When Inspection Needs Perfection

Inspection Machines

Ampoules, Vials, Cartridges, LVP, Pre-filled Syringes.

When Inspection Needs Perfection
The history

Since the late 1950s, Brevetti CEA has been manufacturing inspection machines for injectable pharmaceutical products. The company first concentrated on the production of semi-automatic machines until when, thanks to the intuition of the Owner, the production shifted its focus on fully automated inspection systems, which now represent the core business of Brevetti C.E.A.

The first automatic inspection machine was the "ATM18S" for ampoules, manufactured in 1980 when the availability of first photodiode sensors made it possible to automatically detect particles that contaminate pharmaceutical products.

The first inspection machine for vials was launched in 1987. The machine vision system was "Nuclco", a revolutionary technical approach to inspection methods based on the differential inspection of images (image subtraction method). This technology has been developed and improved over the years, but still represents the basic principle for our machines.

The first machine for the inspection of pre-filled syringes was manufactured in 1992 and its production capacity was 6,000 pieces per hour. In 2006 Brevetti C.E.A. applied the "High Speed Camera" technology on "K15-600" and "K32-600" machines, capable of inspecting 36,000 containers per hours and granting an acquisition of min. 24 images per each inspection device. by increasing the inspection frequency, the chances to seize defects is consequently increased. This technology enables our machines to get real efficiency values that were believed to be impossible to reach, not only on standard products but also on complex applications like vaccine and freeze-dried products.

As a further proof of Brevetti C.E.A. total commitment to continuous research and devotion to vision applications, during the years the Company developed a sophisticated in-house vision system, which includes an owned library adaptable to all different inspection requirements.

Today Brevetti C.E.A. boasts of more than 2,000 inspection machines installed worldwide, half of which fully automatic.

To be continued ...............
**K15**

**Pre-filled Syringe inspection machine**
*(clear and suspension products)*

K15 is an automatic inspection machine for particle and cosmetic inspection of pre-filled syringes configured to be installed in a fully automated line. K15 has been designed as the right answer to the market demand in terms of high production capacity and flexibility of configurations: a single, versatile and compact machine.

### MAIN FEATURES

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<td>Container Diameter: up to 14,45mm</td>
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<td>Leak Detection available for liquid products (High Voltage)</td>
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**K32S**

**Ampoules, Vials and Cartridges inspection machine**
*(liquid and freeze-dried products)*

K32S is an automatic inspection machine for particle and cosmetic inspection of ampoules, vials and cartridges. Design, configuration flexibility and high productivity are the key-factors of its success: a single, versatile and compact machine for liquid and freeze-dried products.

### MAIN FEATURES

<table>
<thead>
<tr>
<th>K32S</th>
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<tr>
<td>Machine nominal speed: up to 400 pcs/min</td>
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<td>Container Diameter: up to 32mm</td>
<td>Container Diameter: up to 20mm</td>
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<td>Particles, fill level and cosmetic inspection</td>
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<td>RPV Remote Parameterization &amp; Validation</td>
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<td>Leak Detection available for freeze-dried products (Headspace Gas Analyser)</td>
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A50 is an automatic inspection machine for particle and cosmetic inspection of liquid and freeze-dried products. It has been designed to inspect a wide range of containers (cartridges, ampoules and vials) from 1 to 100 ml at a mid-range speed, granting high level performances.

**A50**

Capable of covering the full range of LVP containers dimensions, BL-S300 represents a complete solution for the needs of Large Volume Parenteral market. Ranging from 100 ml vials up to 1000 ml bottles, through its flexible design, the machine is able to grant high performances on all configurations.

**MAIN FEATURES**

- **A50-150 - A50-300**
  - Machine nominal speed: Up to 300 pcs/min
  - Container Diameter: Up to 52mm
  - Particles, fill level and cosmetic inspection
  - RPV Remote Parameterization & Validation
  - Manual loading
  - "Fail safe" reject verification system (Optional)
  - In-line connection to upstream and downstream equipments.
  - Leak Detection available for freeze-dried products (Headspace Gas Analyser)
  - Product colour (Spectrometer)
  - Product opacity (Opacimeter)
  - User friendly interface
  - Ethernet connection
  - OCR/OCV

- **A50-450 - A50-450 LD**
  - Machine nominal speed: Up to 450 pcs/min
  - Container Diameter: Up to 32mm
  - Particles, fill level and cosmetic inspection
  - RPV Remote Parameterization & Validation
  - Manual loading
  - "Fail safe" reject verification system (Optional)
  - In-line connection to upstream and downstream equipments.
  - Leak Detection available for liquid products (High Voltage)
  - Product colour (Spectrometer)
  - Product opacity (Opacimeter)
  - User friendly interface
  - Ethernet connection
  - OCR/OCV

**BL-S300**

LVP - Large Volume Parenteral inspection machine (Liquid and Freeze-dried products)

- **Machine nominal speed**: Up to 300 pcs/min
- **Container Diameter**: Up to 110 mm
- **Particles, fill level and cosmetic inspection**
- **RPV Remote Parameterization & Validation**
- "Fail safe" reject verification system (Optional)
- 21 CFR part 11 compliance for electronic records (recipes, batches/sub-batches, audit trail)
- Ethernet connection
- User friendly interface
- In-line connection to upstream and downstream equipments.
A30 is an automatic inspection machine for particle and cosmetic inspection of cartridges, ampoules and vials containing liquid and freeze-dried products. A30 is configured to be loaded manually or installed in-line.

**A35**

**Ampoules, Vials and Cartridges inspection machine (Liquid and Freeze-dried products)**

A35 is an automatic inspection machine for particle and cosmetic inspection of liquid and freeze-dried products. A35 has been designed to inspect a wide range of containers (cartridges, ampoules and vials) from 1 to 30 ml at a mid-range speed granting high level performances.

**MAIN FEATURES**

- Machine nominal speed: Up to 300 pcs/min
- Container Diameter: Up to 32mm
- Particles, fill level and cosmetic inspection
- RPV Remote Parameterization & Validation
- Manual loading
- “Fail safe” reject verification system (Optional)
- 21 CFR part 11 compliance for electronic records (recipes, batches/sub-batches, audit trail)
- Ethernet connection
- User friendly interface
- In-line connection to upstream and downstream equipments.
- Leak Detection available for freeze-dried products (Headspace Gas Analyser)
- Product colour (Spectrometer)
- Product opacity (Opacimeter)
- OCR/OCV

**A30**

**Ampoules, Vials and Cartridges inspection machine (Liquid and Freeze-dried products)**

A30 is an automatic inspection machine for particle and cosmetic inspection of cartridges, ampoules and vials containing liquid and freeze-dried products. A30 is configured to be loaded manually or installed in-line.

**MAIN FEATURES**

- Machine nominal speed: Up to 200 pcs/min
- Container Diameter: Up to 36mm
- Particles, fill level and cosmetic inspection
- RPV Remote Parameterization & Validation
- Manual loading
- “Fail safe” reject verification system (Optional)
- 21 CFR part 11 compliance for electronic records (recipes, batches/sub-batches, audit trail)
- Ethernet connection
- User friendly interface
- In-line connection to upstream and downstream equipments.
- Product colour (Spectrometer)
- Product opacity (Opacimeter)
- OCR/OCV
LDM performs Integrity Test through a well-known and widely proven detection principle based on the measurement of electrical conductivity of the sealed containers using a high voltage electric field. LDM introduces the new concept of leak inspection: a special handling system combined with high conductivity electrodes lead to an accurate detection of the smallest micro holes.

Available as a modular solution, it can be combined to A35S, K32S and A50-450 inspection machines, becoming the most compact and performing "Inspection Line" for ampoules, vials and cartridges available on the market.

**A35 LD**

**K32S LD**
Semiautomatic Inspection System has been designed to visually inspect the full range of containers processed in the pharmaceutical industry at a max speed of 150 pcs/min. The wide range of settings available for the parameter configuration (rotation, speed, light intensity, ...) let the operator create the best scenario for the visual inspection process.

High Speed Cameras can acquire a minimum of 24 images for each object to be inspected. Compared with the standard technology based on cameras at 60 fps (with maximum of 8 acquisitions), High Speed Cameras allow to obtain a higher image efficiency and a reduction of the false reject. More images = more accuracy in defects detection and less false rejection rate = Higher Efficiency.

The measure of the electrical conductivity on the PFS is an efficient method to detect leakages which are typically due to cracks or to sealing defects. The syringe passes between two electrodes placed on the main turret and a high voltage DC (10 to 20 kV) is applied. The system is capable to detect variations in conductivity by measuring the current flow in the circuit.

Features

**High speed cameras**

High Speed Cameras can acquire a minimum of 24 images for each object to be inspected. Compared with the standard technology based on cameras at 60 fps (with maximum of 8 acquisitions), High Speed Cameras allow to obtain an increase in the efficiency and a reduction of the false reject. More images = more accuracy in defects detection and less false rejection rate = Higher Efficiency.

**PFS Leak Inspection with high voltage spark test**

The measure of the electrical conductivity on the PFS is an efficient method to detect leakages which are typically due to cracks or to sealing defects. The syringe passes between two electrodes placed on the main turret and a high voltage source (10 to 20 kV) is applied. The system is capable to detect variations in conductivity by measuring the current flow in the circuit.

Process Analytical Technology

**Head space gas analyzer**

HGA is a no-contact measurement device, suitable for the inspection of containers filled with powder or freeze-dried products. Both Oxygen and Moisture concentration can be controlled by the TDLAS spectroscopic technology (Tunable Diode Laser Absorption Spectroscopy).

**Optical density measuring system**

ODMS device allows to discriminate the opacity or turbidity of a liquid product and it is mainly used to verify the vaccine/suspension concentration. This technology includes a visible laser diode modulated in intensity and stabilized in temperature and a phase-sensitive detector to reduce outside interferences and electronic drifts.

**Spectrometer**

Through the spectrum analysis this instrument allows to detect possible product degradation and to implement anti-mix-up functions. Based on new LED lighting system, the Color Analyzer is available for all type of containers.