defectCon

Defect Detection

made by THETA SYSTEM

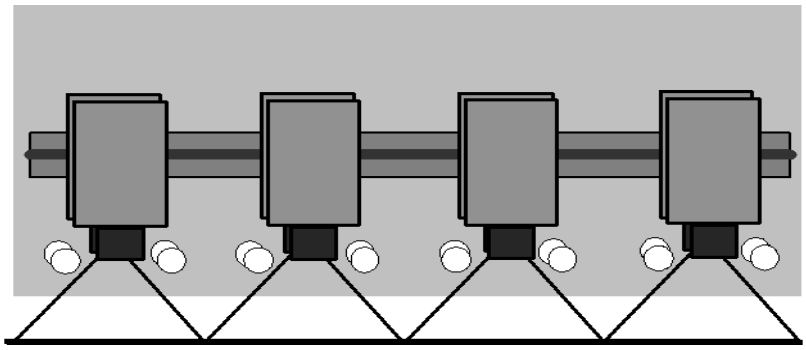
For a steady company's success on the market the guarantee of a consistent high product quality is a crucial factor not only in the printing industry but also in other industries. The necessary increase of quality control can only be achieved by an additional application of a powerful, automated inspection system. Image quality, resolution and speed are essential features for the success of defect detection.

THETA SYSTEM already set milestones in 1986, and other companies made use of this technology from this time. At the DRUPA in 1986, the first web viewing system was introduced, followed by the first systems with 3CCD cameras in 1988 for ideal print quality. Also with our new **defectCon** we are consistently following this path in the division of defect detection systems.

defectCon is the right choice, if a system for perfect defect detection is needed. **defectCon** offers a 100% control of the whole web sheet with outstanding image quality, maximum resolution and highest speed. With its high-performance algorithms **defectCon** detects unimpeachable all typical printing defects like streaks, splashes, misregistrations and even smallest color deviations. Detected defects are recorded in an error log-file with all the defect-relevant data. If a defect is detected an alarm occurs on the monitor, on an alarm device or through the network. The operator is warned in realtime and can therefore take corrective action.

See Better. See More. Know More.

The analysis of **defectCon** is carried out during the printing process via comparison of the inspected web sheet to the masterscan. Due to prompt intervention defects can be avoided and not only the print quality can be increased remarkably but also the waste paper will be noticeably reduced. **defectCon** will be amortised in a very short time period, because printing costs will be economised and margins will be higher. As a result of the modular and flexible design the required system hardware can be customised for every printing machine with its different specifications. The increase of your print quality is reflected in satisfied customers. Benefit from follow-up orders and new orders, which you can realize without hesitation because of your constantly better print quality.



Schematic illustration of an inspection system with 4x2 cameras. The necessary number of cameras is defined by the web width, the required image resolution and by the web speed.

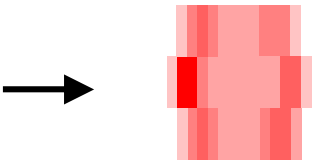
defectCon

See More – See Better – Inspect Better

Principle of defect detection

A comparison of the image resolution for defect detection systems based on line scan cameras and area scan cameras

Line Scan Camera
Detection of ‘e’, 12pt
Red channel
Web speed: **400m/min**



Resulting Image

Line Scan Camera - Data

Pixel/line:	3x 4096, RGB
Pixelrate:	3 x 40MHz
Web width:	660mm
Web speed:	400m/min
Image resolution:	0.82 x 0.16mm

Line Scan Camera
Detection of ‘e’, 12pt
Red channel
Web speed: **200m/min**

Resulting Image

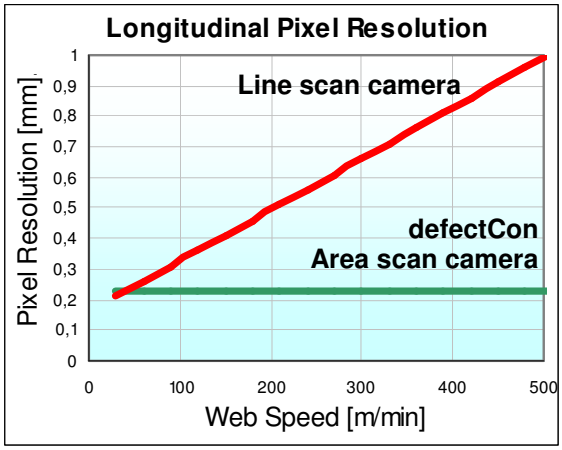
For better visualisation all image results are enlarged 10-fold.

Area Scan Camera
Detection of ‘e’, 12pt
RGB Bayerfilter image
Color seperated red channel,
Web speed: **>400m/min**

Resulting Image

defectCon Camera - Data

Image size:	8x 1024x768
Pixelrate:	8 x 24MHz
Web width:	660mm
Image resolution:	0.24 x 0.24mm



Many suppliers of 100% inspection systems, who use line scan cameras as detector, often only specify in their examples for resolution the horizontal resolution of their systems. Already at slow web speeds the longitudinal resolution, that means the resolution in web running direction, is much higher than the resolution across the web width. This is illustrated by the red line of the diagram, whereas the green line demonstrates the advantage of **defectCon** equipped with area scan cameras whose pixel resolution is constant up to web speeds of >20m/s. Depending on effort the horizontal and longitudinal resolution can be increased up to > 0.1mm. This performance is very important, because for reliable defect detection 2x2 up to 3x3 pixels are necessary as real inspection resolution.
The diagram was calculated with the above-quoted characteristic values of a high-end supplier of 100% inspection systems.

Calculate by yourself:
Ask your supplier for the frame rate in KHz of the used line scan camera. Divide the web speed in m/s (= 1/60m/min) through this frame rate in KHz and you will get the pixel resolution in web running direction in mm, which results for a one-time line readout by web movement.

Longitudinal pixel resolution [mm]
= web speed [m/s] / frame rate [KHz]

Finally, the horizontal image resolution, which is mostly specified as system resolution, has to be added to this value.

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dual View	- for Web Inspection	**defectCon**	- for Automatic Defect Detection
superView	- for High-End Web Inspection	**deCon**	- for Inline Color Density Measurement
regiCon	- for Color Register Measurement	**deCon**	- for Color Density Measurement