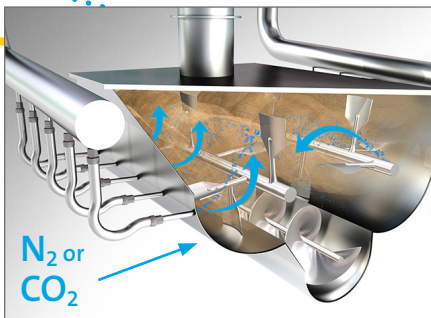


# Freshline® Bottom Injection Cooling Systems



Hygienically chill your mixed or formed food products with a premium cryogenic temperature control system



Air Products' Freshline Bottom Injection Cooling Systems hygienically inject liquid nitrogen or carbon dioxide into your product during the mixing, blending, or grinding processes. Combined with our proprietary clean-in-place (CIP) and analytics platforms, you will be well-equipped to maximize your production safety and efficiency for the long term.

## Benefits & Capabilities

- **Sustainable:** Consistent and repeatable cooling process
- **Accurate:** Provides ideal processing temperature & texture
- **Flexible:** Can be built for liquid nitrogen or CO<sub>2</sub> injection
- **Efficient:** Optimizes cryogen usage
- **Easy:** Simple to operate, clean and maintain
- **Hygienic:** Proprietary, world class CIP system available
- **Adaptable:** Easily retrofitted on new or existing mixers
- **Configurable:** Available in top or bottom injection configurations
- **Smart:** Advanced analytics/process monitoring platform available



Freshline Bottom Injection Cooling Systems use liquid nitrogen or carbon dioxide to deliver rapid, precise temperature control to the blender, mixer, or grinder, optimizing processing speed and product quality. These systems are perfect for chilling ground meat prior to forming hamburger patties, marinated chicken prior to forming nuggets and many other products that require heat removal during a mixing, blending, or grinding step.

By injecting cryogen during these phases, these systems remove the precise amount of heat required to bring your product within a ½ degree of the desired temperature. Whether you want to remove heat generated by friction and mechanical energy in your mixing equipment, or you need additional cooling to reduce the temperature of products prior to forming or other processing steps, Air Products' Bottom Injection Cooling Systems offer an effective, sustainable cooling solution.

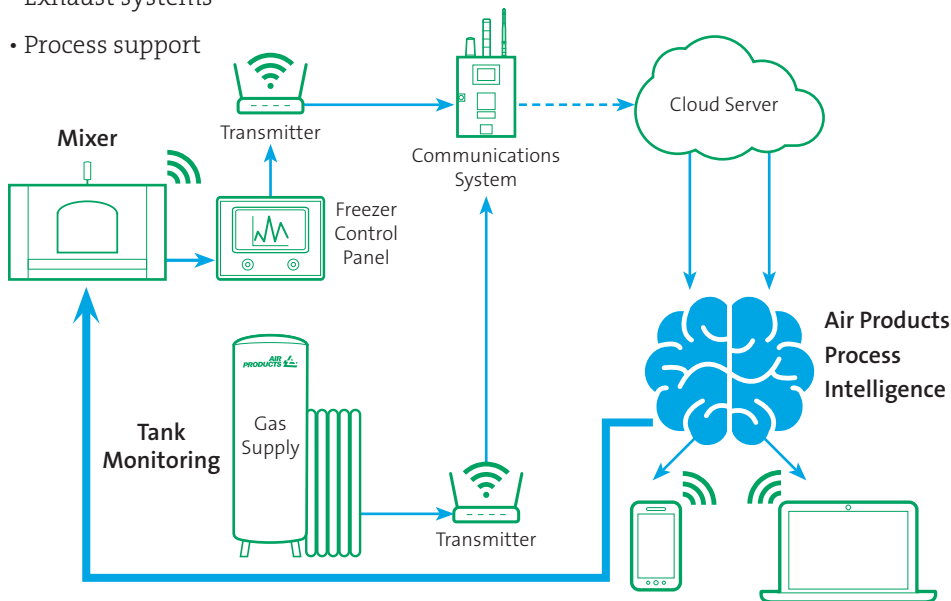
While configurable for bottom or top injection, Air Products recommends bottom injection due to its efficiency advantage. Both can be retrofitted to new or existing mixers, blenders, or any type of stainless-steel vessel. They are easy to operate, clean and maintain thanks to our proprietary, world class CIP system. Additionally, our optional analytics platform allows you to monitor your processing efficiency with daily records of production, troubleshoot issues, and track equipment performance.

## Tailor-made for your system

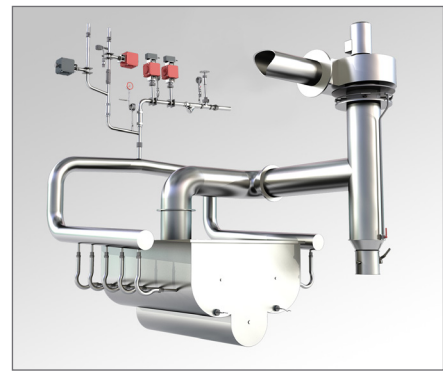
Air Products collaborates closely with our customers to assure the system will be efficient, cost-effective, and meet hygienic standards. The nozzle number, arrangement, and configuration are custom engineered for your specific equipment and desired results. Precise temperature control and cryogen consumption is achieved through one of several modular control schemas.

Monitor your equipment's performance and identify issues before they occur with Air Products Process Intelligence (APPI), our proprietary advanced analytics platform. Recipe functionality, exhaust systems, safety controls, and integration into your controls are all part of the full-service package Air Products provides. We partner with our customers and equipment OEM's to create a completely customized solution to chill your products fast and efficiently. This includes helping you meet the highest safety and hygiene standards. Some additional support highlights include:

- Liquid nitrogen or carbon dioxide piping system design
- Control system design, and integration with the equipment controls
- Mechanical and electrical modifications
- Exhaust systems
- Process support



Air Products has over 15 years of experience retrofitting our Freshline Bottom Injection Cooling Systems on a variety of mixers and grinders at our customer's sites. We can also work directly with the equipment OEM's to install the system on new equipment prior to delivery to your site to save time and money.



Freshline Bottom Injection Systems can supply the cryogen of your choice for maximum chilling efficiency

For more information,  
please contact us at:

**Corporate Headquarters**  
Air Products and Chemicals, Inc.  
7201 Hamilton Boulevard  
Allentown, PA 18195-1501  
T 800-654-4567  
F 800-272-4449  
info@airproducts.com



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