ZERO DEFECT MANUFACTURING

FROM RESEARCH

TO PRODUCTION

PROFACTOR®

MANUFACTURERS of

FACING QUALITY ISSUES like

deformations · casting residues · casting residues · missing operations · missing operations · processing errors · wrinkles · early add/late cut · processing errors · scratches · swarf · wrinkles · marks · overlaps · fiber pullout · scratches · distorted fabric · missing yarns · twisted tows · chipping · breakouts · cracks · marks · overlaps · breakouts · inclusions · blister · cracks · gaps · chipping · blister · cavities · early add/late cut · gaps · blister · fuzzballs · inclusions · cracks · cavities · weaving defects · missing yarns · dents · missing yarns · twisted tows · cavities · missing roving · dents · cracks · swarf · early cut/late add · missing roving · gaps · swarf · processing errors · fiber pullout · Early add/late cut · inclusions · processing errors · wrinkles · weaving defects · matrix smearing · gaps · fuzzballs · foreign objects · deformations · marks · matrix smearing · chipping · swarf · chipping · cracks · casting residues

Choose PROFACTOR's INSPECTION SOLUTIONS for

PERFORMANCE

Detecting all defects is obligatory for inspection systems. The key to successful operation of the system is the minimization of false rejections. Our inspection systems stand out by reliably distinguishing real defects from non-critical variations.
You can focus on production instead of tweaking the inspection system.

FLEXIBILITY

PROFACTOR's solutions have been deployed in mixed model production. Flexible, robot-based machine designs support zero tooling time and accommodate integration of future part types by mere changes in software configuration.
You can handle production changes with minimal investments.

SCALABILITY

Our inspection solutions scale from base-line applications with few features per part, to hundreds of features on the part. Scalability comes in terms of throughput and proven tools for configuration, reporting and archiving of results.
You get solutions tailored to your requirements.

ASSISTANCE

High-value parts inspected as NOK are most often cross-checked by operators to qualify for repair. Our visualization solutions provide effortless matching between inspection results and the physical part at hand. Options range from touch screen interaction to industrial augmented reality, where results are projected on the physical part.
You can seamlessly merge machine accuracy with human judgment.

DETAILS

Ensuring that no scrap part leaves your plant is just the first step. PROFACTOR's inspection systems provide detailed information on all detected defects and near-defects, condensed into meaningful report files.
*You can improve your production process with information on defect types, sizes and locations.*

INSTANT INSIGHTS

PROFACTOR supports your journey to Zero Defect Manufacturing by closing the feedback loop from inspection to production. Our data analysis tools easily process several months of inspection data, while providing real time interaction. Interactive analysis of trends, defect hot spots and the production history of defective parts, is a matter of seconds.
You can close the loop from inspection to production.
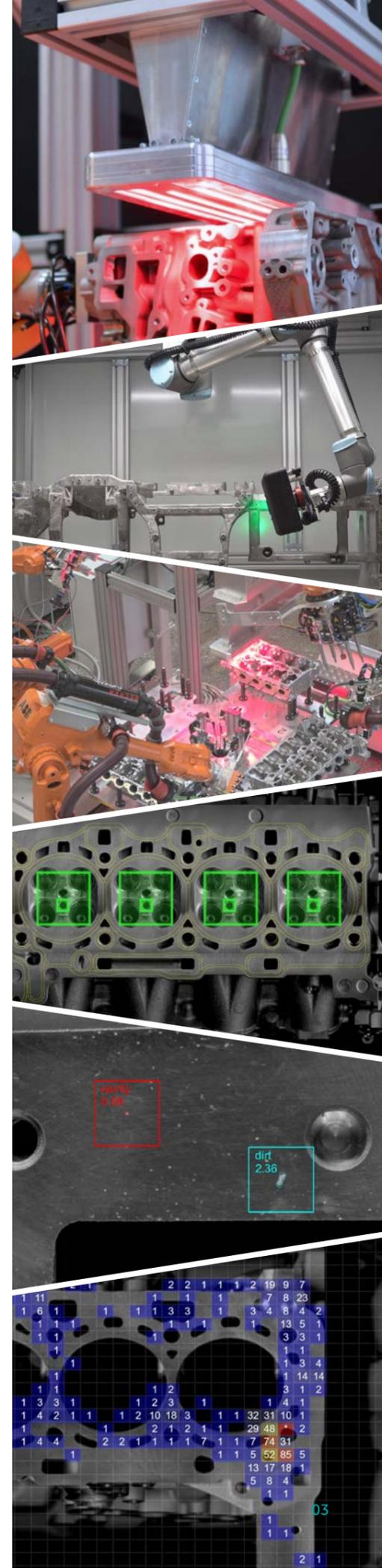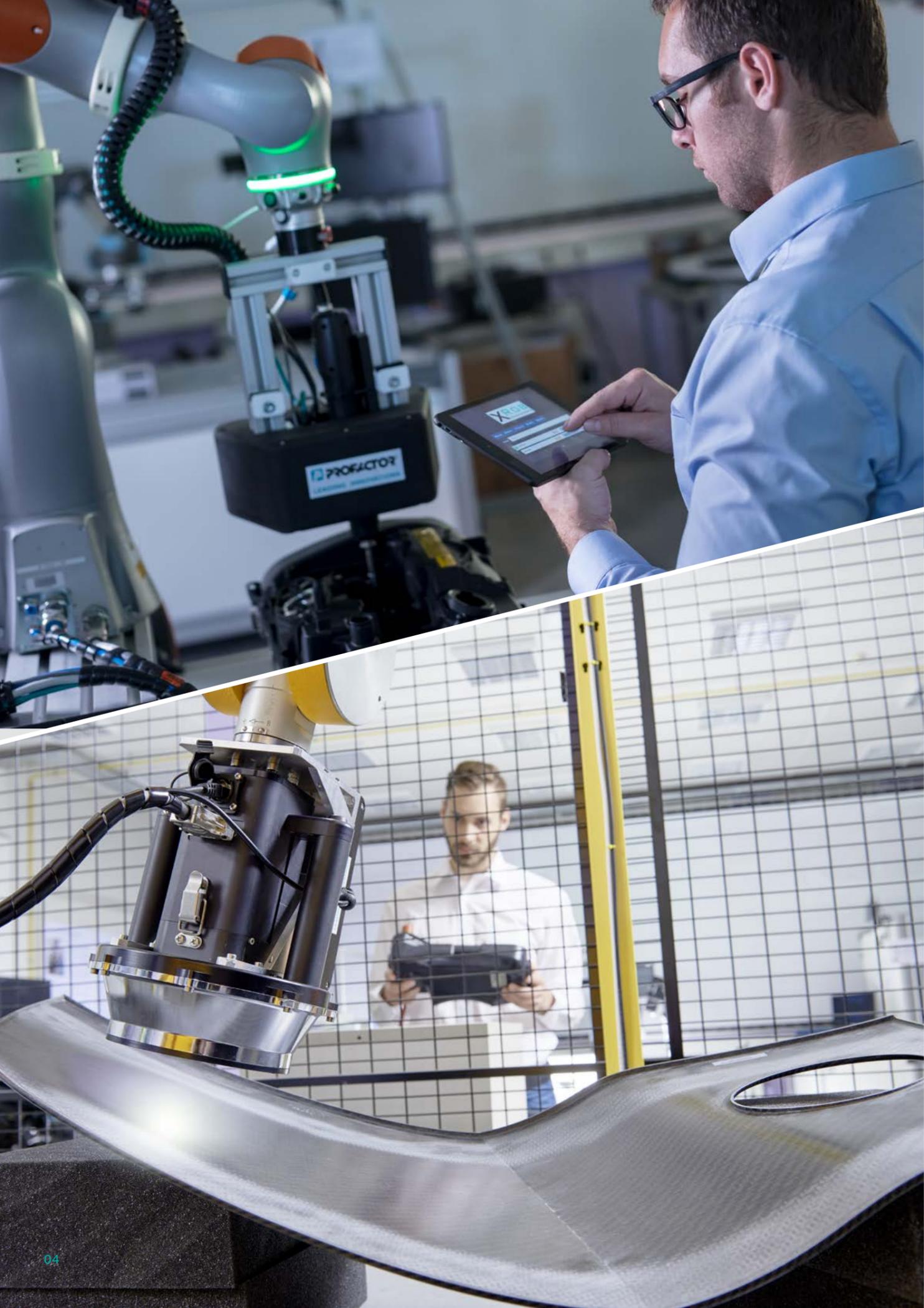
# THE JOURNEY TO ZERO DEFECT MANUFACTURING

Machine vision offers much more than finding defects. Our powerful tools provide a new perspective on your production and take you to the next level: Evolve from sorting out defective parts to avoid defects by closing the feedback loop in your production. PROFACTOR supports every step of your way, with undivided focus on your goal: Zero defects.

Feasibility studies and individual sensor design
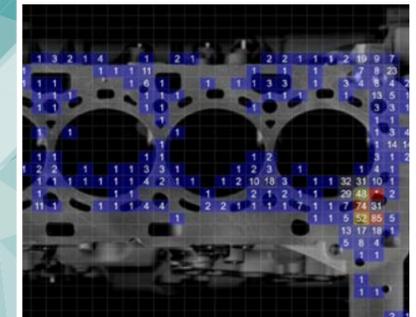
FEASIBILITY

Realization of turnkey inspection cells
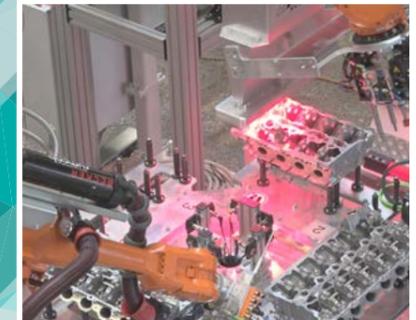
End of line visualization

REALIZATION

Quality data analytics and insights

INSIGHTS

FEASIBILITY STUDIES AND INDIVIDUAL SENSOR DESIGN
Customized quality inspection for zero-defects

H-Scan

GridSense

TPscan

PROFACTOR develops individual sensors for all types of applications. The inspection technology and the inspection process are developed and evaluated together with the customer in feasibility studies.

PROFACTOR works across disciplines to find new solutions to your inspection challenges. Our team include physicists, optical and electrical system engineers, mechanical design engineers, machine vision and machine learning experts.

The following applications have already been deployed.

» Inspection of metallic surfaces
» Inspection of structural parts
» Inspection of wood
» Inspection of inner surface quality of bores
» Measurement of fibre orientation on composite parts
» Quality control of highgloss surfaces
» Inline control for automated fiber production processes
» Active thermography for crack detection
» Individual sensors for special applications according to customer requirements

Your advantage
» Shift the boundaries of what is possible
» Detailed system specification before realization
» Reliable statements for investment decisions

Application areas
» Connecting rods
» Structural components
» Crankcases
» Cylinder heads
» Engine blocks
» Carbon fiber parts
» Wooden veneers
» Boreholes

References
» Automotive
» Aerospace
» Lightweight construction
» Sports, racing, yachting

REALIZATION OF TURNKEY INSPECTION CELLS
Innovation meets experience.

Machine vision is becoming a commodity for tasks like completeness checks and code reading. Successfully establishing 24/7 automated visual inspection in your production line requires an experienced partner. PROFACTOR will assist you from the planning stage through all phases of implementation to successful qualification.

PROFACTOR has more than 20 years of technology development and experience in implementing inspection systems as well as research expertise and network. Our turnkey solutions meet even the most demanding requirements of your production. With the core technology developer as your contractor, you can be sure that achieving the high-

est inspection quality is always a top priority during implementation. From the translation of your quality manual into clear criteria, through the implementation of the system, to production support, PROFACTOR provides you with everything from one single source.

Your advantage
» Full service provider
» More than 20 years of experience
» Access to latest technologies
» Highest level of detection reliability
» Tailored solutions

Application areas
» Fully automatic production
» Casted metallic parts
» Carbon fiber reinforced polymer (CFRP) and carbon-metal composites
» Wood
» Forged parts
» Complex structural components

References
» Automotive
» Steel industry
» Aerospace
» Wood processing industry
» Sports, racing, yachting
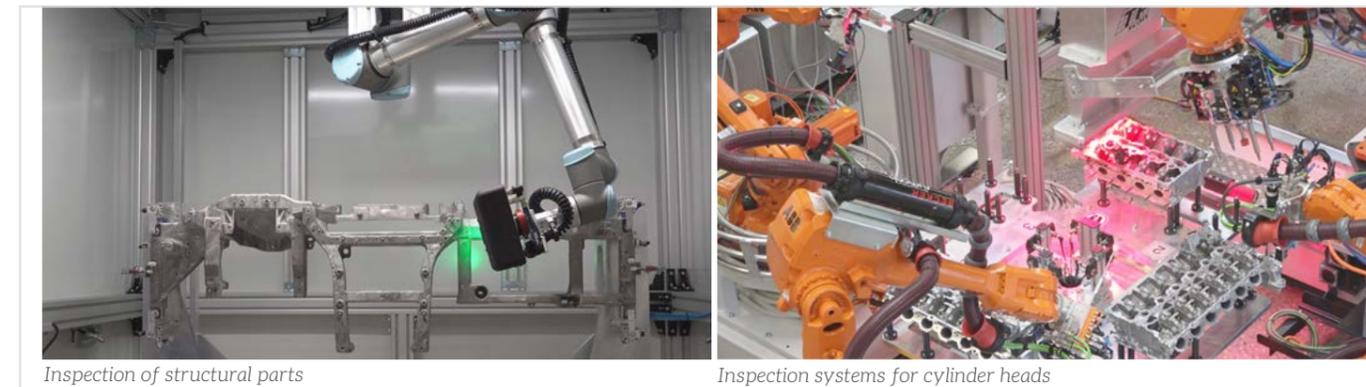
Inspection of structural parts

Inspection systems for cylinder heads

END OF LINE VISUALIZATION
Augmented reality in production process for quality assurance

For certain tasks, such as deciding over disposal of expensive parts and delicate assembly workflows, humans are still superior to an automated solution. To support overcoming human difficulties like lack of time, experience or context information, companies have used assistive instructions printed on paper and mentally demanding visualizations on screens.

Projection-based systems
PROFACTOR develops projection-based systems which illuminate work surfaces, components or interesting regions of the component, that relieves the final inspector considerably and increases quality for the customer.

The system consists of a customer-specific orchestration of projector and related perception technology connected by our visualization software to boost quality and valorize human-centered working places.

Improved working places and end control
Humans are enabled to deliver consistent performance and keep quality control at the highest level. Human skills and capabilities are focused on essential tasks and are not wasted with secondary activities.

Your advantages
- » Minimize human errors
- » Minor secondary activities
- » Visualization directly on the workpiece
- » Minimal training effort
- » Individualized projection

Application areas
- » Visualization of automated inspection results
- » Poka Yoke through projected instructions
- » Guidance of manual quality checks

References
- » Automatic (cylinder head production)
- » Hybrid electronics assembly workplace
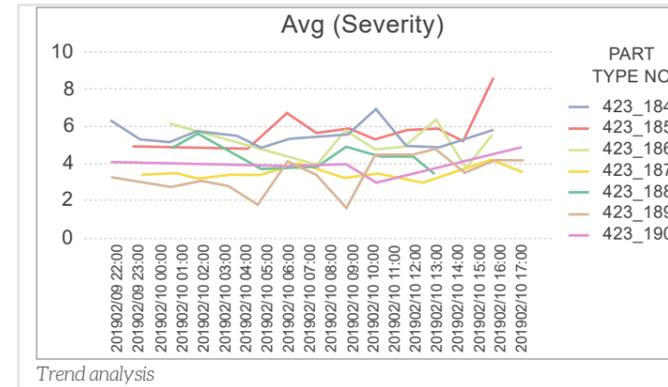- » Conrod assembly

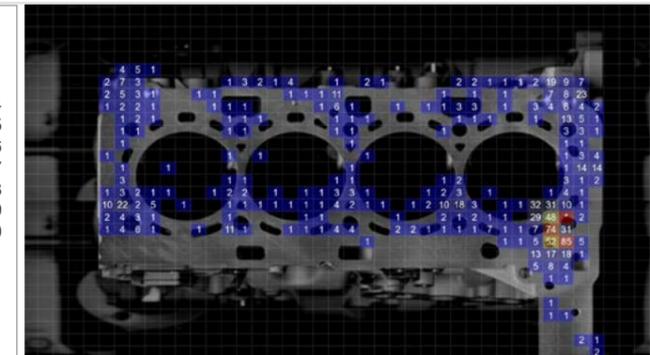*Projection-based quality control*   *Projection of sealing areas*   *Visualization possibilities*

QUALITY DATA ANALYTICS AND INSIGHTS
Decision support for quality assurance

Trend analysis   *Spatial defect density taking many inspections into account*

To assure the quality, not only one single inspection result, but the systematic and continuous evaluation of all inspection results is desirable. This is necessary for the identification of quality related trends over time. Decision and support tools for filtering quality data by criteria such as time period, part type and defect type make the analysis efficient and easy.

PROFACTOR has developed a solution for permanent storage and archiving of inspection results as well as interactive analysis and visualization of inspection data.

Classification of defects
The inspection software developed by PROFACTOR classifies different defect types, such as cavities, scratches and dents. The defect types can indicate the potential causes. For example, shrinkage in cast components can lead to the conclusion that the supplier of the casting is the reason for defects, or that scratches have occurred in the production line due to certain machines.

Defect trend analysis
Interactive analysis of inspection results over a long time period helps to identify reaccuring defects. It's also possible to identify future issues that are likely to arise before these issues hit a critical mark. This enables the evaluation of changes in the production of components from suppliers, whether there has been an improvement or even deterioration in component quality.

Your advantage
- » Statistical analysis of 100% inspection results
- » Documentation of results
- » Trend analysis
- » Decision support
- » Predictive analysis
- » Comparison of different time spans
- » Interactive data analysis

Application areas
- » Line production
- » Mixed model production
- » Flexible production

References
- » Automotive
- » Aerospace
- » Steel industry