

harleNIRc

NEAR-INFRARED INSPECTION SYSTEM
WITH HYPERSPECTRAL CAMERA



Vision Inspection Systems and PAT tools

Near-infrared inspection system with hyperspectral camera to detect the chemical content of products during the packaging process.

HarleNIRc vision system is a chemical inspection system based on hyperspectral technology developed by SEA Vision to check the chemical composition of oral solids forms. It can be installed on counting machines or on blister thermoformers before the sealing.

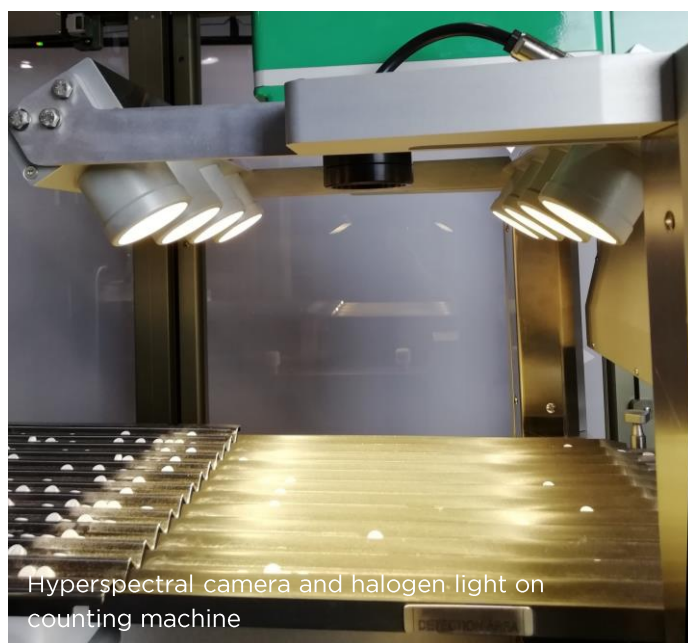
Avoid all mix-up risks

In-line active ingredient and dosage control

Control over 100% of the products

Operations are performed in real-time

Perfect machine integration and rejection management



Hyperspectral camera and halogen light on counting machine

HarleNIRc can avoid the mix-up and recognize a wrong product with same shape, colour and dimensions but with different API (Active principle ingredients)

This is impossible for a vision system with standard cameras.

The new revolutionary system can perform a **not destructive** chemical composition inspection on pharmaceutical products during the production process.

Thanks to integrated imaging technology, HarleNIRc can distinguish products directly from their active ingredients. The spectral control acquires the infrared spectrum from each single pixel of the scanning line, to identify and distinguish similar products not in terms of shape and colour but in terms of chemical compound.

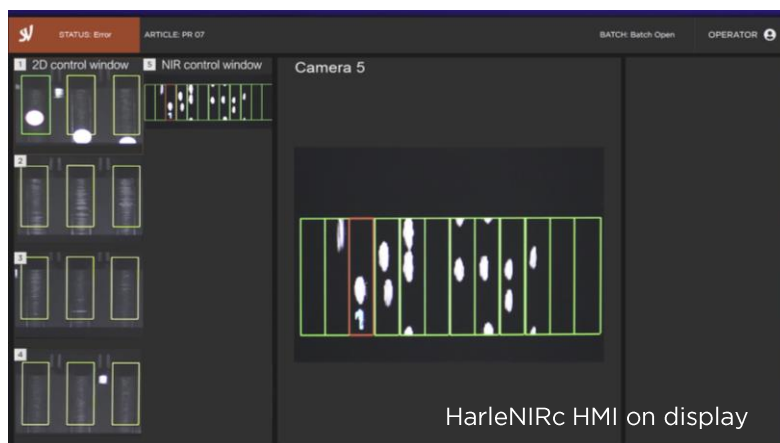
The system performs a **non-destructive analysis** on **100%** of the product during the packaging process, guaranteeing maximum **production quality**, and eliminating all mix-up risks in order to preserve the final user's safety.

Thanks to chemical analysis, it is possible to:

- identify drugs with **different active principle** (qualitative analysis).
- identify drugs with **different dosage** or measure their active ingredient uniformity distribution (quantitative analysis).

HarleNIRc can be installed on every type of counter and blister machine currently on the market **without an impact on the production speed** while perfectly integrating itself thanks to its automation logics.

The use of **100% proprietary algorithms** and of dedicated instructions allows HarleNIRc to use smartly and efficiently the latest generation of hardware in order to guarantee that all controls are done in real-time and measurable in milliseconds.



Materials

Optimal controls over each product and material

HarleNIRc can control all solid oral products:

- White and coloured tablets
- Uncoated tablets and pills
- Capsules - monochromatic
- Capsules - bicolored



Controls

Control the invisible

HarleNIRc inspects the entire production, and it is capable of detecting defects that would otherwise be invisible to a conventional vision system.

HarleNIRc can be combined with other SEA Vision solutions such as Harle2D|3D and harleblister in order to truly control every detail of the production.

Performed controls

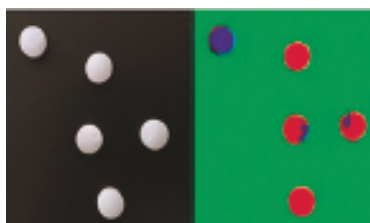
	Tablets	Capsules
Mix-up avoidance ¹	●	●
Foreign object identification ²	●	●
Presence of cracks	●	●
Absence of coating	●	
Overlapping defects ³		●
Identification of empty blister	●	●
Moisture content determination	●	
Measure of API distribution ⁴	●	

LEGENDA

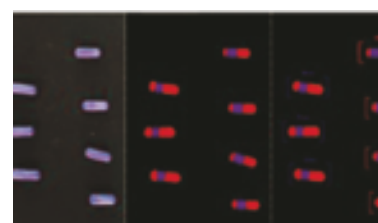
1. Mix-up avoidance: identification and classification of tablets and capsules with different active principle or dosages.
2. Foreign object identification: presence of small foreign object as metallic, plastic, wood or paper.
3. Identification of perfect plastic overlapping in closed capsules and capsules with different filling.
4. Measure of distribution of active principle: The hyperspectral imaging can be used to analyse the spatial distribution of an active principle inside the tablets, so the content uniformity



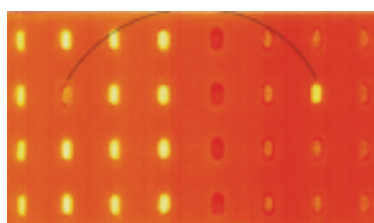
Mix-up avoidance. Identification of tablets with different active principle or dosages inside a blister.



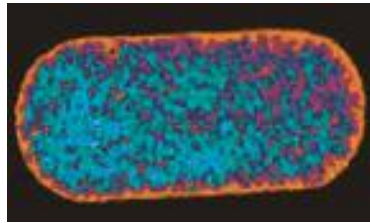
Broken, cracked or chipped tablets detection and partial or total absence of coating on the product.



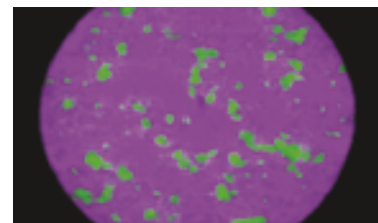
Identification of perfect plastic overlapping in closed capsules. The capsules on the right has major overlapping (violet stripe area) if compared to those on the left.



Identification of empty blister or blister filled with different tablets.



The hyperspectral imaging can be used to analyze the spatial distribution of an Active Principle inside the capsule (powder homogeneity).



Distribution of Active Pharmaceutical Ingredients (APIs) and excipients inside a tablet. The same inspection can be performed on capsules too.

Software

Software features

The system is based on the use of a **linear, hyperspectral camera** for the acquisition of the **spectrum of every single pixel of products** that are under the camera. Each chemical substance have its own spectral reference.

The software analyses the gathered data, recognizes what goes under the camera and returns an image with fake colours on-screen to allow a **simple and quick control** from the operator, all in real-time.

The elaboration times of the calculations, measurable in milliseconds, allows HarleNIRc to perform every control without effecting the machine speed in any way.

The **display clearly shows in real-time the results** of every single check, allowing the operator to keep the production under control through a complete set of data.

The system is expandable and additional controls can be later integrated.



Hardware

Hardware features

Excellent software requires proper hardware. SEA Vision only uses **latest generation** components, customized and optimized for the specific application.

Industrial computers of the **latest generation** with multicore, multithreaded processors that are fully utilized by proprietary algorithms and instructions. The **hyperspectral cameras and the halogen light units** are specifically designed and assembled to adapt to the requested control requirements and to the specifications of the machine in which they are integrated and always guarantee an optimal result. The image acquisition is quick and precise with an optimal illumination management.

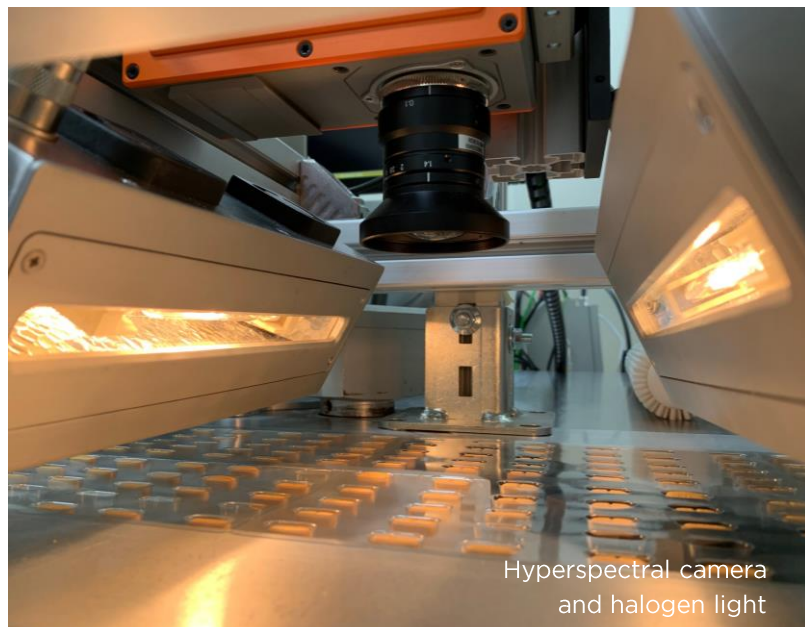
All installed displays are touch-screen and the interface is optimized to be interactive and user-friendly.



Machine integration

Perfect machine integration, result of a wide experience.

Integration on blister machine.

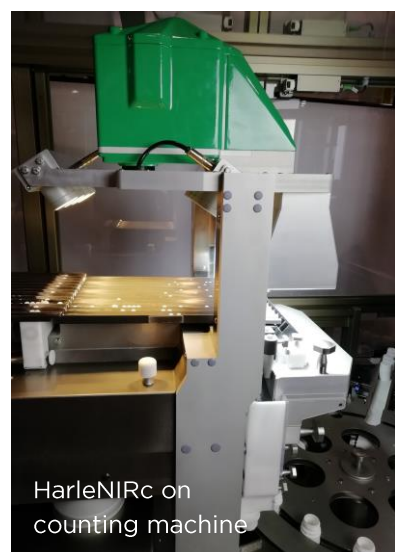


Hyperspectral camera
and halogen light

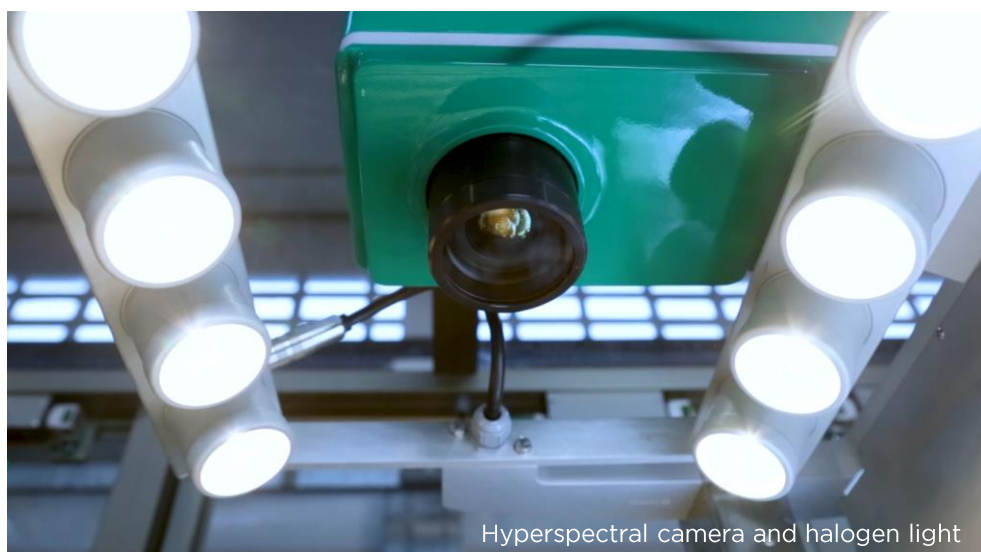


HarleNIRc on blister machine

Integration on counting machine.



HarleNIRc on
counting machine



Hyperspectral camera and halogen light

A perfectly integrated solution

HarleNIRc is a revolutionary system based on the wide integration experience of SEA Vision and it has already been installed on machines from different OEM.

Such a wide and matured experience guarantees a correct machine integration, an accurate signal exchange management and integrated automation and rejection logics.

The graphical oscilloscope allows the observation of signal patterns and to keep them under control, facilitating the diagnostical operation.

The entire process is handled efficiently, from the execution of the control to the rejection of the defective product.

Compliance

Pharma specific

Specifically designed for the pharmaceutical field, the system is entirely compliant to all industry regulations.

User access is regulated in accordance with the FDA regulation 21 CFR part 11.

All events are registered in an audit trail file.

Software development is compliant with the Gamp 5 regulation.



HarleNIRc HMI on display

The optimized touch display makes for a simple and intuitive use.



Native integration with SEA Vision systems

HarleNIRc is a solution that natively integrates with trackability systems and with Yoodoo, the 4.0 software suite for the centralized production management.





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