

# Messer's Bottom Injection Systems.



## Introduction

When it comes to cryogenic chilling, processors may be better starting at the bottom. The bottom of their mixer, that is. Strategically injecting cryogenics such as liquid nitrogen (N<sub>2</sub>) or carbon dioxide (CO<sub>2</sub>) directly into the bottom of a mixture chills food faster, more effectively and at a lower cost than other cooling methods.

Compared with processes such as adding CO<sub>2</sub> snow, water ice or dry ice from the top of an open mixer, bottom injection cryogenic systems using CO<sub>2</sub> (and more recently N<sub>2</sub>) rapidly remove heat from foods with a high level of control and process repeatability.

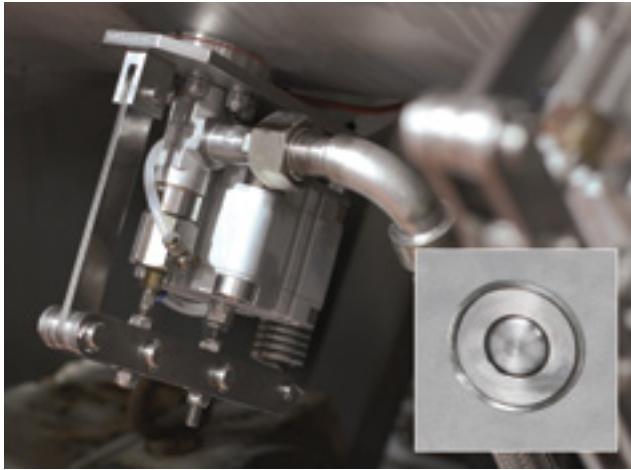
Bottom injection systems may deliver between 20 and 40 percent more chilling efficiency than alternate chilling approaches, as well as help processors improve production, appearance, and yield. Advanced injection systems offer

hygienic design for easier cleaning and improved food safety. Equally important, advanced cryogenic control systems may deliver much higher process repeatability than just a few years ago.

These cryogenic chilling systems can be used on kettles, mixers and blenders. Bottom injection systems can be applied across a range of categories and food items, even traditionally difficult products such as dense, high-moisture and high-protein mixes.

## Benefits

- Up to 20-40 percent improved efficiency by utilizing the BTU content in the vapor phase
- Faster, more consistent temperature pull-down
- Hygienic design for easier cleaning
- Easy field installation on most processing equipment



### **KRYOJECTOR® nozzles**

The KRYOJECTOR nozzle is a patented system that can be used with liquid N<sub>2</sub> or liquid CO<sub>2</sub> for bottom injection applications. The hygienic nozzle design offers positive shutoff of the cryogen at the blender wall and helps prevent food particles from becoming trapped in the nozzle. These nozzles are easily adaptable to existing equipment and require very little maintenance.

### **Precise N<sub>2</sub> dosing and control system**

N<sub>2</sub> has been used in lieu of CO<sub>2</sub> for bottom injection for several years. The ongoing challenge with dosing N<sub>2</sub> is measuring volume when there is a high likelihood of two-phase flow. Messer's proprietary N<sub>2</sub> flow control system includes a flexible operator panel and a N<sub>2</sub> dosing methodology that can provide accurate, conditioned liquid N<sub>2</sub> repeatable batch after batch just like any other ingredient.

- Conditioned liquid N<sub>2</sub> can result in flow rates 2-3 times that of unconditioned N<sub>2</sub> which can result in quicker chill times
- Precise dosing within 1-2%
- Efficiency gains up to 10-15% over traditional CO<sub>2</sub> systems

### **Contact Messer today**

Bottom injection chilling has been around over fifty years. Each plant location and blender manufacturer present different challenges. Chilling can be performed with CO<sub>2</sub> or nitrogen, different nozzles, or different control. Talk to the Messer application team today to find out which solution fits your operation.



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