

## TCS – tableware control system

Tableware inspection machine for tumbler, stemware and pressed products with up to 8 cameras

- ◆ for the inspection of tumbler, stemware and pressed products
- ◆ for the inspection of round articles and articles with special shapes
- ◆ with an inspection speed up to 180 articles per minute

### Installation, Operation, Service:

- ◆ easy installation on an existing conveying belt in a short time
- ◆ supply also with own conveying belt and discharge unit
- ◆ connection to different line control systems and different data acquisition systems possible
- ◆ image evaluation with commercially available hardware

### New software

- ◆ with new intuitive operated user interface
- ◆ many new software algorithms for an inspection result in an optimum way



### Technical data:

© Machine dimensions: 2900 x 925 x 2250mm (W x D x H)

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# Optical inspection of tableware glass

- for the inspection of tumbler, stemware and pressed products
- independent from the rotation position of the objects to be inspected
- exact measurement with telecentric lenses
- 360° inspection area



- + detection of all known side wall defects using shine through method
- + detection of mouth defects, cracks and form deviations in the mouth area
- + detection of a deformed stem or irregularities in connection points
- + detection of bottom and base plate defects for tumbler and stemware

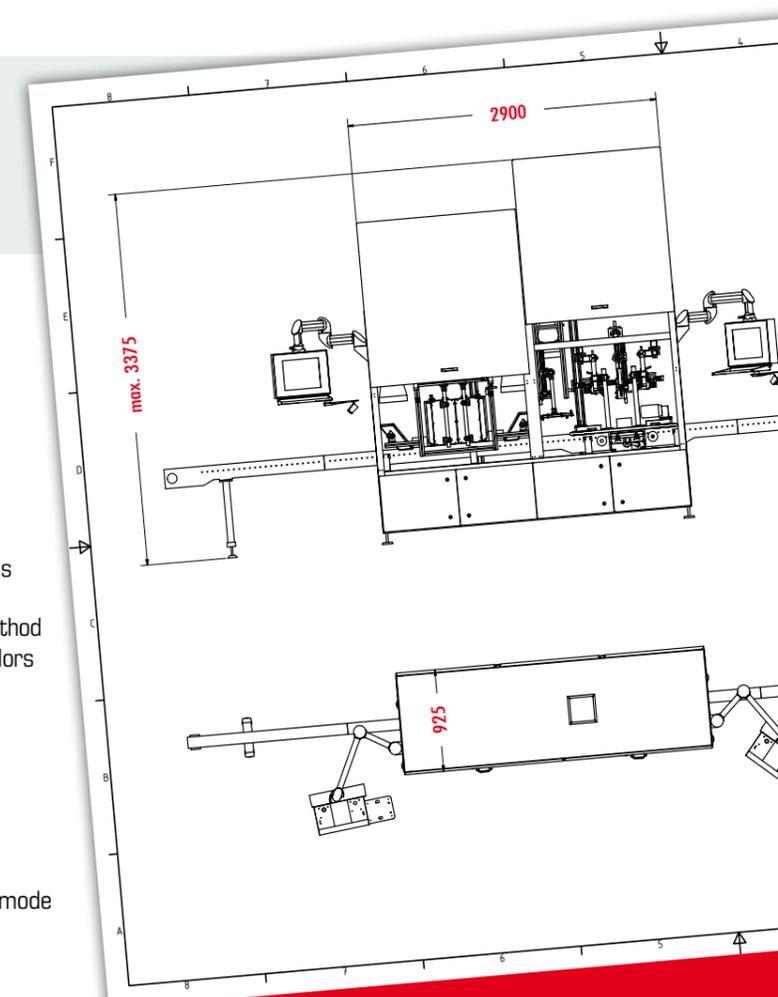
**All inspections for tableware in one compact machine**



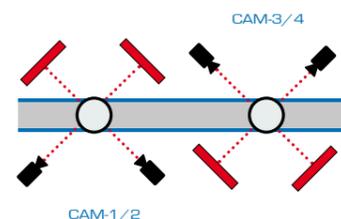
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# Tableware inspection machine for tumbler, stemware and pressed products with up to 8 cameras

Exact and contact-free measurement of the articles by using telecentric lenses

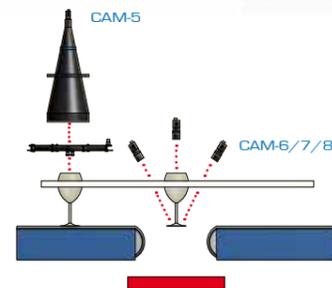


**Take in Operation:**  
Easy installation on an existing conveying belt, supply also with own conveying belt and discharge unit



**Features:**  
using a special light source for finding cosmetic defects (e.g. mould ring)  
logos or engravings will be detected by the software automatically  
inspection machine is checked by self-testing functions

**Camera 1-4:**  
telecentric lenses for high accuracy in dimensional and symmetrical measurements



**Camera 5:**  
telecentric lenses for exact dimensional rim measurement  
minimum effort to calibrate the system

**Camera 6-8:**  
using normal lenses to inspect the bottom and base plate of tableware glass for an effective manufactured size

**Optical features:**

- + using up to 8 high resolution CCD cameras
- + 1 telecentric lens for exactness in mouth measurement
- + long life LED flash light sources especially for cosmetic defects
- + 4 telecentric lenses for exactness in dimensions and symmetric from side

**Inspection characteristics:**

- + automatic detection and differentiation between logos / engravings and real defects
- + all detections and measurements will be done by a contact-free method
- + inspection independent from changing light conditions and glass colors
- + differentiation between shadows and real defects
- + detection of: *folds, body rings, checks, blisters, glass pieces, ovality, stem & connection point defect, ...*

**Operation and evaluation:**

- + new intuitive operated user interface with clear icons to display defect types
- + inspection parameters can be changed during running automatic mode
- + operator can individually set and save the parameters
- + individually changeable limits for the defect size to reject articles
- + for dimensional measurements the operator can easily enter the limit from the drawing
- + simple and quickly adjustable software through automatic adaption of the inspection zones in nearly all parts of the article
- + multiple statistic evaluation of the last hours and the complete production

**Detection of all known side wall defects**

with up to 5 cameras from the side

**typical defects:**

1. defect in- and outside of the handle
2. defect inside the stem
3. fold in the sidewall
4. peaks in the glass
5. crack
6. blister

and many more...

**Detection of mouth defects**

with one camera from top

**typical defects:**

1. unfilled mouth
2. large pip
3. notch
4. broken rims
5. sugar rim
6. fold in the rim area
7. chipped rim
8. cracked rim

and many more...

**Detection of defects and deformations in the bottom and base plate**

with 4 cameras from the side and 3 cameras from top

**typical defects:**

1. deformed base plates
2. glass pieces outside
3. deformed shape (e.g. tea plates)
4. inclined cup

5. offset in stem
6. deformed stem
7. folds in the bottom

and many more...

**The shapes and sizes and colors of the tableware**

The inspection machine is designed to inspect round articles and articles with special shapes as well as clear and colored glass

