



PURDUE DRUG DISCOVERY FACILITY

Overview

Purdue University opened its newly-constructed Center for Drug Discovery in 2014. Inside, wet, dry and biochemical labs are spread out with undergraduates, graduate students, and esteemed faculty expertly manning each station, dedicated to finding cures to the planet's most mortal, debilitating and infectious diseases.

Nearly 140 fume hoods accommodate the exhaust requirements of the state-of-the-art laboratories, which are located on the lower level and the first, second and third floors of the building. And where there are fume hoods and lab exhaust systems, there must also be high-quality, reliable exhaust fans. As a result of a successful bidding process, Purdue University turned to their Twin City Fan & Blower representative to supply the fans.

Challenges

For the new labs, Purdue required ventilation fans that could remove fumes from all labs that could be in operation simultaneously, provide sufficient plume height, and supply sufficient CFM. However, a major requirement of the project was that the fans had to be made in America – including the motors and all parts.

Because it's a U.S. Environmental Protection Agency requirement, plume height was also a high priority. For each fan, the plume height had to be at least 56 feet to meet the facility's design requirements. To accomplish this, the minimum air flow and pressure requirements for each fan would have to be 27,000 CFM at 3 inches WC of static pressure.

The fans also had to meet noise and vibration requirements. The sound level from each fan could not exceed 85 dBA, and vibration had to be minimized. In addition to weight restrictions (fans were to be located on the roof) and brake horsepower requirements, the fans had to be direct drive. They were also required to have custom color paint and a weather-resistant finish.

Solution

Twin City Fan & Blower supplied four direct drive BAIFE induced flow lab exhaust fans. These centrifugal, backward inclined, airfoil fans are designed specifically for laboratory fume hood exhaust applications. Each 40-inch fan can supply up to 27,500 CFM at 3.5 inches WC of static pressure. The speed of each fan is controlled by a variable frequency drive.

Quick Facts

Industry

Lab Exhaust

Application

Lab fans for fume hood exhaust

Customer

Purdue University

Twin City Fan Representative

Elite Equipment Company
Indianapolis, IN

Challenge

Provide ventilation fans with sufficient plume height, CFM, pressure and all parts made in America

Solution

Customized, direct drive BAIFE centrifugal, backward inclined, airfoil lab exhaust fans

CASE STUDY



Twin City Fan & Blower has the engineering and manufacturing capabilities to accommodate virtually every conceivable application. We have completed thousands of successful installations worldwide and have a proven track record for tackling the most technically complex and unique applications.

We separate ourselves from the competition by offering a greater breadth of products and quickly adapting to the needs of our customers. This is truly a testament to our company philosophy – respond to the needs of the customer, the first time, every time.



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The lab exhaust system is divided into two subsystems with two fans on each system that operate continuously and in parallel. Each variable volume subsystem has approximately 70 lab exhaust valves that control the exhaust volume from each fume hood and 52 air flow control valves that regulate how the air is ducted to the fans. There are no mixing boxes or plenums. Ambient entrainment air is pulled through the outlet nozzle of the fans. The nozzle increases the speed of the exhaust stream into the windband. The accelerated air entrains surrounding ambient air into the windband diluting the exhaust.

This BAIFE fan is also an Arrangement 8 design, which means that, in addition to being direct drive, the wheel is attached to the motor via a coupling. The fans were also customized by adding extended life bearings, vibration-isolated bases, and a zinc-based epoxy powder coating with a UV-resistant finish to minimize corrosion.

Results

Purdue University's Center for Drug Discovery can operate safely knowing that its lab exhaust system from Twin City Fan meets – or exceeds – all specifications. At 62 feet, plume height exceed the requirements and the sound level was 80 dBA – which is significantly better than the project requirements. Twin City Fan also met vibration, weight, and brake horsepower requirements. In addition to the custom color paint, extended-life bearings and UV-resistant coating, every part that went into making these fans were made in America.

Twin City Fan satisfied all the stipulations of this demanding project, many of which other fan companies could not. When faced with challenges such as these, TCF is uniquely qualified to provide efficient, reliable solutions.



Model BAIFE
Lab Exhaust Fan