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Case Study

Queen City Candy puts high growth segment of candy manufacturing in the bag with help from Bosch, Siemens

Executive summary

Entering the candy manufacturing business – a tale of challenge and victory

The [IBISWorld 2016 U.S. Candy Production Market Research Report](#) offers unembellished insights into the business and operational challenges of becoming a candy manufacturer in the United States today. Here are just a few of those challenges:

It is moderately difficult to enter the candy production industry. A sufficient amount of capital is needed to operate. More importantly, the industry is heavily regulated by the Food and Drug Administration with respect to content, safety, packaging and labeling standards. In addition, entry requires guaranteed access to raw materials. This may be difficult in the absence of established relationships with upstream markets.

Although Queen City Candy was not new to the U.S. or global candy markets, these factors and many others gave the company a lot to chew on while making its decision to enter the candy manufacturing industry. A family-owned company, Queen City Candy had already invested nearly 35 years in building a thriving business in candy and confections – as a buyer, packager and reseller of top retail candy to customers throughout the world.

Over the years the company expanded its footprint, services, in-house capabilities and clientele, and its made-in-America product line became extensive. Queen City currently offers fruit slices, double dipped peanuts, chocolate covered raisins, caramels, spice drops, crème drops, gummies, jujus and other confections. The facility has been awarded numerous times for cleanliness and safety.

The drive to manufacture was borne out of necessity and desire to grow

Queen City Candy's decision to enter manufacturing was many years in the making, driven in large part by supply chain and product delivery delays that often left the company scrambling to find other suppliers to meet demand. Delays progressively impacted the company and its performance. Queen City recognized that producing some of its own products would not only alleviate supply chain issues, but would also allow the company to seize on the high growth potential in one of its top lines – the gummies and jellies segment.



Partnering with Bosch Packaging Technology and Siemens, Queen City Candy commenced candy manufacturing in 2015. This is the story of how the company bucked the trend of U.S. confectionery companies moving outside the country to take advantage of sugar prices on the world market – and the success of a rare factory startup in the United States.

The Customers

Queen City Candy: Founded in 1983 and based in Greendale, Indiana, Queen City Candy is a full-service candy company specializing in candy manufacturing, custom packaging, private labeling, wholesale distribution and retail. Having served as a buyer, packager and reseller of a wide-ranging selection of candy and confections for more than three decades, the company in 2015 began manufacturing many of its own products, including gummies, jellies, fruit snacks and nutraceuticals. Queen City Candy's state-of-the-art facility holds approximately five million pounds of candy and supplies over 1,000 customers worldwide.

Bosch Packaging Technology: Based in Waiblingen, Germany, Bosch Packaging Technology is one of the leading global suppliers of process and packaging technology. The company provides complete solutions for the pharmaceutical, food and

confectionery industries, complemented by a worldwide service and sales network and a comprehensive after-sales service portfolio.

The Challenges

Taking the leap into manufacturing

On multiple occasions throughout its history, Queen City Candy either lost a main supplier of gummi and jelly confections, or experienced major delays in receiving products. This resulted in short-shipping or delayed shipping to customers. Quality was also an issue. Product quality varied from supplier to supplier, and sometimes between different lots from the same supplier.

To gain control over the consistency in availability and quality of its gummi and jelly product supply, Queen City Candy decided to enter the world of candy manufacturing. The backbone of what the new products would look and taste like was of utmost importance. "A manufacturer can sell a confectionary product once if it looks good, but they won't sell it twice if it doesn't taste good," said Vince Klee, Founder and President of Queen City Candy.

Intense scrutiny would also be given to selecting manufacturing equipment and associated technologies for the new plant.

Starting from scratch: The creation of a state-of-the-art confectionery kitchen

Having never made a pound of candy, Queen City had to construct an environment and work platform that would accommodate its new kitchen, starch mogul and other equipment required to manufacture gummies and jellies. To create a space that would enable the company to exceed current supply and customer expectations, Queen City added 10,500 square feet to its facility. The initiative would also require hiring new leadership and production staff.

Operational challenges and priorities

- Consistently deliver high-quality, fresh and safe product
- Create a repeatable process
- Introduce systems and processes that are understandable to personnel on the floor
- Install systems with the capacity to keep hoppers full of product, canisters full of flavors and coloring, and deliver product day in and day out to meet demand

Implementing standards and controls for safety and quality

While transforming its business and operations to include manufacturing, Queen City Candy would also complete the rigorous, year-long process of obtaining Safe Quality Food (SQF) Level 2 Certification, based on stringent government and global industry food safety requirements. Internal standards, protocols and controls for safety and quality would be implemented in Queen City Candy's manufacturing systems and processes.



“Bosch and Siemens certainly met our expectations, and the outcome has been much more substantial and rewarding than we thought it would be.”

The Solution

Queen City Candy purchased a complete Bosch confectionery production line integrated with Siemens PLC and HMI technologies to gain control over its gummi and jelly product lines and improve quality. The components include both confectionery kitchen equipment and a starch moulding machine (mogul), a combination not offered by other machine manufacturers. Bosch designed and installed the equipment with three major functional areas: the kitchen, a starch mogul and a curing room – with supporting equipment required to produce products onsite.

“The kitchen is complex. It employs the latest available technologies from Bosch and Siemens, for this industry,” said Robert Dono, National Sales Manager Confectionery, Bosch Packaging Technology.” The kitchen’s three major components are individually controlled by Siemens PLCs. One component controls the weighing of base mass ingredients, another handles the pressure dissolving (cooking) process, and the third handles post-cook processes.”

“Choosing Bosch as a single provider for all systems was attractive to Queen City as a one-stop source rather than two manufacturers for mission critical equipment and process controllers,” said Anthony Habib, global consultant and head process engineer for the Queen City Candy integration. “Bosch’s use of the Siemens technology platform, with its global acceptance and simplicity, was a defining factor. And we liked the attentiveness Bosch showed in response to our Request for Proposal (RFP), by answering our questions and fully exploring our needs.”

Products and solutions used in the configuration

Bosch products used in Queen City Candy’s continuous cooking of gummies and jellies include the Bosch/Makat Starch Mogul,

model HLM 35 RS. This high-speed starch moulding plant is controlled by servo-electrical individual drives, so that all courses of movement can be adjusted to Queen City Candy’s requirements. The product offers the safety standard and precision desired by Queen City Candy.

Bosch offers gravimetric and volumetric weighing, dosing and mixing systems with a capacity of processing more than 10,000 pounds per hour. Queen City was replacing approximately seven million pounds of product they were buying per year, so there is current and long-term capacity.

Solutions from Bosch also include the BLS 0500 for the dissolving of gelatin and pectin, and the BDS 6000 AB Gravomat for base mass batch weighing. The BLK 5000 BR Rapidsolver with vacuum is used for dissolving (cooking) under pressure, and the BMG 0010 A 6-Station Gravimetric Dosing and Mixing Line adds colors, flavors, acidulants and fruit juices.

Siemens technologies include the SIMATIC ET 200S PLC, three of which are deployed in Queen City’s complex kitchen configuration. The highly modular I/O systems are precisely tailored to Queen City Candy’s automation tasks. The controller was chosen for its small footprint, capacity and efficiency in controlling all processes, as well as high performance with a PROFINET or PROBIUS communications network, and greatly reduces wiring requirements.

SIMATIC HMI Comfort Panels from Siemens, including the TP1900 19-inch and TP1200 12-inch widescreen display models used in the Queen City configuration, are designed for high-performance visualization applications at the machine-level. The panels provide rich functionality and numerous integrated interfaces for the greatest convenience. While the HMI interfaces are different between the major stations in Queen City’s manufacturing plant, the look and feel of the devices are the same, giving employees a reliably consistent experience.

Tracking of product and performance

Another key function for the manufacturing startup was Queen City's development of a custom enterprise resource planning (ERP) system to audit product planning, inventory management, shipping day and time of production, raw materials consumed by lot number against manufacturing orders, and other critical production, operating and performance functions. Queen City Candy works with Bosch and its local IT expert to get data from the Siemens HMI.

Adjustments and improvements are easy and fast

"Once we had programmers and technicians onsite during implementation, they showed more flexibility than we expected for changes in programming to better serve Queen City's needs," said Habib. "Siemens technology made it easy to program and integrate adjustments and have different systems talk to one another. This simplicity, including for required system maintenance and troubleshooting, will extend over time with Bosch's ability to remotely and securely tunnel into the Queen City system. If Queen City identifies something that might work better, they simply send a request to Bosch and their programmers will tweak the program."

The Results

Exceeding expectations coming out of the gate

Starting up was a much cleaner implementation than Queen City Candy expected. They poured the concrete floor in June of 2015 and started making candy in October, their busiest season. "We worked around the clock to get top product on the market with new employees and technology," Klee said. "We were pleasantly surprised when initial targets were met or exceeded after our second run, achieving everything we set out to do."

Queen City Candy now produces approximately 60 percent of what they sell, and it's growing. "We're making jellies, gummies and jujus, each with different processes and curing cycles. The versatility of our equipment and technology gives us the ability to make a wide range of products with minimal dollars spent towards tooling," Klee said. "Initially, the number of items we produced was less than 10, and we've continually added new formulas and products. Our ability to expand over time will remain robust. Bosch and Siemens certainly met our expectations, and the outcome has been much more substantial and rewarding than we thought it would be."



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