



**Intego**  
Vision Systeme

## Inspection system ZIRKON for high-gloss surfaces

### Field of application

High-gloss and complicated shaped surfaces, for instance design parts in the automotive industry, demand high production quality. Due to the high reflectivity of these surfaces, even smallest production faults are detected by the end customer under certain viewing angles.

Consequently, production faults must be reliably recognized and sorted out. Repetitive faults should be discovered as quickly as possible to minimize rejection rates.



*High-gloss design elements are 100% tested for surface defects.*

The inspection system for high-gloss surfaces inspects parts fully automatically for typical dimensional accuracy, cleaning and surface faults. The system is part of a production chain and is applied, for instance, immediately after electroplating or PVD coating.

In the production of high-gloss surfaces, first the blanks are produced, then their surfaces are "activated", i.e. rising the adherence, for refining them in a multiple step process. For that, the activated parts are mostly stuck on racks or laid in trays for electroplating them in electrolytic baths, for coating them in reactors using PVD / CVD methods or just for imprinting or lacquering them.

Afterwards, the refined parts are manually taken off the racks or out the trays and cleaned if necessary. At that time, parts are often put into a buffer.

The handling unit of the inspection system or an already existing handling system takes the parts from that buffer and feeds them into the inspec-

tion system where they are inspected. On basis of the inspection signal, rejected parts are directly sorted out and good ones are re-fed for further processing.

The inspection can be carried out directly after the surface refinement in form of a 100% process check or as a 100% final check after processing.



*High-gloss surface inspection system with a conveyor belt as buffer.*

### Preconditions for deployment

The inspection system is suitable for production lines with partly manual or fully automatic handling in application fields like telecommunications, automotive, and medicine. The inspection system runs especially economically where products are produced in continuous operations.

In order to exclude pseudo-faults, contaminations (such as dust dragged on by electrostatic charge) should be removed and cleaned off from high-gloss parts before inspecting.

### Contact

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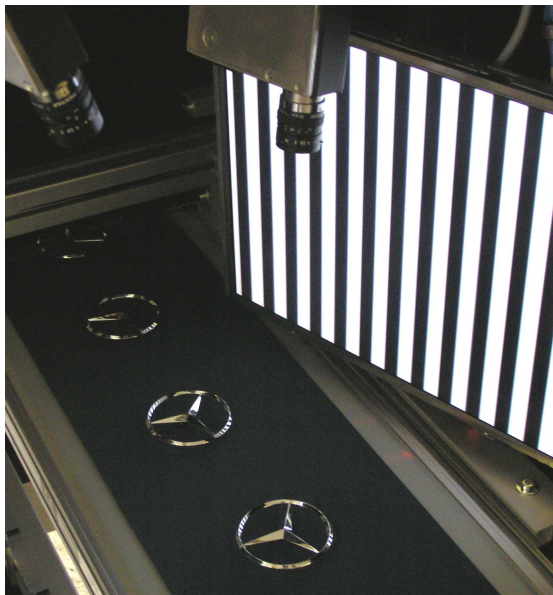


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### Components of the inspection system

The image acquisition unit of the electroplating inspection system contains optical sensor heads and the respective lighting and traversing units. An integrated handling system, in most cases used also as buffer, feeds the parts into the system. A computer for evaluation with user and machine interfaces controls the inspection system. System parameters can be modified, test results can be monitored per cavity, and external control signals can be exchanged.



*Variable lighting and camera technology make also complex surface defects visible.*

The equipment works under normal ambient conditions. Changes in ambient lighting are eliminated by enclosing the sensor heads of the image acquisition unit.

### Inspection sequence

Parts are successively brought on a conveyor into the test positions. There, the high-gloss surfaces are scanned under appropriate lighting conditions and under different viewing angles. The inspection procedure is controlled intersystem.

After completing the inspection process, inspection results are displayed on the user monitor and transmitted to the handling for sorting out the defective parts. The cycle time for the inspection amounts to approx. 10 seconds.

### Typical faults for optical inspection

The following types of faults can reliably be automatically recognized and are relevant for the inspection of electroplated surfaces:

Injection molding defects:

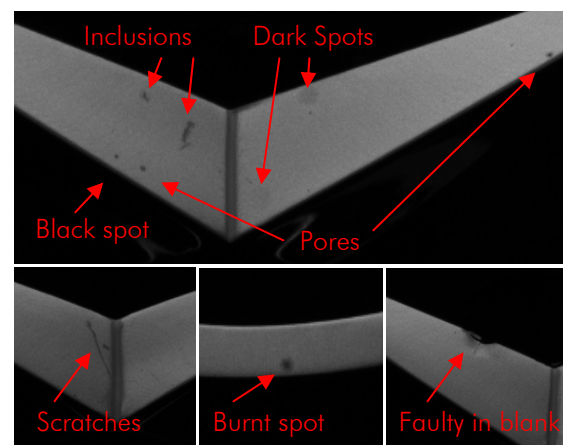
- Flow lines
- Pits and sunk-in areas
- Dimensional errors

Coating defects:

- Bare spots and inclusions
- Dull spots or rough surfaces
- Adhesion defects, bubbles and cracks
- Burnt spots
- Pores or pore clusters

Handling faults:

- Scratches
- Spots of abrasion



*Types of faults in the electroplating inspection.*

If any defect is recognized, a control signal is generated to sort out the part. In case of a permanent fault, an operator call can be released. In addition, cavity-related statistical acquisition of faults provides indications for possible optimization in the production.

### Avoiding faults instead of just detecting them

Close-to-process automatic fault recognition not only saves inspecting costs, but also reduces fault rates, since causes for rejects in the process are signaled immediately and therefore, can be eliminated promptly.