cardboard and thermoforming films, is a promising new application area for laser systems. Compared to a laser, mechanical cutting and punching techniques are prone to wear and tear and require cost-intensive modifications every time the package design changes.

With laser sources from 1000 W to 2500 W, the StarPack® HP cuts even thick packaging material on-the-fly at full web speed. A new high-end scanner system has been especially designed for this type of application and laser sources with a power of more than 2000 W. With an impressive working area of over 1 m² and, while also achieving very small spot sizes, the StarPack® HP is a true alternative to a mechanical punch.

Coherent – Pioneers of CO₂ Laser Development for the Flexible Packaging Industry



The Right Wavelength Makes the Difference

The various polymers commonly used in the packaging industry exhibit different absorption properties at 10.6 µm, which is the standard wavelength of industrial CO₂ laser sources. Polypropylene, in particular, can be processed considerably faster at shorter wavelengths. Consequently, 10.25 µm wavelength lasers deliver substantially higher scribing and perforating speeds for PP-based polymers.

Coherent is the only laser manufacturer who has the capability to conduct its own development of new laser sources for the benefit of the flexible packaging companies. The result is a range of CO₂ lasers, at 10.60 µm, 10.25 µm, and 9.35 µm, at various power levels.

WMC – Precision Perforation at All Times

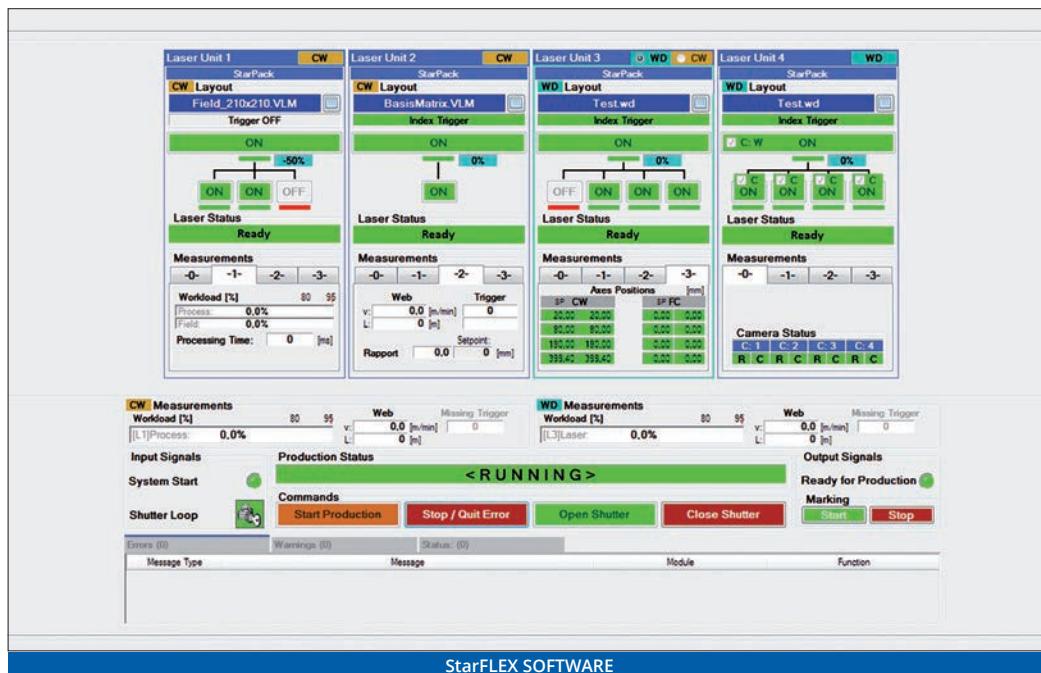
The packaging industry requires precision perforation and consistent quality. The better the perforation, the bigger the shelf life advantage. Multi-chamber trays require different perforation to optimize the storage life of the contents in each particular chamber.

Coherent's web movement compensation (WMC) system provides complete compensation of web movement and ensures the production of perfectly circular holes of the desired size under all conditions.

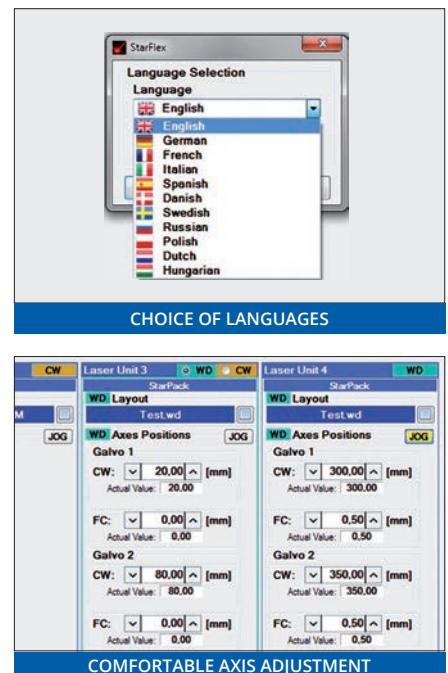
Thus, production waste is reduced significantly and maximum web speed more than doubles. The solution encompasses a comprehensive speed range, from 0 m to more than 380 m per minute and can be fitted and retrofitted in all StarPack® WD and AP systems.

StarFLEX

The All-in-one Graphical User Interface for All Laser Systems



StarFLEX SOFTWARE



CHOICE OF LANGUAGES

COMFORTABLE AXIS ADJUSTMENT

StarFLEX - The Software Developed by Coherent for All Flexible Packaging Applications

StarFLEX can control web direction and cross web systems at the same time. Each laser source and processing head can be activated separately. All necessary parameters, like offset, rapport length and trigger features can be intuitively adjusted and saved to the layout. Each laser can run with a different layout and parameter recipe. To create a layout, access to the Coherent VLM and WD editors is embedded in StarFLEX.

In addition, various components like motorized focus axis and positioning axis can be easily controlled by the software. These settings are saved in the parameter recipe as well. An automatic power measurement allows you to record the quality of your laser.

Quality, Convenience, and Safety with the User Interface StarFlex

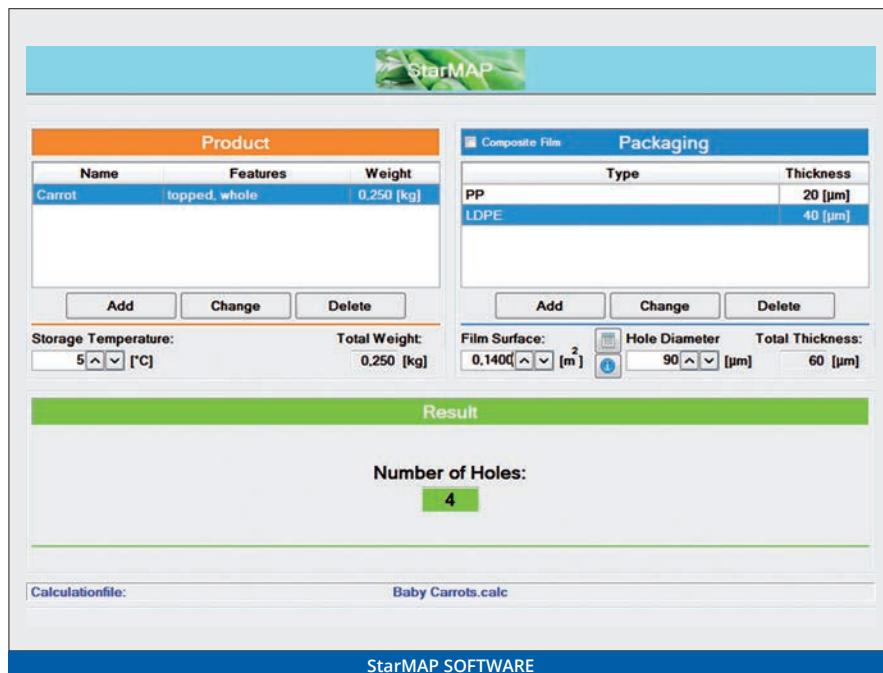
A sophisticated trigger control allows you to guarantee your customer a 100% check of the eye marks. Each missed mark is reported and you can define when the system will automatically stop. For operator convenience, the software language can be changed by a single click. And, more than 12 languages are available. For your safety, you can define access rights for different employees.

StarFLEX provides the following information:

- Current web speed
- Running length
- Real time distance of trigger rapport
- Number of trigger
- Detailed workload status of each laser system
- Processing time

StarMAP

The Smart Software Solution for Defining High-Precision Perforation Parameters



StarMAP - The Smart Software Solution for Providing the Precise Number of Holes for Various Packaging Designs

When shopping, customers instinctively choose the products which look the freshest.

Perforation of the packaging film extends product shelf life and preserves appearance for a longer period of time – but how many holes for which product?

The Coherent StarMAP software has the answer! It provides the ideal hole quantity and size in order to guarantee high product quality of packed goods. Based on an USDA approved database, it uses a scientific approach to calculate correct hole number for an optimized OTR value. This makes conducting long test series history.

To provide the best possible shelf life and product quality, StarMAP takes the following parameters into account:

- Product: fruits, vegetables, whole/fresh cut
- Product volume
- Storage temperature
- Type of packaging film
- Packaging geometry



Reliable Calculation of the Hole Number for Different Products Based on Your Own Database

The software can be used with any Coherent web direction laser system solution for perforation like StarPack® WD and StarPack® AP. The software brings numerous benefits to film and packaging suppliers as well as food processors, including:

- Reliable calculation of micro-perforation
- Fast and easy adaptation to different products and types of packaging
- Less costly and time consuming than trial & error
- Reduced waste
- Easy to use, intuitive user interface
- All database information belongs to the user
- Optional device for on-site measurement of respiration rates to create your own database

O₂-Check Kit – Individual MAP Optimization Package



O₂-CHECK KIT



VARIOUS PRODUCTS - REGIONS - GROW & HARVEST CONDITIONS

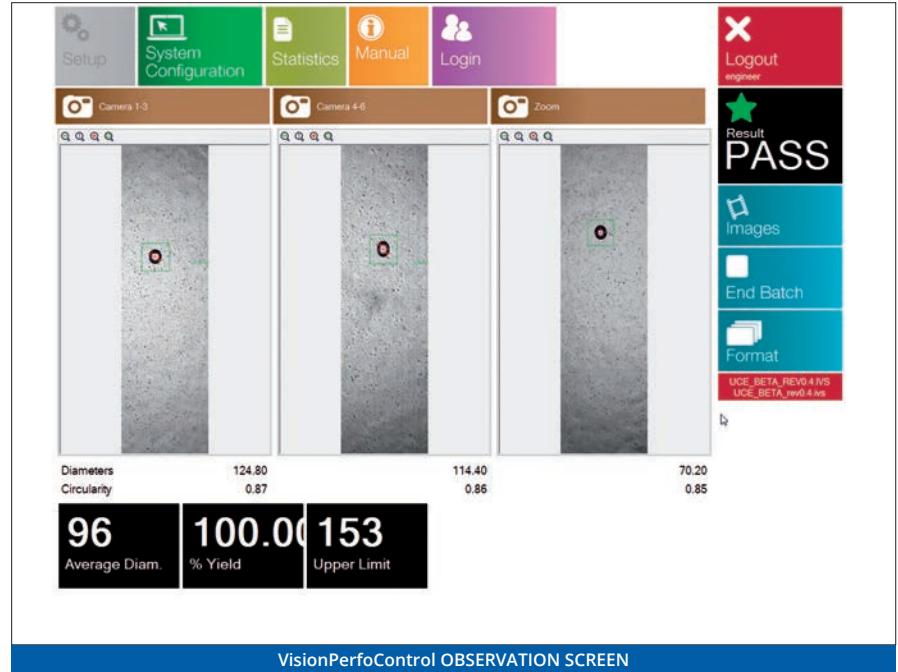
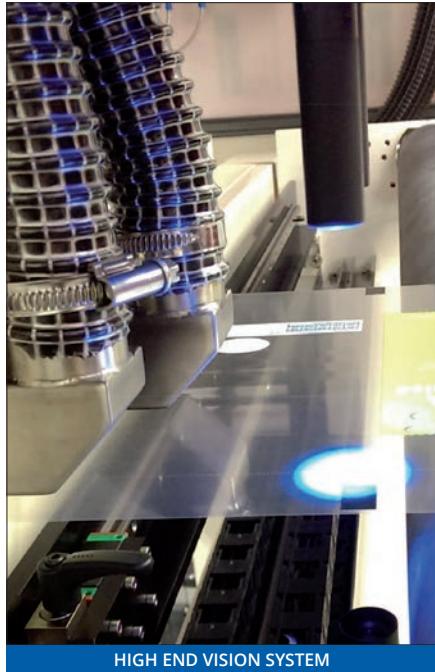
StarMap comes with a USDA approved database of more than 160 products (fruits, vegetables, whole / fresh cut). This database is a good point to start from. But there is still room for optimization and major converters are already addressing this point.

Oxygen-transmission rates of fresh food vary, as growing location and harvest time have an influence. With the O₂-Check Kit, Coherent now gives small and medium sized converters the opportunity to develop their own optimized packaging. It comes with a sensor-equipped, air-tight container, a highly temperature-stable climate cabinet and smart evaluation software.

With the O₂-Check Kit, adapting your micro-perforation pattern to varying circumstances is a breeze. Just put a sample in the sensor-equipped test-box and place it in the climate cabinet. The software will record the oxygen-transmission rates over time and generate a new database record for this specific product. With this new solution, every converter will be able to offer individually and seasonally optimized modified atmosphere packaging for fresh produce.

- All-in-one package, includes hard- and software
- Simple and user-friendly measurement process
- Automatic database update
- Individual and seasonal MAP-optimization

VisionPerfoControl



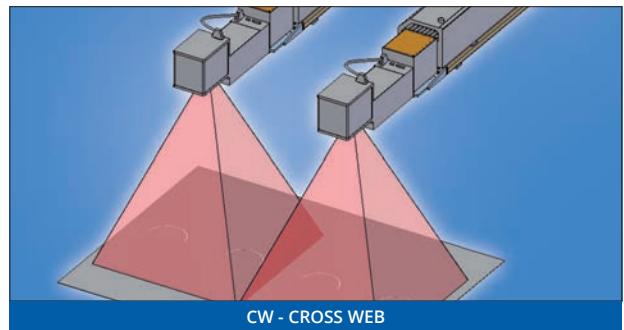
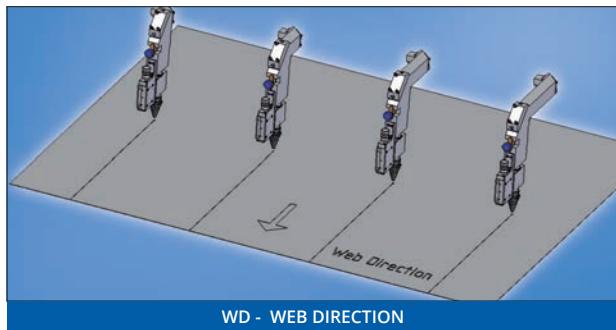
True, real-time monitoring of the perforation process to ensure consistent quality and diameter of the holes is a demanding task. Typically, perforation holes have diameters less than 120 µm, while the packaging film moves at some 100 m/min. Consequently, there have been no ready-to-use solutions on the market up to now.

Coherent is the first supplier to offer true, real-time monitoring of perforation hole diameter and percentage roundness. Each laser perforation head can be fitted with a high-speed camera, and the output of each camera is processed using pattern recognition software to accurately record the dimensions of each hole.

VisionPerfoControl allows for validation of the hole perforation process and eliminates the possibility of incorrect set up (e.g. focus error) spoiling the output from the perforation system. Furthermore, the recorded data documents 100% of the perforation quality of the processed material.

- True, real-time monitoring of perforation quality
- Checking roundness and diameter
- No production waste due to incorrect set up
- 100% quality control documentation

Specifications



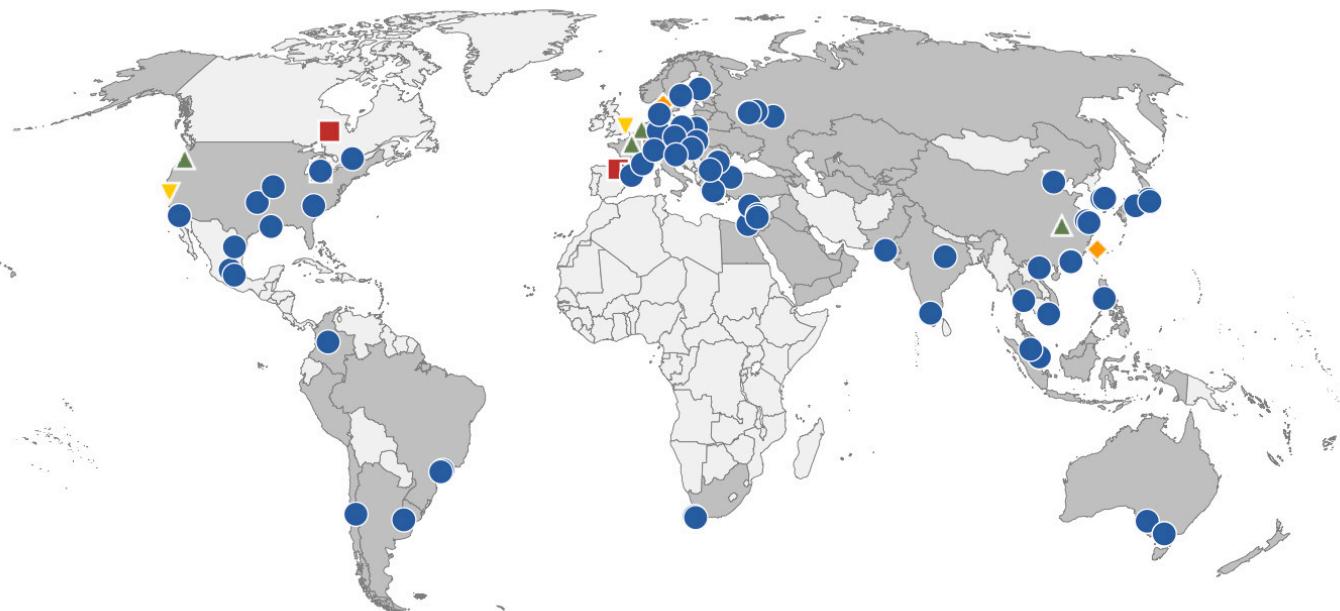
StarPack®	WD	CW	AP	Pouch	HP
Free Form Contour Scribing	no	yes	yes	no	yes
Multiple Head Web Direction Scribing	yes	(x)*	yes	yes	(x)*
Max. Number of Individual Scribing Lines more on request	2/4/6/8	1 to 9 WD 2/4/6/8 more on request	CW 9	2	1
Number of Lasers	1 to 9	1 to 9	1 to 9	1	1 to 9
Power per Laser (W)	100 to 650	100 to 650	100 to 650	100 to 200	1000 to 2500
Number of Super Fast Galvo Heads	-	1 to 9	1 to 9	-	1 to 9
Tailor-made Safety Housing (Class 1) & Frame Works	optional	yes	yes	yes	optional
Web Width (mm)	up to 1800	up to 1800	up to 1800	up to 1800	up to 1800
Web Speed (depending on materialg)	700 m/min.	600 m/min.	600 m/min.	600 m/min.	600 m/min.
Web Movement Compensation (WMC)	yes	no	yes	no	no

(x)* Galvo mirrors can be switched to a fixed position to scribe in web direction.

Coherent Application Labs and Service & Support

◆ - Training Offices ▲ - Sales/Service Offices ■ - Service/Training Offices

▼ - Sales/Service/Training Offices ● - Representatives



Coherent has been developing laser solutions for the Packaging Industry for more than three decades.

In our application labs we work with the widest range of laser sources and laser systems as well as latest CO₂ laser technology and we co-operate closely with winder manufacturers.

Several hundred new applications are evaluated each year by our experts with extensive experience in material processing.

Global Service & Support

Customer satisfaction is Coherent's most important measure of quality. Factory trained service engineers, in offices throughout the world, offer technical support and quick response time. Continuous training of technical support and field service engineers ensure the very best in product and customer care.

It is the mission of the Coherent Product Support Team to provide the real-time service expected from the leader in the laser industry.



Coherent, Inc.
5100 Patrick Henry Drive Santa Clara, CA 95054
p. (800) 527-3786 | (408) 764-4983
f. (408) 764-4646

tech.sales@coherent.com www.coherent.com

