

# Chemicals & Refinery Processing Lab



Flexible and robust testing facility for the chemicals, pharmaceutical, and refining industries



Our state-of-the-art lab aims to replicate and optimize real operating conditions so that you can achieve greater biofuel yield and throughput.

At the Air Products Chemicals and Refinery Processing Lab, we help customers in the refining space adapt to new feedstocks, catalysts, and other operational parameters to optimize the hydroprocessing component of their facility.

## Continuous hydrogenation to serve all industries

The Air Products lab consists of three continuous, trickle bed reactors. During this process the liquid feedstock is injected continuously into the reactors. Once hydrogenated, the reaction products are cooled, and then the liquid phase is separated and collected for analysis (the vent gas can also be analyzed for composition). The reactor lineup is variable and operates as one or more reactors in a sequential configuration. Each reactor can also be customized to use a customer's specific catalyst for trials. This in turn allows you to run multiple sequential reaction steps with differing catalysts at high pressure. The flexibility of our lab allows a variety of hydroprocessing reactions to be tested easily for a multitude of scenarios.

Variable parameters that are able to be trialed within the Air Products' Hydrogen Reactions Lab include the following:

- **Catalyst loading:** Maximize catalyst performance and lifetime, improve product yield and quality, reduce cost of production.
- **Catalyst activation:** Ensure safe and quick facility start-up, improve catalyst performance and lifetime.
- **Feedstock testing:** Identify the specific attributes of the feedstock and tailor the hydroprocessing trial to improve product yield and quality.
- **Process parameter optimization:** Manage utilization of trickle bed reactors to find the ideal balance for high product yield and quality.
- **High temperature and pressure thresholds:** Run various scenarios in a lab setting up to 700 °F and 2000 psig.
- **Air Products Smart Technology solutions:** Auxiliary equipment to improve exotherm control, manage H<sub>2</sub>S in recycle, measure quality of the resulting propane and naphtha, and measure the purity of recycled hydrogen.

As the biofuels space continues to develop, each entrant into the space is aiming to drive the total cost of production down to maximize their competitiveness against traditional fuels and competing biofuels alike. The regulatory and corporate sustainability drivers that are generating a demand for low carbon intensity fuels are expected to continue and potentially ramp up over time. Having a partner in the hydroprocessing space can give refiners a leg-up in establishing themselves as first movers in an aspect of refining optimization that is largely nascent relative to strides made in renewable feedstock pretreatment thus far.

**For more information or to schedule a trial in our lab, please contact us at:**

**Corporate Headquarters**

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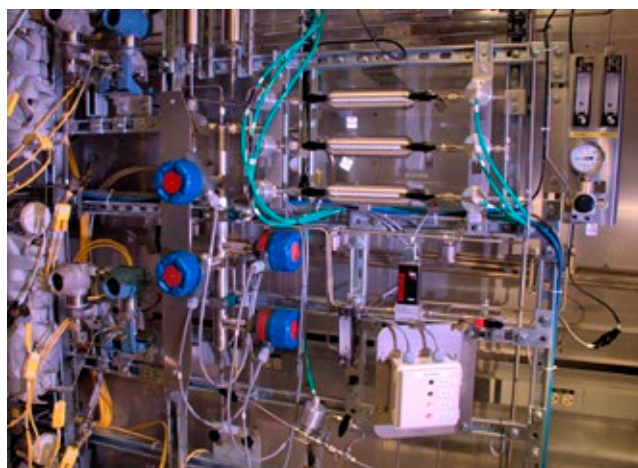
T 800-654-4567

info@airproducts.com

## Benefit from experience

As the pace of decarbonization accelerates, and end-user demand for low carbon intensity solutions continues to grow rapidly, translating technology development, to demonstration-scale success, to commercial-scale operation and excellence in quick succession will be the key to being a first mover in the biofuels space. Air Products is a partner that will be with you every step of the way, as our applications expertise in hydrogen reactions is only one aspect of our industry-leading hydrogen portfolio.

As the global leader in on-purpose hydrogen production, Air Products has hydrogen solutions throughout the value chain, including production technology, distribution and storage equipment, and advanced utilization applications. These end-to-end solutions, along with the wide variety of potential supply modes to deliver hydrogen, will allow refinery customers to translate their biofuels ambitions into reality. Partnering with Air Products means support in optimizing your process, supply flexibility and reliability, and of course industry-leading safety standards to ensure that your refinery is positioned to succeed regardless of how the industry evolves.



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