

Improve Safety
& Efficiency in

Glass Manufacturing With Robotics

Handling large, delicate, and often heavy flat glass panels presents a unique set of challenges. This guide explores how advanced robotic automation enhances safety, optimizes efficiency, and ultimately drives competitiveness for glass manufacturers looking to stay ahead in a demanding market.

How Dangerous is Glass Manufacturing?

Nearly **4 in 100** workers (3.6%) in the glass industry sustain recordable injuries per year — more than those recorded in chemical manufacturing and construction.



Why Robotic Automation for Glass?

Robotic automation for glass is a highly complex process that is often reserved for elite robotics professionals, leveraging robotic precision to improve operations and, ultimately, profitability. When you dig deeper, a robotics solution can do much more.



EASE LABOR SHORTAGES

Like many industries, glass production facilities struggle with labor shortages. The challenge is compounded by the strenuous nature of the work and the inherent safety risks of glass handling. Filling glass-handling positions is extremely difficult, and keeping them filled is just as challenging.

Two or more human workers are often required to load and position panels onto a production line conveyor. Additional labor is required to move glass panels onto or off harp racks and package them into boxes for transport. **Robotic automation helps complete many of these tasks to ease labor shortages and help drive their culture.**

Organizations can reassign workers to more fulfilling work that is safer, less strenuous, and will keep them on the payroll longer.



ENHANCE SAFETY

Not only are tasks highly repetitive, leading to ergonomic strains, but large panels are heavy, weighing more than 1,000 pounds each. Companies also need to invest heavily in proper personal protective equipment (PPE) like Kevlar suits and other gear to ensure workers are protected from broken glass and sharp edges.

Properly designed robotic automation solutions practically eliminate injuries by performing dangerous tasks like lifting and moving flat glass without human interaction.

[VIEW THE JUMBO GLASS HANDLING SUCCESS STORY](#)



IMPROVE PRODUCTIVITY

Automation can also increase productivity, reduce scrap/breakage, and deliver significant ROI over time. That said, some systems aren't designed to boost production and are implemented purely to ensure the safety of a workforce.



TYPES OF GLASS SUITABLE FOR ROBOTIC AUTOMATION

- Flat or float glass
- Insulated glass
- Tempered and untempered glass
- Solar panels, windows, doors, and large architectural applications

Other production, like glass used for electronics, is also automated but may not require the robust safety features often used for industrial applications like architectural glass.

Glass Automation Challenges

Robotic end-of-arm tooling with vacuum grippers is used to pick up glass. While this may seem straightforward because glass is nonporous, multiple scenarios must be skillfully designed and engineered into the tooling to ensure accuracy.

Major challenges need to be anticipated, including the following:

CHALLENGE 1



BROKEN OR ASKEW GLASS IN THE STAGING AREA

If a robot is not programmed to anticipate an unexpected parameter of where it “thinks” the glass is, it may crash into the glass, breaking it. Likewise, if a robot is programmed to hold a piece of glass in the middle but in reality, it’s holding it on the edge, the **extra weight on one side and the overhang** may cause it to crash into the conveyor.

3D vision technology and sensors are programmed to overcome such challenges.





CHALLENGE 2

VARYING SIZES AND THICKNESSES

Another issue is the **pressure applied by the vacuum grippers**. Because glass is fragile, precise calculations and zoning are required to ensure that the vacuum cups have just the right amount of suction to pick glass — too much suction and the glass could crack or break; too little and the robotic arm could drop it. Engineers must determine the number of cups per square inch based on a variety of glass sizes and thicknesses and **ensure the silicone vacuum grippers aren't ripped or cut** when coming into contact with the edges of the glass.



CHALLENGE 3

STATIC BETWEEN SHEETS OF GLASS

Static can also occur, causing the glass panels to stick together. Robotic arms need to accommodate for such a scenario and be programmed to identify the issue based on expected weights and positions.

Glass handling by a robot is no small feat. A robot's movements must be programmed to anticipate every possible scenario, stressing the importance of relying on an experienced team of robotics integrators with a proven track record in the industry.

DEMAND A3 SAFETY CERTIFICATION

Ask your robotics integrator whether they've earned their A3 certification, proving **they've gone the extra mile** and take safety seriously, not just in their own facilities, but in yours.

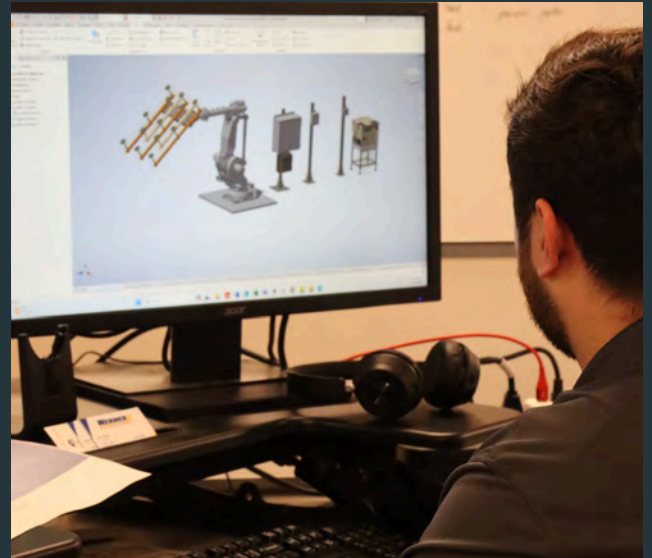
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CERTIFIED
Robot Integrator

Glass Production Robotic Automation Opportunities

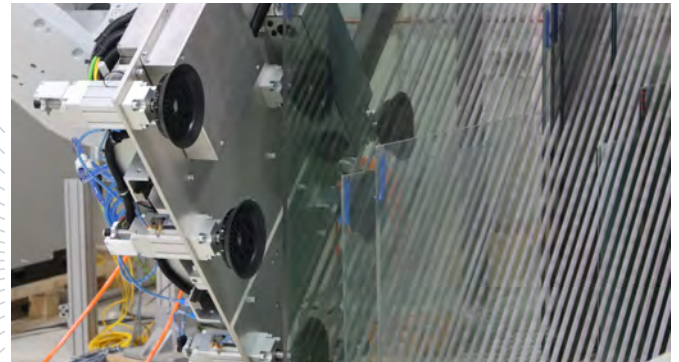
Several stages of the glass production process can be automated with robotics integrations, reaping many benefits for glass manufacturers.



GLASS LINE LOAD

Glass line feed systems automatically take flat glass from a rack, box, or carton and maneuver it onto a conveyor for further processing without breakage or human handling.

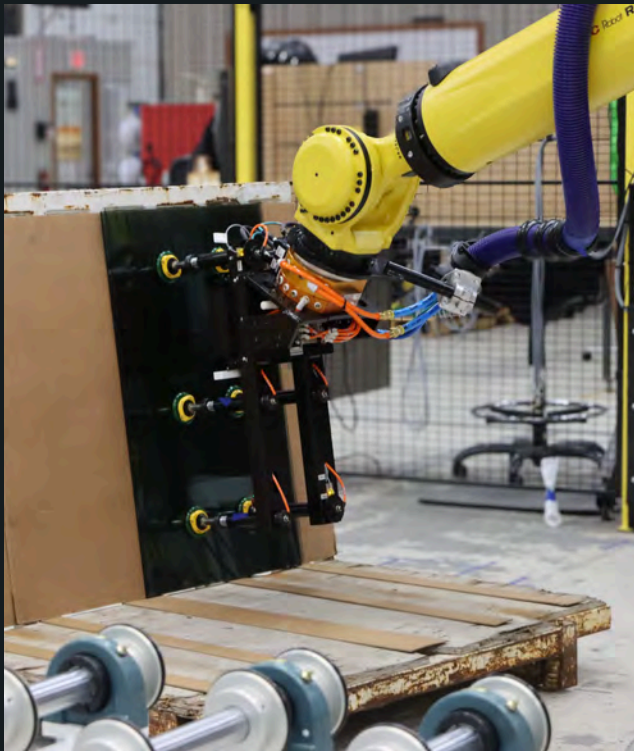
Glass panels can measure up to 8-ft. x 12-ft. in size and are often stacked vertically. A robotic arm with specialized vacuum tooling must grasp the glass, lift, and turn it horizontally onto a conveyor.



UNLOADING & HARP RACK PACKING

Parametrically programmed solutions and proprietary 3D vision robots pick glass sheets and assembly components from a production line, autonomously placing them into a slotted or harp rack.

Placing glass into a slotted harp rack has traditionally been performed by humans who can place items with precision, but it's one of the biggest safety hazards. Robots are parametrically programmed with 3D vision technology to pick flat glass from a conveyor and autonomously place it into position on the rack.



Glass Boxing — End of Line

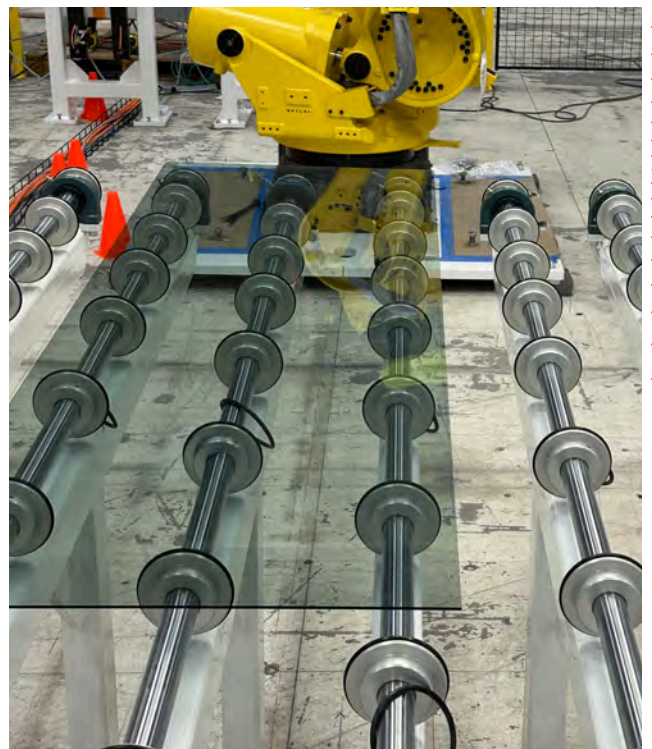
Packing of glass into boxing intended for transport requires extensive care. Automated end-of-line boxing and crating robots precisely and safely place glass into boxes.

Many applications require protective interleave paper to be placed in between each sheet of glass to protect the plates from abrasion and breakage. Additional robotic arm tooling must be engineered to handle this more porous material and work in conjunction with the glass-handling robot.

Advanced Conveyors

Automation isn't always about robots. An experienced automation partner like QComp can also design, manufacture, and integrate proprietary conveyor systems with turntables, inspection, marking, and other equipment to complete your robotic glass handling processes.

Pairing the robotic arms with the conveyor system is critical, especially for picking float glass from the tin side. The robot must handle glass from the bottom with a finger tool that protrudes through the conveyor system and must be perfectly aligned.





Automating glass manufacturing processes with robotics improves safety, efficiency, and productivity. For expert guidance in automating your glass production line, contact QComp. Our team of engineers, programmers, and automation experts has mastered glass automation and specializes in designing and implementing cutting-edge robotic systems tailored to your unique glass needs.

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We conquer complexity.



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