

# Industrial gas solutions for processing industrial hemp and other natural products



Enhance quality, increase productivity and improve safety



In the fast-growing industrial hemp and natural products markets, Air Products offers a suite of industrial gas-based solutions to help you with your harvesting and processing needs.\* Our team of experts can review your process and help you identify opportunities where industrial gases can enhance product quality and shelf-life, increase productivity and improve safety.

Air Products is a world-leading supplier of industrial gases (including nitrogen, argon, hydrogen, carbon dioxide and oxygen). What really sets us apart is our technical knowledge and know-how. Based on decades of experience, our teams can work with you to understand your current and future needs, as well as develop and implement the optimal solutions to your production challenges. Working with you, we can determine how and where industrial gas, such as liquid nitrogen, and related equipment, like cooling conveyors and heat exchangers, can help solve your current issues or concerns related to a variety of applications.

## Cryogenic Cooling for Extraction Processes

Choosing the right refrigeration system is critical to create a safe and economical extraction process. Our PolarFit® cryogenic cooling systems use the ultracold properties of liquid nitrogen to help solve your heat removal and cooling challenges. To maintain steady, lower temperatures due to higher processing demands, you can implement solvent cooling using a cryogenic heat exchanger. We can provide a specially designed heat exchanger and liquid nitrogen system to match your process parameters. We work with a certified cryogenic heat exchanger that can safely and steadily bring solvents like ethanol to temperatures less than -80°F (-62°C) to help achieve higher quality oils. It can also aid in the winterization process by cooling the material to help remove or separate certain compounds, such as lipids.

---

## Pre-cooling of Biomass Plant Materials

With our PolarFit® cryogenic cooling screw conveyor, you can pre-cool industrial hemp or other plant materials to cryogenic temperatures, as cold as -148°F (-100°C). Our system sprays liquid nitrogen onto the material as it moves along the conveyor to efficiently maintain the desired cold temperature as the material is transferred into your extractor process to help improve efficiency and product quality. Safe use of liquid nitrogen to aid in process temperature control can be a fast, precise and economic solution to help with challenging processing requirements.

---

## Freezing

Freezing with liquid nitrogen or carbon dioxide can speed up your entire process by decreasing the time needed to remove heat from your process. Our Freshline® food freezing solutions can help you achieve benefits such as improved retention of moisture, texture, flavor and fragrances. We offer a full line of freezing tunnels and preservation systems that not only enhance product quality, but are also designed to help increase production rates and capacity, plus improve yields with less waste.

---

## Inerting/Blanketing

Inerting your process with nitrogen can help to prevent degradation of your product and increase long-term storage. From a safety perspective, since nitrogen is inert, it can also help prevent fires and dust explosions. From a quality perspective, nitrogen inerting can help keep oils free from moisture and oxygen—this can help keep quality intact and extend shelf-life. Our applications engineers can help you implement best practices into your blanketing system that can help you reduce costs and improve safety.

---

## Greenhouse Carbon Dioxide Supplementation

Since plants use up carbon dioxide from the air during photosynthesis, carbon dioxide levels in greenhouses can be lower than optimal levels needed for maximum plant growth. By adding more carbon dioxide at the appropriate time and concentration, you can positively impact plant growth, production and yields. Turn to Air Products for your carbon dioxide supply.

---

## Grinding/Milling

Our PolarFit® cryogenic particle size reduction systems use the cooling power of liquid nitrogen or carbon dioxide to remove the heat produced in grinding or milling processes. With these systems, you can efficiently and effectively process heat sensitive, oil-containing products like industrial hemp seeds or other plant materials. Our applications engineers can help you determine which part of your process should be cooled to help you achieve the highest product quality, flavor, aroma and volatile oil content — while maximizing production rates and minimizing overall operational costs.

---

## Supercritical Carbon Dioxide Extraction

Supercritical carbon dioxide is a unique and versatile solvent. It's useful for separating and collecting light or essential oils, typically with smaller batch sizes. By using carbon dioxide for extraction, you can reduce or eliminate the need for chemical solvents that can be toxic or flammable, making it a more environmentally-friendly option. Compared to other techniques, this process typically provides more authentically flavored and aromatic products, while minimizing product loss or other undesirable changes. We can safely and reliably provide carbon dioxide supply to your system or equipment at your processing facility.

---

## Packaging

In a world where consumers demand quality, Modified Atmosphere Packaging (MAP) can provide significant benefits to both the retailer and the consumer. MAP can help you produce a product that looks good, smells good and tastes good. It can also help extend your product's shelf life by up to four times longer than non-MAP packaging. Extended shelf life can allow you to increase distribution distance, preserve quality by slowing deterioration and rancidity, reduce the need for artificial preservatives and help minimize food waste. This allows stores to order your product more accurately as well.

---

## Data Monitoring/Process Control

Air Products Process Intelligence uses sensor and communications technology to monitor and control our gases, equipment and other key process parameters. Your personnel can remotely access data for improved process understanding and, when combined with our advanced analytical tools, save valuable time and money. These capabilities can allow you to troubleshoot and improve the efficiency of your processing equipment from just about anywhere.

---

\*Sales will only be made to customers who can show compliance with applicable state and federal laws and regulations.

## The Air Products Advantage

For over 75 years, Air Products' customers have counted on us to deliver more than just gases. Our unique understanding of the industries we serve has delivered more uptime, lowered long-term costs, raised productivity, and enhanced safety. Our teams are dedicated to maintaining our 99.95% reliability record of providing on-time deliveries to the flow, purity, and pressure you specify to meet your supply needs.



.....

**For more information,  
please contact us at:**

### **Americas**

Air Products  
7201 Hamilton Boulevard  
Allentown, PA 18195-1501 U.S.A.  
T 800-654-4567 or 610-706-4730, press 3  
F 800-272-4449 or 610-706-6890  
info@airproducts.com

### **Asia**

Air Products  
Floor 2, Building #88  
Lane 887, Zu Chongzhi Road  
Zhangjiang Hi-tech Park  
Shanghai, 201203, P.R.C.  
T +021-3896 2000  
F +021-5080 5585  
Sales hotline: 400-888-7662  
infochn@airproducts.com

### **Europe**

Air Products PLC  
Hersham Place Technology Park  
Molesey Road  
Walton-on-Thames  
Surrey KT12 4RZ  
UK  
T +44(0)800 389 0202  
apukinfo@airproducts.com



**tell me more**  
airproducts.com