# switchon

## AI POWERED
## EMPTY BOTTLE INSPECTION

Industry : **CPG, Bottling, Glass**
Usecase : Empty Bottle Inspection

**Summary** : Glass bottles are widely used in industries like food, beverage, pharmaceuticals, and cosmetics, where product safety, integrity, and aesthetic appeal are essential. Ensuring that these bottles are free from surface defects is crucial, as it guarantees product protection, brand integrity, regulatory compliance, and operational efficiency. With SwitchOn's **DeepInspect®** system, manufacturers can identify surface defects on empty glass bottles with **99.9%** accuracy.

## USE CASE

### The Challenge

Traditional vision systems face challenges in inspecting glass bottles due to repeatability issues, lighting variations, glass transparency, and bottle shape, leading to **inconsistent quality control**.

### Deadly Contaminants

**Glass pieces** and insects in bottles pose severe risks, potentially causing injury and other hazards, stressing the need for a reliable inspection system

### Chemical Mixing

Chemicals may mix with the bottle's contents, potentially causing **contamination** and health risks for consumers due to chemical leaching.

### Bottom Inspection Limitation

Inspecting the bottom part of the glass bottle is **challenging** due to the small defect size, making detection difficult for traditional systems.

### Top & Bottom Inspection

The system uses four cameras for inspection: two for inspecting both sides of the bottle, one for the top, and one for the bottom.

### Model Training & Validation

The system requires fewer than **200 good bottle images** and just **45 minutes** for model training and validation.

### The Solution

Glass bottles are manually loaded by an operator into the washing machine. After washing, they move onto a conveyor & pass through a knife air blower with an electric oven, which blows hot air to dry them. The bottles then reach a spacer conveyor that creates space between each bottle before they enter the SwitchOn inspection station. The **DeepInspect®** software performs a visual inspection to detect various surface defects, such as **foreign particles**, **broken bottles**, **chipped necks**, etc. with **99.5% accuracy** and a **0.1% false positive rate**. Faulty bottles are then removed by a pneumatic pusher as rejection mechanism.

### The Setup

The setup consists of the listed items with **DeepInspect** software at the heart.

- DeepInspect Pro
- Industrial Controller with i5 and GPU
- Industrial Camera & Lights
- Mitsubishi PLC
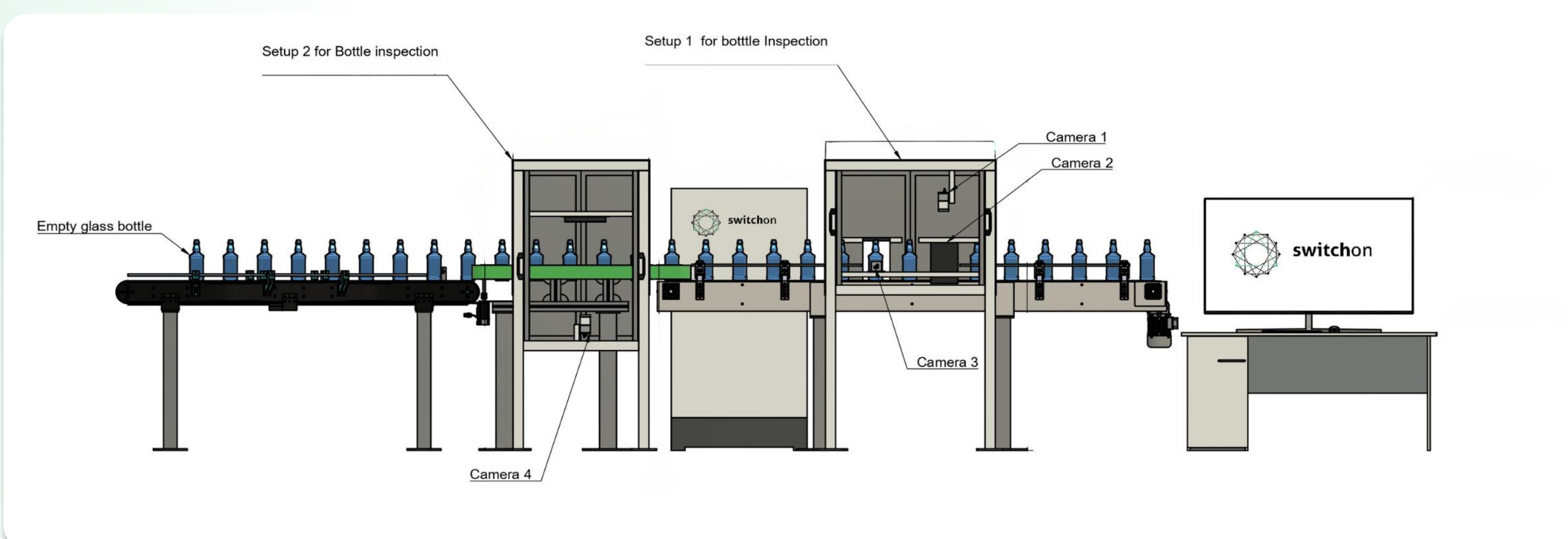


### The Impact

Following the implementation of **DeepInspect®**, glass bottle manufacturers can experience significant improvements in their operations.

**01**
Delivers over **99.5% accuracy** in defect detection, with less than 1% false positives, ensuring reliability.

**02**
DeepInspect software **eliminates** the need for **3 laborers**, inspecting 400-450 bottles per minute efficiently.

**03**
Seamlessly detects **8 sqmm** glass pieces and **4-5 sqmm** foreign particles inside the glass bottles.

**04**
Ensures **customer safety** by rejecting glass bottles containing deadly foreign particles and contaminants.

### Conclusion

The DeepInspect system can effectively detects a wide range of defects on glass bottles, including dirt, foreign matter, insects, chipped and broken bottles, chemicals, metal parts, and paper, with an impressive accuracy rate of 99.5% and a low false positive rate of 0.1%. Operating at a line speed of 400 to 450 bottles per minute, it ensures high-quality inspection, increasing operational efficiency and regulatory adherence

| Tag: Good | Score : 100 | Tag: Not Good | Score : 60 | Tag: Not Good | Score : 60 |
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## Reach out to us