PENNBARRY™

Moving Your Way

LABORATORY & TRAINING CENTER

Testing & Facility Overview

TABLE OF CONTENTS

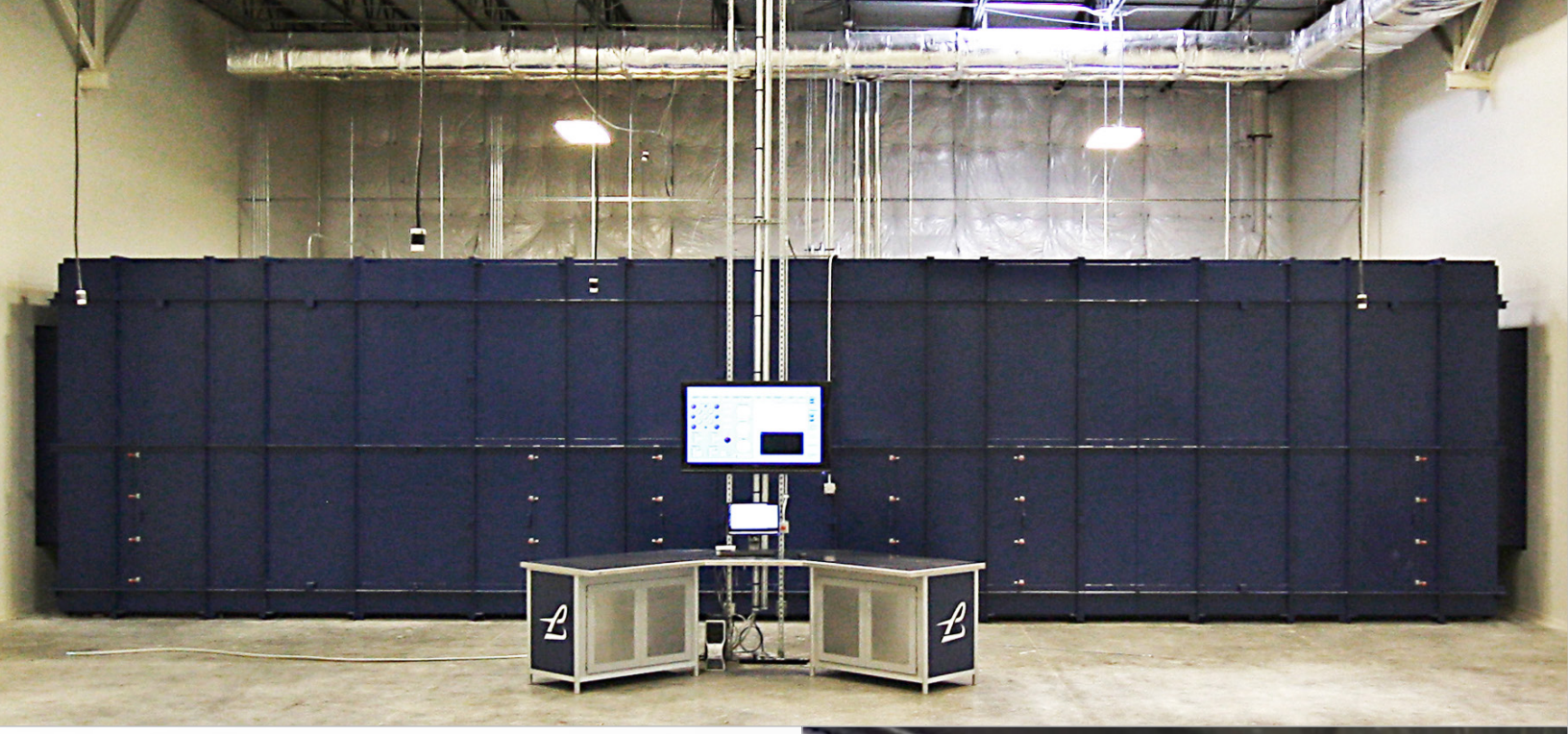
RESEARCH & TRAINING

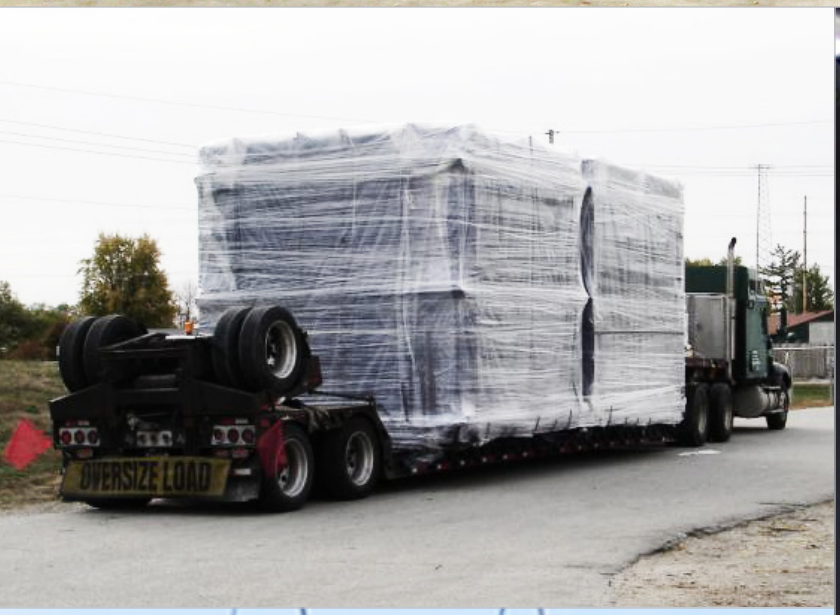
The new PennBarry Research and Training Facility is up and running. We are hosting seminars and tours of the facility and are running preliminary tests to prepare for the Air Movement And Control Association (AMCA) Accreditation process at the end of the year, followed by the Underwriters Laboratories (UL) Test Data Program in 2012.

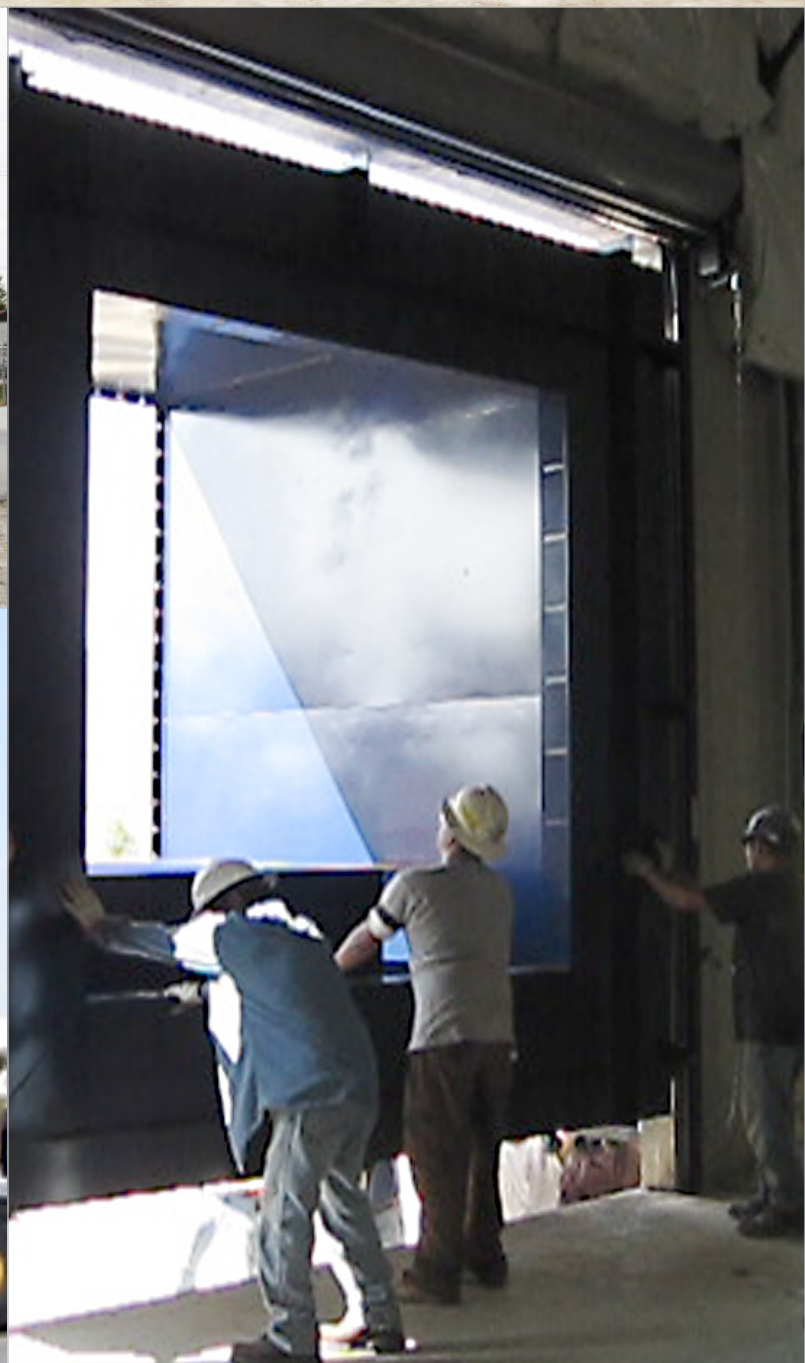
The state of the art lab facility has airflow, acoustic, reliability, and safety testing capabilities and is used for research and development of PennBarry products as well as certification to AMCA Air and Sound and UL standards. Our goal is to achieve the AMCA Accredited Laboratory for air performance testing (per AMCA Standard 210), inlet and outlet sound testing (per AMCA Standard 300) requirements, and become a member of UL's Client Test Data Program (CTDP). The lab is designed to test all types of commercial and industrial fans.

The custom data acquisition system displays data in real time for fast and accurate testing and to eliminate the possibility of human error. As required for AMCA Laboratory Accreditation, test results are periodically compared with tests of the same fan's performance in the AMCA laboratory to verify the accuracy of results. UL's CTDP requires that all UL tests are witnessed annually by UL auditors to assure test procedures are maintained to UL requirements. The data acquisition system, along with the checks required to maintain our AMCA and UL lab accreditations, ensure that PennBarry data are accurate and certified.

The PennBarry headquarters in Plano, TX houses PennBarry sales, marketing, and engineering, as well as support functions such as accounting and operations. The headquarters is home to a 3,200 sq.ft. training facility where employee, representative, engineer, and contractor training on commercial and industrial fans, kitchen hoods, makeup air, and energy recovery ventilation is held.




OVERSIZE LOAD



RESEARCH & DEVELOPMENT

The PennBarry Research and Development Lab is capable of performing tests ranging from the research and development of products to certified airflow and sound test for catalog data. Located adjacent to the lab is a 5,000 sq.ft., fully functional model shop, which allows engineering to immediately prototype product components and designs.

Testing & Equipment Summary

- Two (2) reverberant acoustic chambers capable of full octave band data collection
- Custom data acquisition software
- 65,000 cfm airflow tunnel
- 5,000 cfm airflow tunnel
- Salt spray and corrosion chamber
- Vibration and modal analysis both static and dynamic
- Stress and strain gauging
- Overspeed chamber for rotational failure analysis
- Cycle fatigue
- Full range electrical monitoring and consumption analysis

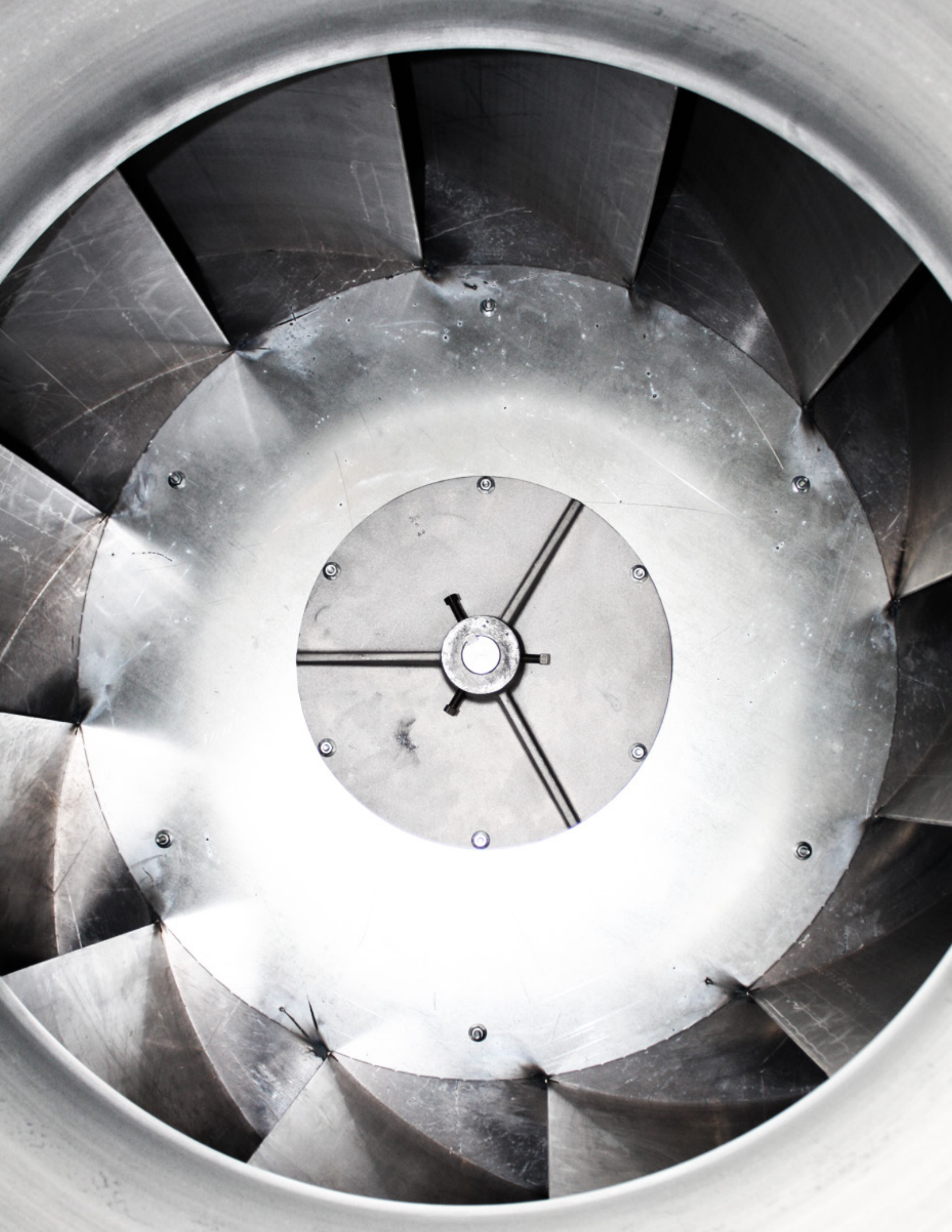
Model Shop Equipment & Capabilities

- CNC Laser Table
- CNC Lathe
- CNC Mill
- CNC Brake Press
- Roll Former
- Shear
- Drill Press
- Keysetting Broach
- Sand Blast
- TIG,MIG,and Arc Welding
- Miter

AIRFLOW TEST TUNNEL

The core of the PennBarry Research and Development Laboratory, completed in 2011, is the airflow test tunnel placed between our two semi-reverberant sound rooms. Each of the two 42,000 cubic ft sound rooms has a bank of 16 silencers and will be capable of acoustic testing on fan inlet and outlet. The two rooms make up the AMCA Figure 12 and Figure 15 semi-reverberant chambers required for AMCA Sound certification. Located between the two sound rooms is the Large Airflow Tunnel. The sound room / airflow tunnel orientation was designed to minimize test setup time by allowing for multiple airflow and sound tests to be performed with a single setup. For lower airflow fans, the lab also has a 5,000 cfm portable airflow tunnel.

The 65,000 cfm Large Airflow Tunnel was designed by PennBarry engineering and manufactured by our Lebanon, IN factory. The tunnel is approximately 13 ft tall, 13 feet wide, and 50 ft long. It was an impressive sight to see the four tunnel sections arrive on two flatbed trailers, be hoisted onto the dock with a crane, and be maneuvered through the lab's 14 ft dock doors by sheer manpower.



TESTING PROCEDURES & STANDARDS

Air Performance Testing - AMCA Standard 210

Air testing is performed using test chambers designed per AMCA Standard 210. During these tests, airflow, pressure, RPM, and fan input power are measured at various operating points. Static pressure can be adjusted during the test by the use of an exhaust or supply fan along with a damper. This setup allows the fan performance to be measured over its full range. Airflow is determined by measuring the differential pressure across flow nozzles. Static pressures are measured in chambers that have relatively large areas, which reduce velocities and ensure accurate and repeatable readings. Data is gathered by a data acquisition system that records and displays real time results.

Sound Testing - AMCA Standard 300

Sound testing is performed in a semi-reverberant room using the substitution method. In this method, sound pressure levels of a reference sound source, with known sound power levels, are measured. The relationship between measured pressure levels and known power levels is used to determine the room characteristics. This is performed before each fan sound test, since variables such as ambient conditions and fan location, can change the room characteristics. The sound power levels of a fan are then determined by measuring its sound pressure levels and adjusting for room characteristics as determined by the substitution method described above. This approach is used by AMCA to establish a uniform testing procedure for laboratories that is both accurate and practical.

Static and Dynamic Stress / Strain Testing

When new products are developed, rotational speed limits of the impeller need to be determined and verified as valid. To determine these limits, computer models are generated and analyzed using Finite Element Analysis (FEA). Strain gages can then be placed on fans in the high stress areas determined by FEA and engineering judgment to verify the accuracy of the computer models. The signals from these gages are transmitted through slip rings so the strains are recorded while the fan is running. Speeds and operating points can be changed while monitoring the strains to simulate worst case conditions. Both static and dynamic strains can be recorded.

Vibration Testing and Modal Analysis

Complete fan assemblies can be analyzed for structural rigidity by taking vibration measurements at various speeds. A number of diagnostic tools including balancers, spectrum analyzers, and modal analysis equipment are used.

Cycle Endurance Testing

In addition to FEA and strain testing, some products are cycle tested for long periods in order to analyze wear patterns and any indications of fatigue that may develop.

Safety Testing

UL standards cover safety testing, such as motor temperature rise testing, abnormal or extreme voltage testing, rain testing, and dielectric voltage-withstand testing. The majority of testing monitors motor temperatures and current draw to verify safe operation of the test units in various field conditions, including unfavorable and extreme conditions.

Connect with PennBarry

PennBarry Product Solutions

COMMERCIAL

Roof & Wall Exhaust Centrifugal Fans

Ceiling, Wall, & Inline Centrifugal Fans

Roof Supply Centrifugal Fans

Square & Round Centrifugal Fans

Wall Mounted Axial Fans

Hooded Roof Axial Fans

Upblast Roof Axial Fans

Gravity Ventilators

Roof Curbs

INDUSTRIAL

Utility Vent Sets

Freestanding Centrifugal Fans

Industrial & Material Handling Fans

Tubular Centrifugal Inline Fans

Mixed Flow Centrifugal Fans

Plug & Plenum Fans

Wall Mounted Propeller Fans

Tubaxial Fans

Vaneaxial Fans

Bifurcator Fans

Fume Exhaust

ENERGY RECOVERY

Outdoor Units

Indoor Units

KITCHEN VENTILATION

Kitchen Hoods

Make-Up Air Units

Exhaust Fans

PENNBARRY™

Moving Your Way

PennBarry is proud to be your preferred manufacturer of commercial and industrial fans and blowers. Learn how PennBarry products can assist you in your next application by contacting your PennBarry Representative or visiting us on the web at www.pennbarry.com.

PennBarry | www.pennbarry.com | pennbarrysales@pennbarry.com | tel: 972.212.4700 | fax: 972.212.4702