

ISO 14126 In-plane Compressive Properties of Fibre-Reinforced Plastic Composites

TEST METHOD SUMMARY

Compression testing of fibre-reinforced composites per ISO 14126, is used to determine mechanical material property data that are of interest for design specification and quality control.

Uniaxial compression force is applied to a rectangular test specimen held in hydraulic wedge grips or a loading fixture to investigate the stress/strain behavior and critical materials properties including compression modulus, compression strength and compressive failure strain. The standard supports loading fixtures that provide shear loading, end loading or mixed loading of the specimen. The standard addresses fibre-reinforced thermosetting and thermoplastic composite materials.

The compression test is performed by placing the loading fixture with the test specimen between compression platens of either a servohydraulic or an electromechanical testing machine and subjecting the specimen to controlled compression load until failure. The specimen response can be measured with a contacting or non-contacting extensometer or strain gauges on both faces of the specimen.

Solutions for ISO 14126 typically include these types of components:

LOAD FRAME OPTIONS*

The MTS Landmark servohydraulic test systems and MTS Criterion electromechanical universal test systems are ideal for performing accurate and repeatable monotonic testing of fibre-reinforced plastics per ISO 14126.

The MTS Landmark innovative test frame design exhibits superior stiffness and alignment capabilities. The test system integrates the latest MTS servohydraulic technology including precision-machined columns for consistently tight alignment, fatigue-rated MTS actuators with low friction bearings, smooth-ramping hydraulic service manifolds, and SilentFlo™ hydraulic power units are quiet enough to be located directly in the laboratory.

The compact MTS Criterion test system features high-resolution MTS digital controls, linear motion guides for superior alignment, high-speed, low vibration MTS electromechanical drives, optional Dual Zone test space for maximizing efficiency.



MTS Landmark®
 Servohydraulic Test Systems



MTS Criterion®
 Electromechanical Universal Test Systems

CHAMBER OPTIONS*

EXTENSOMETRY OPTIONS*

<p>MTS Series 651 Environmental Chambers</p>	<p>MTS Advantage™ Environmental Chamber</p>	<p>MTS Contact Extensometers (Averaging Axial Extensometer Model 632.17)</p>
<ul style="list-style-type: none"> » Temperature range of -150°C to 540°C (-240°F to 1000°F) » Designed for MTS Landmark systems » Compatible with video extensometers 	<ul style="list-style-type: none"> » Temperature range of -129°C to 315°C (-200°F to 600°F) » Designed for MTS Criterion systems » Compatible with video extensometers 	<ul style="list-style-type: none"> » Simultaneously measures axial deflection on the opposite sides of the specimen and then sums those measurements to provide a single average strain output » Works with Model 605.30 ASTM D695 (modified) End-Loading Compression Fixture for determination of compression modulus » Temperature range of -100°C to 150 °C (-150°F to 350°F)

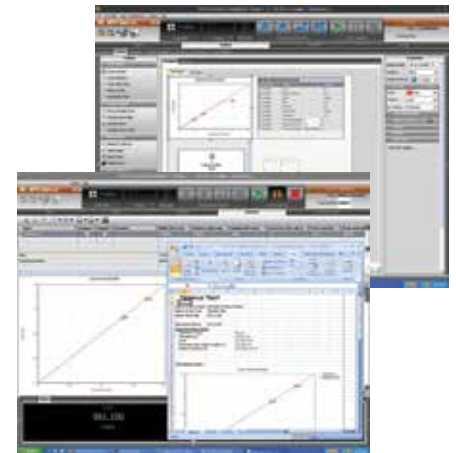
GRIP OPTIONS*

FIXTURE OPTIONS*

			
<p>Model 647 Shear-Loading Hydraulic Wedge Grips</p>	<p>Modified Celanese Shear-loading Compression Fixture</p>	<p>ASTM D3410 IITRI Shear-Loading Compression Fixture</p>	<p>Model 605.30 ASTM D695 (modified) End-Loading Compression Fixture</p>
<ul style="list-style-type: none"> » Recommended to test in accordance with ISO 14126 Method 1 » Tension, Compression & Fatigue capability » Adjustable gripping force to prevent slippage and squashing of the test specimen » Temperature range of -40°C to 175°C (-40°F to 350°F) 	<ul style="list-style-type: none"> » Recommended to test in accordance with ISO 14126 Method 1A » Constructed out of high quality stainless steel » Design based on the University of Wyoming Modified Celanese Compression Test Fixture » Includes wedges with flame sprayed high friction surface » Static Force Rating: 88 kN (20 kip) » Temperature range of -85°C to 122°C (-120°F to 250°F) 	<ul style="list-style-type: none"> » Recommended to test in accordance with ISO 14126 Method 1B and ASTM D3410 » Constructed out of high quality stainless steel » Supplied with one set of replaceable loading wedges » Each fixture comes with an alignment jig for proper assembly of the specimen grip assembly » Static Force Rating: 250 kN (55 kip) » Temperature range of -85°C to 122°C (-120°F to 250°F) 	<ul style="list-style-type: none"> » Recommended to test in accordance with ISO 14126 Method 2B and ASTM D695 (modified) » Constructed out of high quality stainless steel » Specimen alignment pins assure consistent specimen loading, concentric with the load path » Specimen pressure is adjusted by two point pressure on the specimen support plate » Includes anti-buckling side plates with a cut-out for strain gages » Temperature range of -40°C to 177° C (-40°F to 350 °F)

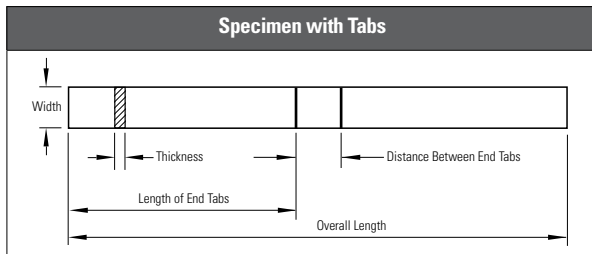
SOFTWARE OPTIONS*

<p>ISO 14126 In-plane Compression Properties of Fibre-Reinforced Plastic Composites</p>	<p>About MTS TestSuite™ TW</p>
<p>To simplify testing to ISO 14126 MTS has developed a TestSuite™ TW test template that will set-up and run the recommended compression tests. The templates support the use of strain gages or extensometers for strain measurement. Reports can display all of the required calculations including stress-strain plot, compression modulus, compression strength, compressive failure strain.</p> <p>MTS consultants are also available to support your composite applications, test method set-up, and data collection and integration requirements.</p>	<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. 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>



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

APPENDIX - TEST SPECIMEN DETAIL



Dimension	Type A Specimen	Type B1 Specimen	Type B2 Specimen
Overall length in mm (<i>minimum</i>)	110	110	125
Thickness in mm	2	2 to 10	≥ 4
Width in mm	10	10	25
Distance between end tabs/grips in mm	10	10	25
Length of end tabs in mm (<i>minimum</i>)	50	50 (if required)	50 (if required)
Thickness of end tabs in mm	1	0,5 to 2 (if required)	0,5 to 2 (if required)



MTS Systems
 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

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