# ASTM A370 Mechanical Testing of Steel Products - *Round Wire Tension*

***TECHNOTEs for ASTM A370 Tension, Bend & Bolt Tension are also available.***

MTS Criterion® & MTS Exceed®
Electromechanical Universal Test Systems

MTS Landmark®
Servohydraulic Test Systems

MTS ReNew™
Upgrade for Hydraulic & Electromechanical Test Systems

## TEST METHOD SUMMARY

ASTM A370 defines test methods and definitions for mechanical testing of steel products. Round wire tensile testing of steel products per ASTM A370 is used to determine mechanical material property data. Uniaxial tensile force is applied to the specimen to investigate the stress/strain behavior, and critical materials properties including yield strength, yield point elongation, tensile strength, and elongation.

Please refer to the standard for more detailed information about the other test setups and for testing tubular products and fasteners.

Solutions for ASTM A370 round wire tension 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 round wire tensile testing per ASTM A370.

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.

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As an alternative to a new load frame, you can replace outdated controls / hydraulics of existing MTS or another manufacturer's static-hydraulic, electromechanical, servohydraulic or custom test systems, including: **Instron®, **Zwick®, **Tinius Olsen™, **SATEC®, **Baldwin® and more with an MTS ReNew™ Upgrade.
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## EXTENSOMETRY OPTIONS*

ASTM A370 refers to ASTM E8/E8M for the testing equipment requirements. ASTM E8/E8M requires that extensometers conform to ASTM E83. MTS offers high elongation contacting and non-contacting extensometers that meet or exceed requirements for calibration according to ASTM E83 Class B1 and ISO 9513 Class 0.5 standards.

|  |  |  |
|---|---|---|
| **High Elongation Extensometer** | **Long Travel Extensometer** | **Non-Contacting Extensometer** |
| » Advantage™ High Elongation Extensometer (AHX850) compatible with MTS Criterion® Universal Test Systems<br>» Supports large initial gage length and accurately measures large displacements | » Long Travel Extensometer (LTX850) compatible with MTS Exceed® Universal Test Systems<br>» Supports large initial gage length and accurately measures large displacements | » The MTS Advantage™ Video Extensometer is just one of many non-contacting strain solutions available for tension testing of metals<br>» Potential options for analyzing all critical tensile properties include 1D, 2D, and 3D measurements, real-time display, post-test analysis, video replay, specimen reanalysis, and more |

## GRIP OPTIONS*

### Bollard Grip

» Model CB503A wire tension grip for up to 3 mm wire diameter
» Wound up specimen clamping to prevent stress concentration and failure out of the gage length
» Rated force 5 kN / 1.1 kip
» Temperature Range 0 to 50°C / 32 to 122°F

### High Force Bollard Grip

» Model ZCC205A wire tension grip for 8 to 12 mm wire diameter
» Wound up specimen clamping to prevent stress concentration and failure out of the gage length
» Rated force 200 kN / 45 kip
» Temperature Range 0 to 50°C / 32 to 122°F

## SOFTWARE & CONSULTING OPTIONS*

### About MTS TestSuite™ TW

The efficient MTS TestSuite TW software provides the versatility required to address unique and complex testing requirements.

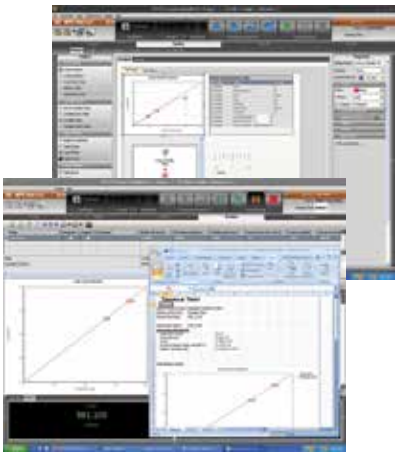
twe TestSuite TW Elite includes all the test definition capacity and flexibility test designers need to create and edit custom test sequences while accommodating the specific runtime needs of lab personnel.

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.

### ASTM A370 Round Wire Tension Test Method Template

To simplify testing to ASTM A370, MTS has developed a TestSuite TW test method template that will set-up and run the recommended tensile tests.

» Crosshead/actuator or extensometers can be used for strain measurement and control
» Post-test review tab and reports show data in stress-strain plots and highlight calculated values such as yield strength, yield point elongation, tensile strength, elongation, 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

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:

» 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

ASTM A370 Round Wire Tensile recommends to use section of the wire that supports the full cross-sectional area. The standard gage length of the wire shall be 10 in. (254 mm), if the elongation values are determined. The total required length of the wire depends on the grip design.

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