Zwick / Roell

Product Information

Alignment Verification - Verifying Test Axis Alignment

Rising quality requirements have caused the traceability of the geometrical alignment of materials testing machines to increase in importance.

The standardized option is described in ASTM E1012 and includes a recorded inspection of test axis alignment. The electronic measurement of bending influences that can arise as a result of the smallest angular errors or offset in the test axis is required.

Alignment verification is a component of Nadcap accreditation and is based on ASTM E1012, which stipulates compliance with defined tolerances.
This is reflected in Nadcap-defined audit criteria AC 7101 and AC 7122, which are decisive for the general conditions of the procedure, i.e., the verification of test axis alignment. Alignment verification is also recommended, for example, in ISO 527-4 Annex A.

In addition to aerospace manufacturers and service providers, an increasing number of companies in other industries are affected by alignment verification as part of Nadcap accreditation requirements.

What is Nadcap?

Nadcap stands for "National Aerospace and Defense Contractors Accreditation Program" and was originally a global accreditation program for suppliers to the aerospace and defense industries.

Its goal is to provide economical approaches for specific processes and products and to promote continuous improvement within accredited companies.

In contrast to certification of quality management systems according to ISO 9001 and EN 9100, Nadcap accreditation includes both detailed examination of special technical processes and an audit with regard to the observance of defined specifications and guidelines.

Aircraft manufacturers in particular define extremely stringent requirements for the technical and personnel qualifications of testing laboratories. These requirements are specified in standards, directives, and audit criteria, and are checked through Nadcap audits allowing maximum process stability to be attained and standardization of quality guaranteed.

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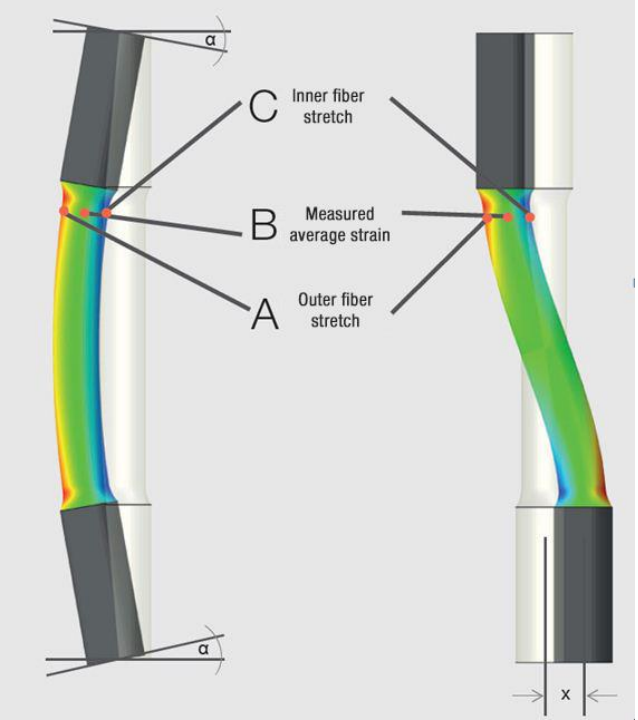


Graphical representation of the effect on specimens of angular and concentric test axis alignment errors

Procedure

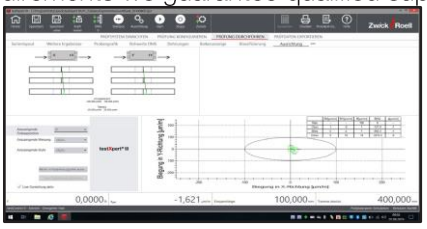
Based on ASTM E1012, strain-gauged alignment transducers, which preferably conform to the geometry of the specimen to be tested at a later time, are required.
The strain-gauged alignment transducer is clamped in the test axis and loaded in the elastic range.
Electrical connection of the strain-gauged alignment transducer is via an HBM measurement amplifier and Catman software, which supplies the test data to ZwickRoell's testXpert software.

In the event of non-uniform force application to the specimen, the strain gauges will register different strains. These will be calculated in the testXpert software in accordance with
ASTM E1012. Convenient, clearly presented evaluation in testXpert enables defined errors in the test axis to be identified on the basis of characteristic results.

In addition, testXpert provides adjustment recommendations for the alignment fixture option, allowing detected alignment errors to be corrected easily and precisely.

What we offer

- By using standardized strain-gauged alignment transducers, ZwickRoell guarantees a high degree of comparability with customer-specific specimen dimensions (adaptation).
- Individual geometry data can be converted into an alignment transducer.
- We can also perform alignment verifications as a DAkkS-accredited service as part of an inspection and calibration.
- Alignment verification is quick thanks to ZwickRoell's standard-compliant strain-gauged alignment transducers.
- Continuous graphic and numerical display of measurement results B and PB.
- Predefined test sequences consist of zero-measurement, measurement clamped without axial strain, measurement under load, zero-measurement repetition, measurements at various transducer mounting positions, and top-down measurements.
- Precise results via measurement of inverted positioning.
- Complete, detailed recording of results as required by the standards and beyond (incorporation of images possible).
- Factory test report stating mechanical and electrical characteristics of the ZwickRoell alignment transducer.
- Complete integration of the HBM measurement amplifier functions in the testXpert testing software.
- Everything from a single source—from consultation to completion
- Correction of alignment errors through adjustment with the optionally available alignment fixture.
- Alignment verification is also possible on testing machines from other manufacturers.
- In the event of questions or individual requirements we guarantee qualified support.



Convenient testXpert testing software with adjustment diagrams directly display the individual components of the alignment error and adjustment instructions for the operator.

We reserve the right to make technical changes in the course of ongoing development.

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Your requirement, our solution

To enable us to perform alignment measurement at your premises, the test axis of your materials testing machine is checked by one of our qualified service technicians using the following components:

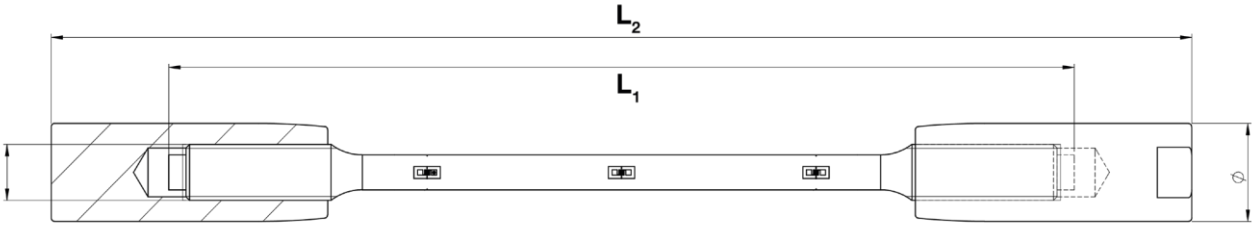
- An alignment transducer from our standard equipment or, upon request, an alignment transducer applied according to your specific requirements
- HBM measurement amplifiers
- testXpert alignment software

Verification and alignment can be performed on both static and dynamic ZwickRoell testing systems.

Upon request, we will check the implementation on testing systems from other manufacturers. Production of customized specimens according to individual geometric data is also possible.

For quick and easy alignment of the test axis, we also offer an optional alignment fixture.

ZwickRoell standard round specimens for alignment verification				
Standard	ASTM E1012	ASTM E1012	ASTM E1012	ASTM E1012
Procedure	**Nadcap AC7101 for metals**	**Nadcap AC7101 for metals**	**Nadcap AC7101 for metals**	**Nadcap AC7101 for metals**
Direction of test	Tensile direction	Tensile direction	Tensile direction	Tensile direction
Alignment transducers used				
Nominal forces of the machine	Max. 20 kN	Max. 50 kN	Max. 100 kN	Max. 250 kN
Application	12 times	12 times	12 times	12 times
Number of measurement planes	3	3	3	3
Strain gauges per plane	4	4	4	4
Fmax of the alignment transducer	**8 kN**	**20 kN**	**40 kN**	**100 kN**
Standard measuring points	10/ 20/ 40% - 2 kN/4 kN/8 kN	10/ 20/ 40% - 5 kN/10 kN/20 kN	10/ 20/ 40% - 10/ 20/ 40 kN	10/ 20/ 40% - 25/ 50/ 100 kN
Protective tabs	- Necessity depends on the specimen grips used -			
Gripping dimensions without protective elements L1	L: 189 mm Thread M12	L: 262 mm Thread M16	L: 262 mm Thread M16	L: 398 mm Thread M24
Gripping dimensions with protective elements L2	L: 265 mm Ø 18 mm	L: 334 mm Ø 24 mm	L: 334 mm Ø 24 mm	L: 443 mm Ø 30 mm



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All data at ambient temperature.

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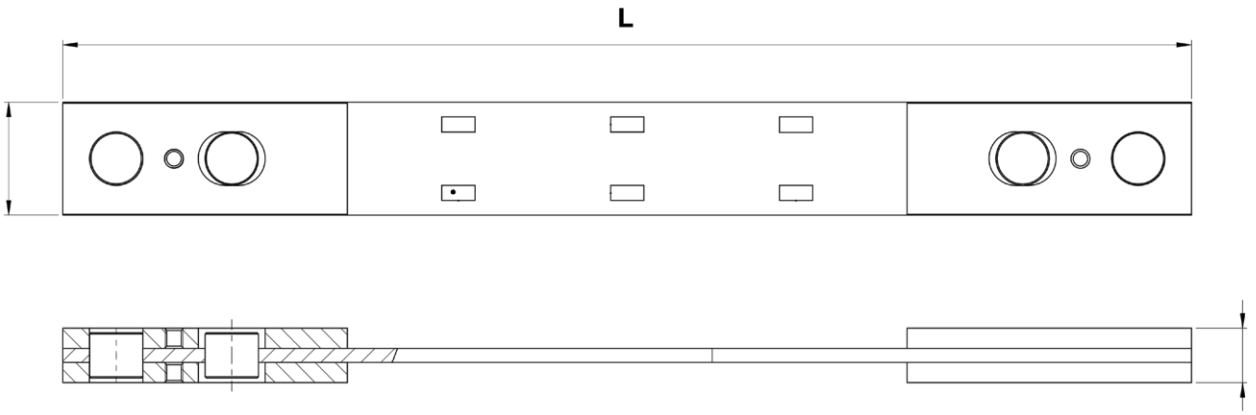
Alignment Verification – Verifying Test Axis Alignment

ZwickRoell standard flat specimens for alignment verification				
Standard	ASTM E1012	ASTM E1012	ASTM E1012	AITM 1.0008
Procedure	**Nadcap AC7101 for metals**	**Nadcap AC7101 for metals**	**Nadcap AC7122 for composites and ISO 527-4**	**AITM 1.0008 (HCCF)**
Direction of test	Tensile direction	Tensile direction	Tensile direction	Compression direction
Alignment transducers used				
Nominal forces of the machine	All	All	All	All
Application	12 times	12 times	12 times	8 times
Number of measurement planes	3	3	3	2
Strain gauges per plane	4	4	4	4
Fmax of the alignment transducer	**20 kN**	**160 kN**	**17.5 kN**	**100 kN**
Standard measuring points	5 kN/ 10 kN/ 20 kN	40 kN/ 80 kN/ 160 kN	1,000 µm/m averaged strain, approx. 17.5 kN	25 kN/ 50 kN/ 100 kN
Protective plates	Required	Required	Required	Required
Gripping dimensions with protective elements L	L: 232.8 mm W: 20 mm D: 7 mm	L: 552 mm W: 60 mm D: 21 mm	L: 254 mm W: 25.4 mm D: 12.2 mm	L: 162 mm W: 32 mm D: 4 mm



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All data at ambient temperature.