

ISO 7438 Metallic Material - Bend Testing

TEST METHOD SUMMARY

The standard covers a method to determine the ability of metallic materials to undergo plastic deformation in bending, by using different bending devices. One of the more common bending device uses two supports and a former in a 3-point setup.

The bend test is performed by placing a test piece with either a rectangular, square, round, or polygonal cross-section symmetrically on the support fixture that is mounted to the testing machine. The load is applied to the specimen at mid-span until the predefined angle of bend is achieved. The angle of bend is determined from the measurement of the displacement of the former. The interpretation of the test results should be in accordance to the requirements of the product standards or if not specified, it should be confirmed that no visible macro-cracks are present.

Please refer to the standard for more detailed information about the other test setups; bending device with a V-block and a former, and bending device with a clamp.

Solutions for ISO 7438 with a 3-point bend setup typically include these types of components:

LOAD FRAME OPTIONS*

MTS offers electromechanical Criterion and Exceed universal test systems and dynamic servohydraulic Landmark® test systems that are ideal for performing accurate and repeatable monotonic bend testing of metallic materials per ISO 7438.

MTS Criterion® universal testing systems are engineered to support the needs of advanced Research & Development. MTS Exceed® universal testing systems are best suited for Quality Control testing by delivering the reliable performance needed to meet the uptime demands of high-volume production environments. Due to the large variety of metals and specimen dimensions that can be tested per ISO 7438, the required force capacities can differ significantly. MTS offers frame models that address the smaller force requirements for testing thin-sheet specimens up to high-force requirements for testing thick plate type specimens.

The MTS Criterion and the MTS Exceed universal testing machines range from tabletop to floor-standing electromechanical models with force ratings of up to 600 kN / 135 kip. Many of the models have dual-zone test spaces to reduce set-up times if you frequently change test requirements.

The MTS Landmark dynamic servohydraulic test system with its superior stiffness and alignment capabilities, is an ideal choice if additional fatigue and fracture testing capabilities are required. Systems are available in highly configurable floor-standing and tabletop models with force ratings from 5 kN / 1 kip to 500 kN / 110 kip.

As an alternative to a new load frame, you can replace outdated controls / hydraulics of existing MTS or another manufacturer's electromechanical, servohydraulic or custom test systems, including:

**Instron®, **Zwick®, **Tinius Olsen™, **SATEC®, **Baldwin® and more with an MTS ReNew™ Upgrade.

**Trademark owned by their respective owners, not affiliated with MTS Systems Corporation.



MTS Criterion® & MTS Exceed®
Electromechanical Universal Test Systems



MTS Landmark®
Servohydraulic Test Systems



MTS ReNew™
Upgrade for Hydraulic & Electromechanical Test Systems

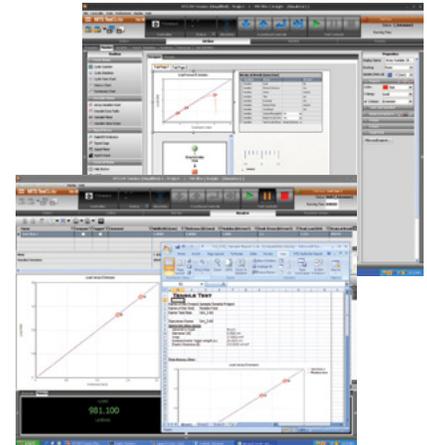
FIXTURE OPTIONS*

The lower support span and the radius of the supports and loading nose are generally selected based on the material and specimen type to be tested. Applicable product specifications define the distance between the supports and radius requirements as related to the specimen thickness to be tested. For example, a hot rolled mild steel sheet or soft aluminum might require only a radius of 1.5 to 3 times the thickness, but high strength steel or hard aluminum alloys with low ductility can require a radius as large as 5 to 8 times the thickness.



SOFTWARE & CONSULTING OPTIONS*

About MTS TestSuite™ TW	ISO 7438 Metallic Material - Bend Testing Test Method Template
<p>The efficient MTS TestSuite TW software provides the versatility required to address unique and complex testing requirements.</p> <p>twe TestSuite TW Elite includes all the test definition capacity and flexibility test designers need to create and edit custom test sequences while accommodating the specific runtime needs of lab personnel.</p> <p>twx TW Express is designed for the test operator and is used to run tests created with TW Elite and can be used without fear of inadvertently modifying the Test Method. This application allows the operator to easily execute even the most complex tests and monitor data or calculated values in runtime views that can be tailored by both test designers and operators.</p>	<p>To simplify testing to ISO 7438, MTS has developed a TestSuite TW test method template that will set-up and run the recommended guided-bend tests.</p> <ul style="list-style-type: none"> » Crosshead/actuator can be used for displacement measurement and control » Post-test review tab and reports show data in load-displacement plots and highlight values such as angle of bend, bend strength, and more » Raw data can be exported in many formats including CSV and TXT » Test methods, calculations, review displays, and report layouts can be customized by the user

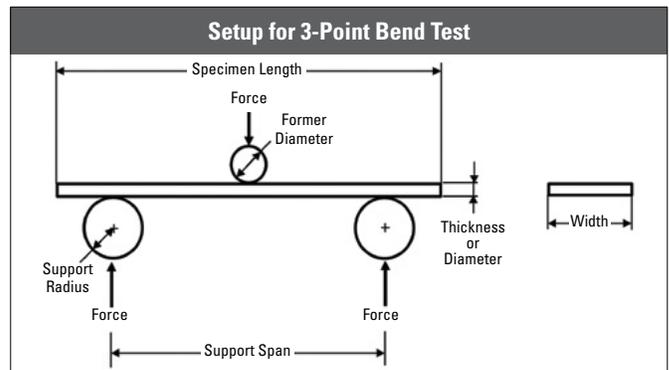


MTS Consulting Can Enable LIMS Integration & Other Lab Efficiency Enhancements
<p>MTS consultants are available to support seamless data integration from your TestSuite test templates to your laboratory information management system (LIMS). Lab Efficiency Enhancements could include:</p> <ul style="list-style-type: none"> » Integrating bar code scanners, reading data from micrometers and calipers, capturing video via webcam » Automating the interface of two-way communications between TestSuite and virtually any LIMS system

*NOTE: This technical note is intended to show some of the more common solutions used for this particular application. Most often, additional options are available and necessary to accomplish more comprehensive test objectives.

APPENDIX - TEST SPECIMEN DETAIL

ISO 7438 supports test pieces with either a rectangular, square, round, or polygonal cross-sections. Please consult ISO for more detailed information about the supported specimen geometries.



MTS Systems Corporation
 14000 Technology Drive
 Eden Prairie, MN 55344-2290 USA
 Telephone: 1-952-937-4000
 Toll Free: 1-800-328-2255
 E-mail: info@mts.com
 www.mts.com

ISO 9001 Certified QMS

MTS, MTS Criterion, MTS Exceed and MTS Landmark are registered trademarks, and MTS TestSuite, MTS ReNew and MTS Advantage are trademarks of MTS Systems Corporation within the United States. These trademarks may be protected in other countries. RTM No. 211177.

© 2023 MTS Systems Corporation
 100-546-446b ISO 7438 • Printed in U.S.A. • 08/23