



# Inspection system in hygienic design

The compact empty bottle inspector **STRATEC LFI 735** is suitable for a wide field of applications. The main feature of this inspection system is the consistent realisation of meeting the requirements of hygienic design. This machine is without a table plate, and the open design of its disposal chute allows for possible contaminations or lubricants, as well as glass fragments to be removed downward. The slanting exterior surfaces prevent accumulation of contamination, thus improving the basic hygienic conditions in the machine surrounding.

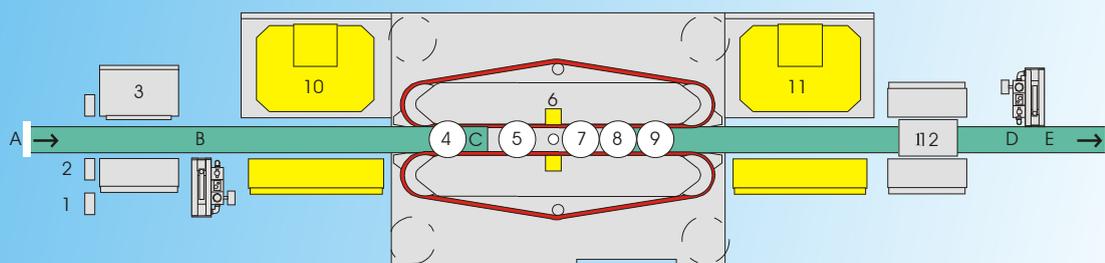
The newly arranged camera technology is easily accessible - from a central point, the operator can set all main parameters. The well-proven IRIS inspection technology is equipped with a software package, which reduces the faulty rejection rate. Components of this optimisation software are water drop detection and monitoring of the camera image, which detects a contamination of the inspection module.

## System advantages:

- Realisation of meeting the requirements of hygienic design with e.g. slanted exterior surfaces, and design without bellows
- Central light well for basic station with slanted protection glass
- Processig of cylindrical and special-shaped containers with bottle selection feature
- Automatic camera image monitoring and operator warning
- Reduction of faulty rejection rate through object detection with PET containers
- Maintenance programme with automatic display

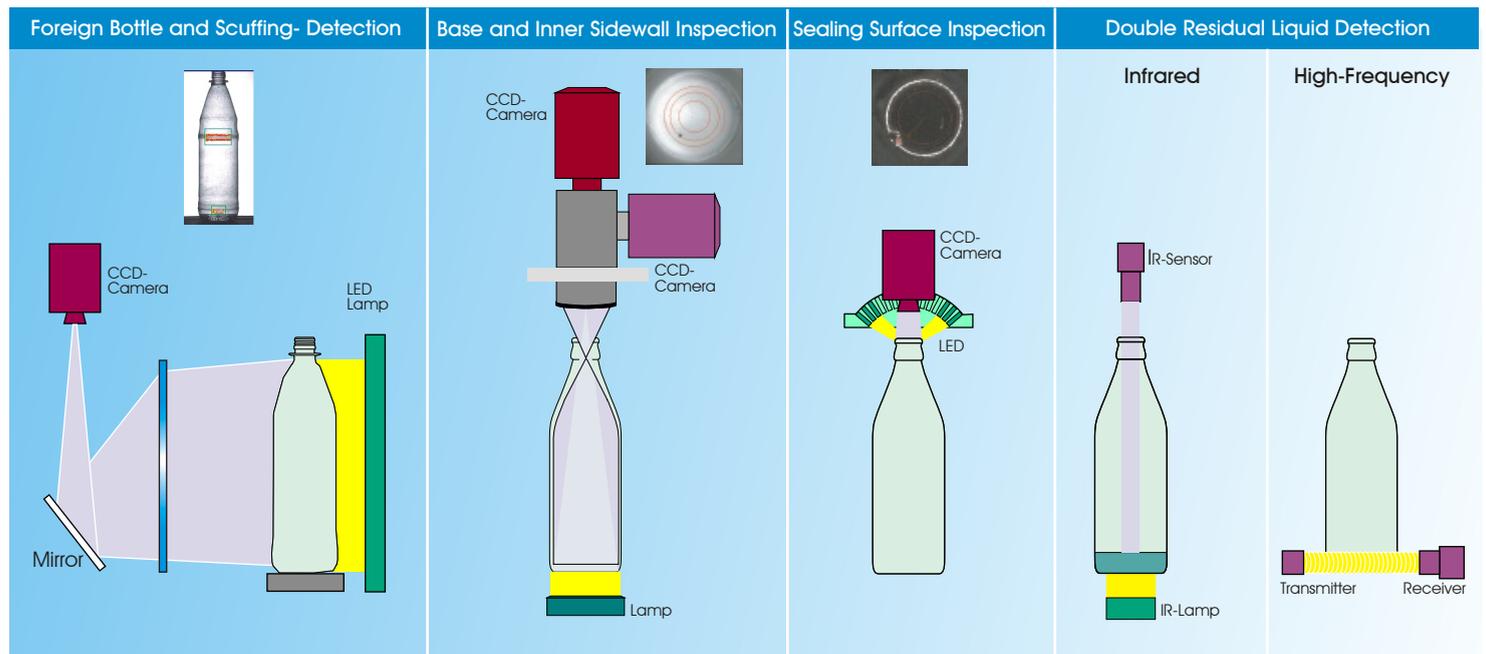
# Principle of operation

- The incoming glass or PET containers are pitched to a small container distance using a transfer module, infeed starwheel, infeed worm and belt spacing station
- Detection of lying, excessively high, and defective containers in front of the machine infeed with stop function, or detection of foreign, coloured, and scuffed containers with rejection via pusher
- Container inspection in the first sidewall module, as well as scuffing detection for glass containers, or scuffing ring detection with PET containers
- Container guidance through the machine with two opposing belt pairs, which are adjustable in distance and height
- Removal of foam and lubricant residues on container base via blowing system
- Removal of blown-off lubricants via disposal chute, and thus avoidance of re-contamination of cleaned containers
- Residual liquid and residual caustic detection, as well as base, inner wall, and sealing surface inspection
- Two vario stations, as needed, for the inspection of the lateral neck finish, or the screw thread, or for the detection of chipping at the container base
- Rotating cylindrical containers with guide belts by approximately 90°
- After passing the inspection area, the containers are transferred to the discharge conveyor
- Rejection of faulty containers via pusher, Smartpush or linear rejection



- |   |  |   |
|---|--|---|
| 1 Colour detection sensor                               | 8 Vario stationScrew thread inspection                 | A Machine protection without rejection at infeed (machine stop for excessively high and lying containers) |
| 2 Height detection P.E. sensor                          | 9 Sealing surface                                      | B Rejection at machine infeed   |
| 3 Contour, height, colour and scuffing detection camera | 10 1st sidewall moduleincl. scuffing and scuffing ring | C Base blowing  |
| 4 Vario station Lateral neck finish or neck finish      | 11 2nd sidewall module                                 | D Rejection of broken containers  |
| 5 Residual liquid IR                                    | 12 Lateral neck finishmirror PET/glass                 | E Rejection of contaminated containers  |
| 6 Residual caustic HF                                   |  |   |
| 7 Base, inner sidewall                                  |  |   |

## Inspections Units



### Foreign Bottle Detection

An additional module can be installed in front of the machine for detecting foreign containers, which have a different contour, height, diameter, and colour than the product container. Here, the camera takes an image of the lateral contour. Thus, foreign containers can be determined and rejected systematically. This inspection module also provides the possibility of scuffing and colour detection.

### Base Inspection / Inner Sidewall Inspection

The camera takes an image of the container base, which is evenly illuminated by a flash lamp. The automatic, electronic exposure control also guarantees a uniform image brightness, and continuously high image quality with containers of different transparencies. Worn PET containers can be detected through stress cracks on their bases. A second camera inspects the inner sidewall through the container opening using this illumination unit. This is especially important for large-surface permanent labels (ACL).

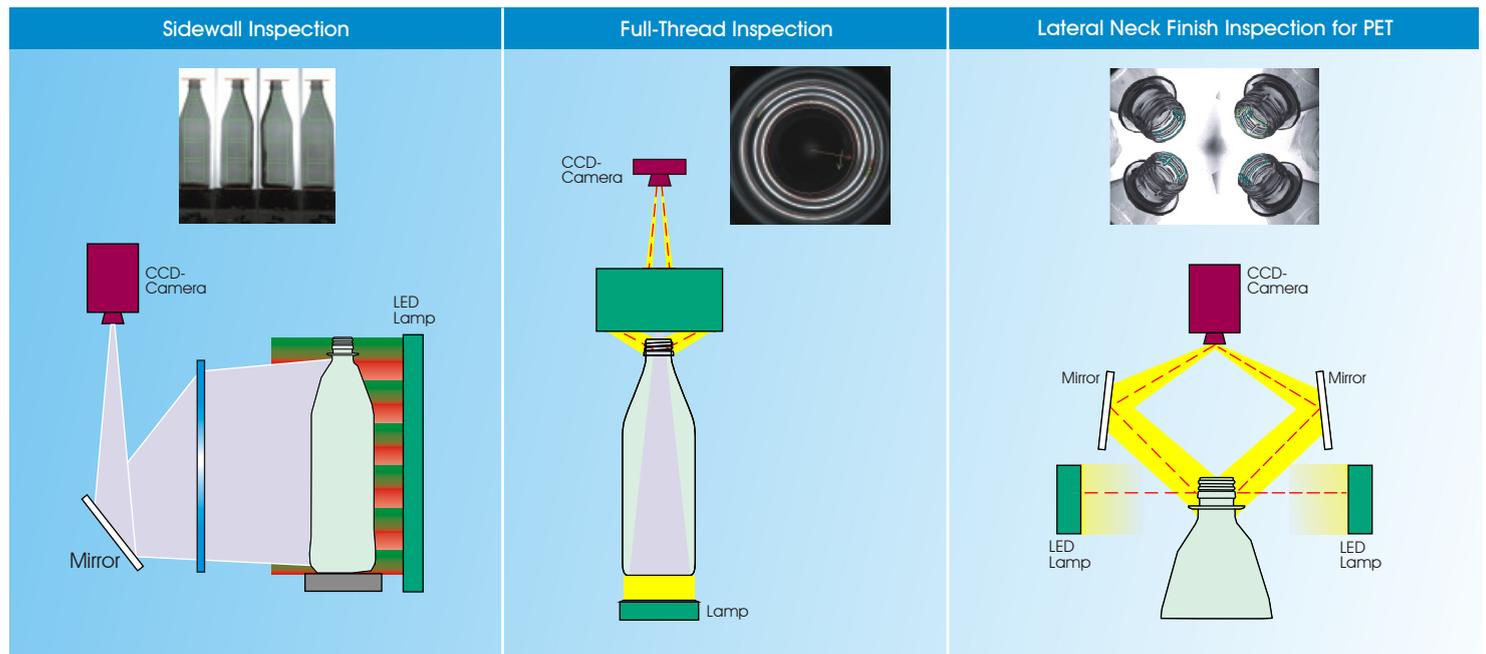
### Sealing Surface Inspection

The sealing surface is illuminated from above via a dome-shaped array of LEDs. The system processes glass and PET containers with neck finishes for crowns, screw caps, or other closures, and it registers even the smallest chips in the sealing surface area. Due to the system's high sensitivity, scuffing of the sealing surface and certain cracks in the glass can be detected. With PET containers, the carrier ring can be monitored, and the neck can be inspected for bent or deformation (ovality).

### Residual Liquid Inspection

The detection of residual liquid in containers is by means of two independent operating systems: A broadband infrared system detects all liquids, e.g. oil residues, whereas a high-frequency probe is especially suitable for detecting smallest amounts of residual caustic. The simultaneous use of the infrared and the high-frequency technology guarantees maximum security. For an optimum protection of the bottling line, a separate residual liquid detection unit at the conveyor (in front of the filler) is recommended.

## Inspections Units



### Sidewall Inspection

In two inspection stations, high-resolution CCD cameras inspect the bottle wall all-around (360°). Several images of each camera enable large overlapping areas between the image sections. The LED wall illumination provides an even light distribution, and has a long shelf life, low power consumption, and very little warmth creation.

With an additional set of filters, the film residues can be securely detected. With glass bottles, scuffing can be detected as of a defined width, and large-surface cracks can be registered in the sidewall area.

### Vario stations

The vario stations, which are prepared by standard, inspect the lateral neck finish, detect base cracks, or perform a full thread inspection, depending on the customer's requirements.

The lateral neck finish inspection checks the mouth piece of the crown bottles for contamination, cracks, and chips below the sealing surface. The base illumination and base camera are positioned below the container base for detection of container base chippings. The full-thread inspection takes a spiral image of the screw thread with special optics. Thus, the interruption lengths of damages can be measured, or coarseness can be accurately detected and evaluated.

### Lateral neck finish inspection for PET bottles

A lateral neck finish inspection unit for PET bottles can be fitted at the machine discharge. All sides of the neck finish are inspected by a camera and an optical system. The lateral neck finish area including the neck ring and the vent slots is inspected for contamination and damage.

# Operation

## Monitor

- The operating unit is a high-resolution 15" TFT colour touch-screen, which is integrated in the machine head
- Current display of all relevant operating data including rejection trend analysis with possibility for display of all camera images
- Access to user interface via individual passwords - optional as number code or with coded transponders
- Different access levels for individual operators, depending on the assigned authorisation



## Documentation of production data

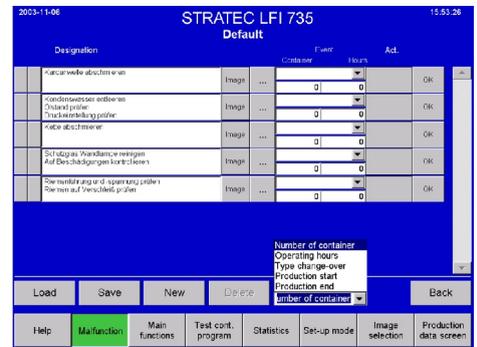
- Recording of all relevant operating data such as production data, parameter changes, the results of the test bottle programme, and special occurrences with the machine function
- Use of these data e. g. for quality management, or storing in a long-time memory
- Saving of these data with exact time indications, operator names, and the respective valid parameter values
- Transfer possibility of defined operating data to an operating data acquisition system, to the customer's network, or to an external PC (customer)
- Different printout representations of production and test container data

## Automatic maintenance programme

- Automatic information on display for machine operator or service technician about upcoming maintenance tasks
- Display of maintenance tasks by priorities and resetting jobs after termination
- Interactive graphical malfunctions diagnostics system to support troubleshooting

## Remote visualisation

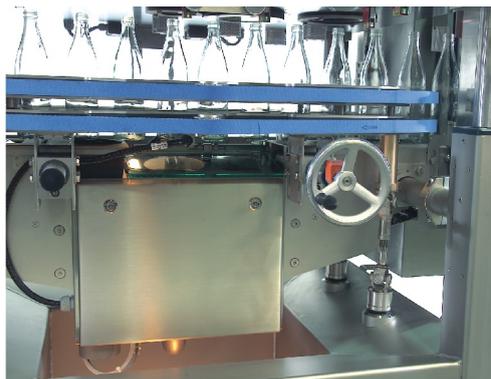
- Display of the machine's operating condition through the company-own network to several PCs by using an additional software
- Monitoring of e.g. counter readings, malfunctions, test bottle programme runs



# Changeover

## Test container programme

- Semi-automatic function monitoring in regular intervals, as well as every time after switching on the machine, and when changing over to a new container type
- Infeed of a prepared assortment of test containers to the machine in any sequence
- Examination of the individual inspection units by error detection with the test container
- Data indication on the display, and recording of results
- Data transfer to operating data acquisition system, to a network, or to a printer



Details of the hygienic design: Disposal chute, cardan shaft without bellows, slanted protection glass for illumination unit

## Product changes

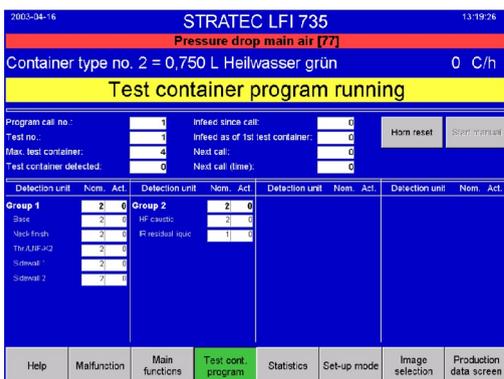
- Selection of container type via touch-screen, thus automatic changeover to container parameter
- Container-type changeover without changing handling parts
- Motorised adjustment of the camera support plate height to the new bottle height
- Adjustment of the guide belt's distance and height to the new bottle size using handwheels and counters

## Teleservice

- Monitoring and operating the inspection machine via teleservice
- Dial-in via modem to the **BBULL TECHNOLOGY** network by an authorised person with a PC, which is installed above the inspection machine
- A **BBULL TECHNOLOGY** technician takes over the machine control
- New entry or optimisation of inspection parameters, retrofitting new container types
- Quick error diagnosis
- Short changeover times and less onsite service tasks due to availability of teleservice with 24-hour hotline



- Necessary data indicated on display
- Possibility of processing very small containers by removing the upper belt pair including the guides, without using tools
- Performing a test bottle programme after each changeover
- Subsequent, automatic changeover to operating mode



## Empty Bottle Inspection Machine

### STRATEC LFI 735

#### Inspection Units

Base/ Inner sidewall	Sealing surface	Residual liquid		Vario stations	Sidewall incl. Scuffing		Foreign bottles/ Scuffing (PET)
●	●	IR	HF	Optional: thread, lateral neck finish, base crack	1	2	▲

#### Machine Data

Machine output (bph)*		Sidewall modules 45°		Bottle diameter	Bottle height
Sidewall modules 30° Glass	PET	Glass	PET	in mm	in mm
60.000	45.000	30.000	24.000	50 - 80	60 - 400
50.000	40.000	25.000	22.000	80 - 100	60 - 400
40.000	30.000	20.000	20.000	100 - 110	60 - 400

● Standard ▲ Optional \* Surge speed: maximum of + 20%

### Design features:

- Basic frame in stainless steel to avoid corrosion
- Easily adjustable, low-wear belt guidance
- Separate main drive and belt drive
- High hygienic standard thanks to design without table plate and bellows
- Compact machine head with ventilation
- Safety switch for infeed of containers with small diameters
- Convenient touch-screen operation
- Electronic function monitoring
- Test bottle programme for the documentation of all machine functions.
- CE conformity according to EC machine guidelines (98/37/EG)

### Service:

BBULL TECHNOLOGY worldwide network of sales and service offices provides optimum support even after the start-up of your inspection system. When needed, our specially trained service technicians for inspection systems will be at your site within very short time, and perform all maintenance tasks quickly and reliably. Our modern storage system allows us to supply the required spare parts immediately.

### Additional Equipment:

- Detection of films and glass fragments via special filters in the base inspection
- Detection of films via special filters in the sidewall inspection
- Processing of low container heights as of 60 mm with removable, upper guide belt
- Electronical block connection with the filling system
- Non-interrupted voltage supply
- Height adjustment of upper belt
- Network connection and remote visualisation of machine's operating condition
- Printer
- Transponder for user administration
- Transponder for test container programme
- Container pool statistics
- Customer-specific spare parts list using e-Cat online, or available via CD-Rom



## BBULL

INFORMATIK & INDUSTRIE  
ELEKTRONIK

BERNHARD BULL COMPUTER GmbH  
Ankerstrasse 73

75203 Königsbach-Stein/Germany  
Telefon (+49) 72 32-40 06-0  
Telefax (+49) 72 32-40 06-25  
E-mail: [info@bbull.com](mailto:info@bbull.com)  
<http://www.bbull.com>

## CENTRO

KONTROLLSYSTEME

CENTRO KONTROLLSYSTEME GmbH  
Hagener Strasse 75

57072 Siegen/Germany  
Telefon (+49) 2 71-48 96 3-6  
Telefax (+49) 2 71-48 96 3-74  
E-mail: [info@bbull.com](mailto:info@bbull.com)  
<http://www.bbull.com>

## STRATEC

CONTROL-SYSTEMS

STRATEC CONTROL-SYSTEMS GmbH  
Ankerstrasse 73

75203 Königsbach-Stein/Germany  
Telefon (+49) 72 32-40 06-0  
Telefax (+49) 72 32-40 06-25  
E-mail: [info@bbull.com](mailto:info@bbull.com)  
<http://www.bbull.com>

## SYMPLEX

VISION SYSTEMS

SYMPLEX VISION SYSTEMS GmbH  
Grüntenstrasse 10A

80686 München/Germany  
Telefon (+49) 89-55 27 98-0  
Telefax (+49) 89-55 27 98-79  
E-mail: [info@symplex.de](mailto:info@symplex.de)  
<http://www.symplex.de>