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TWIN CITY FAN

New York University - Abu Dhabi Lab Exhaust Fans

Quick Facts

Industry
Lab Exhaust

Application
Fans for laboratory fume exhaust system

Customer
New York University in Abu Dhabi
Abu Dhabi, United Arab Emirates

Twin City Fan Representative
Sharco International Corp.
Northbrook, IL

Challenge
Remove laboratory fumes; provide sufficient plume height, CFM and static pressure; meet noise criteria

Solution
TVIFE induced and mixed flow, direct drive lab exhaust fans

Overview

A global university in the heart of today's changing world, New York University in Abu Dhabi (NYUAD) is the first comprehensive liberal arts campus to be operated abroad by a major American research university. The newly constructed NYUAD campus opened in 2014 and is located on Saadiyat Island in United Arab Emirates (UAE).

The university's Experimental Research Building (ERB) supports advanced research with 19 laboratories, each of which is ventilated with an independent fan system. Due to system design and redundancy requirements, 42 fans were needed for the project.

Like most new construction projects, supplying the fans and controls for the NYUAD labs went out for bid with very strict specs. As a result of a successful bidding process, the university turned to their Twin City Fan & Blower representative to supply the fans for this project.

Challenges

Competition was this project's primary challenge. The highly visible NYUAD project was one of the largest lab jobs in the Middle East at the time.

In addition to strict specs and high expectations, the university's performance criteria included a 10 meter (32.8 foot) plume height. The university specified direct drive, low noise fans with air flows ranging from 475 CFM to 8,800 CFM and static pressures from 500 Pascal (2 inches WC) to 800 Pascal (3 inches WC).

Model TVIFE
Direct Drive Induced Flow Mixed Flow Exhaust Fan

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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Solution

Twin City Fan & Blower supplied 42 direct-drive TVIFE induced and mixed flow lab exhaust fans. In addition to meeting the AMCA 260 standard, TVIFE fans combine the benefits of axial flow and centrifugal flow fans with the added benefit of entraining ambient air for a pre-diluted exhaust plume. These fans dilute contaminated air at the outlet as well as increase the outlet volume of the fan, which accelerates the discharge air, increasing plume height without a tall stack. Dilution ratio is the ratio of the total fan outlet volume to the lab exhaust volume. In addition to induced airflow, TVIFE fans use bypass air to maintain the dilution ratio.

The fans for this project have 50 Hz motors instead of 60 Hz motors. The smallest fan has a 15-inch wheel and the largest has a 27-inch wheel. Motors range from 2 hp to 10 hp. The speed of most of the fans are 1,500 rpm. However, the speed of the low CFM, high static pressure fans is 3,000 rpm.

Although the fan motors are started across-the-line, they are VFD ready. In this application, the fans are constant speed, providing constant flow to maintain the 10-meter plume height. However, instead of modulating the fan speed, the bypass damper is modulated to maintain outlet velocities – and plume height – by allowing a constant volume at the fan discharge when exhaust air is reduced.

Each of the 19 labs is ventilated with an independent fan system, constituting a single lab fan group. However, some groups are equipped with one fan, others are equipped with two fans, but each group has a standby fan for redundancy. Every lab has multiple fume hoods connected to a common exhaust duct with a damper control device at the end. After each damper control device, another duct exhausts fumes to its corresponding fan group on the roof.

All of the TVIFE fan operation modes are used: bypass, dilution and/or entrainment. A mixing plenum box is located under each fan. Some of the mixing boxes are bottom intake; others are side intake.

Results

The ERB at New York University in Abu Dhabi can operate its state-of-the-art labs knowing that fumes are safely and efficiently removed, diluted, and dispersed. Twin City Fan provided high quality TVIFE fans that supply the required lab exhaust ventilation, exceptional plume height and the required dilution ratio. In addition to meeting, or exceeding, the specified performance criteria, the fans met the noise criteria as well.