

# DELTEC

## Highest Throughput with AOI Parallel Inspection



Case Study

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*„High-tech electronic production at its top level“ – so states the company philosophy at DELTEC Automotive GmbH & Co. KG. With over 6,000 m<sup>2</sup> production space in Furth im Wald and in Domažlice (Czech Republic), the electronic services provider manufactures automotive, industrial and consumer electronics for top-name and predominantly globally active customers. Steadily rising demands for quality and use of the most modern electronic component types require equally modern inspection technology. Above all in their role as supplier to the automotive industry, DELTEC must rise to the highest standards, meaning that the fail-safe reliability of completed assemblies must be guaranteed. The highest productivity and quality are overarching goals, which are successfully attained at DELTEC. This is where the flexible AOI systems from Viscom make an important contribution. Wherever they are deployed in the line, after reflow or wave soldering, these systems cover every production concept.*

## DELTEC: Successful family company

The cornerstone for today's DELTEC Group was laid by Franz Dahlhoff in 1992 when he acquired ABB Metrawatt in Furth im Wald. A second facility was opened in Domažlice (Czech Republic) in 1993. Production of automotive electronics started in 1996 and grew to become the most significant business area, leading to the 1999 founding of the DELTEC Automotive GmbH & Co. KG in Furth im Wald. The company's most impressive leap forward came in 1996 when their SMT capacity quadrupled from 400 million components a year, to 1.6 billion. Today, the DELTEC Group is among the top production services providers in Germany.



Lead-free ignition electronics with 0201 assemblies

## Zero-defect quality with AOI

In 2001, DELTEC evaluated AOI systems from various manufacturers. Their starting position was an in-house investigation which revealed that 25 % of defects could not be detected by the human eye. For an automotive supplier, this was clearly unacceptable. The decision process finally led to an AOI system from Viscom. „Viscom was the only company who could provide us with convincing analysis results. 98 % of the defects were detected; the best the competition could muster was 50 - 60 %“, recalls André Dalhoff, who heads DELTEC with his father, to summarize the results of the evaluation phase. Other strong points favoring Viscom were, a wide product spectrum ranging from straight solder joint inspection to special solutions, plus excellent support.



Four Viscom type S6056 DS2W systems in off-line operation

During the course of the multi-year cooperative partnership with Viscom, many new requirements were presented to the AOI systems. For example, in 2003 the inspection of lead-free soldered components came to assume top priority. DELTEC was the first company in Europe qualified to reflow solder assemblies with 0201 components, in serial production with high piece counts for the automotive industry. After a few months the company began automatic optical inspection after the wave solder stage. At that time this was out of the ordinary and even today remains more the exception than the rule. „AOI after the wave process was implemented in a very short time; today the results speak for themselves. Prior to this, ppm rates between 10,000 and 20,000 were common. Today – thanks to Viscom – each AOI analysis gives an evaluation with a range of 7 - 20 ppm within 30 minutes, for the most complex assemblies. For wave solder technology, this is an exceptionally good result“, again André Dahlhoff.

In addition, DELTEC has employed a system for the inspection of selective solder joints, THT and SMT components on the bottom side of the printed circuit board. To accomplish this, in close cooperation with DELTEC, Viscom crafted a solution especially to their needs which in turn gave rise to the S3016, now a standard Viscom product. André Dahlhoff underscores the fruitful collaboration: „The AOI system that we now employ for selective solder joints is very reliable and contains numerous customized solutions that we are very satisfied with. Defect escape is nearly zero. This is an absolute must because the system inspects the soldering process for automotive ignition electronics; the product must function without a hitch.“

**Parallel AOI guarantees the highest quality with outstanding throughput**

The year 2006 brought an exciting development, as DELTEC staked an investment on two double track systems type S6056 DS2W in order to land a major order from an Asiatic firm. Any risk has more than paid off, as this level of quality assurance allowed DELTEC to steer production of consumer electronics back to Germany from Asia.

With its high performance 6M camera technology – commanding up to 5.6 million pixels – the S6056 achieves maximum throughput with the highest inspection depth. In addition to the orthogonal camera modules, inspection with angular cameras guarantees assured recognition of critical defects including lifted leads in the fine pitch range. Even 01005 components and small raster dimensions such as 0.3 mm can be inspected thoroughly and without restriction.



Fl.t.r.: André Dahlhoff, DELTEC Automotive GmbH & Co. KG and Walter Schneider, Viscom AG, before the Viscom S6056 DS2W

With its double inspection tracks and two camera heads, the system type S6056 DS2W facilitates the simultaneous inspection of two printed circuit boards per transport track. This is accomplished by a second track behind the „normal“ front track, to which printed circuit boards are also transported. While a board is being inspected on one track, the one on the other track is being exchanged. This eliminates handling time so that cycle time is cut by nearly 50 %. This is where the superior flexibility of the S6056 system platform, which allows various inspection concepts from single through double track operation to parallel inspection to be tailored expressly to customer requirements, is utilized to greatest advantage.

With the EasyPro operating interface, program creation and optimization is fast and easy. Defect images can be evaluated at the repair station and the results so gained flow immediately into the generation of statistical data. Statistical process control from Viscom (the VPC software) ensures systematic defect analysis for secure



SMT production line at DELTEC

process monitoring. Previously, process evaluation consumed several weeks before DELTEC got results; there was no possibility to adapt the process in near real time. Now prompt corrections can be made in the production process, to prevent costly serial defects.

Up to 80 million components per month are now inspected after reflow and wave soldering at Furth im Wald. Using the S6056 DS2W in off-line operation allows simultaneous inspection of two assemblies. This actually halves analysis time – for two assemblies, 470 components in 27 seconds – to yield the same productivity as four systems of type S6056 DS1W. Investment in two double track machines saves the company considerable costs for handling systems and production surface as well; the S6056 DS2W has a small footprint. A conventional configuration would have called for a minimum four additional AOI systems to handle the required workload.

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## AOI today and the requirements of the future

Today several AOI systems from Viscom are in action at DELTEC, both in- and off-line. 100 % of all assemblies (reflow and wave soldered) are proofed under automatic optical inspection. In the reflow area, this includes all visible solder joints, component positions and missing, rotated or misplaced components; after wave solder, voids, open solder joints and inspection of the solder meniscus. Also, a Viscom X-ray system is used for both manual and automatic inspection of BGAs, QFNs, etc. as well as void calculation, for steady process monitoring of the SMD production. The systems are normally run through all three shifts five days a week, sometimes reaching uninterrupted seven-day operation. Currently DELTEC produces 280 different electronics assemblies. Per year, 8 - 10 million assemblies of various sizes are delivered. Among others, large series of assemblies populated with up to three BGAs are run. Currently their

number reaches 200,000 per year, and is steadily rising. „This also proves why the decision for a high performance inspection system was so important. Increasing assembly with BGAs makes 3-D inspection critically essential. The solution we have found is optical inspection of both sides of the board and simultaneous 3-D X-ray inspection, with the X7056 from Viscom“, points out André Dahlhoff.

For DELTEC, future trends call for increased use of QFN and the introduction of 01005 components. DELTEC is in contact with major suppliers in the medical technology sector, where 01005 components find frequent use. The quality requirements in this sensitive area can be even higher than in the automotive branches; yet with the inspection systems from Viscom, DELTEC finds itself on very firm footing from which to meet the requirements of the future.

Are you interested in more details on this application or do you have any question regarding automatic optical inspection? The Viscom SP Division will be glad to help you.

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