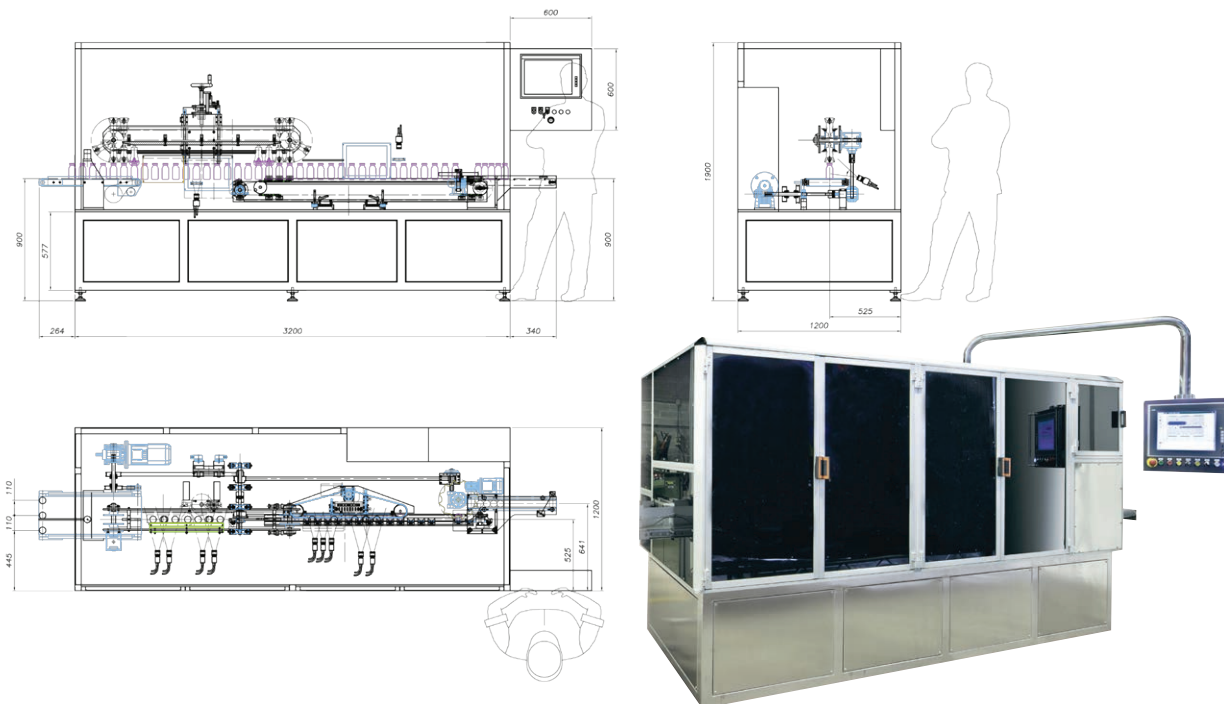
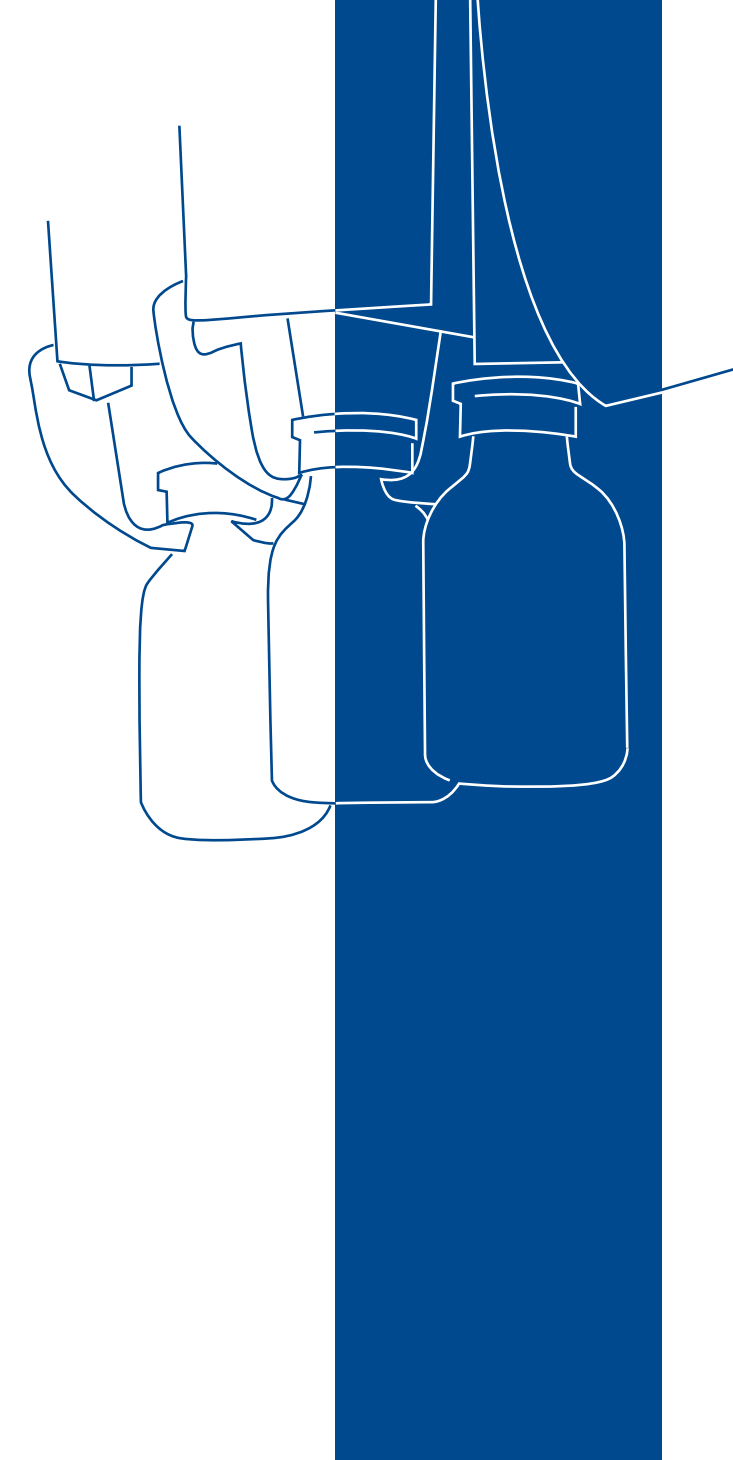


TECHNICAL SPECIFICATIONS

VIALS TYPOLOGY	Transparent vials with powder
VIALS SIZE	From 10 to 100 ml
OUTPUT	18000 vials/hr
DIMENSIONS	1870x1100x3100 mm
WEIGHT	950 kg
OPERATING TEMPERATURE	10 - 30° C
MAXIMUM VIAL LINEAR SPEED AT INLET	22.86 m/min
VIAL STEP	76.2 mm
VIAL OUTLET	1 outlet channel for good vials 1 outlet channel for rejected vials 1 outlet channel for vials to be rechecked (optional)
VISION HARDWARE	12 high resolution BW CCD cameras 1024x768 1 high resolution colour CCD cameras 1024x768 7 A2 Analyzers, Texas Instruments processor. White LED high power and stability illuminators
OTHER HARDWARE	15" touch-screen, industrial PC (Windows OS) Ethernet interface Digital I/O for line interface Built-in laser printer for reports and audit trails
CONTROLS PERFORMED	Cap integrity Flip-off integrity and colour Vial neck Vial surface Vial bottom Visible contents in vial Powder level
FUNCTIONS	Customized user access with password Setting of control parameters and tolerances Display of images of last 10 rejected vials Transport and loading system diagnostics Alarm signal by sensors Printing of reports on built-in laser printer Compatible with 21 CFR part 11
QUALITY & VALIDATION	User Requirements Specifications review, Validation Plan, Risk Analysis, Traceability Matrix, Functional Design Specification, Software Design Specification, Hardware Design Specification, IQ/OQ Protocol, FAT Protocol, SAT Protocol, Support to Customer SOPs upgrade, Validation Report
SAFETY AND ALARMS	Alarms for safety guard opening, minimum load, failed rejection. Coloured warning lights and buzzers
INSTALLED POWER	6 Kw
POWER SUPPLY	400V 50Hz



VLI
VIALS
LINEAR
INSPECTOR



VLI VIALS LINEAR INSPECTOR

VLI is an inline or standalone machine for the automatic inspection of a wide range of glass medical vials containing powder.

VLI is time-saving, allowing a quick return of investment: it has a capacity of output up to 300 vials per minute, a 5 times faster speed compared to the typical 30-40 vials/minute of a manual operator inspection performance.

VLI is accurate and reliable, allowing a total conformity control of the body of the vial, of cosmetic defects, of the closures (cap and flip-off) and of the powder content. The high resolution of the cameras and the optics used allow tiny defects to be identified, while sophisticated analysis algorithms minimise false rejections even in conditions of maximum sensitivity.

MACHINE FUNCTION

The vials enter the machine from a conveyor belt or a storage plenum, and are separated and timed by a star-shaped device.

The process involves 13 Hi-Res CCD (Charge Coupled Device) cameras divided into 7 analysis stations.

The vials are caught by a series of self-adapting grippers that lift and turn them again through 360° so that the subsequent stations can check the lower part and the bottom.

The control automatically sets the motor rotation speeds according to the diameter of the vial, so that one full rotation coincides with the analysis area of each camera, ensuring the entire surface is grabbed regardless of the size. At the same time the vials are subjected to micro-vibrations that level the powder inside and enable the level check to be performed.

Several light sources and different lighting techniques (direct light and back light) enable the identification of all the defects present in the glass, such as cracks, chips or impurities. The same cameras detect closure defects (ie. missing flip-off, dents).

Vials found to be defective following the analysis are sent to the rejection station or to the optional recheck station.

FEATURES AND BENEFITS

A VERSATILE SYSTEM

- Wide range of inspection formats (from 10 to 100 ml)
- Self-adapting grippers handle all vials without any adjustment
- Motor rotation speed is automatically set depending on vial size

PERFORMED CONTROLS

- Flip-off seal cap: color and integrity
- Metal vial seal: dents or snicks
- Vial neck, upper and lower part: cracks, scratches, or air bubbles in the glass, stains
- Vial bottom and bottom edge: breaks and chippings
- Vial content: powder level and estimated volume, visible foreign bodies over the powder level

SMART AND EFFICIENT

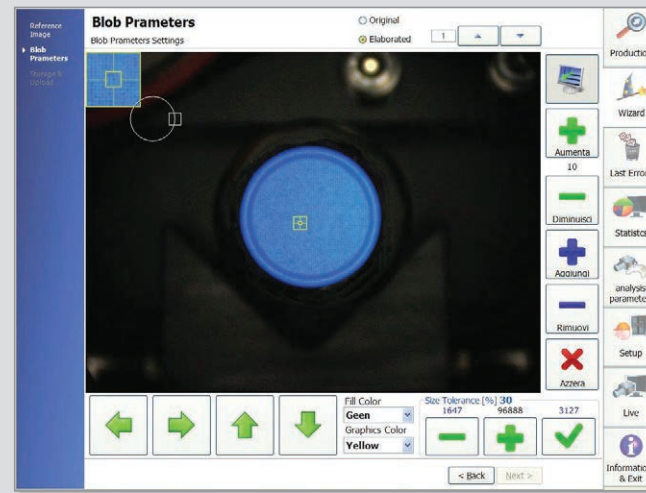
- High throughput (up to 300 vials/minute) and high reliability for a faster return of investment
- Identification cracks down to 2 mm length on the vial surface
- Automatic rejection system with various outlet channels depending on the nature of the defect
- Optional recheck station for dubious defective vials to minimize false rejects even in conditions of maximum sensitivity
- Multiple cameras high resolution based inspection system with high speed vision capturing and processing system to increase accuracy and efficiency of the machine
- Wizard menu for new formats or modification of current format
- Easy and quick format changeover
- Double picture, double lighting (front and back light), and micro-vibrations system that levels the powder to distinguish the spread powder over vial surface from a real glass defect
- Advanced statistical analyses with detailed reject typology to help detecting the reject causes in the upstream production process
- CFR 21 Audit Trail Reports can be printed on a laser printer built into the machine

ADVANCED HMI

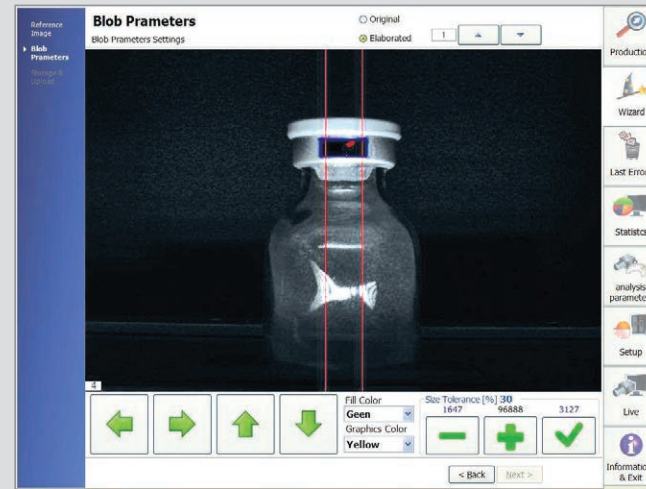
- Single touch-screen display to control all machine functions:
 - check of all cameras
 - machine status
 - programming of formats
 - diagnostics
- Industrial 15" PC Windows OS based
- Easy and user-friendly graphic user interface

QUALITY AND VALIDATION

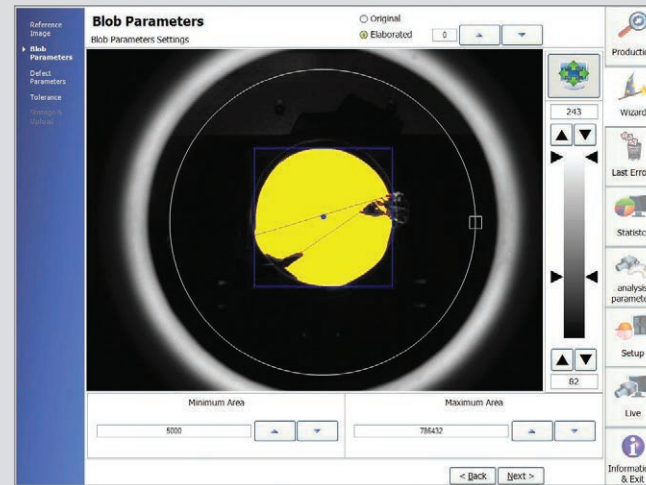
- Manages up to 5 user login levels.
- FDA 21 CFR part 11 and GMP Annex 11 compliant.
- Developed following GAMP 5 approach.
- Availability of all documentation involved in the GAMP approach.



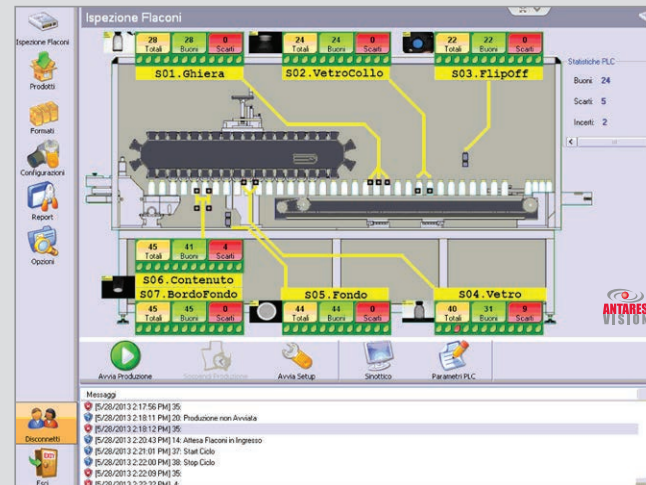
FLIP-OFF ANALYSIS FROM TOP



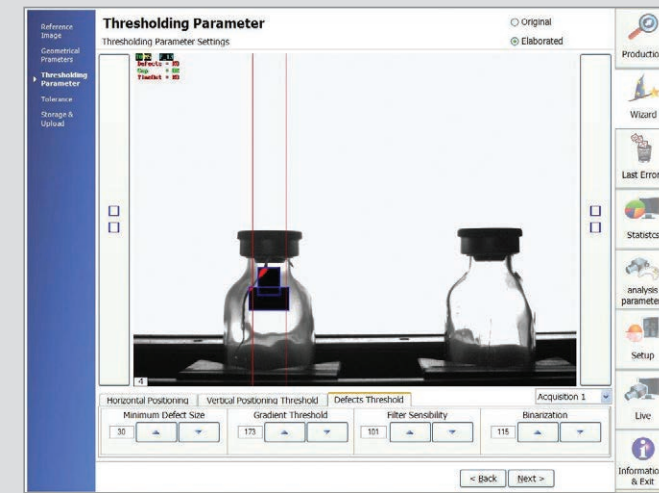
ANALYSIS WITH DIRECT LIGHT



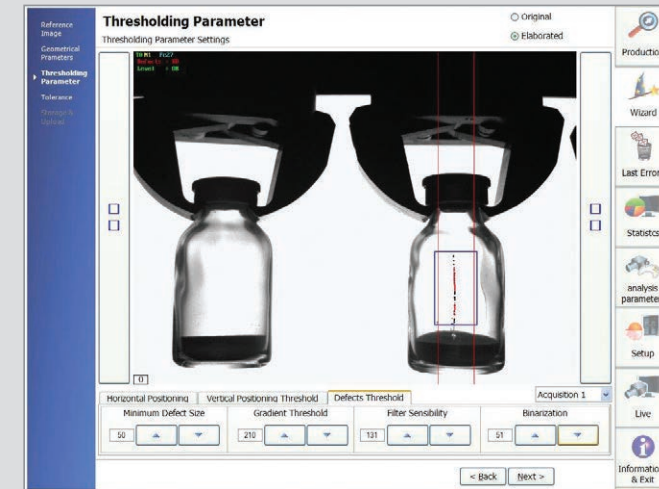
DETECTION OF A CRACK ON THE BOTTOM OF THE VIAL



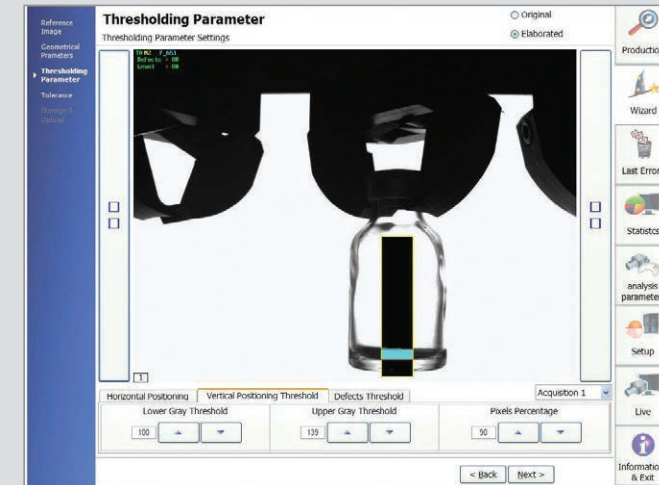
ADVANCED SYNOPTIC HMI FOR COMPLETE LINE MANAGEMENT



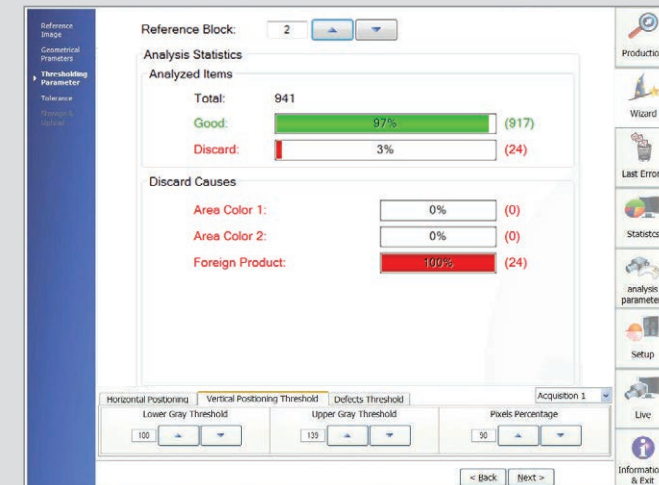
ANALYSIS OF THE UPPER PART OF VIALS WITH BACK LIGHT



VERIFICATION OF GLASS INTEGRITY

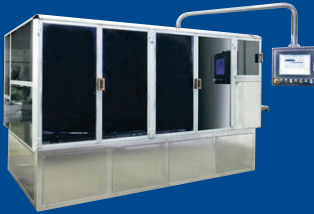


CHECKING OF THE POWDER LEVEL CONTAINED IN THE VIAL



STATISTICS WITH REJECT CAUSES

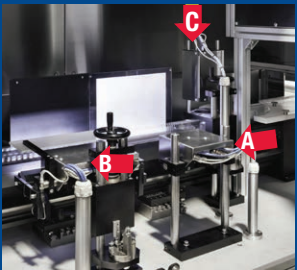
THE VLI INSPECTION MACHINE



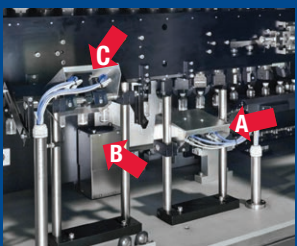
Vials enter the machine from an accumulation conveyor and are separated and timed by a star-shaped device.



The self-adapting grippers enable 10 to 100 ml vials to be handled without making any adjustments.



Control stations for vial neck and upper part (A), metal vial seal (B) and flip-off analysis (C)



Control stations for glass and level analysis (A), bottom analysis (B) and content analysis (C)