

# Bovine Bliss

## BRAKE APPLICATION KEEPS COWS HAPPY AND COMFORTABLE AT DAIRY FARMS

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Photo provided by Igor Spanholi.

A happy cow is a more productive cow. Ask any dairy farmer and they'll tell you an upset cow will not provide as much milk as one that is comfortable. BouMatic, a Wisconsin manufacturer of cow-milking equipment, is in the business of making cows happy, and by doing so, keeping its customers happy as well.

A few years ago, BouMatic needed a brake design to keep a rotary gate from crashing down on the cows when they exited the milking stalls at dairy farms. Anthony Esch, product manager-cow traffic systems at BouMatic, had initially attempted to use a hydraulic ram to solve the problem.

"Adjusting the flow controls for the proper speed was difficult, and if air got into the hydraulic ram, it would throw off the braking of the reel," Esch says.

Although it's hard to imagine a group of engineers sitting

around a table pondering an application to ensure the contentment of cows, that's exactly what the company did when they contacted Mach III Clutch Inc. in Walton, Kentucky for a new brake design.

"BouMatic needed a brake to hold both the closed and open positions of a rotary gate in a cow-milking parlor," says Lesli Riehemann, president at Mach III. "The brake prevents the gate from rotating in the event one or more of the cows would push against it during the milking process. If the gate rotated, it would crash down on the other cows in the stall."

According to Riehemann, Mach III worked with BouMatic's engineering department for several weeks when the application was first presented by a Wisconsin distributor, Techmaster, Inc.

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“One unique challenge was determining the torque requirement because it involved estimating the amount of force a cow was capable of applying to the gate,” Riehemann says. “BouMatic opted for a 5" and 6" diameter, double-disc standard brake that was not covered or sealed. As the brakes were located inside an enclosure, we believed they’d have enough protection from moisture to allow proper function.”

Esch says that the exit system on the Xcalibur stall milking system is a balanced reel that makes a 180-degree turn to exit the cows out of the milking parlor. The reel is turned by using an air cylinder attached to a ratcheting sprocket through the use of a roller chain. This cylinder turns the sprocket that is on the shaft to rotate the reel.

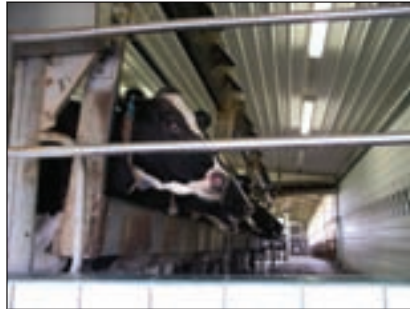
“Once the reel is turned about 90 degrees, air is applied to the brake to stop the reel in the horizontal position to allow the cows to walk out. After 5 to 10 seconds, the air brake releases and allows the reel to slowly rotate the last 90 degrees to allow for another group of cows to file in to be milked,” Esch says.

After supplying the standard brake models for about a year, BouMatic began to have customer complaints about brake failure and limited torque capacity. The company sent some of the failed brakes back to Mach III for evaluation.

“Rusting and corrosion were clearly causing problems, so



**The rotary gate, seen here in the closed position, keeps the cows safe during the milking process.**



**Water is used everywhere in the milking parlor, which made it difficult to keep the original brake assembly clean.**

I traveled to meet with a BouMatic engineer and our distributor to review the problem and discuss possible solutions,” Riehemann says. “We also visited a dairy farm where our brakes were installed so I could get a better feel for the environmental conditions.”

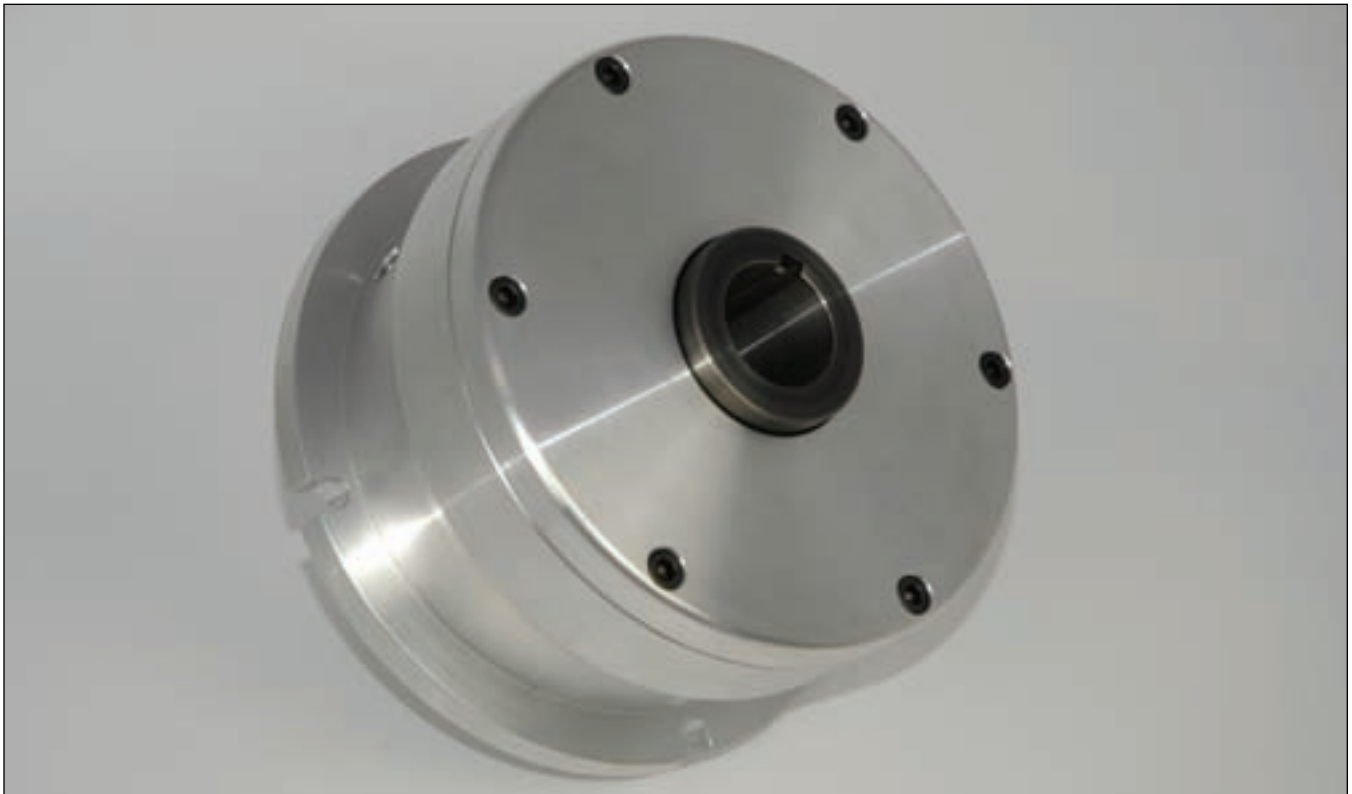
It was determined that despite the enclosure on the gate, the equipment was getting washed down with hoses and power sprayers, and water was finding its way into the brakes, contaminating the friction linings and causing brake failure.

“Water is used everywhere in the milking parlor, and unfortunately the first couple of installations used a brake assembly that was open to the environment,” Esch says.

A simple fix would be to manufacture the same brake using corrosion resistant materials such as stainless steel and to provide a better enclosure. This, unfortunately, would have cost three times more than the standard design, and BouMatic

was not willing to absorb the costs.

“Instead, our engineers went back to the drawing board and came up with an enclosed brake design in both 5" and 6" sizes made from standard materials,” Riehemann says. “To resolve the complaint of inadequate torque, the surface area of the pis-



**The brake provided by Mach III was customized with solid housing to protect from contamination.**

ton was increased and a third disc was added.”

Riehemann states that this design was accomplished without adding to the overall length. It also doubled the torque capacity with only a cost increase of 10 percent. The new enclosed brake models have been utilized on BouMatic equipment without any other failures for the past four years.

After Mach III began supplying the new covered and sealed brakes to BouMatic, an engineer in Holland contacted the company about brakes for a chain conveyor at a processing facility in Indiana. Mach III provided a prototype within 48 hours and delivered 55 covered and sealed 8" diameter brakes within two months.

The work done in Indiana was very similar in design to the brakes needed for BouMatic. The biggest difference was that the brakes had to be electroless nickel-plated, and the aluminum components had to be anodized to meet food safety standards.


“You’ll find covered and sealed Mach III clutches in automatic carwashes at thousands of gas stations across the United States,” Riehemann says. “There are also enclosed Mach III products on machinery producing and packaging Kraft cheese, Cloverhill Bakery pastries, Jack Lin’s beef jerky and Minute Maid juices.”

Riehemann says that all requests for quotes are met with a single question. Is this for a new or existing application? New inquiries are sent to the engineer team who continue to ask questions. If a catalog product suits the application, the initial work is done.

“We typically have a new design finalized within a week of the initial inquiry and deliver the product in three to four weeks,” Riehemann says. “Customers are pleasantly surprised by the prices at which we offer specialized products. Henry Ford certainly would not have approved of our manufacturing model, but it’s been working for us for nearly 45 years, so we

figure we must be doing something right.”

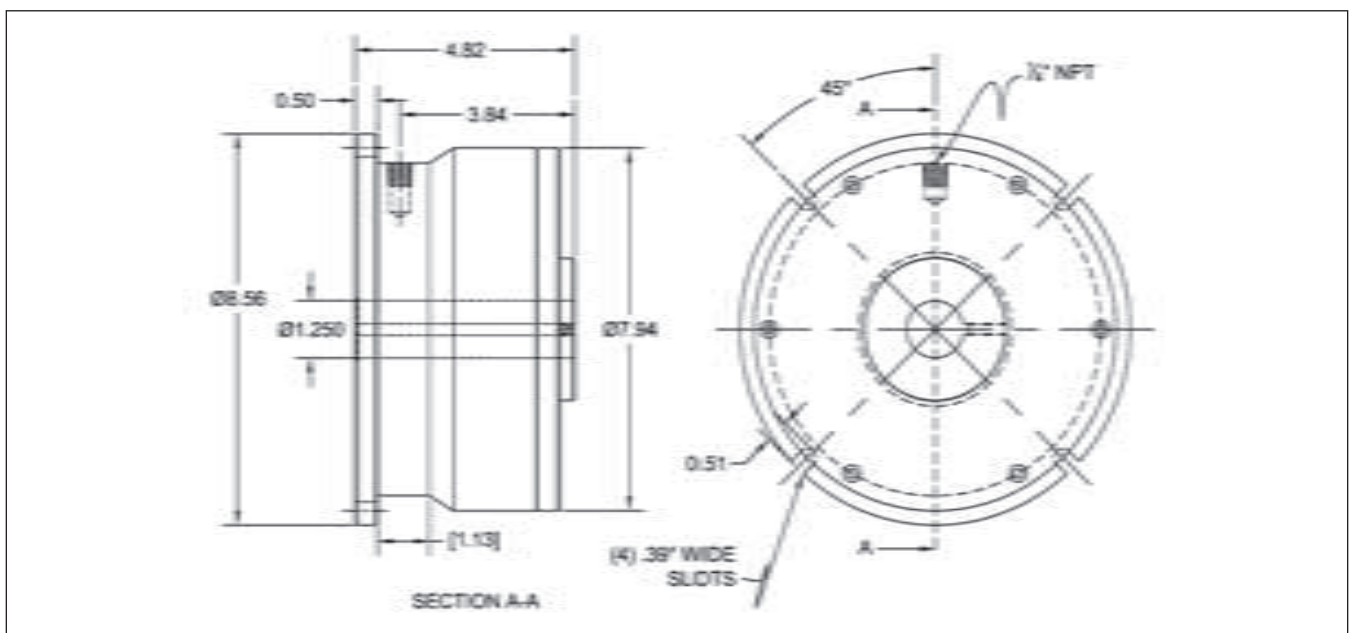
Esch seems to think so.

“A happy cow likes consistency and a calm working environment. One thing we can do to provide this environment is to equip our BouMatic milking parlors with the most reliable equipment available.” 

### For more information:

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An outline of the revised brake designed by Mach III.