



# NEXTGEN MATERIAL TESTING

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## Machine Alignment Device (NADCAP-Ready Precision Fixture)

Standards: [ISO 7500-1](#), [ASTM E4](#)



ULTIMATE USER-FRIENDLINESS



LEADING DEPENDABILITY AND RELIABILITY



STRICT COMPLIANCE WITH INDUSTRY STANDARDS



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LIFETIME PRODUCT SUPPORT ADVANTAGE



### Description

NextGen Material Testing's Alignment Device is a precision-engineered fixture designed to ensure perfect axial alignment in universal testing machines. Originally introduced as an optional add-on for NextGen's [Class D dual-column floor-standing UTM](#) systems, this alignment device has proven so vital for accurate testing that it is now offered as a standalone product. It can be retrofitted onto both NextGen machines and third-party frames (such as popular Instron® models), instantly upgrading them to meet the strictest alignment standards. By fine-tuning the load train coaxiality to within  $\leq 5\%$  misalignment, the device eliminates bending stress and off-center loading, resulting in highly reliable and repeatable material test results.

In practice, the alignment device installs between the machine's crosshead and grips (or fixtures), allowing for initial coarse positioning followed by fine adjustments via an integrated high-precision coaxiality meter. After the initial setup, the system's coaxiality detection mechanism enables operators to dial in precise alignments, achieving full compliance with alignment standards like ASTM E1012 and NASM 1312B. The outcome is a test frame alignment that meets or exceeds stringent requirements for aerospace and other quality-critical industries. Labs can leverage this device to ensure uniform force application, preventing the subtle bending stresses that can cause premature specimen failures or data inaccuracies. The Alignment Device is compatible with a wide range of load capacities (from low-load testing machines up to high-capacity floor models) and is constructed to be durable and rigid, so alignment is maintained even under maximum loads.

### Alignment Device Advantages

- **Precision Alignment ( $\leq 5\%$  Coaxiality Misalignment):** Achieves exceptionally tight load alignment, minimizing bending and eccentric forces. This level of precision ensures compliance with ASTM E1012 and NASM 1312B alignment standards, which is critical for achieving [NADCAP](#) accreditation in aerospace testing labs. The built-in coaxiality meter guides the user to adjust alignment until the load train is virtually perfectly centered.
- **Enhanced Test Result Reliability:** By removing misalignment-induced errors, the device delivers accurate and repeatable test outcomes. Engineers can trust that variations in

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test data are due to material behavior, not quirks of the test frame. This improves the statistical significance of results and reduces the need for re-tests due to suspect data.

- **Versatile Application:** The alignment fixture supports tensile, compression, bending, and other test modes without modification. Whether you are pulling metal specimens to failure, compressing aerospace components, or flexural testing composites, the device maintains the coaxial alignment of the specimen throughout the test. This versatility makes it suitable for labs dealing with multiple types of mechanical tests.
- **Cross-Platform Compatibility:** Designed for universal adaptability, the NextGen alignment device can be installed on NextGen's own [Class D UTM](#) machines as well as third-party testing machines (e.g., Instron). Its mounting system and adjustment interfaces are standardized, allowing seamless integration with most universal testing frames. This protects your investment – you can use the same alignment tool across different machines in your lab, or even if you upgrade equipment.
- **Standards Compliance & NADCAP Readiness:** Using this device helps laboratories conform to the highest international testing standards (ASTM, ISO, DIN, etc.) and meet specific alignment criteria set by programs like NADCAP. In fact, integrating this fixture enables labs to be "[NADCAP ready](#)," since it ensures the alignment calibration required during audits is in place. The device directly addresses requirements from standards such as ASTM E1012 (verification of testing frame alignment) and ISO 23788 (alignment of fatigue testing machines), and helps satisfy audit criteria (e.g., NADCAP AC7101/AC7122 for materials testing) by keeping alignment error within permissible limits.
- **Improved Operator Efficiency and Confidence:** The alignment process is straightforward and quick. After installation, operators can perform alignment verification in-house without lengthy downtime. The device's coaxiality indicator provides immediate feedback, saving time compared to trial-and-error methods or the need for external alignment services. With confidence in the alignment, engineers can focus on the test itself rather than worrying about equipment setup.



### Importance of Precise Alignment in Testing

Even slight misalignments in a test system can dramatically affect the outcome of material tests. If the test specimen is not perfectly aligned with the machine's loading axis, it will experience uneven stress distribution. Misalignment causes the specimen to bend under load, creating strain "hot spots" near the gripping points and leading to premature failure at the grips. In a tensile test, for example, a misaligned specimen often breaks at or near the grip faces instead of the gauge length, indicating that bending stress, not just axial tension, contributed to the failure.

These unintended bending stresses not only cause early breakage but also distort the measured results – the material may appear to have a lower elongation or strength than it



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actually does, due to the added bending component. In short, poor alignment can mask the true behavior of the material.

Without a precision alignment device, labs may find that stiff or brittle materials frequently fracture outside the expected gauge region at seemingly low loads. This is a classic symptom of misalignment: the specimen is effectively being stressed in a combination of tension and bending, causing it to fail earlier than it should. Such failures and data are not reliable for analysis or certification. Moreover, non-uniform force application violates the assumptions of many testing standards, potentially putting a lab out of compliance. ASTM and ISO testing protocols assume that the force is applied axially; if that is not the case, the calculated material properties (like tensile modulus, yield strength, etc.) can be significantly in error. Engineers in aerospace, automotive, and metallurgical fields are particularly sensitive to these issues because even minor data inaccuracies can lead to improper material selection or unexpected component failures in service.



From a quality and accreditation standpoint, precise alignment is not optional – it is mandatory. The ASTM E1012 standard was developed specifically to address this: it outlines how to verify and quantify the alignment of a testing frame because industry studies showed that misalignment-induced bending can seriously skew test results. In aerospace and defense testing, the NADCAP program similarly requires proof of proper alignment as part of its Materials Testing accreditation. During NADCAP audits, laboratories must demonstrate that their tensile or fatigue test frames have been aligned within allowed tolerances (often using strain-gauged specimens per ASTM E1012 or similar methods). Failure to control alignment can result in audit non-conformances, meaning the lab cannot achieve or maintain NADCAP accreditation until the issue is fixed.

This is why an alignment device is so critical. By using NextGen's Alignment Device, labs ensure uniform, axial loading of test specimens, which improves result reliability and repeatability dramatically. It eliminates one of the biggest hidden variables in materials testing. When alignment is taken care of, any variations in test results are truly due to material differences or natural scatter – not an artifact of test setup. This not only boosts confidence in the data but also means labs can meet the requirements of strict standards and customer specifications (for example, NADCAP or OEM mandates that tests be done under aligned conditions as per ASTM E1012).

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## Standards Compliance and NADCAP Integration

The Alignment Device is engineered to help your lab meet key industry standards and accreditation requirements related to testing machine alignment:

- **ASTM E1012** – Standard Practice for Verification of Testing Frame and Specimen Alignment. This device enables you to verify and adjust frame alignment in accordance with ASTM E1012, ensuring that any bending strain in the specimen is within the allowable percentage. By achieving a coaxiality of  $\leq 5\%$  during setup, you're directly adhering to ASTM E1012 guidelines for minimal misalignment. The result is reduced measurement error in tensile, compressive, and fatigue tests, as required by this standard.
- **NASM 1312B** – This is a specification derived from aerospace requirements (originally stemming from MIL standards) that also demands strict alignment in fastener and material testing. The NextGen alignment fixture meets the NASM 1312B criteria for coaxial loading, which means it's suitable for use in testing scenarios governed by this aerospace methodology. In practical terms, if your projects or contracts reference NASM 1312 series test methods, this device will ensure your setup complies.
- **DIN / ISO Standards** – Many European and international standards emphasize proper alignment (for example, ISO 23788 for fatigue test machine alignment and parts of ISO 6892 and DIN 50100 series for tensile testing procedures). Using the alignment device helps laboratories conform to these global standards by maintaining the alignment within specified limits. This is important for multinational companies or those selling to global markets, as compliance with DIN and ISO standards is often required. The device's capability to reduce misalignment to negligible levels supports adherence to the alignment verification guidelines found in these standards, ensuring that tests conducted are valid under ISO/DIN criteria.
- **NADCAP** (National Aerospace and Defense Contractors Accreditation Program) – For labs seeking NADCAP accreditation in materials testing, alignment measurement is a mandatory component. NADCAP audit checklists (AC7101 for materials testing laboratories, and AC7122 for nondestructive testing, etc.) include verifying that test frames meet alignment tolerances (often referencing ASTM E1012 as the method). NextGen's Alignment Device is NADCAP-ready by design – it was developed specifically to help labs pass the stringent NADCAP alignment requirements. By ensuring your tensile or compression frame is aligned within  $\leq 5\%$  bending, the device reduces testing variability and helps you meet NADCAP audit requirements with confidence. When installed, it provides documented evidence of alignment control, which you can present during audits to demonstrate compliance. For detailed information on how NextGen equipment supports NADCAP compliance, please refer to NextGen's Accreditation and Certification of Testing Equipment page, which outlines our commitment to industry standards and includes our NADCAP alignment solutions.





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In summary, the Alignment Device acts as an insurance policy for your testing process: by meeting or exceeding all these standards, it ensures that your lab's test data will be accepted in regulated industries. Whether it's an internal quality system audit, a customer inspection, or a formal accreditation process, having this alignment fixture in place signals that your lab takes accuracy seriously and has the tools needed to prove it.

### **Contact for Estimate**

Ready to elevate your testing accuracy and compliance? Contact NextGen for an Estimate – our team will be happy to discuss your needs and provide a tailored quote. [Request a consultation or quote through our online form](#), and take the next step toward NADCAP-ready precision in your lab.

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