



## Case Story

# Sour Cream Recipe Succeeds with ICF Flexline™

Eating healthier, more natural foods is a growing trend that delights Daisy Brands -- a family-owned, Garland, Texas-based firm that makes the best-selling brand of sour cream in the United States. Known for its "Pure and Natural" recipe using no additives, preservatives or artificial growth hormones, the company recently opened a plant in Casa Grande, Arizona, to expand its national distribution. The continuing success of Daisy Brands is based on a recipe that uses all-natural ingredients -- plus, the technology ingredient of the Danfoss Flexline™ family of motor control valves and control stations.

"Making sour cream requires close temperature control to maintain quality," says Tom Cooper, president of Refrigeration Concepts, Inc., (RCI) Comstock Park, Mich. "That's why the refrigeration system we built for the Casa Grande plant in 2008 uses the Danfoss Flexline platform to deliver precise control."

Refrigeration is required in all phases of sour cream production. Sour cream is made by introducing a bacteria found naturally in milk to change the taste and texture of cream. Cream is normally sweet, but fermentation by the bacteria produces lactic acid, which changes the texture and taste. The flavor becomes mildly sour -- which is why a dollop of sour cream adds tang

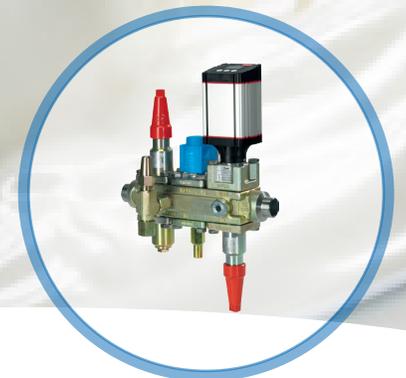
to foods ranging from baked potatoes to tacos to fruit salads. Daisy Brand makes both regular and light sour cream styles using just one ingredient -- Grade A cultured cream. The low-fat style also uses vitamin A palmitate, a stabilized form of the vitamin.

The proprietary sour cream production process begins by pumping raw milk through a cream separator. Then it is homogenized and pasteurized. Cooper explains that Daisy has unique requirements for their proprietary process. As such, precise control is a benchmark that Daisy requires and insists on. After pasteurization and homogenization, the cream is cooled. Then the culture is added and given time to ferment. Fermentation is stopped, then the sour cream is packaged in cups. USDA specifications require sour cream to be stored at a minimum of 45 degrees F (7.2 degrees C) for at least 12 hours prior to inspection. But with Daisy, they exceed government requirements in all facets of the process.

To meet these temperature requirements, Cooper installed the plant's ammonia refrigeration system to produce chilled water to cool various vats and silos and to supply evaporator coils in the storage area.

**1/6th**  
of the install time

A conventional valve train can take up to five hours. The ICF valve station requires only two welds for a fast and efficient installation.



"Ammonia refrigeration is still the backbone of the cold storage and food processing industries," says Cooper. "It is a naturally occurring gas that is environmentally friendly, with an ozone depletion potential (ODP) and a global warming potential (GWP) of zero.

Ammonia also has good thermodynamic properties that make it very energy efficient. And thanks to its long history, our industry knows how to handle it safely."

### **Valve trains provide proven control**

Cooper notes that the circulation of ammonia refrigerant in the system is controlled by various valves assembled together in valve trains or stations. The valves open and close to regulate the flow of refrigerant from compressors to heat exchangers to evaporator coils to condensers.

"We have installed many Danfoss valve trains in food processing and cold storage applications," says Cooper. "It is a much better solution than the traditional method of welding individual valves into a valve train."

A typical valve train is assembled from four or five components. Using the traditional method, Cooper would need to order the valves, unpack, assemble and weld each valve into piping, and then ship the finished valve train to the job. Since each valve requires two welds, that could involve up to 10 welds or more per valve train.

The Casa Grande project involved about 25 valve trains, which would have involved up to 250 welds. Combined with unboxing, cleaning, assembling components and leak checking, at least four hours of work would be required for each conventional valve train, eating up time in the production schedule.

"Fabricating a valve train from scratch requires a lot of welding and integrating a large number of valves and sensors from multiple suppliers," says Cooper. "We've found Danfoss ICF Flexline technology is a far better alternative."

Flexline is the name of the technology platform developed by Danfoss to facilitate fabrication of valve trains from start to finish. An ICF station consists of a single valve body with multiple port openings. Individual valves can be specified

and installed at the factory to build the required configuration. "With the ICF valve train, we can replace a string of valves with just one valve station," Cooper says.

### **Reduces five hours of valve train installation time to 45 minutes**

The multi-ported ICF valve train is about a foot long. The body is a modular design that accepts a variety of ready-made inserts that are simply pushed into the precision-machined opening to accomplish the desired function. Then, a separate top cover is added for protection. Function modules that can be mounted on an ICF body include: stop valves, strainers, solenoid valves, check valves, combination stop/check valves and motorized or hand expansion valves.

Once specified by the customer, the valve station is delivered from Danfoss, ready to be installed with just two welds for piping on either end -- a tremendous time savings for the Casa Grande project.

For this project, the ICF valve train was configured with Danfoss ICM motorized valves. "The ICM is a very compact, direct operated motor valve," explains Cooper. "It is comprised of the valve body, a combined function module/top cover and an ICAD actuator. The valve regulates the refrigerant expansion process in liquid lines and controls pressure or temperature in dry and wet suction lines and hot gas lines. A stepper motor opens or closes the valve based on level signals from the control system.

The valve stations were delivered with the ICM valves and other components already mounted. Thanks to the modular design, installing an ICF valve train takes about 45 minutes, compared to nearly five hours per conventional valve train.

Cooper performed only two welds on each valve train. "These are weld-in-line valve trains," Cooper emphasizes. "This eliminates the need for flanges and gaskets, which have a tendency to leak. When you consider the reduced total welds and less leak potential by eliminating gaskets, ICF valve trains are well worth it."



### **Compact size combines with flexibility**

Cooper also appreciates the ICF platform's compact size.

"Traditional valve trains require more welding. They also take up a lot more space because the pipe spans are longer between each valve," he says.

To support fabricated control stations that are spread out with more welds, a conventional valve train is about four feet long. A Danfoss ICF valve train is much more compact -- about a foot long -- which saves a lot of space in the plant and reduces the amount of refrigerant in the line.

The adaptability of the ICF Flexline is also an advantage. The multi-ported body was also able to accept other stop valves and line sensors. Electronic control modules are also available where extremely tight temperature control is required.

"The ICF Flexline valve station covers 90 percent of all applications in just four basic configurations," notes Terry Chapp, regional sales manager for Danfoss Industrial Refrigeration. "In total, it allows for more than 50 special configurations in low- and high-pressure applications for liquid lines, compressor injection lines and hot gas lines."

For Cooper, the labor savings, fewer leak points and flexibility of the ICF Flexline station proved to be a smart decision.

"ICF valve trains improved our productivity on the project. And they helped us deliver a more cost-effective solution to our customer. But most importantly, after four years of service, Danfoss ICF valve trains have been operating flawlessly. All our service guy does is check calibration once a year. This ICF Flexline technology is our recipe for success."

[www.danfoss.us](http://www.danfoss.us)

Danfoss can accept no responsibility for possible errors in catalogues, brochures and other printed material. Danfoss reserves the right to alter its products without notice. This also applies to products already on order provided that such alterations can be made without consequential changes being necessary in specifications already agreed. All trademarks in this material are property of the respective companies. Danfoss and the Danfoss logotype are trademarks of Danfoss A/S. All rights reserved.