

Industrial image processing  
in the quality management  
of the automobile industry

a-s-e-n-t-i-c-s

a-s-e-n-t-i-c-s  
vision technology



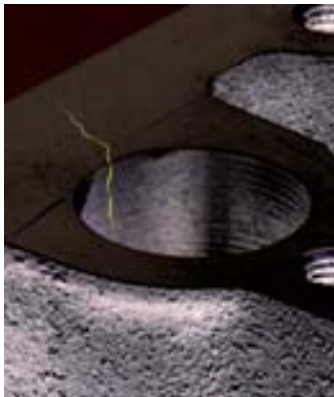
# The requirements made of industrial image processing in the quality management of the automobile industry and its component suppliers

**Industrial image processing** is being applied increasingly in the quality management of the automobile industry and its component suppliers. It is an excellent instrument for making tests and doing monitoring.

**The advantage of industrial image processing** is clearly to be seen in the non-destructive testing process. This means that all objects to be tested are scanned and evaluated contactlessly.

**We would like to illustrate** what demands are made of industrial image processing these days using the example of a cylinder head.

For instance, such things as hair-line cracks or threads that are not properly cut render the cylinder head useless for further assembly. Beyond this, residues such as chips in cavities and thread turns have to be located, identified and removed to prevent damage down the line. All cylinder heads have to be checked to guarantee their functionality. And industrial image processing is the ideal instrument to make a very fast test where inspection with the human eye is often impossible or uneconomic.



Industrial image processing essentially consists of two components: 1. **recording the image** and 2. **evaluating the image**

The image recording building block is responsible for gathering data. A camera records the shape, colour and size. The image evaluation building block is the digital processing of the data in a computer to get a precise statement on whether the testing object may be classified as belonging to a specific quality class with regard to shape, colour and size.

**If a product** is going to be assessed for its qualitative features using an industrial image processing system, it is necessary to deposit good and bad, large or small, correct or incorrect, etc. in the system with the corresponding parameters. Apart from these parameters, the correct components such as the cameras, lenses, lighting and electronic components for the evaluation, interfaces and evaluation programs (software) have an important role to play.

The software is generally adapted to the customer's specific testing needs. This means that it is necessary to have great core competence in the area of software development.

**ASENTICS industrial image processing means great expertise and know-how in the automobile industry and component supplier industry.**



These **cylinder heads** tests are only one example for demonstrating the various products and applications. On the following pages we will be showing you various testing problems on widely differing products that the automobile industry posed ASENTICS and that it has successfully solved.

**ASENTICS** offers industrial image processing systems with all of the necessary components for complex testing requirements in the automobile industry and its component suppliers.

**ASENTICS** can also master the corresponding integration of feeds or special machines in existing systems.

# Some example of testing problems



## Centre Consoles

position control and surface inspection

testing for:  
correct assembly, fitting, scratches, damage and shape control



## Electrical Motors for Sun Roofs

completeness check

testing for:  
correct positions, completeness of subassemblies, correct assembly and damage



## Motor Blocks

complete motor block inspection

testing for:  
dimensional accuracy of drilling holes, threaded and cooling water passages, damage and residues, checking the flat and sealing surfaces for blowholes and scratches



## Crankshafts

check of dimensional accuracy

testing for:  
position accuracy, distances, diameters, scratches and blow-holes



## Car Body Assembly

assembly check

testing for:  
positions, completeness, welding seams

checking for:  
damage



## Brake Fluid Containers

housing inspection

testing for:  
correct assembly, labelling, sizes and shapes, inclusions and break-outs, welding seams and spit-outs



## Door Locks for Central Locking Systems

assembly check

testing for:  
correct position, completeness of subassemblies, correct assembly and damage



## Pre-Mounted Front Axles

completeness inspection

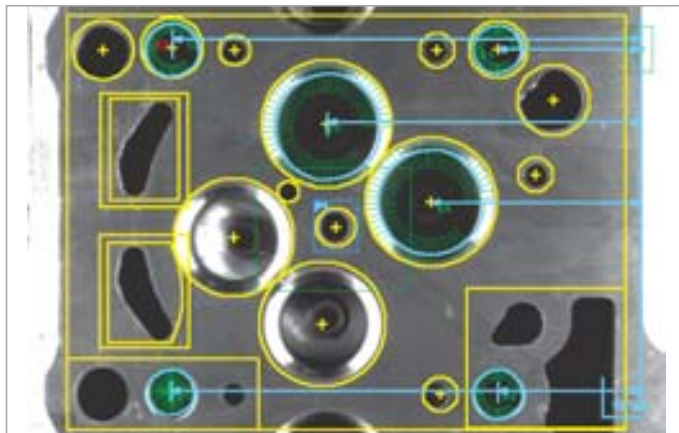
testing for:  
correct assembly, completeness, position accuracy and damage

# Applications with the industrial image processing system from ASENTICS vision technology

## Checking the flat and sealing surfaces of cylinder heads

**The flat and sealing surfaces are inspected for surface faults to prevent early motor breakdown and avoid expensive repairs.**

Cameras and illumination are positioned vertically and to the side of the test component. All of the components and positions are selected to ensure suitable physical resolution and to make sure that the



relevant testing features contrast as much as possible from the rest of the image to be able to identify even the smallest faults. When the correct testing position has been reached, a trigger signal starts image recording with the cameras.

A special software module does image evaluation. Any surface faults or impermissible deviations from size, contour or position are tracked down and analysed. The information gained makes it possible to make a statement on whether the cylinder head can be used based upon precisely defined characteristics.

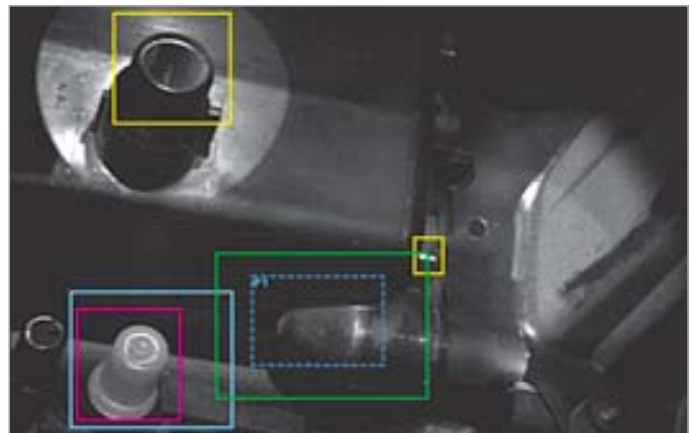
### **ASENTICS equipment for the testing problem:**

**computer:** 2 Videolab G6M  
**cameras:** 12 standard cameras  
**opt. equipment:** 12 standard lenses with great focal distance  
**lighting:** fluorescent tubes and homogenous dark field illumination  
**software modules:** Detect with Blobanalyse, Search, Logik Editor

**testing duration:** 300 ms

## Subassembly Inspection of radiator modules Only correctly pre-mounted subassemblies allow the shortest assembly times. They guarantee fast installation with a limited number of movements.

The relevant testing areas of the radiator with the coolant recovery bottle, condenser, transmission oil cooler and cooling loop for the power steering are checked with a total of 28 cameras from



various perspectives and a variety of details. They are illuminated with halogen projectors.

These image processing systems process the various testing jobs in parallel while being linked with one another through a network. The results of testing are transmitted to the upper-level machine control unit through TCP/IP. This means that faults identified are clearly visualised at a repair station in addition and they can be quickly corrected. It is also possible to remote service the entire image processing unit.

### **ASENTICS equipment for the testing problem:**

**computer:** 3 Videolab G5  
**cameras:** 28 standard cameras  
**opt. equipment:** lenses with 16 / 25 / 50 mm focal distance  
**lighting:** halogen projectors  
**software modules:** Detect / Verify / Search / Blob

**testing duration:** 900 radiator modules per hour



### Checking brake linings

**Brake linings are extremely sensitive components and they are of enormous importance for vehicle safety. This is the reason why zero-fault production is an absolute priority.**

The things checked are dimensional accuracy, completeness and the printing image in the top view with 14 standard cameras, standard lenses and conventional illumination. The linings are positioned under the



cameras in the running production process. Now the image processing system checks whether all of the parts are present, properly positioned and mounted. Then it queries the dimensional accuracy of the individual components and finally it checks the printing image for reasons of identification. The results of the individual tests are communicated through the upper-level control unit that then transfers the faulty parts outward.

#### ASENTICS equipment for the testing problem:

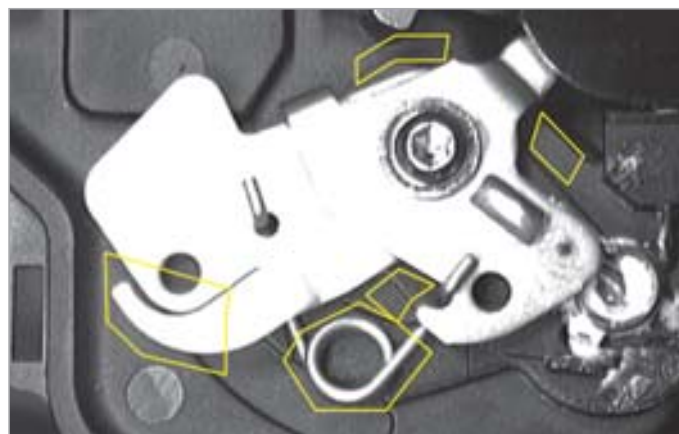
- computer:** 3 Videolab G6M
- cameras:** 14 standard cameras
- opt. equipment:** standard and telecentric measuring lenses
- lighting:** LED impinging light, transmitted light and telecentrically transmitted light
- software modules:** Detect, Measure and Verify

**tests: 1,320 brake linings per hour**

### Checking door locking systems

**Industrial image processing is used to prevent confusion of more than 40 variations and guarantee complete and correct assembly.**

8 cameras are used with lenses of varying focal distances to make inspections on the more than 40 different door locking systems. Testing is done with impinging light using pole filters. Industrial image proces-



sing simultaneously inspects 2 locks at a time. The system receives information on the various types of locks for testing through a centralized control system. Industrial image processing checks to see if the correct components are actually there and if they satisfy the criteria. If a fault is discovered, the lock is transferred outward and shuttled to a repair workstation. Industrial image processing systems from ASENTICS vision technology control everything in this system, including the sensory mechanisms so that you don't require an SPC.

#### ASENTICS equipment for the testing problem:

- computer:** Videolab G6M
- cameras:** 8 standard cameras
- opt. equipment:** 8.5 mm, 16 mm, 25 mm, 50 mm focal distance
- lighting:** fluorescent tubes with impinging light and transmitted light
- software modules:** Logic Editor and Detect

**tests: 1,800 door locking systems per hour**





# What benefit does ASENTICS industrial image processing bring the customer?

## Optimising processes and quality management

Having your employees do visual inspection has become uneconomical in many cases because the defect rates are no longer acceptable. This generally comes from a lack of concentration, improper optical assessment, mistakes or fatigue.

In contrast, **ASENTICS industrial image processing** records every defect, be it ever so sporadic. It assesses every testing object completely objectively without fatiguing, without a lack of concentration and day by day, around the clock without taking a break.

**Our systems** are also capable of solving various testing problems at the same time with 8 cameras per computer (for instance, geometric or dimensional checks). Using several cameras also allows you to also increase the cycle rates significantly.

**Integrating** our industrial image processing systems and the knowledge gained from this make it possible to control and accelerate a number of internal processes.

A precise check and assessment in the automobile industry is increasingly becoming the prerequisite for optimising other processes. For example, think of subsequent sorting according to sizes, colours or quality classes. They can be designed more efficiently and automated using ASENTICS industrial image processing so that manual interference by your employees becomes superfluous.

**Quality management** systems are absolutely necessary these days to be able to measure up to customer requirements. Depending upon the direction of your company's production, there not only are national, but also international directives that you have to satisfy.

For instance, national and international standards demand a complete testing certification. If you are lacking a certificate or if it is incomplete, your competitors will have the edge on you.

ASENTICS industrial image processing offers you an almost perfect solution to documenting these testing or individual certificates.

## The benefits of ASENTICS industrial image processing

**ASENTICS industrial image processing** is extremely compact and built modularly.

At the customer's request, our system can be re-configured according to requirements again and again.

Furthermore, our system can be excellently adapted to the customer's convenient specific operating interfaces.

ASENTICS offers you all-round one-source applications in quality testing and quality assurance for the automobile industry.

We also offer comprehensive service and excellent detailed consultation either ahead of time and as a follow-up service.

## Your benefits when using ASENTICS industrial image processing

**We ensure** your customer's quality requirements for you.

**We solve** your problems.

**We help** you avoid rejects.

**We offer** you 100% control

**We help** you to reduce costs.

**We help** you increase your production rates.

**We help** you to utilise your human resources in a more useful fashion.

**This means  
that you save money!**





# ASENTICS industrial image processing systems are **extremely efficient tools**

to comply with even the highest quality demands for  
your products.

Take advantage of our know-how.  
Have our staff give you detailed non-binding advise.

Challenge us!  
We're looking forward to it.

**Your team from ASENTICS vision technology.**



# a·s·e·n·t·i·c·s

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