

# Serigraphic print control



## Product Description

The products are bottles made of plastic material (PE) that need to be checked immediately after finished the hot serigraphy. The products are therefore subject to slight morphological deformations dictated by temperature changes that alter the size of the bottles.

The screen prints are generally on the front and on the back, and differ both for the color, depending on the fragrance content, and on the bottle shape.

## System Features

The function of the system is to ensure the serigraphy quality, discarding the bottles that do not appear to be suitable with the requirements.

The defects to be identified can be the following:

- a misalignment between the screens that make up the serigraphic image, for which the final effect will be a decomposed or otherwise inconsistent print

- smudging dictated by a not perfect pattern adhesion on the product, or from a not proper molds cleaning
- deficiency / excess of color, that make uneven the graphics on the bottle
- press inversion between front and back, caused by incorrect bottle insertion in the serigraphic machine
- spots outside the printing area .

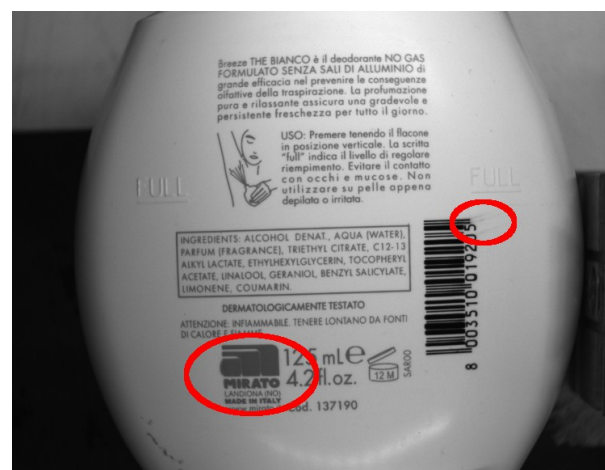


Figure 1: The typical defects can be smudged or ink excess

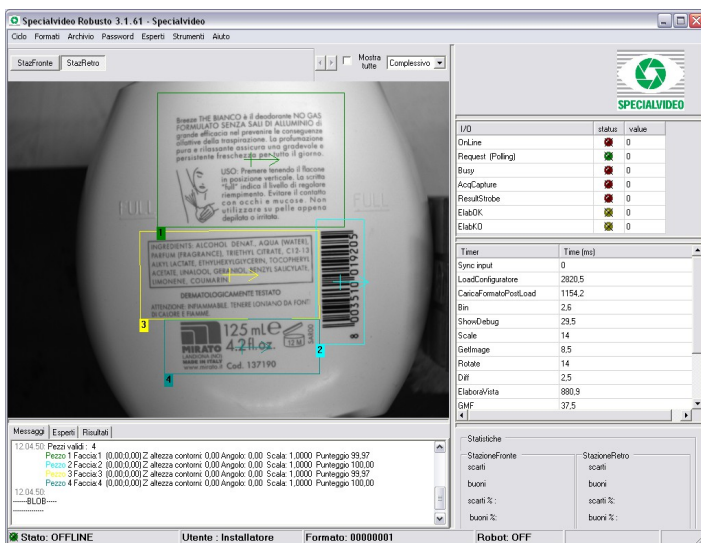


Figure 2: Particular of operator interface

### Functioning principle

The system consists of two cameras which frame the product while it is maintained in position by the transport device. There are two stations, one for the front and one for the back control, out of phase by one step in order to avoid that the lights and cameras interfere with each other.

The lighting system has been appropriately designed taking into account the overall machine dimensions and ensuring optimal light distribution.

The operation principle is based on some good product samples learning (reference samples), and subsequent comparison with the samples to be checked. The waste is generated by the presence of sufficiently large concentrated areas different from the reference sample (above threshold).

The steps required for effectively achieving the required control are the following:

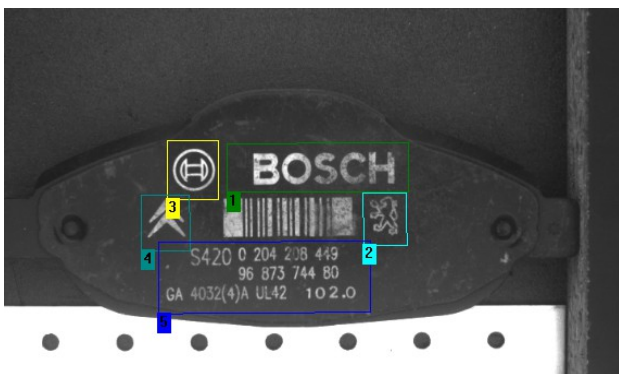


Figure 3: faded tampography example



Figure 4: the error zones are highlighted in cyan

- precise prints position localization , separated by areas of interest, so as to compensate the deformations and possible position product errors
- tolerance to lighting changes without confusing erroneously with different serigraphy shades
- calculation of the zones above the contrast comparison threshold and above the size threshold.

The vision system has been developed entirely by Specialvideo allowing you to meet the requirements of the client, based on software libraries designed internally and continuously enriched during many years of experience in the computer vision field.

The system maintainability is guaranteed from the graphical interface that allows operators to easily store new products and change the acceptance thresholds.

### Other uses

The same control technique has been successfully used in the pad printing field despite the print mode and the defects causes are completely different.

The images below show a sample with the buffer consumed, and then with a part of faint printing: in the right image the areas in error are highlighted in cyan.