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Automotive Glass Inspection

Optical Inspection Systems Assure Perfect Quality of Windshields

It's often said that there's a lot riding on automotive tires – and how vital it is for every single one off the assembly line to be high quality and defect-free. Perhaps just as vital to automotive safety is windshield glass, with outstanding clarity and smoothness extremely important for driver visibility and performance in all conditions.

With windshield glass becoming more and more complex, the challenge – and the cost – has been escalating, according to Stephane Baldo, chief technology officer of Synergx, a Quebec-based manufacturer of automated optical inspection equipment for the glass industry.

“A defective glass panel caught early – before the sophisticated value-added features and electronics are installed – might cost a manufacturer \$20 or so,” he explained. “But if a panel with a bubble, scratch, double image or other visual distortion sneaks in further down the line, after sound-proofing, defrosting, antennas, heads-up displays or other components have been added, that scrap cost can escalate to well over \$100.”

Further, if such a windshield actually gets out of the factory and is delivered to an OEM, it can be highly problematic for Baldo's customers – the windshield manufacturers.

“The safety and liability aspects are so important to automotive OEMs that even one or two defective windshields out of tens of thousands could get an entire shipment rejected and returned to the windshield manufacturer. Then, the OEM will likely send inspectors to their factory to analyze everything and see what the problem is,” he said. “As you can imagine it can be a *very* big deal.”

In addition, Baldo notes, with more and more sophisticated electronics in increasing demand – such as those related to self-driving vehicles – the challenges for both windshield manufacturers and the inspection companies like Synergx that serve them are continuing to accelerate.

Small Player – Big Performance

Despite this challenging environment, Synergx has succeeded – even thrived – for more than a decade, providing glass inspection equipment to windshield manufacturers serving nearly every automotive OEM, from traditional to high-tech nameplates – a fact made even more impressive when one considers that this 40 person company competes against divisions of huge technology companies around the world.

What sets them apart? In addition to their small company agility, Baldo says, it could be their strong emphasis on R&D and the development of superior technology.

“I believe that we put an especially large amount of effort into developing outstanding algorithms as well as superior optics. For example, our optics perform very wide telecentric fields of view that allow our equipment to detect defects in a highly repeatable

The bottom line is that chips, scratches, bubbles and other defects – many less than the width of a hair, and all but invisible to the eye – are flagged by the Synergx system very early in the process, helping their customers minimize waste, optimize quality and stay decisively on the right side of demanding OEMs.

Reliability and Accuracy Help Drive Success

According to Baldo, Teledyne Dalsa cameras – mostly line scan as well as area scan products – have been key components of Synergx glass inspection machines since the company’s founding, with three to eight units currently on each machine.

“Teledyne Dalsa cameras seem to just live on forever,” he noted. “Lasers eventually burn out, PCs crash or power supplies fail, but the cameras just keep on working. And it’s important to also consider that these machines are often placed in environments not very friendly to sensitive equipment. Often, temperatures can run from 10°C to 40°C (45 to 110 degrees F) there’s high humidity and the ambient air can be so dusty or polluted that you can clearly see the laser running through it. But nonetheless, Teledyne Dalsa cameras have always been one of the most reliable components in our equipment.”

Baldo also finds that these cameras provide him – and his customers – with outstanding signal-to-noise ratios, helping them achieve the accuracy craved by everyone down the supply chain. “For example, we can deliver highly precise measuring capabilities accurate to about 1/20 of a pixel – that’s how much information we are able to extract because the Teledyne Dalsa camera signal is so clear,” he said.

A Valuable Partner

Baldo also commends the customized support that Teledyne Dalsa offers them. “We were developing an innovative new optics capability and the engineers at Teledyne Dalsa immediately stepped up to provide some custom coding in the bias that would perform enhanced line averaging in the camera,” he explained. “Other times we might be facing an especially fast turnaround to help one of our customers and their organization mobilizes to help get us what we need to help meet that. That kind of support is very, very valuable for us.”

“We are always scanning the marketplace for backup sources of supply in every product category and, even more so than any other product we use, we’ve never found technology and value that can match what we get from Teledyne Dalso,” he said.

Going forward, Baldo notes, he and Synergx plan to continue to look to Teledyne Dalsa to support even their most innovative visions. “Every time we have a new product concept, one of our first calls early on in the development process is to Teledyne Dalsa to see how their cameras can support our ideas,” he said. “At every stage of the process, our partnership is critical to our success.”

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