

BAKING & SNACK

A SOSLAND PUBLICATION

JUNE 1996

WHAT'S POPPING WITH POPCORN

PACKAGING TECH TRENDS

ADDING EMULSIFIERS

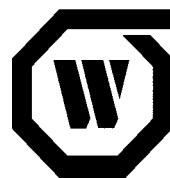
CHIP PROGRESS

Better Bun Baking

*Multi-Marques' new
bun plant is fast and flexible*

*Bun packaging rolls along
with new equipment*

Since 1919



**I.J. WHITE
SYSTEMS**

"Putting Innovation Into Motion since 1919"

BREAD AND ROLL COOLING

PEAK EFFICIENCY

Multi-Marques named its large 5 1/4-in. specialty bun *Le Gros* — French Canadian that translates roughly as “Da Big” or the big one. It’s a name that also suits the company’s new bun plant. In capacity and capability, the new bun operation truly is “the big one.” And while Quebec satisfies its new passion for barbecue sandwiches with Multi-Marques’ big buns, the bakery’s new bun plant positions the company to expand its supermarket and food service business.

The bakery designed its bun mixing, makeup, proofing, baking, spiral cooling, packaging, controls and scheduling systems for peak efficiency when making retail cluster buns and hot dog rolls but with enough flexibility to produce food service, niche and short-run items.

The new bun facility, a C\$20-million (US\$14.4 million) expansion of the company’s 250,000-sq-ft bakery at Laval, Que., in suburban Montreal started up this spring. The showcase bun line employs a robotic pan system — the first of its kind — to keep up with twin high-tech bun makeup systems, and dual spiral cooling systems. Output can climb as high as 1,500 pieces per minute, depending on variety.

Now swinging into three-shift, 24-hour operation for the summer months, the bun line completes the third phase of Multi-Marques’ plan to upgrade wholesale manufacturing operations in Montreal, its headquarters city. Investment to date totals more than C\$50 million (US\$38 million).

“We have to be high-tech to be competitive in this market,” said Gerald Pelletier, president of Multi-Marques, Inc., about corporate choices that created the Laval bakery.

AVOIDING LIMITS. Six years ago, Multi-Marques executives saw changes coming in

Quebec’s wholesale baking industry. They made manufacturing and distribution plans to meet the forces of plant consolidation and competition. They also wanted to offer their customers fresher products and operate at the lowest cost possible.

The first decision was to centralize distribution for Montreal-based operations. An industrial park in Laval, a fast-growing suburb just north of Montreal, offered the best logistics. The first phase, the new distribution center with more than 100 docks, went

on-stream in 1988. Then the company expanded Laval by opening a 86,400-sq-ft bread plant in 1992 capable of baking one million loaves a week (see June 1994 *Baking & Snack*, page 8).

Buns were next.

When planning the bun line, Pierre Samson, Multi-Marques’ vice-president of engineering, and his staff faced a difficult design problem. To achieve peak efficiency for high-volume items, equipment speeds would approach operating limits just to



[Above] I.J. WHITE COOLING SPIRAL. Buns are uniformly cooled on a continuous belt.



Multi-Marques opted for two I.J. WHITE SPIRAL COOLING SYSTEMS to efficiently handle the high volume of buns it bakes.

handle current volume.

“The main idea on plant design was to make production of cluster buns and hot dog items as efficient as possible,” Mr. Samson said. “So we sized the oven and proofer for those two products. The other items can be done at slower speeds.”

Two bun makeup systems would be required, with a combined output that could exceed 250 cuts, or 1,500 buns, per minute. While the oven and proofer could run at this rate and higher, post-baking operations would be pushed right to the edge. One cooling line could carry present volume, but it would have to run “all out” all the time, eliminating the opportunity for future growth. Potential service life of the equipment would also be shortened.

Mr. Samson opted to split post-oven operations. Two depanners, two pan return lines and two I.J. WHITE COOLING SPIRALS create twin lines. Now conveyors could be run at variable speeds for better performance and longer life.

“With variable speed, you don’t have to run spirals always at maximum,” Mr. Samson said, noting that different pans require different line speed. “You don’t have to rush the pans or risk pan damage.

“This way of operating adds a lot of flexibility. We can run the high-speed items but be flexible for variety items.”

RENEWAL PROGRAM. Sales for Multi-Marques, Inc. in 1995 totalled C\$260 million (US\$188 million). Based in Montreal, the company operates 13 bakeries in the province of Quebec and one in Ontario. Through distributors and strategic alliances, it also ships products throughout the Maritime provinces. While most products baked at Laval sell in greater Montreal, a region populated by nearly three million people, the bakery’s service radius extends 600 miles. Some items travel more than 1,100 miles to reach consumers — a longer distance than that separating Montreal from New York City.

Merger of two groups of wholesale bakers — Montreal-based Unipain and Samson, headquartered in Quebec City — formed Multi-Marques in 1984. A group of Quebec partners owns 75% of the baking company, and Corporate Foods Ltd., Etobicoke, Ont., has the other 25%.

“We’re working hard to rejuvenate our company,” Mr. Pelletier said. That effort extends both to plant facilities and staff. “Over the past few years, we’ve brought in experienced people and new blood. And we’re evaluating the performance of all our plants.

“We’re strong in private label and in national brands,” he continued, also noting that the Laval plant bakes most the buns

Multi-Marques supplies to its food service customers.

“Bread is relatively stable in its individual sectors,” he continued. “It’s the opposite with rolls. Burger and barbecue outlets are a growing market.”

Multi-Marques continually tries out new products. It introduced the big 5 1/4-in. *Le Gros* buns to capitalize on the current barbecue craze. Italian bread is another hot new product for the company. Niche products like these and a new round loaf introduced two months ago are important.

“We don’t want to see our market erode, so we’re looking for niche markets, too,” Mr. Pelletier said. “You can get premium returns on these, so that takes care of the higher production costs.”

Laval offered Multi-Marques a proving ground. This was the first time that the company built a new facility from scratch. For startup of the distribution center, Mr. Samson moved to Montreal from Quebec in 1987.

“We decided to do this work in stages. That’s a more conservative approach, and we’re happy with the way we went,” Mr. Samson said. “We learned from each stage of this project, and we made changes in the next phases.” He said that the slow approach also helped earn the confidence of both management and production. “It’s a

big job for everybody to do this much automation.”

To add bun production to Laval, the company extended the existing building by 48,000 sq ft, bringing the under-roof total to 250,000 sq ft on the 32-acre site. All the utilities that power processing equipment run under the floor.

“When we designed the plant, we put electrical connections under the floor to prevent putting in utility drops from the ceiling,” Mr. Samson said. “It’s far more sanitary to do this, but you have to know where each machine will be before you pour the floor.”

Multi-Marques completed its bun plant project on-time and within budget.

PLANT INFRASTRUCTURE. When Multi-Marques schedules bun, or *petits pains*, production at Laval, cluster hamburger buns and hot dog rolls each represent one-third of total output. Variety items, the other third, don’t require the same volume but are harder to run because of their many set ups and the operator knowledge required.

The bakery’s Reimelt system, installed with the 1992 bread line, supplies the bulk and minor ingredients for bun production, too. To gear up for buns, the bakery added another flour scale, a second pneumatic blender, two staging bins, extra blowers and piping. The blenders and bins serve either line, as required.

“We doubled our flour line speeds,” Mr. Samson said. Two lines with conveying rates up to 200 kg per minute bring flour capacity to 400 kg per minute, supplied from the existing single 75-tonne (150,000-lb) whole-wheat and two 100-tonne (220,000-lb) white flour silos.

A two-tank, glycol-cooled, 50,000-liter (13,000-gal) cream yeast system and two double-reservoir 25,000-liter (6,600-gal) tanks for high-fructose corn syrup and shortening handle bulk liquids for both bread and buns.

For buns, however, the bakery added a liquid brew system, consisting of two 3,500-kg (7,700-lb) tanks plus a heat exchanger and clean-in-place capability, which it shares with the cream yeast system. While the ingredient system supplies water, cream yeast and corn syrup to the liquid brew system, an operator manually batches the small ingredients. Each tank supports four hours of production through a recirculation loop to the mixer.

“We have three bun plants. The other two operate with water brews, so we stayed with liquid brew here,” Mr. Samson said.

Blended dry ingredients, liquid materials and fermented liquid brew meet at the ETMW #26 150-hp overtilt bun dough

mixer. Batches weigh about 2,700 to 2,800 lb and run every 18 to 20 minutes, although some items require smaller batches.

The bakery continues to staff its bun line with a mixer operator. “We’re trying to go fully automatic,” Mr. Samson said. “Bread doughs are 100% automatic. But bun doughs are more slack, more difficult to discharge on fully automatic mode.

“We asked Campbell Technologies to put the dough pump on a load cell,” he continued. When the wheel-mounted pump is in operating position, the legs retract upward, seating the pump assembly on the load cell. Weights read out in a panel mounted on the mixer. These measurements allow comparison of finished dough weights with the amounts of incoming ingredients.

The Camtech 3,500-lb-capacity transfer and degassing pump moves dough to the vertical dough transfer conveyor, which discharges it onto a reversing belt that alternately feeds the dough hoppers on the two Camtech Precision Bun Systems (PBS).

NEXT GENERATION MAKEUP. Bun makeup takes place under electronic control. The Camtech rotary divider senses internal operating pressure to prevent further processing of underweight dough pieces. When pressure levels move out of range, the divider head retracts, sending dough balls into the catch pan.

The PBS uses two peristaltic metering pumps instead of one to feed dough to the rotary motion cut-off. Mr. Samson credited the pumps’ sinusoidal design with gentle dough handling. The system’s jacketed dough developer is mounted within the machine. The table supporting the rounding section provides cooling for the belts, another quality control mechanism. Multi-Marques engineers and bakers tested two sets of rounder bars, one on each PBS, before making their final choice, a Teflon-coated design. A pneumatic lift raises rounder bars for cleaning, maintenance and belt changing operations.

Additionally, the bun system employs several new concepts for pan indexing. Zero-pressure rollers receive the bun pans from the pan return conveyor. Small, powerful bar magnets move pans into position to receive the moulded dough pieces with a synchronized, continuous motion.

PAN ROBOT. Multi-Marques chose a first-of-its-kind pan system. The Robocap by Emtrol employs two pick-and-place robots whose long, many-fingered arms stack and unstack bun pans. The robots pick up pans 10 at a time, carry them over to the line in-feed or back to stacking rails. Arms travel quickly to pick and carry, but they slow down when

about one centimeter above the stack or conveyor. Placement of the pan is smooth, quiet, gentle and straight.

The system stacks the pans onto skids consisting of parallel rails, configured to the exact dimensions of the pan. When in stacks, all the weight of the pan rests on its external rib, not the pan cups. Stacks can weigh more than 1,000 lb, yet pans stack high without stress or deformation. When stacks reach full height, an Emtrol shuttle cart removes the loaded skid and stores it. Multi-Marques now stocks nine pan styles for its bun lines, a total of 19,000 pans. At full capacity, the pan system will handle 25,000 pans in 12 styles.

Pans travel from the unstacker and through empty pan return conveyors, leading with their 8-across edge — the slow direction. At the PBS, they turn to run in the fast 6-across direction.

The pan system’s PLC tracks each pan. Conveyors that feed pans to the two PBS lines slow down or speed up to match the speed of bun makeup.

“We can control the gap between pans and feed pans, spiral coolers and packaging systems at proper speeds and exact rates,” Mr. Samson said. CADEC Automation built the controls for the liquid brew system, pan system and spiral cooler.

As filled pans leave the two bun makeup lines, they change directions 90° to enter the conveyor feeding pans one at a time onto carriers that will move them through the proofer. The conveyorized proofer carries buns through a 55-minute proof at 41°C (106°F) and 80% relative humidity.

Proofed buns pass through a Burford mandrel-style seeding/splitting station. With top treatment applied, they continue forward, entering the carriers of the Sasib/Stewart conveyorized oven. They bake for eight minutes at 270°C to 285°C (518°F to 545°F).

“We decided to split the product stream in two, so conveyors are running at effectively half speed,” Mr. Samson said. “It’s like two smaller lines, each at 700 buns per minute.”

After depanning, buns proceed to cooling, while pans recirculate on Rexfab pan conveyors to the two bun makeup systems.

Two I.J. WHITE COOLING SPIRALS installed in parallel handle bun cooling rather than a conventional overhead race-track system.

The bakery opted for 30-in.-wide spiral belts, wider than those available for overhead systems. Spirals also cut product movement since there are no transfers between tiers. The product does not slide on the grids, generating no crumbs. And with cen-

tralized belt cleaning, the I.J. WHITE SYSTEMS are automatically sanitized and have reduced yearly maintenance costs.

"We want the products to stay in place, to exit as they go in," Mr. Samson said. "And in emergency mode, should one spiral go down, we can speed up the other to carry 70% to 90% of the production of a second spiral." This can be controlled from the I.J. White's pre-wired Electrical Control Center which incorporates their Belt Tension Control (BTC) System.

CONTROL MODE. Precisely timed production breaks, set up by computer, allow packaging line operators to switch bag supplies and packaging styles efficiently. Buns travel through Grasby Goring Kerr metal detectors, one for each spiral, and converge at the long switching conveyor that feeds the packaging room. A series of Sasib/Stewart horizontal switches assures smooth flow to the six lines: two LeMatic bulk packers and four LeMatic paddle-style baggers, equipped with Kwik Lok closers. Each line has three sets of LeMatic slicers, enabling hinge, top and web-style slicing. About 20% of the bun plant's output is bulk-packed for food service, the rest go into bags for retail grocery sales.

Engineers mounted the packaging area's Allen-Bradley computer terminal on a long arm that reaches over all four lines. Operators can easily pull it into position when shifting from the bulk wrappers to the retail packing lines.

Bulk-packed buns move directly into waiting delivery baskets, while retail bagged buns enter a Pulver pattern loader that groups them for insertion into baskets. Each packaging line ends in a Pulver bottom-up basket stacker. When stacks reach their completed height, the stacker releases them onto the Cannon Conveying Systems in-floor conveyor. They pass into the distribution area, merging with stacks of bread and other baked foods.

To make room for bun packaging operations, Multi-Marques built a new washing room, moved its existing Pulver bread basket unstacker and Convay basket washer and added a second washer, a Newsmith immersion-style system. Although the Newsmith has six blowers, it operates at noise levels under 90 decibels, a big improvement. The washer's soaking action removes dirt and grime.

The bakery now operates with three types of baskets: one for bread and two for buns. It added a second Pulver basket unstacker, capable of handling all three types of delivery trays. An Allen-Bradley PanelView terminal readout at the unstacker alerts washing room operators to the style and number of



trays needed by the system.

SETTING SCHEDULES. When starting up the bun lines in January, the bakery ran the system's Allen-Bradley programmable controllers in local mode, operating line components as separate units. In April, engineers planned to switch into automated mode.

Also, the new bun line prompted engineers to reconfigure the bakery's plant floor computer network with four loops. The original bread line required only a single loop system. Multi-Marques added an Allen-Bradley supervisory PLC to manage communications with the bakery's other PLCs.

From the mezzanine-level production office, plant manager Robert Leduc, production manager Richard Ferrand and their staff can oversee all processing operations. The bakery's production office also houses the computer hardware handling control functions. All scheduling originates here.

"Sales orders compiled by our IBM AS400 mainframe download into the plant computer," Mr. Leduc said.

The dough schedule transfers electronically to the Reimelt system and on down the line through production and packaging. Mr. Leduc explained that in automatic mode, "we will get feedback from intermediate stages and even make reconciliations of data from shipping and distribution with ingredient usage."

Multi-Marques took the time to start up its new bun plant slowly. The bakery now runs the bun line on the same schedule as bread: three shifts, 24 hours a day, five days a week for a total of 120 hours a week. Bun schedules, however, are seasonal, busier during warm months than cold, which helped with installation, training and commissioning of the new line.

"When we first developed our Critical Path plan for buns, we knew we did not want to start up in April and have to go immediately to three shifts," Mr. Pelletier said.

"This was our first experience with extrusion divider on rolls, even though our bread line is an extrusion system," Mr. Samson said. "And when systems are so new in technology, it takes time to set up for them properly."

Mr. Pelletier added, "The productivity gains here put heavier demands on our staff's technical knowledge."

Although the new line needs just half the number of operators as older lines, it requires enhanced skill levels. This gave the company an opportunity to re-align staff assignments. The company worked with a consulting firm to evaluate and train staff, as well as write manuals. Trainers were present during installation of the equipment. Managers identified key employees to train others. These key operators also traveled with Multi-Marques engineers to field-test equipment at factory sites.

While the bread line operates with only seven employees per shift, the bun line requires 12 because of its more complex packaging systems. Employment now totals 107 people: 33 for bread, 36 for buns, eight full-time in sanitation, 12 in maintenance and 18 supervisors and engineers.

Multi-Marques started up its bun plant with five pan styles. During the first two months of testing, one new item per week went on-line.

The careful startup schedule also helped re-assure one of Multi-Marques most important constituencies: its own salesmen.

"We wanted to convince our sales staff that they were getting greater quality than before," Mr. Pelletier said. ■