

Top 10 Considerations for Acoustical Testing



TOP 10 CONSIDERATIONS FOR ACOUSTICAL TESTING

Following is our Top 10 list of the most important things you need to consider to get the most out of your acoustical product testing experience. To start, how well do you know your products? If you have never tested your products at an acoustical testing laboratory, you probably do not know them as well as you should. The information gained from acoustical testing is an essential part of architectural specifying and manufacturing and can have an impact on your clients' satisfaction, contracts, and bottom line.

Testing shows the acoustical performance of your products and quickly identifies leaks and under performance that can lead to unhappy clients and possibly legal actions. In other cases, many manufacturers over design their products to ensure conformance and satisfy performance ratings requirements. For example, architects typically call for Sound Transmission Class (STC) ratings for windows, doors, and other partitions in buildings; these ratings come from an ASTM E90 test that can only be conducted in a test laboratory. A series of laboratory tests with detailed report data can help identify components that can be value-engineered to meet the needed performance. The end result could likely add up to significant cost savings for a product line and ensure a happy client.

These Top 10 considerations are the result of ETS-Lindgren's decades of experience in acoustical testing. We test a wide range of products in our accredited Acoustic Research Laboratory (NVLAP Lab Code 100286-0) located at our headquarters in Cedar Park, Texas. In addition to standardized testing, our Acoustic Research Lab conducts customized test programs to answer client-specific product research and development needs, provide independently proven product noise emission information, and ensure product compliance requirements. Our lab includes multiple acoustic test chambers including a reverberation chamber suite used for determining sound transmission loss, sound absorption, and noise isolation. The lab also houses a hemi-anechoic chamber used to measure noise emissions and sound power determinations. The entire laboratory operates under a quality system that meets the strict requirements of ISO/IEC 17025:2017 and general requirements for the competence of testing laboratories.

So what do you need to know to maximize your investment in acoustical testing? Our veteran acoustical team shares its Top 10 tips from selecting the test lab, to preparing your product to expedite test time, to reviewing the test data obtained on your product. You will find ETS-Lindgren's expertise in this guide created to ensure a successful acoustical test experience and high return on your investment.





1. Use a testing laboratory that is third-party accredited to test to the latest requirements of a specific standard, such as MIL-STD-1474E, ASTM E90, ASTM E596, ISO 3744, and ISO 7779.

Examples of widely accepted accrediting bodies are the National Voluntary Laboratory Accreditation Program (NVLAP), the American Association for Laboratory Accreditation (A2LA), and the International Accreditation Service (IAS). Accreditation is a demanding but extremely important process for any testing laboratory. Accreditation is designed to guarantee that the laboratory has a quality program that helps assure the results provided to you are verified, open to audit, and meet all requirements of the test standard. Visit the accrediting body's website to locate a lab near you that can perform the test you are requesting (www.nist.gov/nvlap or www.a2la.org or www.iasonline.org). These accrediting bodies also ensure that all testing equipment is calibrated within current intervals to provide proper measurements. If you would like to know more about equipment calibration, ask to see the laboratory accreditation and equipment calibration records.

2. Choose a lab with demonstrated quality procedures and oversight; accredited laboratories are independently verified to have well-documented testing procedures.

This is very important as technical competence alone is not enough to be considered a superior acoustical laboratory. A reputable quality policy ensures that staff is well trained and tests are repeatable and reliable. A good example is ISO/IEC 17025:2017 which is a thorough and rigorous quality program. It is subjected to internal audits on both a scheduled and unscheduled basis. These audits are detailed and company management is required to follow any findings and resolutions. In addition, each accredited laboratory is audited biannually by external assessors that are experts in acoustical testing. The National Institute of Standards and Technology (NIST) ensures that these assessments are thorough, both from a management and a technical basis. The unofficial slogan of "continuous improvement" is something that all testing laboratories should take to heart.



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3. Select your laboratory with care and foresight. Does the lab provide acoustical testing services for internal and/or external clients? Does the lab maintain confidentiality?

Many acoustical testing laboratories test for both internal and external clients. If that is the case, talk to the laboratory staff to confirm that they treat both internal and external clients in the same manner; that is, the same level of service, integrity of staffing, and confidentiality of results are unmistakably maintained throughout the process. It is essential that all results and data are stored separately from other computer users to maintain control of this confidentiality. Ensure that a third party verifies the lab's confidentiality program. A top quality laboratory should have a vigorous, established confidentiality program. At all laboratories, the information, data, and accredited reports are yours alone. Keep in mind that you paid a fee for these testing services and you own the results. For your product's protection, make sure that the testing lab cannot discuss or disseminate in any manner these results to others without your prior written consent.

Accrediting bodies assure confidentiality of client results to protect your product. With strict controls in place, any experienced acoustical lab can function as an independent test facility for your needs. The performance of the products a lab tests should be just that — a metric that stands on its own irrespective of any specific job or past performance claims. This is the only fair and impartial way to test for all laboratory clients.

4. Select a laboratory that operates with full transparency.

Transparency cannot be underestimated. You should be welcome to visit, participate in, and witness all facets of the test program. Remember that you are purchasing the test time at the lab. It is your time and you should be involved with the testing as much or as little as you desire. This transparency should begin with your first contact with the laboratory. If your questions are not answered to your satisfaction or if it seems the laboratory staff is being evasive or impatient, contact a different laboratory.

At the end of the program, you should feel confident in the laboratory's capabilities and have a better understanding of the acoustical data that your product received. The data is more than a rating of your product. It provides insight into how your product is performing and can serve as an indicator about how to improve your product's design.

Make sure you know how the data corresponds to your product's performance. If you find that you have questions about your data days or weeks later, contact the laboratory and ask those questions. You should never have unanswered questions about your data.

Be sure to ask questions about any part of the testing process that you do not comprehend and expect a technical but understandable answer. Do not be afraid to ask the most basic questions about your test or test program. The laboratory staff are experts in the field of acoustical testing and you should ask as many questions as you need in order to feel comfortable with the tests and the results. Good laboratory staff will respond enthusiastically to questions about the tests and results.



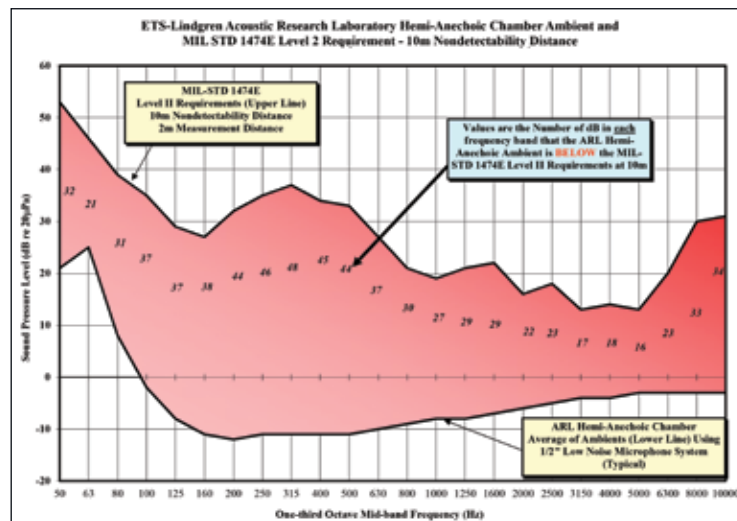


5. As the technology behind your product increases in capability and complexity, make sure your acoustical test lab accommodates increasingly sophisticated products.

For sound emission testing, it is important to find a laboratory that has a test chamber with a noise floor low enough to test your product. For example, with today's tablets and other handheld electronic devices, products (test samples) have become quieter and quieter. As a result, it is increasingly difficult to find a laboratory with the low-noise capabilities to test these quiet products. Ask the laboratory to provide the ambient levels inside their test chamber. This data could be a single number but should be presented by frequency in 1/1 octave, 1/3 octave, or narrow bands. Make sure that the laboratory can prove sufficient measurement headroom in the bands you need tested.

For transmission loss testing, be aware that the testing laboratory will produce signals of over 100 dBA to measure your sample. This high level is needed to ensure test results are not biased due to facility limitations. Sounds used to test the products are closely controlled by the test standard, such as ASTM E90. Understand that these test signals will not sound like something you'd expect (traffic, railroad, aircraft noise, etc.). The specific noise spectrum is designed to ensure that the fenestration product being testing is equally subjected to noise at all frequencies so that the sample's acoustical performance strengths and weaknesses are ascertained without bias to the test signal.

This graph provides an example of the ambient noise level in the hemi-anechoic chamber at ETS-Lindgren's Acoustic Research Lab. The ambient is ideal for testing products that must meet the aural non-detectability requirements specified in MIL-STD-1474E. As a result of this quiet test environment, you can be assured that your test results are not masked by ambient energy. Ask a laboratory you are considering for testing your product to provide data showing the ambient levels inside their test chamber.



6. Accurately describe the product to be tested. This is crucial to the credibility placed on the product by you and, ultimately, your clients.

You are the expert in the products you send in for testing. The lab staff should be expert in acoustical testing and accurately report testing results for the sample provided. Laboratory staff should be deemed proficient in the specific test methods you are requesting to guarantee proper measurements and precise results. It is the laboratory's responsibility to independently confirm as much information about the products as is technically feasible. There should be no ambiguity in what was tested and what was reported. Sometimes the laboratory will seek your help with sample information that is specific to your industry.

7. Request a detailed testing proposal that clearly defines the scope of work being contracted and includes discounted pricing if you need multiple tests of the same product size and type.

The lab should be able to include information on sample throughput and price advantages in the proposal. Ask the lab to provide test efficiency price options based on the product sample and type of testing you require. For one sample, it may be more cost effective to receive a quote based on the number of tests while on another sample paying for lab time by the day may be the most cost effective approach.

Communication is key before the test program begins or is undertaken to ensure that everyone has the same understanding. The test proposal should cover all configurations you anticipate testing, clearly define pricing, and advise the appropriate time for the test series. The test plan agreed upon by you and the laboratory should demonstrate knowledge and foresight by the lab on proper sample handling and give you a clear point of contact for the day of testing. Having a formal proposal and mutually agreed upon test plan make the entire test program much quicker and more efficient.

8. Have your product test samples ready for the test lab environment, including related firmware and hardware.

For transmission loss testing, provide product test samples of the size requested and stated in the mutually agreed upon proposal. For example, most laboratories have specific size requirements and deviations from the agreed upon size can delay testing. Efficient labs have specific sizes to increase throughput of test samples.

For sound emission testing, make sure to provide working samples configured appropriately for acoustical testing. If any firmware changes are needed during testing, make sure those capabilities are also provided for the test. For example, an electronic product sample that requires multiple fan curves likely involves firmware changes.

Remember to supply all associated hardware for operation and set-up shipping/sample return instructions in advance. Good communication between you and the laboratory will ensure that test results are received in a timely manner.

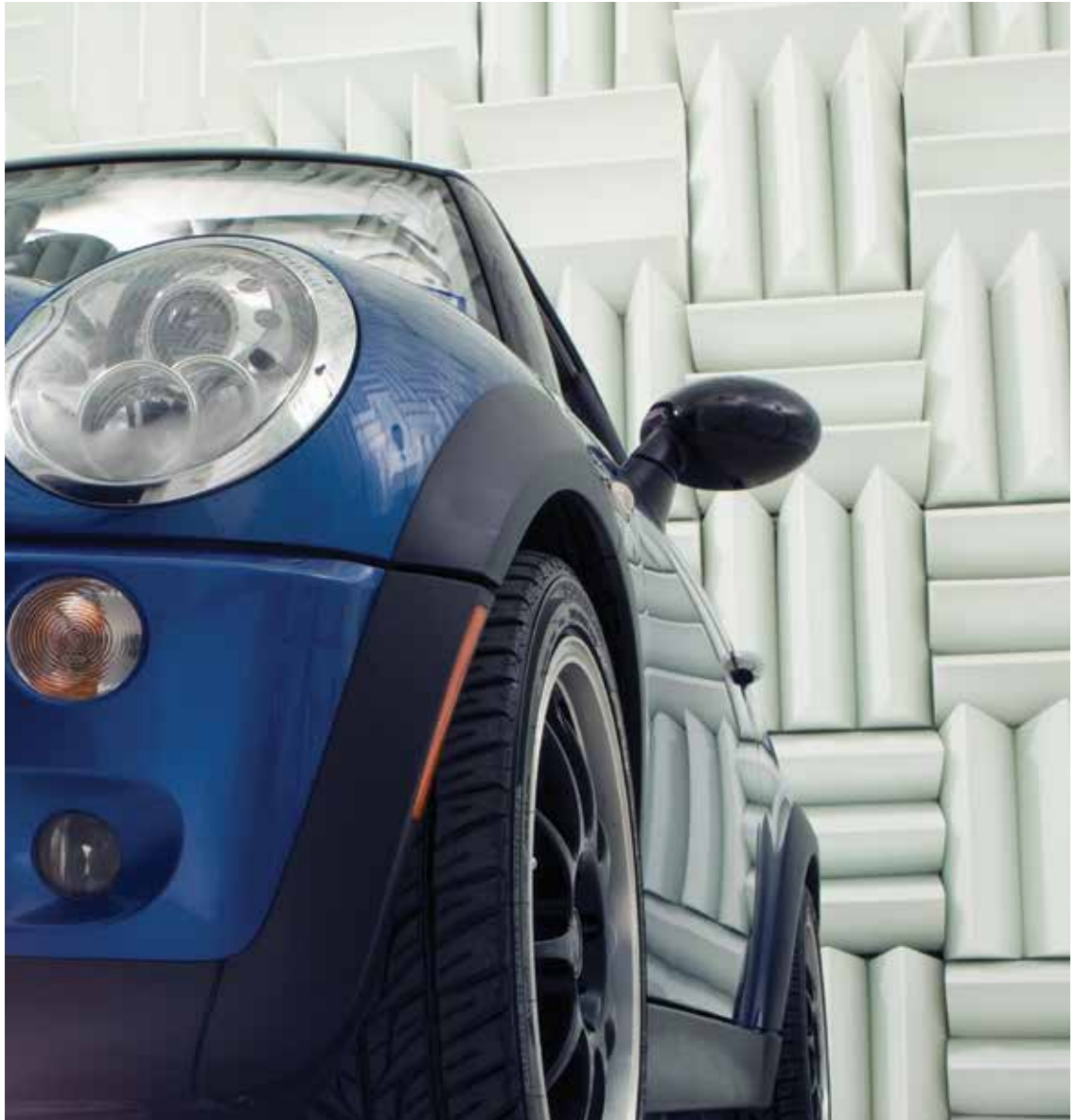


9. Review, evaluate, and approve test results individually.

It is important to understand that all test results apply only to the product sample tested. Discuss anything you do not understand about the data and test report with your testing laboratory. Keep in mind that significant effort goes into testing before your test sample arrives on-site. Quality Assurance initiatives, calibration programs, and proficiency test programs ensure the test equipment is ready to use and the personnel are continually trained and provide exemplary service, which are all part of your sample ratings.

10. Be patient on site at the acoustical testing laboratory.

And last but not least, once you are on site at the test lab, be patient and keep in mind acoustical testing involves much more than the time the data is collected. The pivotal part of a test can take a few seconds to several hours once the test is set up. However, much more time is typically spent on receiving the sample, uncrating it, ensuring appropriate temperature acclimation, and properly setting up the sample so as not to influence the results. These are all activities that are part of the final acoustical test. After testing is complete, most laboratories can provide preliminary test results the same day. If final reports bearing the accrediting body's logo are requested, these should be available within two weeks of final testing.



Whether you're developing products or environments designed to enhance the listening experience, minimizing interference from outside noise and vibration, creating ideal conditions for sound recording, ensuring precise audio measurement, or maximizing the insulating and privacy characteristics of building materials – ETS-Lindgren is the partner that consistently delivers the solutions you need. Contact your local ETS-Lindgren representative, phone us at +1.512.531.6400, or visit our website at www.ets-lindgren.com.



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