

The cost of poor quality

Increase profits by reducing glass defects during production

By Nate Huffman

Recycling bins at most glass fabrication plants fill up quickly with scratched, broken and incorrectly tempered, coated, laminated and fabricated glass. Defective glass impacts profits significantly, with the typical North American fabricator annually losing 4 percent to more than 10 percent in profits due to poor quality products, according to an informal Fenetech survey. This easily adds up to hundreds of thousands if not millions of dollars a year.

Quality problems tend to get worse during the busy season or with the influx of new hires. But fabricators don't have to live with the costs of poor quality. This article explores common glass fabrication challenges and potential solutions to help reduce scrapped glass.

Quality challenges

Glass is fragile. It breaks, chips and scratches. It collects dust and

fingerprints. It pits, ripples and bows.

"We have to accept and understand that we sell a sensitive product and that it has to be handled with care," says Gemma Martini, CEO of Vitrum Industries, www.vitrum.ca.

"It's an easily damaged product," adds David Wickham, general manager of ITI Glass, itiglass.com. "I ask employees: if their job was to transport a single lite of glass through all processes, could they do it without damaging the product? They generally respond, yes. We realize that this is not efficient, but it's critical for each person in the plant to identify his workmanship with the quality of our finished product."

Each step of the fabrication process presents quality challenges. The glass gets off-loaded, racked, stored, cut, coated, tempered, laminated, drilled, etched, washed, fabricated and shipped. Each time the glass is handled is another opportunity for damage.

And of course, the work is done by

people who have varying skill levels, and who have good days and bad days. Human error can come into play at each step in the fabrication process.

Martini says the basic scratch is the biggest issue in the plant. Glass breakage also tops the list of quality concerns. Additional challenges include "vendor defects, fisheyes in the glass, interlayers with specks, [and low-emissivity] coatings that have inconsistencies, particularly with temperable product," Martini says.

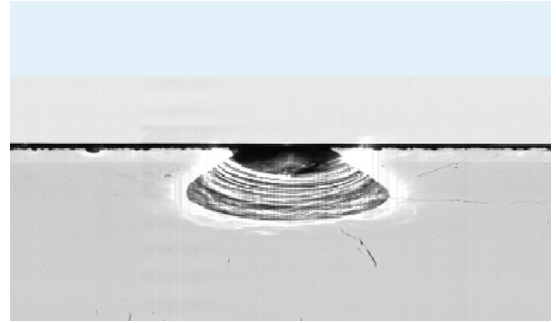
Technology advances can bring their own issues, particularly with the new low-E coatings, Wickham says.

"We now use more soft-coated low-E glasses that show defects much more acutely," Wickham says. "As we began studying underlying causes of rejected glass, we found that the same scratches and rubs that were rejected on soft-coated glass were present on our uncoated glass. We began to work on the underlying processes and have noticed a marked improvement. We learned what PPG [Industries, www.ppg.com] had always told us—that handling soft-coated glass will make us better at handling all types of glass."

In addition, because most glass fabrication is custom, or involves mass customization, the process is susceptible to errors in size, features, locations and assembly. For example, the possible practical combinations for insulating glass can easily be in the hundreds of thousands.

All employees at Vitrum are responsible for ensuring quality products enter and exit their work station, says Gemma Martini, CEO. In this photo, a Vitrum employee inspects the glass for scratches or coating defects as it passes through his work station.





Left: Scanning and quality-control equipment, like the SoftSolution LineScanner, detect glass defects, helping to keep bad glass from getting to customers and stopping companies from adding any more value into the glass if it is already defective. A modified version of the pictured scanner is sold in North America through Fenetech as the FeneVision LineScanner. **Above:** A glass edge chip detected by a scanner.

Cost concerns

The cost of poor quality affects glass fabricators in several areas. There is the cost of glass problems caught inside the plant, the rare defects that make it to the field, incomplete or late orders, and the cost of a lost customer and bad word of mouth.

Fabricators can calculate the scrap cost. However, it is more difficult to calculate lost fabrication costs—the cutting, tempering, laminating and assembling production time and material that is lost when a problem is discovered. It is cheaper to catch a defect sooner, when offloading a glass shipment or right at the time the defect occurs, rather than when loading for delivery.

Remakes cost Vitrum up to three times as much to fabricate as the original in flow, Martini says.

The cost of a late delivery, however, can be much greater. Commercial construction projects are competitive and have tight deadlines. Wickham and Martini agree they would rather damage a little more glass in production than miss a deadline.

“What customers really want is to receive their product on time without errors or quality issues,” Martini says. “Things can get very stressful on site with tight deadlines. If we provide

them with the service and quality they need to get their job done on time without headaches, they will want to partner with us again.”

Likewise, Wickham says customers complain most about late shipments. “It is the surprise on delivery day that we must avoid. It puts our customer off schedule. ... When you can’t make a shipment, it is a big negative. We see every job as an opportunity to set us apart by delivering on schedule.”

Solutions and possibilities

While the North American fabricators who participated in Fenetech’s survey said they scrap 4 percent to 10 percent of their glass, European fabricators report a much lower scrap rate, some as low as 1 percent. How are these 99 percent yields possible? They’ve invested in automation that reduces human touches, a trend that is spreading across Europe and gaining traction here.

“A 1 percent to 1.5 percent scrap rate is a very common achievement over here,” says Christian Krenn, sales director, Fenetech Europe. “Labor and fuel costs are much higher in Europe, so even a 5 percent reject rate would not allow a company to be profitable.”

Like in the United States, the market downturn of 2008 left

European fabricators scrambling for fewer projects. Quality emerged as a significant differentiator.

“Fabricators started doing whatever they could to provide high quality product and lower the risk of customer claims,” Krenn says. “This started the evaluation process for quality-control equipment. When money became available in the past two years or so, they started to invest in inspection and touchless processes.”

Several North American fabricators—such as Vitrum and ITI—have started to make advancements to move toward the European model, and to work to achieve higher yield rates.

Fabricators don’t have to invest in equipment, or rearrange their plant to improve quality or yields. One simple step is increasing awareness—educating employees at the management level and on the shop floor about quality issues and how improvements will benefit the company.

Communicating openly with production employees about quality concerns reduced ITI Glass’ scrap rate significantly, Wickham says. The topic of quality is on the agenda at every daily management meeting for the company, he adds.

“I talked with each shift individually to shine a light on the issue, stating that

Factory floor



reducing the amount of glass we dispose of is an opportunity for everyone to make more money," Wickham says. "I pointed to our recycling dumpster, stating that close to 50 percent of its contents were due to handling and processing rejects. They all got it, and we noticed immediate improvement."

Software upgrades can also help reduce and identify problems in the process. ITI and Vitrum have both replaced aging production software with the FeneVision ERP system that provides better information regarding what is happening in a facility.

"We realized we did not have good enough data on our production and our rejects," Wickham says. "Our intention is to cut our scrap rate in half. To do that, we have to continue to be better at understanding where our issues come from. ... [With the ERP system], we can see the source [of the problem], which can be a process as often as a person.

"Now we cut glass sooner and handle it less," Wickham adds. "We're able to schedule, spreading out work within a shift, so more work is routine rather than rush.

Rush work is inefficient, more costly, with more opportunities for error."

Martini says Vitrum focuses on what it can control, "our processes, the constant training of our teams, our quality inspections and data retrieval, and our response to quality issues that arise."

Like ITI, Vitrum is big on data and looks for ways to reduce handling. "Everyone in our company is responsible for quality. We look for trends in our quality reports so we can focus on the particular areas that have increased defects."

Another step to increasing quality is the addition of scanners and other quality-control equipment. Neither ITI nor Vitrum has yet invested in automated quality-control equipment like scanners, but they are considering them for the future.


According to Krenn, the progression toward this equipment is natural. European fabricators have improved their awareness and yields, and have recognized that scanning incoming glass is a key area for quality improvement, he says.

Quality concerns are costing glass fabricators significantly.

An employee at Intigral Inc., an insulating glass fabricator in Walton Hills, Ohio, completes a post-tempering scan on a lite of glass.

Improvement begins with a willingness on behalf of management to invest in trying solutions.

"Quality is very important to our customers, and very important to us at Vitrum as well. No quality equals no customers," says Martini. "Better processes, efficiencies and quality make our customers happy and positively impact our bottom line."

For Wickham, "It's not good enough to be no better than anyone else. The past five years brought home for us that we have to continue to get better or our competitor will. We have to improve. We want to compete on value and performance, not price. Quality is vital." 

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