

SOLUTION

Robots help bring high quality hand-crafted ceramics production back to Stoke



An automated production solution built by ABB Authorised Value Provider The Automated Technology Group (ATG) featuring four ABB robots is helping a Stoke-based ceramics producer to produce high quality flagons to a hand-crafted finish. Used as part of four production cells, the robots have helped to increase output and reduce scrap product by helping to speed up flagon production whilst ensuring improved quality and consistency.

— Robots help ceramic flagon manufacturer to achieve the best of both worlds by enabling high quantity production with a high-quality finish

Originally founded in 1810, Wade Ceramics currently operates two production sites, with its site at Bessemer Drive in Stoke specialising in the production of flagon containers used by several premium-brand alcoholic spirits manufacturers.

The company produces up to 80,000 flagons a week, including both refillable and non-refillable versions. As well as standard bottle designs, it also produces containers to its customers' specific requirements, with past and current designs including fish, dogs and even mermaids.

Just like any hand-crafted product, production of the flagons is an intricate process. Every flagon passes through multiple stages, starting with it being cast in clay and ending with decoration and inspection of the final glazed product prior to packaging and despatch. Every flagon is fired twice in the company's two kilns; first after the casting and fettling stage and again after the application of the coloured glazing that gives each flagon its distinctive finish. At every stage, each container needs to be produced to the tightest possible tolerances to ensure it meets the company's strict quality standards.

"The flagons we produce need to reflect the values of the luxury brands we deal with," says Stuart Shickell, Head of Engineering for Wade Ceramics. "Even the slightest imperfection, whether it is the width of a bottle neck or inconsistencies in the colour or glazing, can result in one or more products being rejected. As each flagon takes between 16 to 20 hours to produce, we were keen to minimise the risk of any problems occurring during our manufacturing process."

As one of the last surviving ceramics companies in Stoke, Wade Ceramics has been no stranger to change. Originally offering around 50,000 products in its portfolio manufactured across three sites, the company took the decision in 2000 to slim down its product range to focus on decanters. In 2010, the company opened its current factory at Bessemer Drive, with new machines and kilns. With increasing production demands, Wade Ceramics was keen to find ways to improve production by further automating its production line.

Installed in Christmas 2016 during a two-week production shutdown, the automated system supplied by ATG has helped Wade Ceramics to increase production and overcome several issues that had previously affected manufacturing output and product quality.

One of these issues related to the positioning of the flagons prior to the first kiln firing. Flagons placed too closely together sometimes became fused during the firing process, resulting in them being rejected for scrap.

This issue has been overcome by two robot cells featuring ABB IRB1600 robots positioned on the in-feed to the first kiln. Each cell includes a vision system that locates each flagon as it is conveyed to the kiln infeed and ensures it is correctly positioned to prevent it fusing together with other flagons during firing.

Another issue concerned inconsistencies in the glazing around the base of the flagons. Applied as a powder coating, the glaze gives each container its distinctive colour. To meet Wade Ceramics' high product quality standards, the glaze must be evenly applied over the complete surface of every flagon. Previously, imprecise wiping after the application of the glazing powder was causing some of the powder to be removed from the bottom of the flagons, resulting in an uneven finish.

To tackle this, ATG developed an additional robotic cell incorporating an automated 'foot wiping' system which helps to ensure precise and consistent wiping of the flagon base without removing the glazing powder. The cell uses an ABB IRB2600 robot, which picks up each flagon before wiping its base on a rotating cleaning mat and then passing it to the conveyor to the second kiln. Developing this solution was not without its challenges, as Simon Miles, Applications and Proposals Manager – Systems Division for ATG explains:

"One of the biggest hurdles in developing the foot wiping cell was the need for the robot to be able to keep pace with the powder glazing machine. To keep everything perfectly synchronised, we needed to get the whole foot wiping process done within a target Takt time of just 16 seconds."



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To achieve this meant not only getting the products to the robot from the glazing machine, but also making sure that the flagons were properly tracked when they arrived at the robot and when they were arranged on the Kiln batts located on the outfeed conveyor to the second kiln.

"Getting the process exactly right involved extensive testing to arrive at the best set-up that would allow the cell to operate at the maximum speed," says Miles. "To enable the robot to stay within the target Takt time, the system tracks the position of the flagons as they enter the foot wiping cell to allow the robot to squarely pick up the flagon. Similarly, once the flagon base has been wiped, the robot places the finished unit in a specific location on the kiln batt on the outfeed conveyor, enabling it to get into position to accept the next flagon as quickly as possible."

An added complication was the need for the cell to also include an extra step required for non-refillable flagon variants, which requires the robot to remove a temporary shield plastic cap from the top of the flagon on exit from the glazing machine and prior to placement onto the kiln batt.

The thorough testing carried out by ATG, together with the accuracy and speed of the IRB2600 robot, means that both the foot wiping process and removal of the plastic caps for non-refillable flagons can be comfortably performed within the 16-second window. Not only that, but the improvements delivered by the robotic foot-wiping process have meant that the flagon reject rate has now fallen to just 1.5 percent.

The value of prior preparation

With Wade Ceramics running its production 24 hours a day, seven days a week, and with little spare space available at the factory, the complete automated system, including the four robot cells, had to be built and tested at ATG's Northampton site. Working in conjunction with Wade Ceramics' engineering team, the system was extensively tested to help ensure it would be ready for operation with the minimum of disruption once installed at the company's Bessemer Drive site.

"The complexity of this project, coupled with the need to get the automated system up and running as quickly as possible once it was installed, meant carrying out thorough testing to ensure any problems were ironed out," explains Simon Miles. "As a result, we were able to install everything on site within Wade's two-week Christmas shutdown in 2016, with production being ramped up as the system became fully operational."

The company's ability to maintain a high production output without compromising the quality of its products has given it a key advantage over its competitors, which has been greatly enhanced by its use of automation. "The methods that we use, together with the design of our production process and the improved performance achieved through our use of automation, enables us to produce around 3.5 million flagons per year, more than any of our competitors, whilst maintaining the very highest standards of product quality," concludes Stuart Shickell.