A BRIEF REVIEW OF ASME PTC-13 WIRE-TO-AIR PERFORMANCE TEST CODE FOR BLOWER SYSTEMS

Finally, a test code has been created that will provide accurate performance comparisons for both positive displacement and dynamic (centrifugal) blowers. PTC-13 provides procedures for determining the required total operating electrical power of a packaged blower system, termed the "wire-to-air" performance.

ASME PTC 9 and PTC 10

Previous ASME Test Codes PTC-9 for positive displacement and PTC-10 for dynamic machines were inadequate for current technologies and the demands of customers and the market. PTC-9 for positive displacement blowers is an inactive specification. The ASME website states, "This standard is no longer an American National Standard or an ASME-approved standard. It is available for historical reference only." (www.asme.org)

AERZEN (and others) recognized the inadequacies of PTC10 many years ago and wrote about it in a white paper titled "Why ASME PTC10 is not sufficient to define the testing of a High-Speed Turbo Blower".

1. PTC10 allows for measuring the flow at the inlet of the blower. This assumes all the air entering the blower comes out of the discharge connection, which may not be true.

2. PTC10 does not provide any guidelines for a contractual guarantee. Commercial items were outside the scope of this test code.

3. PTC10 does not discuss or make any reference to the term "wire-to-air." This was a test code primarily for bare stage testing and not appropriate for a packaged blower system with an integrated high-speed motor, variable frequency drive, controls, filtration, etc.

4. PTC10 does not show any test arrangement where the blower is inside the box (the enclosure). Today's customer and the market purchase a blower with a sound enclosure for the most part. The heat that could be trapped inside the enclosure and the pressure loss through the inlet air filtration will negatively impact the blower performance.

5. PTC10 would allow a turbo blower test of just the blower core. As stated earlier, PTC10 was written back in the days when a blower or compressor stage could be easily separated from the rest of the system and tested as an individual component.

Overall view of ASME PTC 13 conforming factory test facility at Aerzen Coatesville facility.

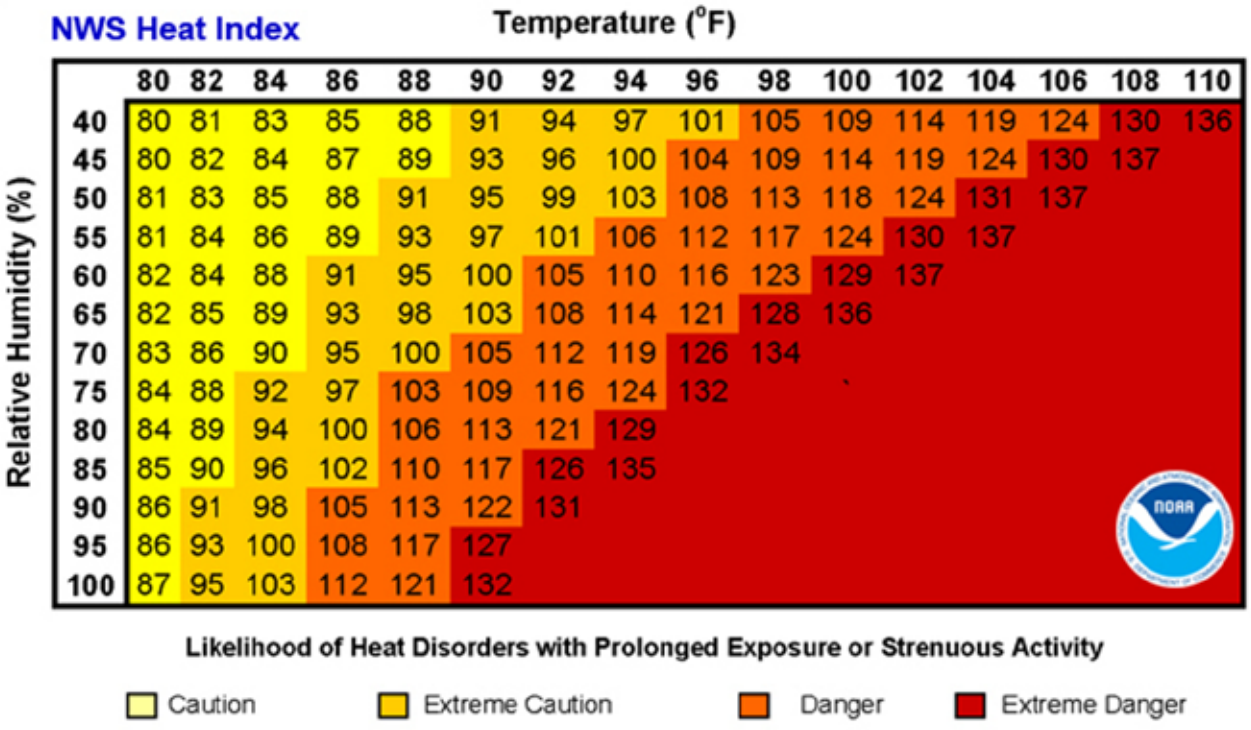
PTC13 was written by a group that represented ASME, equipment manufacturers, specifying engineering authorities, and end users. Aerzen is proud to be a member of the PTC 13 committee.

ASME PTC 13 was developed to attain the following goals:

- Develop a procedure to accurately verify the overall electric (wire) power required by an aeration blower to supply a specified volume of air, with a specified pressure rise, at a specified set of anticipated site inlet conditions.
- Focus on testing the total power required for all power consuming devices in modern integrated blower packages.
- Make the Code applicable to both dynamic (axial and centrifugal) and displacement blower packages.
- Make the process of blower testing more accessible for specifiers and purchasers of WRF blowers by simplifying thermodynamic guidelines

While this appears to be a perfect solution for all stakeholders, caution that this test code is not "self-driving" and the specifier must still get his or her hands "dirty" in order to get the desired results. Several decisions should be made, including:

1. What operating points should be tested? This takes some educated guesses, but you want to specify to the best of your ability, operating points that represent where the blower will operate when you get it installed at your plant. Many times, we see specifications that will list the historical maximum ambient temperature along with 100% relative humidity. While this seems like a prudent decision, a deeper investigation would reveal that this combination rarely, if ever occurs. The "heat index" is determined by the combination of ambient temperature and relative humidity. As an example, a US record heat shows an index in Iowa of 131 F...90% RH and 92 F



While PTC 13 is an ideal technical solution for evaluating blower performance, it does not provide any contractual commercial guidance.

Another downside of specifying extreme ambient conditions is that the blower needs to be oversized to provide the lbs. of O2 needed for aeration, possibly leading to less efficiency at your normal operating point and reduced turndown.

2. The test code is written for determining the wire-to-air performance of a blower system in a controlled environment. A decision needs to be made on what is included in the "blower system." A checklist of components and boundaries is shown in PTC 13 for reference.

3. Commercial agreements are not provided for by this Code.
   a. What is the method for comparing test results with specified performance? Is there an allowable power tolerance between the guarantee and the test?
   b. What is the penalty or remedies if the test results fall short of the guarantee? How should the blowers be evaluated when performance results come in more positive on most specified points but may have a few points with greater energy consumption? Are these results to be averaged, or do they stand independently?
   c. If multiple blowers are purchased for the same application, are all the blowers tested? Does each test result stand independently, or are the results averaged?

A comprehensive list of items for which agreement shall be reached prior to conducting the performance test is included in Section 3 of the Code. Some other important items not listed above include: Will the test be witnessed and who pays that cost? Will the test only be for establishing performance, or will there be other mechanical considerations such as vibration and noise? What amount of documentation is required, pre-test and post-test?

Finally, PTC13 testing is not for everyone. It is a rigorous test that may add cost and time to the project. Customers and specifying engineers should think about whether PTC13 testing adds value for the project. For example, if you are only purchasing small HP blowers, say 50 HP or less, the energy usage of Brand A blower versus Brand B blower may not be so important since energy savings may be minimal.

As a blower manufacturer, Aerzen wholeheartedly welcomes this new testing standard as it will:

1) Bring more awareness to the test procedures and methods used by manufacturers.

2) Add much-needed clarity during the bid phase of a project.

3) Allow customer to make accurate performance comparisons between different blower technologies and manufacturers.

LET'S TALK

Darrel Hill, Director of Industrial Sales
+1 610-470-3492 darrel.hill@aerzen.com

AERZEN USA CORPORATION
108 Independence Way – Coatesville, PA 19320
United States
Telephone: +1 800-444 1692 – Fax: +1 610 380 0278
USA-Inquiries@aerzen.com – www.aerzen.com/en-us

AERZEN
EXPECT PERFORMANCE