



ADVANCED MATERIALS TESTING

High Performance Alloys | Specialty Alloys
Ceramics | Powders



Choosing an Analytical Testing Lab: Your Questions Answered

Accurate and reliable chemistry is a foundational consideration for advanced materials used in products for critical industries such as aerospace, oil and gas, energy, medical devices and additive manufacturing.

That is why choosing the right analytical testing lab is one of the most critical decisions you can make for your product's performance and safety.

Without consistently accurate and reliable chemical analysis, subsequent downstream decisions – including whether a product goes to market – cannot be made with certainty. For that reason, it is beneficial to know certain things about your lab:

- ▶ Do you trust that their methods are comprehensive and accurate?
- ▶ Does your lab have all the accreditations or compliance requirements that your industry needs?
- ▶ Will you get reliable results *quickly*?
- ▶ What happens if they report an out-of-spec or unexpected result?

Reliability in your testing is what gives you confidence in your materials' performance, ensures regulatory compliance and prevents costly failures and recalls down the line. Here are some key questions to consider about the lab for your materials testing.

1.

Do they have proven chemical testing methods and technology in place?

Accurately characterizing the chemistry of advanced materials requires pairing the right methods with your specific requirements. For materials with stringent specifications, This means leveraging proven, industry-leading techniques such as ICP-Optical Emission Spectroscopy (ICP-OES), ICP-Mass Spectroscopy (ICP-MS), and LECO analysis (Combustion Analysis and Inert Gas Fusion).

Selecting a method with the right detection limit for your needs is critical. Many labs offer ICP-OES testing, but not ICP-MS, which enables trace-level detection. Additionally, ICP-techniques alone cannot measure certain elements. This is where complementary methods like LECO testing come in: to analyze the elements in a sample that ICP cannot measure, specifically C, S, O, N and H.

[These testing methods](#) are often combined to generate complete, accurate and repeatable results for most materials. Still, certain elements like mercury or halogens require their own methods such as cold vapor atomic adsorption and ion chromatography. Selecting a laboratory with these comprehensive testing capabilities is crucial to obtaining precise, reliable, and repeatable results, no matter your material.



Did You Know?

NSL Analytical was the first commercial lab to offer ICP-MS in 1994.

Does your project need more than just chemistry testing?

NSL has on-site experience and expertise in mechanical and metallurgical testing.





2.

Do they have the proper accreditations?

Any lab can buy testing equipment, but can you consistently trust the results you get?

Third-party labs that attain and maintain accreditations provide independent validation of a lab's operation. It gives customers confidence that the test results are consistently accurate and produced to the highest quality standards.

Becoming accredited is a rigorous, multi-stage process that requires the lab to have a deep understanding of test standard requirements, comprehensive documentation of policies and procedures, and peer comparisons. Each accreditation is maintained through registrar audits and a commitment to continuous improvement of industry best practices.

Working with a lab that holds accreditations such as Nadcap MTL, ISO/IEC 17025 and NQA-1 gives you peace of mind that your materials tests are held to the highest standards of quality, safety and integrity.



3.

Do they have the experience and expertise?

Having advanced equipment and following published methods is important, but it's only part of the equation. For truly accurate and dependable chemical analysis, you need a laboratory team with demonstrated experience and technical expertise.

- Even standardized tests can yield varying results. How do you determine if results are accurate? Is your lab experienced enough to prevent sample contamination or the loss of volatile elements during preparation? Can they effectively recognize and mitigate analytical interferences?

A knowledgeable laboratory will have rigorous sample preparation, instrumentation, calibration and validation protocols in place. If you supply them with your specifications and requirements, they should be able to fine-tune the tests and procedures to minimize erroneous results and investigate any out-of-spec results before they are reported. Ask specifically about their processes to confirm how they ensure accurate, repeatable results.

Ultimately, reliable chemical analysis requires a team with decades of experience, backed by a suite of internally developed and proven procedures.



4.

What happens if your test results are out-of-spec or questionable?

No one likes to receive failed or out-of-spec results, especially if the issue is the test and not the material. Testing errors can happen at any lab for several reasons. What separates a good lab from a great one is the way they minimize and address those discrepancies.

Most labs should have processes and equipment in place to minimize inaccurate analyses. For example, at NSL, a failed test to a provided standard will trigger an automatic retest or review, minimizing outlier errors. But without the right relationship with your lab, if you still receive results you're unsure of, you might be left with a questionable report without a reliable explanation.

This is why it is critical to find a lab that is a trusted partner who understands you, your business and your material to catch any potential sources of error, from sampling, to test method, to reporting.

Check if you have access to the team performing the test. Can you speak directly with someone, or does your message only get passed down the line? If the test results still don't make sense, what can you do next?

All labs should prioritize alignment on testing needs and expectations up front to minimize potential sources of error. A great lab will proactively work with you, offering direct access to their experts and swiftly addressing any concerns to ensure you have complete confidence in your results.

NSL's scientific and engineering teams work directly with our customers to ensure alignment on intention, specifications and methods, and any questions or troubleshooting are addressed quickly. We minimize delays in reporting by automatically retesting failed results (often in triplicate), with our technical teams assisting to resolve any questionable results.



5.

What differentiates a satisfactory lab from an indispensable partner?

A good lab might prioritize some of the questions above and test your materials adequately. But do they communicate with you at each step? Can you truly – and consistently – trust the results? Will you get them quickly, or be waiting a long time?

A great lab makes these concerns a foundational part of their process and purpose. Above all, the common characteristics of a great lab are:

- ▶ They are approachable and accessible
- ▶ They test your advanced materials using proven methods and technology
- ▶ They have decades of experience and unmatched expertise
- ▶ They have the proper accreditations to validate their operation
- ▶ They have a robust quality management system to ensure precision and consistency
- ▶ They deliver your results with fast turnaround times

NSL Analytical makes you feel like a priority. Since 1945, we've invested in the processes, accreditations and proven testing methods to consistently deliver trustworthy results in days, not weeks.

Got questions?
Need more information?
Reach out to the friendly experts at nslanalytical.com.



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