

Test method for determining the structural performance of shelf suspension systems using various joinery methods and materials.

### 1.0 Scope

The purpose of this test method is to document the performance, structural integrity, and/or the physical endurance of a shelf suspension system.

### 2.0 Applicable Documents

- 2.1 AWI 0641 – Architectural Wood Casework
- 2.2 AWI 1232 – Manufactured Wood Casework
- 2.3 AWI 1235 – Specialty Casework

### 3.0 Significance and Use

This test method will not determine the useful life of shelf suspension systems resulting from the test data obtained. It will, however, indicate shelf suspension system performance outcomes from test stress levels.

Test data will provide useful information for architects, design professionals, and manufacturers in making judgments on the ability of a shelf suspension system to maintain serviceability under actual loads and operating conditions.

### 4.0 Test Fixture

#### 4.1 Main Testing Equipment

The main testing machine is an MTS Alliance RF/100 Tension and Compression Testing Machine as illustrated in Figure 79. The test machine is manufactured by MTS. The test machine is calibrated and certified by a third-party.

Approved jig assembly, as described in section 7.1.

\*Equivalent testing equipment is permitted.

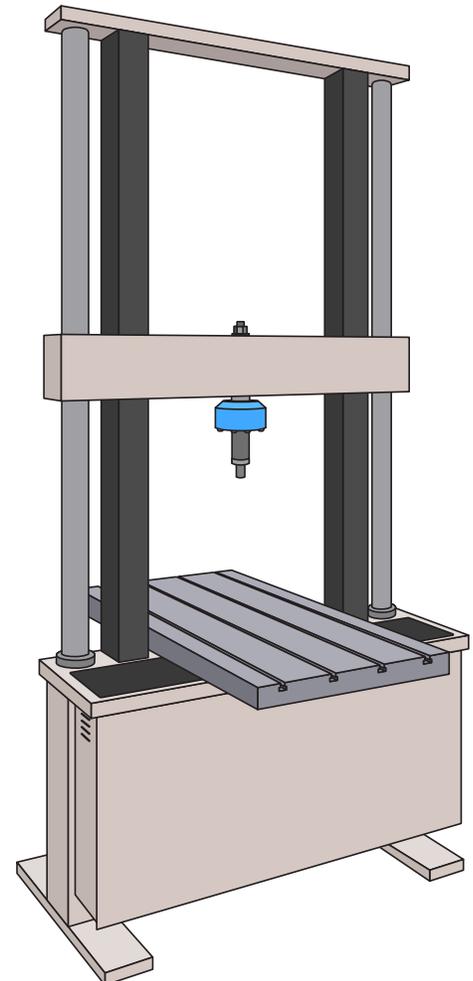


Figure 79

### 5.0 Test Specimen

#### 5.1 Test Specimen Technical Drawings

##### 5.1.1 Drawing Requirements

Drawings shall be submitted as 11" x 17" documents, formatted in landscape orientation.

All drawings shall be rendered in black and white.

Text markings shall be rendered in either Helvetica or Arial font no smaller than 10 point.

Line weight in drawings shall be no less than 0.5 point weight.

All measurement dimensions shall be expressed in both Metric and U.S. Customary System units of measure.

##### 5.1.2 Drawing Formats

All information in the submittal's title block must be complete and in accordance with specimen submittal drawing instructions.

One set of digital test specimen drawings in PDF file format shall be attached to each test application form submitted.

One set of printed drawings on 11" x 17" paper shall accompany to each set of test specimens. Paper drawings shall be inserted into a clear plastic document protector sleeve and secured.

##### 5.1.3 Drawing Information Conveyance

Drawings shall convey means and methods of intersecting shelf suspension system components, as well as the relevant machining dimensions.

For clarity, full scale details of specimen shall be included as supplemental illustrations.

Identification notes for each specimen item shall include nomenclature type, size, material, model number, and manufacturer, as applicable.

#### 5.2 Test Specimen Assembly

##### 5.2.1 Specimen Materials

The test specimen may be constructed of any material, provided that the materials, spacing, and machining operation details are fully documented by way of drawing information conveyance.

##### 5.2.2 Specimen Requirements

- A minimum of 36 specimen components to be tested (e.g. spoon pins, L-pins, nylon clips, etc...).
- Manufacturer/supplier's documented installation instructions.

### 6.0 Conditioning

#### 6.1 Pre-Test Acclimation

Test jig assembly materials shall be acclimated in the test facility environment for no less than 72 hours after date of test specimen arrival and under conditions in compliance with requirements established in AWI 200 - Care and Storage Standard.

#### 6.2 Test Environment

The test facility's policy requires continuous monitoring and an archival record of the facility's indoor environmental conditions, including:

- Temperature
- Relative humidity

##### 6.2.1 Humidity Testing Equipment and Maintenance

- Lignomat Wireless Monitor Receiver Station Software - Located in lab
- Lignomat Kiln Data Transmitter Moisture Sensing Equipment - Located in acclimation room 1-2, lab, warehouse, and outside.
- Lignomat Data Collector Moisture Sensing Equipment - Located in lab
- \*Equivalent equipment is permitted

Device(s) shall be calibrated in accordance with manufacturer/supplier's documented instructions prior to obtaining measurements.

Two moisture measurements shall be taken, one at the right support and one at the left support. Measurements shall be taken in the exposed core material at the top of each support panel.

##### 6.2.2 Environmental Conditions - Record and Official Log

The official date and time of the Environmental Condition Log (ECL) begins upon receipt of the test specimen and is continuous throughout the acclimation and testing procedures. At the conclusion of the final test procedures, the test specimen's ECL shall cease and be closed with a final environmental close-out log entry.

### 7.0 Testing Procedure

#### 7.1 Anchoring Test Specimen to the Test Fixture

The shelf suspension system test fixture shall consist of:

- An approved jig assembly, measuring 724 mm [28.5"] by 343mm [13.5"] with two 559 mm [22"]

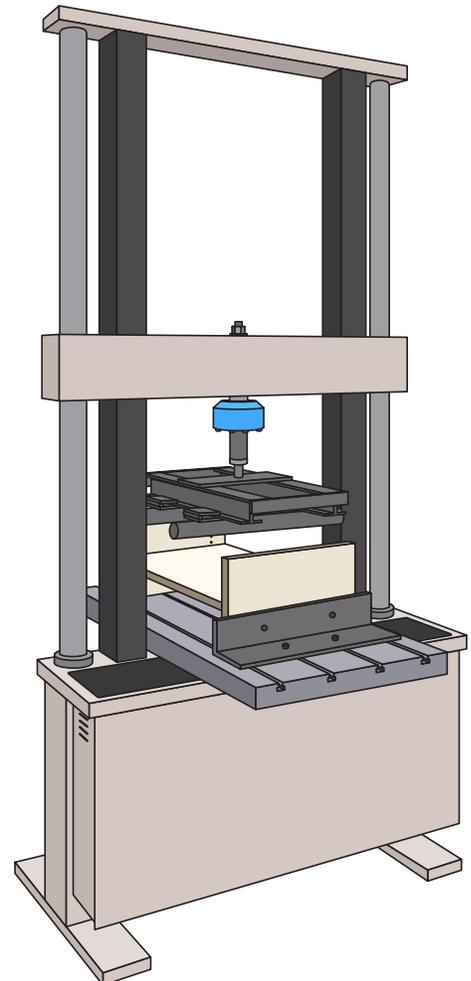


Figure 80

## Testing Methods, SS-1 Shelf Suspension System Test

lengths of 50.8 mm [2"] round stock attached to the bottom at a distance of 305 mm [12"] apart.

- A test specimen mounting fixture consisting of two 559 mm [22"] lengths of 101.6 mm [4"] by 101.6 mm [4"] by 12.7 mm [.500"] angle iron.
- Two side components each of particleboard (set 1), MDF (set 2), and veneer core (set 3), each measuring 305 mm [12"] by 559 mm [22"]. Components shall be machined in accordance with manufacturer/supplier's documented instructions to receive shelf support components (test specimens). Components shall be machined to accept three separate sets of support components (test specimens), a minimum of 50.8 mm [2"] apart vertically.

Attach jig assembly components to the load cell of the MTS Alliance RF/100 Tension and Compression Testing Machine.

Secure angle iron to the base of the MTS Alliance RF/100 Tension and Compression Testing Machine. Ensure that test fixture is square, and adjust as necessary.

Secure side components of matching materials (set 1) to angle iron mounting fixture using 76.2 mm [3"] 1/4-20 bolts.

Insert shelf support hardware (test specimens) in accordance with manufacturer/supplier's documented instructions.

Place appropriate shelf material onto shelf support hardware.

Ensure that test assembly is square and level, and adjust as necessary.

### 7.2 Test Specimen Tolerance Verification/ Measurement Devices

MTS Alliance RF/100 Tension and Compression Testing Machine (See Figure 79)

### 7.3 Load Testing Process

#### 7.3.1 AWI Casework Load Table

Performance Duty Level	Functional Load	Typical Application
Duty Level 1	1223.26 Newtons [275 lbf]	Light Commercial
Duty Level 2	1890.49 Newtons [425 lbf]	Commercial
Duty Level 3	2557.73 Newtons [575 lbf]	Institutional
Duty Level 4	3224.96 Newtons [725 lbf]	Laboratory

#### 7.3.2 Test Steps and Test Process Step 1

Engage MTS Alliance RF/100 Tension and Compression Testing Machine. Rate of travel for testing procedure is 6.4mm [.250"] per minute.

Test is automatically stopped when MTS Alliance RF/100 Tension and Compression Testing Machine ceases to record resistance from testing material.

Repeat test three times at different locations on side components, a minimum of 50.8 mm [2"] apart vertically.

### 7.3.3 Test Steps and Test Process Step 2

Remove side components from mounting fixture.

Repeat steps of section 7.1 with side components of a different material (set 2).

Repeat steps of 7.3.2.

### 7.3.4 Test Steps and Test Process Step 3

Remove side components from mounting fixture.

Repeat steps of section 7.1 with side components of a different material (set 3).

Repeat steps of 7.3.2.

## 8.0 Record of Test Result

### 8.1 Measurement Devices

Data is recorded on Admet MTEST Quattro Materials Testing Software.

\*Equivalent recording software is permitted.

### 8.2 Nonconformities

All nonconformities shall be identified and deviations recorded.

Deviation measurements greater than the tolerances allowed in the referenced standard shall be deemed as a failure to meet the structural performance requirements of this test.

### 9.0 Test Report

- The final test report shall include the following information:
- Name, address, and contact information for the following: The independent testing agency conducting the test as described above, the company or individual initiating the testing process, and the company or individual providing the specimens tested.
- Copy of each drawing submitted.
- Verification by the testing agency that the specimen submitted is in conformance with the drawings.
- Copy of the environmental condition log for the test specimen with specimen's moisture percentage reading entries.
- Photographic documentation of each step of the loading procedure.
- Any failures that occur during the testing and/or nonconformities noted during the verification process.
- Identify the point of failure, if applicable.
- Certification issued with testing manager's signature and date that the test report is complete, factual, and that testing procedure was performed as described above.

No part of this publication shall be reproduced in any form, in an electronic retrieval system or otherwise, without the prior written permission of the publisher.



Architectural Woodwork Institute  
46179 Westlake Drive, Suite 120, Potomac Falls, VA 20165  
Phone: 571-323-3636, Fax: 571-323-3630  
[www.awinet.org](http://www.awinet.org)