

Quadra USA, Inc, Phoenix, Arizona 85004, USA

# Fully customized and automated cubing of concrete products

Basalite, a subsidiary of Pacific Coast Building Products has become one of the largest suppliers of concrete masonry products in the western United States. Active for more than 40 years in the industry, Basalite provides an extensive range of products that attract homeowners, architects, landscape architects, engineers and contractors. Basalite provides complete product lines including structural block, interlocking paving stones, wall systems, ornamental and garden products with customized shapes, sizes, colors and finishes, and are renowned for their durability, sustainability and beauty.

This focus on customization and quality led Basalite to the equipment manufacturer Quadra. Having opened its US subsidiary in 2016, Quadra USA Inc committed to study and understand the products and manufacturing processes for concrete products in the US. Now Quadra USA Inc has full time dedicated technical staff and sales team as well as local spare parts inventory.

After a visit to France to see Quadra's headquarters and several Quadra block plants in operation, the Basalite team were impressed by the technical solutions provided by Quadra in terms of the block machine, handling solutions and robotic cubing systems. One of the brand leaders in France for more than 20 years, Quadra supplies fully automated production plants, typically supervised by only one operator, without any



Products manufactured by Basalite

manual operations. These were exactly the kinds of solutions Basalite was looking for.

For the new cubing line in Dupont, Quadra designed something completely different than any other solution available or currently being used in US plants today. In order to create a fully automatic solution, with only one person on the line for quality control, Quadra designed a line with 3 robots and several product conveyors and pushers. This solution requires no hydraulics, drastically reducing maintenance costs, and uses only electric and pneumatic power. This innovative robotic solution allows Basalite to achieve cycle times to keep up with the fastest machine cycle as well as multiple product changes throughout the day, automatically. The system holds over 200 product programs that can be changed at the control panel by simply choosing the product to be cubed.



Complete new cubing line with three robots, conveyor system and splitter



Depalleting robot Kuka KR700 4-axis, with pneumatic clamp designed and manufactured by Quadra

**State-of-the-art handling system**

The new cubing line consists of three Kuka robots, various conveyors and pushers and a splitter. Cured products travel on the pallet return conveyor towards the new cubing line. Two depalleters were replaced by one removal robot. The removal robot moves the products off the pallet to a grouping

table based on how that particular product will be cubed further down the line. It can take the products from one pallet, certain products from two different pallets, or all the products from two full pallets. This Kuka KR 700-4axis robot is equipped with a pneumatic clamp designed and manufactured by Quadra. The robot loads the slat conveyor that moves the products to the first pusher.



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21-25 Nov 2018  
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*Splitting waste is removed by a waste conveyor belt*

For the many products that Basalite needs to split, the pusher feeds a splitter that can roll in and out of line on tracks as needed. After the products are split, any waste drops on to a conveyor which carries it away from the line in to two waste bins for removal and recycling.

After the splitter, the products then move to a conveyor that, depending on the product, can move the product in a walking beam style or push them. The pusher has two paddles which can alternate, preparing products with angled sides properly for the next robot.

The products then arrive at a pattern making robot designed for regrouping and preparing the product for the final regrouping robot. This robotic solution provided by Quadra is customized in order to arrange the correct pattern for each one of Basalite's products. Most products need to be turned and repositioned to prepare the tier properly. This robot has pneumatic clamps like the other two robots and can handle each block individually if necessary, but also has a vacuum to move units like solid caps if needed. These are the primary



functions of this Kuka KR240 6-axis robot. For standard block and some other more traditional products, this robot is not used.

Finally, the products are moved on a conveyor by a pusher equipped with a clamp. This groups the products together and moves them to the palletizing robot. This robot, a Kuka KR700 4-face 4-axis robot groups the product in a tier and moves them to an elevation table, and finally sets them on top of the cube. Once a cube is complete, it moves to a hooper on the exit conveyor. The same robot then picks up the next wood pallet and places it on the exit conveyor for the next cube.

Over 100 automatic programs were created for the more than 200 products the line will cube automatically. Each program from start to finish is designed based on the product dimensions and how those products end up cubed on the pallet in the yard. This is a customized cubing solution for a complete range of products with different shapes, sizes and heights, as well as many different cubing patterns, often defined by Basalite's customers.



*Kuka KR240 6-axis robot for pattern making and KR700 4-axis palletizing robot*



*One example of cubing pattern*

Basalite and Quadra collaborated closely and worked through the details of how every product is cubed in order to design the cubing line properly. Basalite visited the Quadra factory once the equipment was manufactured to see how it would function before being shipped for installation. This was an extremely successful partnership for both Basalite and Quadra as both companies worked together during the planning, design, assembling, testing and commissioning processes. Both Basalite and Quadra are quite satisfied with their first project together.

**Conclusion: Automation, Speed, Reliability and Reduced Maintenance**

Reliable and efficient, the automation of Basalite Dupont's robotic cubing line leads to a significant speed of operation, productivity, lowers labor costs and maintenance costs.

Quadra has decades of experience in automating all processes for concrete products manufacturing. The Basalite project is a successful solution for cubing all the products produced in the US market, both in terms of how to move the product through the line as well as creating the final cube on the pallet.

The complete line was designed and developed to be supervised by only one operator. The human intervention required is for quality control, and the production rates are efficient and consistent. ■

FURTHER INFORMATION



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