ANSI/SOHO S6.5-2008 (R2013)

Small Office/Home Office Furniture - Tests
American National Standard for Office Furnishings
American National Standard

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FOREWORD

The material presented in this standard was developed as a result of the efforts of BIFMA members and reviewed by a broad representation of interested parties including manufacturers, suppliers, commercial testing laboratories, procurement organizations and users.

This standard defines specific tests, laboratory equipment, conditions of test, and recommended minimum levels to be used in the test and evaluation of the performance, durability, and structural adequacy of storage and desk-type furniture intended for use in the small office and/or home office.

The original work on this standard was completed in 2000 by the BIFMA Engineering Committee and particularly by its Subcommittee on Small Office/Home Office Products. The Subcommittee conducts routine reviews of the standard to ensure that the tests accurately describe the proper means of evaluating the safety, durability, and structural adequacy of storage and desk-type furniture products intended for use in the small office and/or home office. The reviews produced revisions and/or additions to the various test procedures that improve the procedures and provide consistency. The previous revision was approved by ANSI on August 4, 2008. On October 17, 2012, the BIFMA Engineering Committee recommended the 2008 edition be reaffirmed. No substantive changes were made to this document. The following non-substantive changes were made: 1) In Definitions, the note referring to PD-1 Industry Definitions was changed to PD-1 Mechanical Test Standards – Compiled Definitions; 2) Definition 2.30 the word ‘product’ was ‘component’ to clarify and to align with other recently revised BIFMA standards; 3) In section 3.5 – we added degrees to the Level tolerance; and 4) Clarified Figure 8 and Section 8.2 that the end panel or two legs remain in contact with the floor. The reaffirmation was approved by ANSI on September 17, 2013

Suggestions for the improvement of this standard are welcome. The suggestions should be sent to BIFMA, 678 Front Ave. NW, Suite 150, Grand Rapids, MI 49504.
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Small Office/Home Office Products - Tests

1 Scope
This standard is intended to provide a common basis of mechanical tests for evaluating the safety, durability, and structural adequacy of storage and desk-type furniture intended for use in the small office and/or home office. The styling, marketing and chain of distribution for these products are intended to address usage in a residential, home office or small office environment. These products may be completely assembled, partly assembled or totally unassembled (often known as RTA or “ready to assemble”), when they leave the control of the manufacturer. These partly assembled and RTA products are designed to be assembled by the end user. Where a product is intended for use outside of the small office and home office environments, it is the responsibility of the user of this standard to determine if it is suitable for use in such evaluations.

This standard defines tests used to determine acceptability of the product for the intended and reasonably foreseeable uses of the product. It specifies acceptance levels to help assure reasonable safety and performance independent of construction materials, manufacturing processes, mechanical designs, or aesthetic designs. The acceptance levels prescribed in these tests are based on the actual field and test experience of the BIFMA International association members. These tests are not intended to assess a product that has been in use in the field.

Reasonable safety of the product shall be considered the manufacturer's responsibility only to the extent that the product is assembled and used in accordance with the original manufacturer's instructions. The assembler must follow the manufacturer's instructions to ensure the product performs as designed.

ISO 17025 requirements for reporting uncertainty do not apply when determining conformance to this standard.
2 Definitions

Note: Refer to BIFMA PD-1 Mechanical Test Standards – Compiled Definitions for related terms not included in this standard. Otherwise, the common dictionary definition shall be used for terms not defined in this section or in BIFMA PD-1. In the case of a conflict between the definitions in this standard and PD-1, the definitions in this standard shall apply.

2.1 acceptance level: The performance level required to pass the test.

2.2 adjustable glides: Support devices for leveling and/or stabilizing an office product. Alternately referred to as glides, levelers, adjustable supports, or height adjusters.

2.3 cabinet: The case and the full complement of storage elements.

2.4 caster: A wheel or set of wheels mounted in a swivel frame and fixed to the leg or base of a piece of furniture, used for supporting and easily moving furniture.

2.5 center/pencil drawers (also known as low height drawer): A drawer, with a clear height less than 76 mm (3 in.), attached to a desk or table or is part of a pedestal which is primarily intended for the storage of light office supplies (such as pencils, pens, erasers and staples).

2.6 clear dimensions: The clear dimensions of the extendible element or storage component are defined by the sides of the largest rectilinear box that fits into the space. For extendible elements, the box must clear all stationary elements as the extendible element is taken through its full range of travel. These dimensions are used to calculate extendible element test loads.

2.6.1 clear depth: The horizontal dimension of the box (as defined in 2.6) in the direction of travel. The clear depth is not reduced by the presence of a compressor.

2.6.2 clear height: The vertical dimension of the box (as defined in 2.6).

Exceptions:

• In the case where there is no bottom for the extendible element, the maximum clear height value used for the clear space calculation shall not exceed 305 mm (12 in.).
• In the case where there is a unit bottom, the maximum clear height value used for the clear space calculation shall not exceed 457 mm (18 in.).
• For shelves that extend, the maximum clear height value used for the clear space calculation shall not exceed 305 mm (12 in.).

2.6.3 clear width: The horizontal dimension of the box (as defined in 2.6) at right angles to direction of travel.

2.7 clear space: The volume defined by the product of the clear dimensions. For example, clear space = clear depth x clear width x clear height.

2.8 compressor: A device used to restrict the movement of the filed material.

2.9 credenza: A desk height cabinet generally 457 mm to 610 mm (18 in. to 24 in.) deep, containing various combinations of extendible elements and storage compartments.

2.10 cycle: A complete operation of loading and unloading or of stress reversal or to open and close; one complete revolution; to operate in a cyclic manner.
2.11 **depth:** The horizontal dimension from front to rear. This may be applied to either the unit or to the extendible elements, so it shall be specified and described.

2.12 **desk:** An article of furniture having a primary work surface that is between 660 mm (26 in.) and 965 mm (38 in.) high and is supported by legs and/or storage component(s) with or without extendible element(s) and with a knee space.

2.13 **doors:** A barrier by which an area is closed or opened. Types include: horizontal receding, vertical receding, tambour, sliding, vertical swinging, horizontal swinging, bi-fold, accordion, and others.

2.14 **extendible element:** A movable load bearing storage component, including, but not limited to: drawers and filing frames. This excludes doors, writing shelves, equipment surfaces, and keyboard surfaces.

2.15 **force:** A vector quantity, expressed in newton (N) or pounds-force (lbf.) that tends to produce an acceleration of a body in the direction of its application.

2.16 **freestanding:** A term that applies to movable, self-supporting furniture not supported by other structures.

2.17 **fully extended:** The extendible element pulled out to the limit of its stops. For extendible elements with no out stops, the fully extended position shall be where the inside back of the extendible element is 89 mm (3.5 in.) from the point where the inside face of the extendible element stops when the extendible element is fully closed. (See Figure 3e)

2.18 **functional load:** A level of loading intended to be typical of hard use.

2.19 **ganged units:** Two or more units fastened together.

2.20 **hutch:** A non-freestanding storage unit that is mounted on a primary work surface(s). Also known as service modules, shelving units, riser, overhead storage units, etc.

2.21 **input device support:** A surface that is occupied exclusively by computer input devices such as computer mice, trackballs, and light pens.

2.22 **interlock:** A device that limits the extension of one or more extendible elements to maintain stability of the unit.

2.23 **lbf.:** Abbreviation for pounds-force. The corresponding unit in the SI (Système International), also known as the Metric System, is the newton (N).

2.24 **leg:** The support member of a desk, credenza, or table.

2.25 **length:** The measure along the greatest horizontal dimension, but not the diagonal dimension, of an object/unit. This may be applied to either the unit or to the extendible elements, so it shall be specifically identified and described.

2.26 **leveled:** A condition where the unit, when installed, adopts and maintains a true horizontal and vertical attitude. Leveling may be accomplished by, but not limited to, the use of adjustable glides or shimming.
2.27 **load**: The weight to which a structure is subjected; a weight or force applied to a product; force acting on a surface, usually caused by the action of gravity.

2.28 **load-bearing element**: The part of furniture that is intended to carry loads. These may include extendible elements, keyboard surfaces, work surfaces, writing surfaces, equipment shelves, door shelves or cantilevered surfaces.

2.29 **lock**: A device that secures the stationary and extendible elements of the unit against undesired access or opening.

2.30 **loss of serviceability**: The failure of any product to carry its intended load or to perform its normal function or adjustment. Unless otherwise specified, cracked or broken glass is considered a loss of serviceability.

2.31 **N (newton)**: A unit of force in the SI (Système International), also known as the Metric System.

2.32 **office armoire**: A vertical cabinet with doors that conceal a work surface.

2.33 **out stops**: A device that limits the travel of the extendible element in a direction away from the product.

2.34 **pedestal**: A self-contained storage unit, less than or equal to 787 mm (31 in.) in height with a depth equal to or greater than its width, and having extendible elements or doors. The extendible elements are typically used for multi-functional general storage or filing. It may be freestanding, mounted under a horizontal surface, or mobile. Pedestal tops may be configured to accommodate seating or storage.

2.35 **product safety label**: A sign, label, cord-tag or decal affixed to the product that provides safety information about that product. Product safety signs or labels may identify the hazard, the degree or level of seriousness, the probable consequences of involvement with the hazard, and how the hazard can be avoided.

2.36 **proof load**: A level of loading or force in excess of hard use.

2.37 **pull**: A feature used to facilitate the opening and closing of an extendible element or door. Pull refers to both projecting and recessed features.

2.38 **RTA**: Ready To Assemble. Products that are generally unassembled when they leave the point of manufacture. These products are designed to be assembled by the end user.

2.39 **rack resistance**: The ability of the cabinet to resist stresses that tend to make the product distort and the extendible elements to become misaligned.

2.40 **SOHO**: Acronym for Small Office/Home Office.

2.41 **stability**: The ability of a unit to resist tipping under normal loading and use conditions.

2.42 **stops**: Devices that limit travel of extendible elements or doors.

2.43 **storage cabinet**: A freestanding unit that contains a combination of one or more of the following: drawers, doors, shelves and/or other storage option.
2.44 surface classifications:

2.44.1 door shelf: A surface or load-bearing compartment affixed to a door.

2.44.2 equipment surface: A moveable, typically stowable, surface whose primary function is to support office equipment such as printers and scanners.

2.44.3 keyboard surface: An adjustable, rolling or stationary surface that is intended for placement of the keyboard, and/or other computer input devices.

2.44.4 primary surface: A surface that has the apparent potential for the highest loading or a surface on which a person may sit. In cases where more than one horizontal surface of a unit exists, there may be more than one primary surface. In cases where all surfaces are intended for equipment placement, there may be no primary surfaces.

2.44.5 secondary surface: A surface that is vertically separated from and smaller than the primary work surface(s). It is used for storage (that is, a shelf) or occupied exclusively by the equipment placed on the surface.

Note: If it is unclear whether a surface is primary or secondary, the surface shall be considered primary.

2.44.6 unit top, cosmetic/aesthetic: A surface that is over 1524 mm (60 in.) above the floor surface. These tops are intended to be non-load bearing.

2.44.7 writing shelf: A moveable, typically stowable surface that is not intended to carry loads greater than defined in Table 1 (See page 18), whose primary function is to support ancillary office tasks, such as writing and short term reference material handling.

2.45 suspension: The system that is used to facilitate the movement of the extendible element in and out of the unit (alternately referred to as "slides").

2.46 tambour: A flexible compartment closure that travels along a curvilinear path.

2.47 test platform: The horizontal hard work surface (concrete or other unyielding surface), on which the unit to be tested is placed during testing.

2.48 tip over: The condition where the unrestricted unit will not return to its normal upright position.

2.49 unit: When used in the test procedures in this standard, unit refers to the product to be tested.

2.50 user adjustable surfaces: A surface that is intended to be adjusted by the user while under normal use including articulating keyboard mechanisms.

2.51 width: A horizontal dimension from side-to-side. This may be applied to either the office product or to the extendible elements, so it shall be specified and described.

2.52 work center: A freestanding unit, containing a primary work surface and overhead storage capability. A work center may have storage below the primary work surface.

2.53 work surface: A horizontal surface used to perform tasks and/or for storage space.

2.54 worst-case condition: The condition (i.e. size and construction of a given unit type) most likely to be adversely affected by the test.
3 General

3.1 Types of Tests

3.1.1 The testing and evaluation of a product in accordance with this standard may require the use of materials and/or equipment that could be hazardous. This document does not purport to address all the safety aspects associated with its use. Anyone using this standard has the responsibility to consult the appropriate authorities and to establish health and safety practices in conjunction with any applicable regulatory requirements prior to its use.

3.1.2 The types of tests to be employed fall into the following general categories:
   a) static load applications;
   b) dynamic load applications;
   c) durability tests.

3.1.3 Each manufacturer’s model or unit type in any configuration shall comply with applicable requirements when tested in accordance with this standard. Only worst-case models need to be tested for a specific unit type. A worst-case condition shall be representative of all models or units of the type tested. If the “worst-case condition” is not readily evident, a case-by-case product line analysis by the manufacturer in consultation with the designated testing facility may be necessary, taking into consideration any special attributes, methods of construction, materials, and/or design features, etc.

3.1.4 Unless otherwise specified within an individual test section, only the worst-case component(s) (extendible element, door, etc.) per unit need be tested. This will typically be the largest component(s) of each construction/mounting type. If the worst-case condition is not readily evident, multiple components may require testing.

3.1.5 It is not intended that all of the tests in this standard be conducted on a single unit; tests may be conducted on a series of units. When a test requires that functional loads and proof loads be applied as part of the test criteria, they shall be applied to the same components in the same unit. Similarly, this rule of testing a singular item also applies to desk/table leg assemblies when these items are of identical construction.

3.1.6 If components are intended to be attached to the desk/table unit, the entire unit including interfacing hardware and/or brackets must meet the applicable static loading and durability tests within this standard.

3.1.7 The tests may be conducted in any sequence.
3.2 **Manufacturer's Instructions**
When a manufacturer provides specific assembly/installation instructions, operation instructions, product safety labels, or maintenance adjustments that may be required in order to keep the product in good operating condition, these instructions shall be followed during testing unless otherwise specified by the test procedures herein.

3.3 **Figures**
The figures within this standard are generic in nature and should be considered as guidelines. Illustrations may not be representative of all applicable products, product configurations, test set-ups, or test equipment.

3.4 **Figure Symbols**

3.5 **Tolerances**
Unless otherwise specified, tolerances on test equipment, measuring equipment and loading devices, shall be:

- Test weights, forces, velocities, and time, ± 5%
- Linear measurements, ± 1.5 mm (0.06 in.)
- Angles, ± 5 degrees
- Level, within 5 mm per meter (0.06 in. per linear foot) or +/- 0.3 degrees
- Cycle requirements are minimums

Test weights, forces, dimensions, angles, time, rates and velocities shall be targeted at the nominal values specified.
3.6 Pretest Inspection
Before beginning the testing, visually inspect the unit thoroughly. Record any defects so that they are not assumed to have been caused by the tests.

3.7 Test Report Format
When a test report is required, the following information should be included:
1. A title: (i.e., "Test Report");
2. Name and address of the laboratory, and the location where the tests were carried out, if different from the address of the laboratory;
3. Unique identification of the report (such as serial number) and on each page an identification in order to ensure that the page is recognized as part of the test report and a clear identification of the end of the test report;
4. Name and address of the client (where applicable);
5. Description and unambiguous identification of the item tested (i.e., model number, manufacturing date, etc.);
6. Characterization and condition of the test item;
7. Date of receipt of the test item;
8. Date(s) of the performance of test;
9. Identification of the test method used;
10. Any additions to, deviations from, or exclusions from the test method (such as environmental conditions);
11. The name(s), function(s) and signature(s), or equivalent identification of the person(s) authorizing the test report;
12. Where relevant, a statement to the effect that the results relate only to the items tested;
13. Date of issue of the report;
14. Test results with, where appropriate, the units of measurement and a statement of compliance/non-compliance with requirements and/or specifications;
15. A statement that the report shall not be reproduced, except in full, without the written approval of the laboratory.
Figure 3a - Loading Configuration for Extendible Elements (Deeper than Wide) with Bottoms

Figure 3b - Loading Configuration for Extendible Elements (Wider than Deep) With Bottoms
Figure 3c - Loading Configuration for Extendible Elements (Deeper than Wide) Without Bottoms

Figure 3d - Loading Configuration for Extendible Elements (Wider than Deep) Without Bottoms
3.8 Loading Guidelines

3.8.1 Loading Material for Other Than Extendible Elements
Loading material of any density that meets the weight requirements of the test may be used. (Examples: concrete bricks, shot bags, metal plates, sand bags, typical bond copier paper, etc.).

3.8.2 Loading Material for Extendible Elements
The functional loading material shall have a density of 672 ± 80 kg/m³ (42 ± 5 lb./ft.³). A typical loading material could be 721 kg/m³ (45 lb./ft.³) industry standard particleboard or typical bond copier paper. The loading material size may be adjusted to accommodate the size of the extendible element to be tested. If necessary, up to 15% of the weight may be made up of higher density plates placed on edge centered between the other loading material. For extendible elements with clear heights greater than 216 mm (8.5 in.) the loading material shall be placed on its edge to minimize deflection of the extendible element bottom. For extendible elements with clear heights less than 216 mm (8.5 in.) the loading material does not need to be placed on its edge.

Note: Higher density materials may be used for proof loads.

3.8.3 Loading - General Guidelines - Dynamic testing of extendible elements with bottom supported loads (Figure 3a and 3b)

Note: Where extendible elements have the capability of supporting loads on the bottom and in hanging folders, test in accordance with 3.8.3.

The clear space within an extendible element shall be loaded using the materials specified in Section 3.8.2. The loading material shall be uniformly distributed front to rear, side to side and not less than 70% of the clear height. The gap in the front and the gap in the rear shall each be 25 mm ± 6 mm (1.0 in. ± 0.25 in.). The loading materials may be adjusted with the use of rigid materials (such as rigid foam, steel, etc.) in order to maintain the specified front and rear air gaps. The front and rear air gaps are to be free of any materials. See Figure 3a for extendible elements which are deeper than wide. See Figure 3b for extendible elements which are wider than deep.

3.8.4 Loading - General Guidelines - Dynamic testing of extendible elements for hanging file supported loads (See Figure 3c and 3d)

The loading material specified in Section 3.8.2 shall be placed in hanging file folders of the appropriate size. The loading material shall be uniformly distributed front to rear, side to side and not less than 70% of the clear height. The gap in the front and the gap in the rear shall each be 25 mm ± 6 mm (1.0 in. ± 0.25 in.). The loading materials may be adjusted with the use of rigid materials (such as rigid foam, steel, etc.) in order to maintain the specified front and rear air gaps. The front and rear
air gaps are to be free of any materials. See Figure 3c for extendible elements which are deeper than wide. See Figure 3d for extendible elements which are wider than deep.

### 3.8.5 Load Application

Loads may be secured to surfaces, excluding extendible elements. The method of securing the loads shall not enhance or compromise the structure of the component(s) being tested. When loads are applied through load disks, the load shall be centered on the disk. The disk shall be of sufficient thickness and rigidity to evenly distribute the applied load over the area of the disk.

### 3.8.6 Test Force Application

To ensure that negligible dynamic force is applied, the forces in the static force tests shall be applied sufficiently slowly until the target load/force is achieved. Where time limits are given, loads and forces shall be maintained according to the tolerance given in Section 3.5 unless otherwise specified.

### 3.9 Fully Extended Position for Extendible Elements With No Out Stops

![Figure 3e – Fully Extended Position for Extendible Elements With No Out Stops](image-url)
## Table 1

### Test Loads for All Categories of Horizontal Surfaces and Extendible Elements

<table>
<thead>
<tr>
<th>Surface Class</th>
<th>Surface Size</th>
<th>Functional Load</th>
<th>Proof Load</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Concentrated</td>
<td>Distributed</td>
</tr>
<tr>
<td>Primary</td>
<td>≤ 1143 mm length length ≤ 45 in.</td>
<td>91 kg (200 lb.)</td>
<td>N/A</td>
</tr>
<tr>
<td>See Note 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>1143 mm &lt; length ≤ 1829 mm (45 in. &lt; length ≤ 72 in.)</td>
<td>91 kg (200 lb.)</td>
<td>0.027 kg/mm of perimeter (1.5 lb./in. of perimeter)</td>
</tr>
<tr>
<td>See Note 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>length &gt; 1829 mm (length &gt; 72 in.)</td>
<td>Two loads of 91 kg (200 lb.) each</td>
<td>0.027 kg/mm of perimeter (1.5 lb./in. of perimeter)</td>
</tr>
<tr>
<td>See Note 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary and Shelf</td>
<td>Calculate load based on the height of the available space above the surface¹, but not &gt; 305 mm (12 in.)</td>
<td>N/A</td>
<td>470 kg/m³ (0.017 lbs./in.³)</td>
</tr>
<tr>
<td>See Note 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Keyboard Surface</td>
<td>≤ 914 mm width (≤ 36 in. width)</td>
<td>N/A</td>
<td>13.6 kg (30 lb.)</td>
</tr>
<tr>
<td>Keyboard Surface</td>
<td>&gt; 914 mm width (&gt; 36 in. width)</td>
<td>N/A</td>
<td>20.4 kg (45 lb.)</td>
</tr>
<tr>
<td>Equipment Surface</td>
<td>All</td>
<td>18 kg (40 lb.)</td>
<td>18 kg (40 lb.)</td>
</tr>
<tr>
<td>Writing Shelf</td>
<td>All Sizes</td>
<td>N/A</td>
<td>11 kg (25 lb.)</td>
</tr>
<tr>
<td>Door Shelves</td>
<td>All</td>
<td>N/A</td>
<td>0.018 kg/mm (1 lb./in.)</td>
</tr>
<tr>
<td>Extendible Element</td>
<td>Calculate load based on the clear space</td>
<td>N/A</td>
<td>470 kg/m³ (0.017 lbs./in.³)</td>
</tr>
<tr>
<td>Center/Pencil</td>
<td>All</td>
<td>N/A</td>
<td>2.3 kg (5 lbs.)</td>
</tr>
<tr>
<td>drawers (Low Height)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Notes:

1) See Section 2.44 for definitions of surface classifications.

2) If it is unclear whether a surface is primary or secondary, the surface shall be considered primary.

3) For the purposes of surface loading/classification, input device supports and storage unit tops are not considered to be load-bearing surfaces.

¹ The available space above the surface shall be determined using the concept of the largest rectangular box that will fit into the space. This concept is similar to that described in Section 2.6 “Clear Dimensions”.
## Table 2
Attachment Location for Pull Type

<table>
<thead>
<tr>
<th>Pull Type/Position</th>
<th>Device Attachment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narrow pull ≤ 33% of extendible element/door front width or height (center pull and single side pull)</td>
<td>Center of pull area.</td>
</tr>
<tr>
<td>Wide Pull &gt; 33% of extendible element/door front width or height</td>
<td>Three areas (one at a time): 1) Center of pull area. 2) At a distance from the right hand edge (or top of the door for horizontally sliding doors) of the extendible element/door front equal to one-sixth of the extendible element/door front width (or height for horizontal sliding doors) ± 6 mm (0.25 in.) or from one end of the pull, whichever is a greater distance from the edge/top of the extendible element/door. 3) At a distance from the left hand edge (or bottom of the door for horizontally sliding doors) of the extendible element/door front equal to one-sixth of the extendible element/door front width (or height for horizontal sliding doors) ± 6 mm (0.25 in.) or from one end of the pull, whichever is a greater distance from the edge/bottom of the extendible element/door.</td>
</tr>
<tr>
<td>Dual Side Pulls</td>
<td>Center of the right hand pull and then the center of the left hand pull.</td>
</tr>
</tbody>
</table>
4 Stability Tests

4.1 Purpose of Tests
The purpose of these tests is to evaluate the stability of various types of units.

Note: For all stability tests, if the manufacturer's instructions indicate the unit is to be secured to the permanent building structure, the test shall be performed with those securing means in place during the test.

4.2 Stability Under Vertical Load Test (See Figure 4a)

4.2.1 Purpose of Test
The purpose of this test is to evaluate the stability of a unit when subjected to vertical loads.

4.2.2 Test Setup
The unit shall be placed on a level platform and leveled in its normal operating position. If equipped with casters, each front caster shall be blocked with an obstruction 13 mm (0.5 in.) in height. The obstruction shall prevent forward motion but not restrict the tilt of the unit. Casters shall be oriented in
their least stable position. Counterweights or other stability devices shall be used in accordance with the manufacturer’s instruction.

4.2.3 Test Procedure

a) Place the edge of a 305 mm (12 in.) diameter disk 25 mm (1 in.) from the edge of the primary surface at the least stable location.

b) A 57 kg (125 lb.) static load shall be placed on the disk.

If necessary, repeat Steps (a) and (b) to verify the least stable position has been evaluated.

4.2.4 Acceptance Level

The application of each load shall not cause the unit to tip over.

Figure 4b - Typical Load-Bearing Elements
4.3 **Stability Test for Units with Extendible Load-Bearing Elements** (See Figure 4b)

This test does not apply to freestanding pedestals.

### 4.3.1 Purpose of Test

The purpose of this test is to evaluate the stability of units with extendible load-bearing elements. These units may include office armoires, work centers, multi-media centers, desks/tables, credenzas and desks with hutch.

### 4.3.2 Test Setup

a) The unloaded unit shall be placed on a test platform and leveled. Place the unit in its apparent least stable position. The glides, feet, or casters shall be oriented in the least stable condition and blocked or otherwise prevented from moving along the surface. The blocks shall not restrict the tilt of the product in any direction. Counterweights or other stability devices shall be used in accordance with manufacturer's instruction.

b) Load the elements as determined below with the distributed functional loads per Table 1 (See page 18). Determine the number of load-bearing elements, which, when loaded and extended (if applicable) will create the least stable condition. These may include extendible elements, keyboard surfaces, writing surfaces, equipment shelves, door shelves or cantilevered surfaces.

- If the unit contains only one element, or if two elements are unavailable for loading due to the presence of interlocks, the test may be run with a single element loaded.
- If two elements are available, load the largest to its functional distributed load, and load the remaining element to 50% of its functional distributed load and, if extendible, close. Do not use elements with caster(s) or other stability features as one of these two elements.
- If there are three or more load bearing elements, determine the two load-bearing elements, which, when loaded and in use, will create the least stable condition and load them with the functional distributed load. The third largest remaining storage element or surface shall be loaded to 50% of its functional distributed load and, if extendible, place it in its closed position. Do not use elements with caster(s) or other stability features as one of these three elements.

c) Open all the doors of the unit to 90 degrees from the closed position, or the least stable configuration that allows access to the internal features of the unit.
4.3.3 Test Procedure

a) Open the fully loaded element(s) to the fully extended position(s). If applicable, the extendible element with the 50% functional load shall be placed in the closed position.

b) If necessary to verify the least stable position has been evaluated, close the elements and reconfigure the unit to additional position(s), and repeat a).

4.3.4 Acceptance Level

The unit shall not tip over. If open extendible elements, doors, or other elements prevent the unit from tipping over due to contact with the test platform, the unit does not meet the acceptance criteria. Exception: the intentional use of devices such as casters on a bottom extendible element, door, or other element is an acceptable method of preventing tipping.

Figure 4c - Stability Test for Freestanding Pedestals
4.4  Stability Test for Freestanding Pedestals  (See Figure 4c)

4.4.1  Purpose of Test
The purpose of this test is to evaluate the stability of freestanding pedestals with extendible elements.

4.4.2  Test Setup
a) The unit shall be placed on a test platform and leveled or positioned in accordance with the manufacturer's instructions. If the unit is equipped with glides, extend them to their midpoint but not to exceed 13 mm (0.5 in.) from the fully retracted position. If equipped with casters, each front caster shall be blocked with an obstruction or other restraining device 13 mm (0.5 in.) in height affixed to the test platform. The device shall prevent sliding but not restrict the unit from tipping. Casters shall be oriented in their least stable position. See Figure 4c. Load shall be configured per Section 3.8.2 (Figure 3a or 3b) if extendible element has a bottom. Load shall be configured per Section 3.8.3 (Figure 3c) if extendible element does not have a bottom. For extendible elements functioning as a shelf the load shall be evenly distributed front to back and left to right on the shelf surface.

b) Load the extendible element that will cause the least stable condition with the functional load requirement in Table 1 (See page 18).

   Note: When there is more than one extendible element that can cause the equivalent instability, load the extendible element at the highest position.

c) The largest extendible element of those remaining shall be loaded uniformly to 140 kg/m³ (0.005 lb./in.³) of clear space.

d) All elements other than that loaded in 4.4.2b) shall be closed and secured against opening.

4.4.3  Test Procedures
The extendible element loaded in 4.4.2b) shall be fully extended.

4.4.4  Acceptance Level
The unit shall not tip over. If open extendible elements prevent the unit from tipping over due to contact with the test platform, the unit does not meet the acceptance criteria.

   Note: The use of devices such as casters on a bottom extendible element is an acceptable method of preventing tipping.
4.5 Horizontal Stability Test for Desk/Tables with Casters (See Figure 4d)

**Note:** This test applies to products with or without extendible elements.

### 4.5.1 Test Setup

The unit shall be placed on a level platform and leveled. Adjustable height desk/tables shall be positioned at a height that places the desk/table in its least stable condition. Extendible elements shall be unloaded and closed.

### 4.5.2 Test Procedure

a) Apply a 11.4 kg (25 lb.) static load through a 203 mm (8 in.) diameter disk centered 102 mm (4 in.) from the edge of the top of the desk/table at the least stable location.

b) The casters that primarily support the load in (a) shall be blocked with an obstruction or other restraining device 13 mm (0.5 in.) in height affixed to the test platform. The device shall
prevent sliding but not restrict the unit from tipping. Casters shall be oriented in their least stable position.

c) Gradually apply a horizontal force perpendicular to the obstruction(s) in (b), to the leading edge of the top surface opposite the load as shown in Figure 4d, but not more than 13 mm (0.5 in.) below the top surface, until 44.5 N (10 lbf.) is reached, or the product tilts to 10 degrees, whichever occurs first. (Angle measuring device must be accurate to within ± 0.5 degree.) If the geometry of the leading edge does not permit a direct application of the load, the geometry of the leading edge may be altered to accommodate the 13 mm (0.5 in.) dimension. A test fixture/adapter must be used if the edge of the top is not perpendicular to the obstruction(s) in (b).

d) If necessary, repeat Steps (a) through (c) to verify the least stable position has been evaluated.

4.5.3 Acceptance Level
The unit shall not tip over. If an extendible element(s) opens during the test and prevents the unit from tipping over due to contact with the test platform, the unit does not meet the acceptance criteria.
Figure 4e - Horizontal Force Stability/Disengagement Test for Tall Units
4.6  **Horizontal Force Stability/Disengagement Test for Tall Units** (See Figure 4e)
This test applies to any unit or assembly whose combined height is greater than 1067 mm (42 in.).
**Note:** If manufacturer’s instructions indicate that the unit is to be placed against the wall, no back or front horizontal stability tests are required. This test does not apply to bookcases (See Section 4.7).

4.6.1  **Purpose of Test**
The purpose of this test is to evaluate the stability of tall products such as office armoires, work centers, multi-media centers, desks with hutch, storage cabinets and storage armoires.

4.6.2  **Test Setup**
The unloaded unit shall be placed on a test platform and leveled. The glides, feet, or casters shall be blocked or otherwise prevented from moving along the surface. Casters shall be placed in their least stable position and shall be blocked with an obstruction 13 mm (0.5 in.) in height. The blocks shall not restrict the ability of the product to tilt or tip.

4.6.3  **Test Procedure**
   a) Apply the horizontal forces through the center of a 203 mm (8 in.) in diameter disk. The forces shall be applied perpendicular to the plane of the disk.
   b) Gradually increase the force until 178 N (40 lbf.) is reached or the product tilts to 10 degrees, whichever occurs first, at the locations specified in Step (c). Allow the unit to return to its setup position.
   c) The forces shall be applied one at a time to the following locations 1372 mm (54 in.) from the floor or 102 mm (4 in.) down from the top edge, whichever is lower:
      location 1) Apply force to front of the product at its left side,
      location 2) Apply force to front of the product at its right side,
      location 3) Apply force to back of the product at its left side,
      location 4) Apply force to back of the product at its right side,
      location 5) Apply force to center of the product’s left side,
      location 6) Apply force to center of the product’s right side.

4.6.4  **Acceptance Level**
The unit shall not tip over as a result of the force application or prior to reaching the 10 degree tilt angle. There shall be no loss of serviceability. Assembled products shall not become disengaged.
4.7 Vertical Force Stability Test for Bookcases and Other Units Without Extendible Elements

4.7.1 Purpose of Test
The purpose of this test is to evaluate the stability of bookcases and other units without extendible elements that are higher than 1067 mm (42 in.) tall when subjected to a vertical force.

4.7.2 Test Setup
The unit shall be placed on a test platform and leveled. The glides, feet, or casters shall be blocked or otherwise prevented from moving along the surface. Casters shall be placed in their least stable position. The blocks shall not restrict the ability of the product to tilt or tip. Place an evenly distributed load of 36 kg/m (2 lb./in.) of width on the lowest shelf in the unit. If so equipped, any doors on the unit shall be initially placed in the closed and unlocked position.

4.7.3 Test Procedure
Apply a 22.7 kg (50 lb.) load centered on a vertical line 127 mm (5 in.) in front of the outermost edge of the most forward protruding fixed shelf or top. The fixture used to apply the load shall not apply any additional counterbalancing force to the unit.

4.7.4 Acceptance Level
The unit shall not tip over.
Figure 4g - Horizontal Force Stability Test for Bookcases and Other Units Without Extendible Elements
4.8 Horizontal Force Stability Test for Bookcases and Other Units Without Extendible Elements (See Figure 4g)

Note: If manufacturer’s instructions indicate that the unit is to be placed against the wall, no back or front horizontal stability tests are required.

4.8.1 Purpose of Test
The purpose of this test is to evaluate the stability of bookcases and other units without extendible elements that are higher than 1067 mm (42 in.) tall when subjected to a horizontal force.

4.8.2 Test Setup
The unit shall be placed on a test platform and leveled. The glides, feet, or casters shall be blocked with an obstruction 13 mm (0.5 in.) in height. Casters shall be placed in their least stable position. The blocks shall not restrict the ability of the product to tilt or tip. Place an evenly distributed load of 36 kg/m (2 lbs./in.) of width on the lowest shelf in the unit. If so equipped, any doors on the unit shall be initially placed in the closed and unlocked position.

4.8.3 Test Procedure
   a) Apply the horizontal forces through a 203 mm (8 in.) diameter loading fixture.
   b) Gradually increase the force until 178 N (40 lbf.) is reached, or the product tilts to 10 degrees, whichever occurs first at the locations specified in Step (c). Allow the unit to return to its setup position.
   c) The forces shall be applied one at a time to the following locations 1372 mm (54 in.) from the floor or 102 mm (4 in.) down from the top edge, whichever is lower:
      location 1) Apply force to front of the product at its lateral center,
      location 2) Apply force to back of the product at its lateral center,
      location 3) Apply force to the left side of the product at its lateral center,
      location 4) Apply force to the right side of the product at its lateral center.

4.8.4 Acceptance Level
The unit shall not tip over as a result of the force application or prior to reaching the 10-degree tilt angle.
Figure 5a - Distributed Load Tests for Primary Surfaces

Figure 5b - Distributed Load Tests for Secondary Surfaces
Figure 5c - Top View of Primary Surface Distributed Load Test
Figure 5d - Keyboard Surface Load Test
5 Static Load Tests

5.1 Purpose of Tests
The purpose of these tests is to evaluate the ability of the unit and its components to withstand static loads to which it may be subjected when in use. These tests are applicable to all units.

5.2 Distributed Functional Load Test for Individual Surfaces (See Figures 5a, 5b, 5c and 5d).
Note: The distributed functional load test may be run simultaneously with the unit distributed functional load test in Section 5.6.

5.2.1 Purpose of Test
To test the ability of individual surfaces to withstand the distributed functional static loads to which they may be subjected while in use.

5.2.2 Test Setup
5.2.2.1 The unit shall be leveled in its normal operating position and may be secured to prevent tipping. The method of securing shall not affect the load application. If unit requires support from adjacent units, all units shall be assembled together.

Note: Adjustable surfaces are to be loaded in their highest and most extended position.

5.2.2.2 Depending on the component's surface classification, apply the distributed functional loads specified in Table 1 (See page 18) to each component, one at a time, as follows:

a) Primary Surfaces: (see Figures 5a and 5c)
Apply the specified distributed loads per Table 1 (See page 18). The load is evenly distributed and centered over a line 203 mm (8 in.) in from the edge along the entire perimeter. Loading materials shall not overhang the edge of the unit. For surfaces which are less than 406 mm (16 in.) deep, evenly distribute the load across the surface. If the primary surface is partially covered by a hutch or shelving unit but remains accessible, calculate the perimeter as if the primary surface is without the hutch, and evenly distribute the load along the unobstructed sections of the perimeter.

b) Secondary Surfaces: (See Figure 5b)
Apply the specified distributed functional loads per Table 1 (See page 18). The load is evenly distributed along the length of the surface at midpoint.
c) **Keyboard Surfaces**: (See Figure 5d)
   
   Evenly distribute the load across the keyboard surface. Open adjustable keyboard surfaces to their stops or maximum of 254 mm (10 in.).

d) **Writing Shelves**: 

   Evenly distribute the load in Table 1 (See page 18) across the writing shelf.

5.2.2.3 Individually, each extendible element shall be uniformly loaded with the functional load per Table 1 (See page 18) and fully opened to the stop or locked position for the duration of the test. If doors contain storage features, individually load each of the storage features with the functional loads according to Table 1 (See page 18).

5.2.3 **Test Procedure**

   a) Loads shall remain for 60 minutes and then removed.

   b) Close the extendible elements and perform the Pull Force Test in Section 20.

5.2.4 **Acceptance Level**

   There shall be no loss of serviceability. Upon the completion of the test, the extendible element(s) shall meet the pull force requirements of Section 20.
Figure 5e - Concentrated Load Tests for Primary Surfaces
1) CENTER POINT OF LONGEST UNSUPPORTED SPAN

2) LONGEST DISTANCE FROM CANTILEVERED SUPPORT TO WORK SURFACE EDGE

3) EQUIDISTANT ABOUT A GANGED EDGE

**Figure 5f – Top View of Concentrated Load Test**

**Figure 5g - Top View of Ganged Units Surface Size Determination**
5.3 Concentrated Functional Load Test For Primary Surfaces (See Figures 5e, 5f and 5g)

5.3.1 Purpose of Test
The purpose of the test is to evaluate the ability of an individual surface to withstand the concentrated functional loads to which it may be subjected.

5.3.2 Test Setup
a) The unit shall be leveled in its normal operating position and may be secured to prevent tipping. The method of securing shall not affect the load application. If the unit requires support from adjacent units, all units shall be tested together as a system. Adjustable height surfaces shall be adjusted to their highest position but not to exceed 965 mm (38 in.).

b) Apply the specified concentrated load described in Table 1 (See page 18) through a 305 mm (12 in.) diameter area 25 mm (1 in.) from the unit’s edge at its apparent weakest point. The following are some typical weakest points (See Figure 5e):
   location 1) Center point of longest unsupported span.
   location 2) Longest distance from cantilevered support to work surface edge.
   location 3) Each side of ganged surface edges.
   When the weakest point is not obvious, several load applications may be necessary to properly test the product.

c) When testing ganged units where the surface size is such that a 2.6 m (102 in.) chord can fit within the area of the tops (See Figure 5g), (See Step 5.2.1b (Example 3)), two concentrated loads are required. The concentrated loads, described in Table 1 (See page 18), are applied through 305 mm (12 in.) diameter disks. Place the two 305 mm (12 in.) diameter disks equidistant about the ganged edge while maintaining the centers of these disks 914 mm ± 25 mm (36 in. ± 1.0 in) apart and 178 mm (7 in.) in from the edge of the ganged unit’s top (See Figure 5f).

d) When testing units with lengths (or diameters) greater than 1829 mm (72 in.), two concentrated loads shall be placed 914 mm ± 25 mm (36 in. ± 1.0 in) apart at the apparent weakest point. See Section 5.3.2(b) for guidelines.

e) All extendible elements shall be uniformly loaded with the distributed functional load per Table 1 (See page 18) and fully opened to the stop for the duration of the test. Keyboard surfaces shall be fully extended.

5.3.3 Test Procedure
a) Loads shall remain for 60 minutes and then be removed.

b) Perform the Pull Force Test in Section 20.

5.3.4 Acceptance Level
There shall be no loss of serviceability. The extendible element(s) shall meet the pull force requirements of Section 20.
5.4 Distributed Proof Load Test for Individual Surfaces (See Figures 5a, 5b, 5c and 5d)

Note: The distributed proof load test may be run simultaneously with the unit proof load test in Section 5.6.

5.4.1 Purpose of Test
The purpose of the test is to evaluate the ability of an individual surface to withstand the distributed proof loads to which they may be subjected.

5.4.2 Test Setup
Perform the Setup per Section 5.2.2 using the applicable distributed proof loads per Table 1 (See page 18).

5.4.3 Test Procedure
Loads shall remain for 15 minutes and then be removed.

5.4.4 Acceptance Level
There shall be no sudden and major change in the structural integrity of the product. Loss of serviceability is acceptable.

5.5 Concentrated Proof Load Test for Individual Surfaces (See Figures 5e and 5f)

5.5.1 Purpose of Test
The purpose of the test is to evaluate the ability of an individual surface to withstand the concentrated proof loads to which they may be subjected.

5.5.2 Test Setup
The setup shall be performed per Section 5.3.2 with the applicable concentrated proof load per Table 1 (See page 18).

5.5.3 Test Procedure
Loads shall remain for 15 minutes and then be removed.

5.5.4 Acceptance Level
There shall be no sudden and major change in the structural integrity of the product. Loss of serviceability is acceptable.

5.6 Unit Strength Test - Static Load

5.6.1 Purpose of Tests
The purpose of these tests is to evaluate ability of the entire unit to withstand simultaneous loading of work surfaces and all load-bearing elements to the loads specified in Table 1 (See page 18). These tests evaluate the entire unit for static loading and represent the most extreme loading condition.
5.6.2 Unit Distributed Functional Load Test (See Figures 5a, 5b, 5c and 5d)

5.6.2.1 Test Setup

a) The unit shall be leveled in its normal operating position and may be secured to prevent tipping. The method of securing shall not affect the load application. All extendible shelves that cannot carry loads in their stowed position shall be placed in their fully extended position.

b) Extendible elements shall be uniformly loaded per Table 1 (See page 18). All loaded extendible elements and doors shall be closed during this test.

c) Center/pencil drawer shall be uniformly loaded per Table 1 (See page 18).

d) Depending on the component’s surface classification, apply the distributed functional loads specified in Table 1 (See page 18) to each component as follows (Adjustable surfaces are loaded in their highest and most extended position):

- **Primary Surfaces**: (See Figures 5a and 5c)
  Evenly distribute the load and center over a line 203 mm (8 in.) in from the edge along the entire perimeter. Loading materials shall not overhang the edge of the unit. For surfaces which are less than 406 mm (16 in.) deep, evenly distribute the load across the surface. If the primary surface is partially covered by a hutch or shelving unit but remains accessible, calculate the perimeter as if the primary surface is without the hutch, and evenly distribute the load along the unobstructed sections of the perimeter.

- **Secondary Surfaces**: (See Figure 5b)
  Evenly distribute the load along the length of the surface at midpoint.

- **Keyboard Surfaces**: (See Figure 5d)
  Evenly distribute the load across the keyboard surface. Open adjustable keyboard surfaces to their stops or maximum of 254 mm (10 in.).

- **Writing Shelves**:
  Evenly distribute the load across the writing shelf(s).

e) If doors contain storage features, load the storage features according to Table 1 (See page 18).

5.6.2.2 Test Procedure

a) Loads shall remain for 60 minutes and then be removed.

b) Perform the Pull Force Test in Section 20.

5.6.2.3 Acceptance Level

There shall be no loss of serviceability. The extendible element(s) shall meet the pull force requirements of Section 20.
5.6.3 Unit Proof Load Test

5.6.3.1 Test Setup

Note: The loads for this test are similar to that in 5.6.2 except that the largest primary surface has a concentrated proof load applied rather than functional distributed load.

a) Continue the test as described in 5.6.2, except replace the load on the largest primary surface with the concentrated proof load per Table 1 (See page 18). Apply the specified concentrated load described in Table 1 (See page 18) through a 305 mm (12 in.) diameter area 25 mm (1 in.) from the unit’s edge at its apparent weakest point. The following are some typical weakest points (See Figure 5e):
   - Center point of longest unsupported span.
   - Longest distance from cantilevered support to work surface edge.
   - Each side of adjacent surface edges.

When the weakest point is not obvious, several load applications may be necessary to properly test the product. When testing multiple primary surfaces where two concentrated loads are required, the centers of the two 305 mm (12 in.) diameter areas shall be 914 mm ± 25 mm (36 in. ± 1.0 in) apart. The two 305 mm (12 in.) diameter areas shall be equidistant about the adjacent edges as shown in Figure 5f (3).

b) All currently loaded shelves and surfaces shall remain loaded to the distributed functional loads specified in Table 1 (See page 18).

5.6.3.2 Test Procedure
Loads shall remain for 15 minutes and then be removed.

5.6.3.3 Acceptance Level
There shall be no sudden and major change in the structural integrity of the product. Loss of serviceability is acceptable.

5.7 Extendible Element Proof Load Test

Note: This test does not apply to center/pencil drawers.

5.7.1 Test Setup

a) The unit shall be leveled in its normal operating position and may be secured to prevent tipping. The method of securing shall not affect the load application.

b) Determine the extendible element of each type (each element construction, suspension design, etc.) with the largest available clear space (if two or more elements have identical
clear space, select one of the elements for further testing). Uniformly distribute a proof load per Table 1 (See page 18) in the selected extendible element.

5.7.2 Test Procedure

a) Close the extendible element for 15 minutes.

b) Open the extendible element to the stops and/or locked position for 15 minutes, and then remove the load.

c) Repeat the test as necessary for each element per Section 3.1.4.

5.7.3 Acceptance Level

There shall be no sudden and major change in the structural integrity of the product. Loss of serviceability is acceptable.
Figure 6 - Top Load Ease Test - Cyclic
6  Top Load Ease Test - Cyclic (See Figure 6)

6.1 Purpose of Test
The purpose of this test is to evaluate the durability of the unit to withstand cyclic loading of the top. This test applies to units with primary surfaces including mobile and freestanding pedestals.

Note: Products with overhead storage units, hutches, etc. that limit the useable depth such that it interferes with a person’s ability to sit on the surface are not subject to this test. This test does not apply to surfaces less than 406mm (16 in.) deep, surfaces greater than 965 mm (38 in.) in height, shelves, or adjustable keyboards.

6.2 Test Setup
a) The unit shall be leveled in its normal operating position. The unit shall be placed on the test platform and restrained to prevent movement. Height adjustable surfaces shall be set at the midpoint of adjustment, but not higher than 965 mm (38 in.).

b) All extendible elements shall be tested to and meet the pull force test requirements of Section 20.

c) All extendible elements shall be loaded per Table 1 (See page 18) and closed for the duration of the test.

d) For work surfaces greater than 457 mm (18 in.) deep, a 91 kg (200 lb.) weight applied by means of a 406 mm ± 51 mm (16 in. ± 2 in.) diameter bag (see Appendix A) shall be positioned on the primary surface with the edge of the bag within 25 mm (1 in.) from the edge of the surface at the center of the largest unsupported span. For work surfaces 406 mm to 457 mm (16 in. to 18 in.) deep, center the bag on the available work surface depth.

e) The cycling device shall be set to operate at a rate of 14 ± 6 cycles per minute.

6.3 Test Procedure
a) The bag shall be raised until the entire weight is off the primary surface and then eased (without impact) onto the primary surface so that it takes the entire weight without any support from the cycling device.

b) Repeat Step (a) for a total of 5,000 cycles.

c) Remove the bag and perform the pull force test in Section 20.

6.4 Acceptance Level
There shall be no loss of serviceability. Upon completion of the cycling test, the extendible element(s) shall meet the pull force requirements of Section 20.
Figure 7 - Leg Strength Test Configurations
NOTE:
IT IS NOT NECESSARY TO REPEAT TESTS ON LEGS OR SUPPORT MEMBERS OF IDENTICAL CONSTRUCTION.

COLUMN TABLES TESTED AS SHOWN ABOVE

Figure 7 Continued - Leg Strength Test Configurations
Figure 7 Continued - Leg Strength Test Configurations
7  **Leg Strength Test - Static** (See Figure 7)

7.1  **Purpose of Test**
The purpose of this test is to evaluate the ability of the unit's legs to withstand horizontal forces and their ability to withstand handling or moving. This test does not apply to freestanding pedestals. **Note:** It is not necessary to repeat tests on legs or support members of identical materials and construction.

7.2  **Test Setup**

   a) The unloaded unit shall be positioned on its top, back or side, on a test platform, and secured in place. If the unit is equipped with glides, extend them to their midpoint but not to exceed 13 mm (0.5 in.) from the fully retracted position. Adjustable height desk/tables shall be positioned at the midpoint of their adjustment range.

   b) Calculate the Force "A" as follows (not to exceed 445 N (100 lbf.)):
   
   \[ A = 0.5 \times \text{(unit weight)} \]

   c) Calculate the Force "B" as follows:
   
   \[ B = 0.5 \times (\text{Force } A) \]

7.3  **Test Procedure**

   a) Attach a loading device to the support member to be tested. The placement of the loading device shall be within 25 mm (1 in.) of the end of the support member/glide assembly that makes contact with the floor. The placement of the loading device shall be as close to the glide end as possible (may be on the glide stem, but not on the glide foot itself). For units with casters, apply the load as close as possible to the end of the support member but not to the caster assembly.

   b) Gradually apply the horizontal forces ("A" and "B"), one at a time, as shown in Figure 7.

   c) Repeat steps (a) and (b) for each unique type or non-symmetrically placed supporting member on the unit.

   d) If the leg being tested is attached to a pedestal, perform the pull force test per Section 20 on each type and size of extendible element in the attached pedestal.

7.4  **Test Acceptance Level**

No loss of serviceability shall occur as a result of the application of the loads. After the application of the loads, each extendible element in the unit to which the tested leg is attached shall be tested to and meet the pull force requirements of Section 20.
Figure 8 - Horizontal Racking Resistance Test
8 Horizontal Racking Resistance Test (See Figure 8)

8.1 Purpose of Test

The purpose of this test is to evaluate the ability of the unit to function properly after handling/moving. This test only applies to un-ganged freestanding desks and tables less than or equal to 1829 mm (72 in.) in length. This test does not apply to units with casters.

8.2 Test Setup

Note: Perform the test by raising an end of the long axis as shown in Figure 8.

a) A test platform shall be covered with 1.2 – 1.4 kg/m² (36 - 40 oz./ yard²) nylon, 10 – 12 mm (3/8 - 1/2 in.) thick cut pile carpet with a re-bond carpet cushion with a thickness of 11 mm (0.44 in.) ± 8% and a density of 2 kg/m³ (6 lb./ft³) ± 8%.

b) The unloaded unit, with glides (adjusted at midpoint, if applicable) shall be placed on the test platform.

c) The unit shall be supported within 152 mm (6 in.) of the raised end.

8.2 Test Procedure

Note: It is not necessary to repeat tests on legs or support members of identical materials and construction.

a) Raise one end of the long axis of the unit as shown in Figure 8 until one end just clears the nap of the carpet.

b) Rotate unit 90 degrees and return it 90 degrees to its original position. Note: One end panel or two legs of the same end remain in contact with the floor surface during this procedure.

c) Repeat for 10 cycles at a rate of 1 to 2 cycles per minute.

d) Raise the opposite end of the unit, rotate 90 degrees and return it 90 degrees to its original position.

e) Repeat for 10 cycles at a rate of 1 to 2 cycles per minute.

f) Perform the pull force test in Section 20 on all extendible elements.

8.3 Acceptance Level

There shall be no loss of serviceability. The extendible elements shall meet the pull force test requirements in Section 20.
9 **Interlock Test - Static** (See Figure 9)

This test applies to extendible elements equipped with interlock devices.

9.1 **Purpose of Test**

The purpose of this test is to evaluate the interlock system.

9.2 **Test Setup**

The unit shall be placed on a test platform, leveled, and secured against movement.

9.3 **Test Procedure**

   a) One extendible element shall be fully extended.

   b) The load attachment device shall be connected as specified in Table 2 (See page 19).

   c) A horizontal pull force of 133 N (30 lbf.) as per Figure 9 shall be applied to each remaining extendible element, one compartment at a time.

   d) Repeat Steps (a through c) until all possible combinations of extendible elements have been tested.

9.4 **Acceptance Level**

There shall be no loss of serviceability to the interlock system. The remaining extendible elements shall not bypass the interlock system.
Table 3
Drop Height vs. Unit Weight

<table>
<thead>
<tr>
<th>Unit Weight</th>
<th>Drop Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;45 kg (100 lb.)</td>
<td>150 mm (5.9 in.)</td>
</tr>
<tr>
<td>45- 90 kg (100-200 lb.)</td>
<td>100 mm (3.9 in.)</td>
</tr>
<tr>
<td>&gt;90 kg (200 lb.)</td>
<td>60 mm (2.4 in.)</td>
</tr>
</tbody>
</table>
10 Drop Test (See Figure 10)

10.1 Purpose of Test
The purpose of this test is to determine the ability of a single unit to withstand an impact force on the legs, column or base member. This test only applies to un-ganged freestanding desks or table products that are less than or equal to 1829 mm (72 in.) in length. This test does not apply to units with casters.

Note: It is important to follow manufacturer's instructions (regarding telescoping sections, removal of hutches, etc.) when performing this drop test. See Section 3.2.

10.2 Test Setup
The unloaded unit shall be placed on a test platform. If the unit is equipped with glides, extend them to their midpoint but not to exceed 13 mm (0.5 in.) from the fully retracted position. Adjustable height desk/tables shall be positioned at the midpoint of their adjustment range.

10.3 Test Procedure
a) One end of the unloaded unit shall be raised off the test platform per Table 3 (See page 53) or at the balance point, whichever is lower.

b) The end of the unit being tested shall be released and allowed a free fall to the test platform.

c) Repeat steps (a) and (b) for the opposite end of the unit.

d) Perform the pull force test in Section 20 on all extendible elements.

10.4 Acceptance Level
There shall be no loss of serviceability. The extendible elements shall meet the pull force test requirements in Section 20.
Figure 11a - Force Test for Extendible Element Locks

Figure 11b - Force Test for Door Locks
11 Lock Tests

11.1 Purpose of Tests
The purpose of these tests is to evaluate the ability of locking mechanisms, if present, to provide a nominal amount of security for the contents.

11.2 Force Test for Extendible Element Locks (See Figure 11a)

11.2.1 Test Setup

11.2.1.1 The unit shall be placed on a test platform and leveled. The unit shall be secured to prevent it from moving. The method of securing shall not interfere with the operation of the extendible element(s) being tested.

11.2.1.2 Close and lock all extendible elements.

11.2.1.3 The load attachment device shall be connected as specified in Table 2 (See page 19).

11.2.2 Test Procedure

a) A horizontal outward force of 222 N (50 lbf.) shall be applied once at each of the applicable locations indicated in the test setup.

b) An outward and upward force (30 degrees from horizontal) of 222 N (50 lbf.) shall be applied once at each of the applicable locations indicated in the test setup.

  Note: If the pull design does not allow a user to pull up on the extendible element from the pull, step (b) shall be omitted.

c) Repeat steps (a) and (b) for each extendible element.

d) Unlock the extendible elements.

e) All extendible elements in the unit shall be uniformly loaded per Table 1 (See page 18). Any uniform loading configuration in Section 3.8 (Figure 3a – 3d) is acceptable.

f) The loaded extendible elements shall be closed and locked.

g) Repeat procedure (a) through (d).

11.2.3 Acceptance Level
There shall be no loss of serviceability of the locking mechanism. The extendible elements shall remain in the normal locked position during application of the forces.

11.3 Force Test for Door Locks (See Figure 11b)

11.3.1 Test Setup

a) The unit shall be placed on a test platform and leveled. The unit shall be secured to prevent it from moving. The method of securing shall not interfere with the operation of the doors being tested.
b) Close and lock all doors.

c) Set up the test to apply forces to the center of the door pull area.

11.3.2 Test Procedure

a) Apply a force of 133 N (30 lbf.) in the direction of initial door travel.

b) Repeat step (a) for each door.

11.3.3 Acceptance Level

There shall be no loss of serviceability of the locking mechanism. The doors shall remain in the normal locked position during application of the forces.

Figure 12 - Extendible Element/Equipment Surface Test - Cyclic
12 Extendible Element/Equipment Surface Test - Cyclic (See Figure 12)

12.1 Purpose of Test
The purpose of this test is to ensure that the suspension system is capable of supporting typical loads while the extendible element/equipment surface is being opened and closed. This test does not apply to input device supports and writing shelves.

12.2 Cycle Test for Extendible Elements/Equipment Surfaces Deeper Than Wide
Note: Center/Pencil Drawers are tested per 12.4.

12.2.1 Test Setup
   a) The unit shall be placed on a test platform, leveled, and secured against movement.
   b) Extendible elements/equipment surfaces shall be uniformly loaded to the applicable distributed functional load per Table 1 (See page 18).
   c) The extendible element/equipment surface shall be tested to and meet the pull force requirements of Section 20.
   d) The cycling device shall be connected to the center of the extendible element's pull or the center of the front edge of an equipment surface. If equipped with side pulls, the cycling device shall be connected to the center of one of the pulls.
   e) The cycling device shall be set to cause the extendible element/equipment surface to travel from within 0 to 6 mm (0.25 in.) of the closed position to 0 to 6 mm (0.25 in.) of the fully extended position and return to its original position. For extendible elements/equipment surfaces without out stops, see definition 2.17. The cycling device shall not support or add vertical or horizontal loads to the suspensions.
   f) The cycling device shall be operated at a rate of 12 ± 4 cycles per minute.

12.2.2 Test Procedure
   a) One extendible element/equipment surface of each type and size (See 3.1.4) shall be subjected to 25,000 cycles.
   b) The suspensions shall not be cleaned or lubricated during the test. When necessary, the extendible element/equipment surface may be reset by fully opening and closing the element at intervals of not less than 500 cycles throughout the test.
   c) Upon completion of the cycles, perform the Pull Force Test in Section 20.
   d) If the extendible element/equipment surface is equipped with an interlock device, perform the Interlock Test in Section 9.

12.2.3 Acceptance Level
There shall be no loss of serviceability to the unit. After the cycle test, the extendible element(s) /equipment surface(s) shall meet the pull force requirements of Section 20. After the cycle test, the extendible elements/equipment surface, if applicable, shall meet the Interlock test requirements of Section 9.
Table 4
Extendible Elements/Equipment Surfaces Wider Than Deep - Requirements by Pull Type

<table>
<thead>
<tr>
<th>Pull Type</th>
<th>Cycles per Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>single pull ≤ 33% extendible element width</td>
<td>25,000 cycles at center of pull.</td>
</tr>
<tr>
<td>(center pulls and single side pulls)</td>
<td></td>
</tr>
<tr>
<td>single pull &gt; 33% extendible element width</td>
<td>15,000 cycles at center of pull</td>
</tr>
<tr>
<td>(wide width pulls)</td>
<td>5,000 cycles at RH position (see test setup)</td>
</tr>
<tr>
<td></td>
<td>5,000 cycles at LH position (see test setup)</td>
</tr>
<tr>
<td>dual pulls</td>
<td>12,500 cycles at center of RH pull</td>
</tr>
<tr>
<td></td>
<td>12,500 cycles at center of LH pull</td>
</tr>
</tbody>
</table>

12.3 Cycle Test for Extendible Elements/Equipment Surfaces Wider Than Deep

Note: Center/Pencil Drawers are tested per Section 12.4. Keyboard Surfaces are tested per Section 15.

12.3.1 Test Setup

a) The unit shall be placed on a test platform, leveled, and secured against movement.
b) Extendible elements/equipment surfaces shall be uniformly loaded to the applicable distributed functional load per Table 1 (See page 18).
c) The extendible element/equipment surfaces shall be tested to and meet the pull force requirements of Section 20.
d) The load attachment device shall be connected as specified in Table 2 (See page 19) or the center of the front edge of an equipment surface.
e) The cycling device shall be set to cause the extendible element/equipment surface to travel from within 0 to 6 mm (0.25 in.) of the closed position to 0 to 6 mm (0.25 in.) of the fully extended position and return to its original position. The cycling device shall not support or add vertical or horizontal loads to the suspensions.
f) The cycling device shall be operated at a rate of 12 ± 4 cycles per minute.

12.3.2 Test Procedure

a) One extendible element/equipment surface of each type and size (See 3.1.4) shall be tested per Table 4 (See page 59).
b) The suspensions shall not be cleaned or lubricated during the test. When necessary, the extendible element may be reset by fully opening and closing the element at intervals of not less than 500 cycles throughout the test.
c) Upon completion of the cycles, perform the Pull Force Test in Section 20.
d) If the extendible element is equipped with an interlock device, perform the Interlock Test in Section 9.
12.3.3 Acceptance Level
There shall be no loss of serviceability to the unit. After the cycle test, the extendible element(s) shall meet the pull force requirements of Section 20. After the cycle test, the extendible elements, if applicable, shall meet the Interlock Test requirements of Section 9.

12.4 Cycle Test for Center/Pencil Drawers (also known as low height drawers)

12.4.1 Test Setup
a) The unit shall be placed on a test platform, leveled, and secured against movement.
b) Load the center/pencil drawer per Table 1 (See page 18).
c) The center/pencil drawer shall be tested to and meet the pull force requirements of Section 20.
d) The cycling device shall be connected to the center of the center/pencil drawer pull.
e) The cycling device shall be set to cause the center/pencil drawer to travel from within 0 to 6 mm (0 to 0.25 in.) of the closed position to 0 to 6 mm (0 to 0.25 in.) of the fully extended position and return to its original position. The cycling device shall not support or add vertical or horizontal loads to the suspensions.
f) The cycling device shall be operated at a rate of 12 ± 4 cycles per minute.

12.4.2 Test Procedure
a) The center/pencil drawer shall be subjected to 5,000 cycles.
b) The suspensions shall not be cleaned or lubricated during the test.
c) Upon completion of the cycles, perform the Pull Force Test in Section 20 when loaded uniformly with 2.3 kg (5 lb.) of weight.

12.4.3 Acceptance Level
There shall be no loss of serviceability. After the cycle test, the center/pencil drawer shall meet the pull force requirements of Section 20.
Extendible Element/Equipment Surface Retention Tests

13.1 Purpose of Tests

The purpose of these tests is to evaluate the ability of extendible elements/equipment surfaces to withstand excessive pullout forces. This test applies to extendible elements with load capacity per Table 1 (See page 18) of greater or equal to 7 kg (15.4 lb.).
13.2 Test Setup

a) The unit shall be placed on a test platform, leveled, and secured to prevent it from moving. The method of securing shall not interfere with the operation of the extendible element(s)/equipment surface(s) being tested.

b) The extendible element/equipment surface shall be uniformly loaded to the applicable distributed functional load per Table 1 (See page 18).

c) Prior to performing test procedure, the extendible element/equipment surface shall be tested to and meet the pull force requirements of Section 20.

d) A stranded metallic cable shall be attached to the most rigid point of the vertical centerline of the extendible element. This may be accomplished by means of a clamp or similar device that does not affect the test results.

e) The opposite end of the stranded metallic cable shall extend horizontally to a pulley and then downward to an attached weight. Open the extendible element/equipment surface 38 mm (1.5 in.) and determine the minimum weight that will cause it to open to full extension. Add an additional 2.3 kg (5 lb.) to the weight on the cable. This combined weight shall be used to conduct the test.

13.3 Test Procedure

13.3.1 Extendible Element/Equipment Surface Retention Test – Cyclic Impact (See Figure 13a)

a) The extendible element/equipment surface with stranded metallic cable and hanging weight shall be held 38 mm (1.5 in.) from the closed position and then released, permitting it to open rapidly. The weight shall be restrained after the extendible element/equipment surface reaches 80% of its total extension and impact the out stops. See Figure 13a. Repeat this procedure for a total of 5 times without resetting the loading gaps.

13.3.2 Extendible Element/Equipment Surface Retention Test – Cyclic Durability (See Figure 13b)

a) Remove the load restraint such that the extendible element/equipment surface will travel to full extension. See Figure 13b.

b) A device shall be used to move the extendible element/equipment surface 51 mm (2 in.) toward the closed position and then to release it rapidly, allowing it to impact the out stop. This procedure shall be repeated 7,500 cycles at a rate of 12 ± 4 cycles per minute. When necessary, the extendible element/equipment surface may be reset by fully opening and closing the element at intervals of not less than 500 cycles throughout the test.

13.4 Acceptance Level

There shall be no loss of serviceability or disengagement of the extendible element/equipment surface from the unit. After performing the Retention Tests, the extendible element/equipment surface shall meet the pull force requirements of Section 20.
14 Rebound Test (See Figure 14)

14.1 Purpose of Test
The purpose of this test is to evaluate the rebound characteristics of a loaded extendible element. This test does not apply to center/pencil drawers, keyboard surfaces, input device supports, or writing shelves.

14.2 Test Setup
a) The unit shall be placed on a test platform, leveled and secured to prevent it from moving. The method of securing the unit shall not interfere with the operation of the extendible element(s) being tested.
b) The extendible element to be tested shall be uniformly loaded with the distributed functional load per Table 1 (See page 18).
c) Prior to performing test procedure, the extendible element shall be tested to and meet the pull force requirements of Section 20.
d) A force gauge with a spring rate of 17.5 N per cm (10 lbf./in.) shall be mounted per Figure 14 and centered on the extendible element front.

14.3 Test Procedure
a) The extendible element shall be opened against the spring to exert a force equivalent to the load in the extendible element but not to exceed 178 N (40 lbf.).
b) Release the extendible element allowing the force applied by the force gauge to close the extendible element. Record the position of the extendible element after rebound.

c) Reset the position of the load to meet the air gap requirements of Section 3.8. See Figure 3a-3d.

d) Repeat steps (a) through (c) for a total of 5 times.

e) Repeat steps (a) through (d) for each type and/or size of extendible element.

14.4 Acceptance Level

There shall be no loss of serviceability. The extendible elements shall meet the pull force test requirements in Section 20. The rebound position of the extendible element after each of five closings shall not exceed 38 mm (1.5 in.) from its closed position.

Figure 15 - Keyboard Support and Input Device Support Adjustment Tests
15 Keyboard Support and Input Device Support Adjustment Tests (See Figure 15)

15.1 Purpose of Test
The purpose of this test is to evaluate the ability of keyboard surfaces and input device supports to be cycled through their range of motion.

15.2 Test Setup
a) The surface to which keyboard and input device support surface(s) are attached shall be leveled in the normal operating position and secured. Disable any latching/locking devices during this test.

b) Apply an evenly distributed 2.25 kg (5 lb.) load across the surface of the keyboard support. Input device supports shall not be loaded.

c) Attach a cycling device to the surface such that it will not add load or provide vertical support during horizontal or swivel adjustment testing. For keyboard surfaces with pulls, attach the device per Table 2 (See page 19).

d) The cycling device shall be set to operate at a rate not to exceed 6 cycles per minute.

15.3 Test Procedure
The keyboard support surface and input device support surface(s) shall be subjected to 2500 cycles in each position below as applicable:

a) Horizontal Motion; within 6 mm (0.25 in.) of the end stops.

b) Vertical Motion; within 6 mm (0.25 in.) of the end stops.

c) Swivel Motion; minimum of 120 degrees of adjustment, or to within 6 mm (0.25 in.) of the end stops over its full range of motion, whichever is less.

Note: Individual adjustment motions may be tested one at a time. The cycling device shall neither add load nor provide vertical support during horizontal or swivel adjustment testing, unless the product design requires load to activate the mechanism in accordance with Section 3.2.

15.4 Acceptance Level
There shall be no loss of serviceability.
16 Hinged Door Tests

Note: these tests do not apply to multi-fold (accordion) doors.

16.1 Strength Test for Vertically Hinged Doors (See Figure 16a)

16.1.1 Purpose of Test
The purpose of this test is to determine the ability of doors to withstand excessive vertical loads.

16.1.2 Test Setup
a) The unit shall be placed on a test platform, leveled, and secured against movement.
b) Attach the specified load per Table 5 so that it is equally distributed on both sides of the door and its center of gravity acts 100 mm (4 in.) from the edge of the door opposite the hinge. Test receding doors in the fully extended position. For bi-fold doors, attach the load so that it is applied to the section of the door farthest from the point where the hinge(s) is (are) attached to the frame in a manner that does not affect the operation of the door.

Table 5
Door Height vs. Load

<table>
<thead>
<tr>
<th>Door height</th>
<th>Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 46 cm (18 in.)</td>
<td>10 kg (22 lb.)</td>
</tr>
<tr>
<td>46 cm (18 in.) and greater</td>
<td>20 kg (44 lb.)</td>
</tr>
</tbody>
</table>

16.1.3 Test Procedure
Cycle the door 10 times from a position 45 degrees from fully closed to a position 10 degrees from fully open (but not more than 135 degrees) and return.

16.1.4 Acceptance Level
There shall be no loss of serviceability to the unit.
16.2 Wear and Fatigue Tests for All Hinged Doors (See Figure 16b)

16.2.1 Purpose of Test
The purpose of this test is to evaluate the resistance of hinged doors to wear and fatigue.

16.2.2 Test Setup
   a) The unit shall be placed on a test platform, leveled, and secured against movement.
   b) Door latches are to be disabled. Doors that have the ability to retract may have this feature disabled during the test.
   c) For doors that contain storage features, load the storage feature to the functional load according to Table 1 (See page 18).
   d) Attach a device to cycle the door from a position 10 degrees from fully closed to a position 10 degrees from fully open and return, not to exceed a maximum swing angle of 90 degrees.
   e) Cycle the door at a rate of 12 ± 4 cycles per minute.

16.2.3 Test Procedure
   Cycle the door 5,000 times. The hinges shall not be cleaned or lubricated during the test.

16.2.4 Acceptance Level
There shall be no loss of serviceability.
16.3 Slam Open/Closed Test for Vertically Hinged Doors (See Figure 16c)

16.3.1 Purpose of Test
The purpose of this test is to evaluate the ability of the door to withstand forceful (slam) closures.

16.3.2 Test Setup
a) The unit shall be placed on a test platform, leveled, and secured against movement. Doors shall not be loaded.
b) A force gauge with a spring rate of 17.5 N/cm (10 lbf./in.) shall be mounted per Figure 16c. The force gauge shall be positioned so that it applies the force 25 mm (1 in.) in from the edge of the door, and shall be centered top to bottom.

16.3.3 Test Procedure
a) Open the door through an angle of 30 degrees so that the force gauge, perpendicular to the face of the door, indicates 89 N (20 lbf).
b) Release the door allowing it to close.
c) Repeat Steps (a) and (b) for a total of 5 times.
d) From the fully opened position, pivot the door closed 30 degrees so that the force gauge, perpendicular to the rear face of the door, indicates 89 N (20 lbf).
e) Release the door allowing it to open.
f) Repeat Steps (d) and (e) for a total of 5 times.

16.3.4 Acceptance Level
There shall be no loss of serviceability.
16.4 Drop Cycle Test for Horizontally Hinged and Horizontally Hinged Doors

(See Figure 16d)

16.4.1 Purpose of Test
The purpose of this test is to evaluate the ability of the horizontally hinged door mechanism to withstand lifting and a free fall drop.

16.4.2 Test Setup
   a) The unit shall be placed on a test platform, leveled, and secured against movement.
   b) The receding door shall be attached at its center to a mechanism that will pull the door up to an 85-degree to 90-degree angle from the closed-door position.
   c) The mechanism shall release the door, allowing it to fall freely against the unit.

16.4.3 Test Procedure
The door shall be lifted and dropped 250 times at a rate not to exceed 10 cycles per minute.

16.4.4 Acceptance Level
There shall be no loss of serviceability to the desk/table unit or its components.
17 Receding Door Tests - Cyclic

17.1 Purpose of Tests
The purpose of these tests is to evaluate the ability of a receding door and its suspension to withstand repeated movements in and out of the stored position.

17.2 Test for Horizontal Receding Doors (See Figure 17a)

17.2.1 Test Setup
a) The unit shall be placed on a test platform, leveled, and secured against movement. Door latches shall be disabled for this test.
b) The cycling device shall be connected to the leading edge of the door at a point one-sixth of the width of the door in from the left or right end.
c) Prior to performing the test procedure the door shall be tested to and meet the pull force requirements of Section 20. The door may be supported in a horizontal plane during the pull force measurement test.
d) Adjust the cycling device to cause the door to travel between 0 to 6 mm (0 to 0.25 in.) of its fully extended and retracted positions.
e) The cycling device shall be set to operate at $12 \pm 4$ cycles per minute.

17.2.2 Test Procedure
a) The door shall be subjected to 2,500 cycles with attachment to the right side.
b) The door shall then be subjected to 2,500 cycles with attachment to the left side.

17.2.3 Acceptance Level
The door shall have no loss of serviceability. After the cycle test, the door shall meet the pull force requirements of Section 20.
17.3 **Test for Vertical Receding Doors** (See Figure 17b)

17.3.1 **Test Setup**
   a) The unit shall be placed on a test platform, leveled, and secured against movement. Door latches shall be disabled for this test.
   b) The cycling device shall be connected to the leading edge of the door at the center pull area. If the unit to be tested has two or more identical doors, only one of them needs to be tested.
   c) Prior to performing the test procedure the door shall be tested to and meet the pull force requirements of Section 20.
   d) Adjust the cycling device to cause the door to travel between 0 to 6 mm (0 to 0.25 in.) of its fully extended and retracted positions.
   e) The cycling device shall not be used to support the weight of the door during the test.
   f) The cycling device shall be set to operate at $12 \pm 4$ cycles per minute.

17.3.2 **Test Procedure**
The door shall be subjected to 5,000 cycles.

17.3.3 **Acceptance Level**
The door shall have no loss of serviceability. After the cycle test, the door shall meet the pull force requirements of Section 20.
18 Sliding and Tambour Door Tests – Cyclic

18.1 Purpose of Tests
The purpose of these tests is to evaluate the ability of sliding or tambour doors to function. These tests apply to doors that move either horizontally or vertically. These tests do not apply to doors that are hinged.

18.2 Wear and Fatigue Test (See Figure 18a)

18.2.1 Test Setup
   a) The unit shall be placed on a test platform, leveled, and secured against movement.
   b) Attach a cycling device to the center of the pull such that it does not add load to or support load from the door.
   c) Prior to performing test procedure the door shall be tested to and meet the pull force requirements of Section 20.
   d) Adjust the cycling device to cause the door to travel between 0 to 6 mm (0 to 0.25 in.) of fully open and fully closed positions.
   e) Set the cycling device to operate at $12 \pm 4$ cycles per minute.

18.2.2 Test Procedure
The door shall be subjected to 5,000 cycles.

18.2.3 Acceptance Level
There shall be no loss of serviceability. After the cycle test, the door shall meet the pull force requirements of Section 20.
Figure 18b - Slam Open and Closed Test for Doors Which Do Not Free Fall
18.3 Slam Open and Closed Test for Doors Which Do Not Free Fall (See Figure 18b)
This test applies to doors which slide or roll, open and closed, but not under their own weight.

18.3.1 Test Setup
a) The unit shall be placed on a test platform, leveled, and secured against movement. Doors shall remain unloaded for this test.
b) Prior to performing the test procedure the door shall be tested to and meet the pull force requirements of Section 20.
c) A cable shall be attached to the center of the door’s pull area. This may be accomplished by means of a clamp or similar device that does not affect the test results.
d) The opposite end of the cable shall be attached to a weight that will act to cause the door to open or close. The weight shall be determined from the following equation using the pull force measurement taken in b) above:

\[
\text{Weight (kg)} = 2 \times \frac{\text{Pull Force (N)}}{9.8 \text{ m/s}^2}
\]

\[
[\text{Weight (lb.)} = 2 \times \frac{\text{Pull Force (lbf.)}}{9.8 \text{ m/s}^2}]
\]
e) Set up the test device to restrain the weight once the door has moved to within 25 mm (1 in.) of the door stop to be impacted.

18.3.2 Test Procedure
a) Move the door, lifting the weight, until within 25 mm (1 in.) of the doorstop opposite to the one to be impacted.
b) Release the door, permitting the door to move rapidly, and allowing it to impact the door stop.
c) Repeat Steps (a) and (b) for a total of 5 times.
d) Repeat Setup and Procedure Steps (a) through (c) to impact the opposite door stop on the same door.
e) Repeat Setup and Procedure for each type and size of door.

18.3.3 Acceptance Level
There shall be no loss of serviceability. After the test, the door shall meet the pull force requirements of Section 20.
Figure 19 - Durability Test for Products with Casters - Cyclic
19 Durability Test for Products with Casters - Cyclic

19.1 Purpose of Test
The purpose of this test is to evaluate the ability of a unit with casters to withstand fatigue, stress, and wear caused by moving the product.

19.2 Test Setup
a) Place the unit on a level, smooth, hard-surfaced test platform. Load the extendible elements and/or shelves, keyboard surfaces, or equipment surfaces to the functional distributed loads in Table 1 (See page 18). Load shall be configured per Section 3.8.

b) Attach the cycling device no lower than 51 mm (2 in.) from the primary surface of the unit. For units without a primary surface, attach the cycling device 762 mm ± 51 mm (30 in. ± 2 in.) above the test platform. The method of attachment shall neither remove load nor support the unit during the test.

c) Apply a concentrated load of 38.6 kg (85 lb.) centered on the unit through a 305 mm (12 in.) diameter area. The casters shall be free to rotate and swivel where applicable.

d) Position the unit to cycle parallel to its longitudinal axis unless prohibited by the orientation of any non-swivel casters. Adjust the length of stroke of the cycling device to a minimum of 610 mm (24 in.).

e) Operate the machine at a rate of 10 ± 2 cycles per minute. One cycle consists of a forward, then a backward stroke of the machine.

f) For units with caster and glide combinations, the legs without casters may be raised a maximum of 51 mm (2 in.) above the test platform (i.e., supported by the attachment device) during this test.

19.3 Test Procedure
Cycle the device for 1000 cycles.

19.4 Acceptance Level
There shall be no loss of serviceability.
20 Pull Force Test (See Figure 20)

20.1 Purpose of Test
The purpose of this test is to measure the force required to move an extendible element/equipment surface or door from the fully closed position to the fully extended/fully opened position.

20.2 Test Setup
a) The unit shall be placed on a test platform, leveled, and secured against movement.
b) The extendible elements/equipment surfaces shall be uniformly loaded to the applicable distributed functional load per Table 1 (See page 18). The load shall be configured per Section 3.9.3 (Figure 3a or 3b) if the extendible element has a bottom. The load shall be configured per Section 3.9.4 (Figure 3c or 3d) if the extendible element does not have a bottom. Any latching mechanisms shall be disabled. Door shelves shall not be loaded for this test.
c) The extendible element/equipment surface or door may be subjected to a one-time break-in period of 100 cycles. One cycle is defined as travel from 0 to 6 mm (0 to 0.25 in.) of the closed position to 0 to 6 mm (0 to 0.25 in.) of the fully extended position and return to its original position. Horizontal receding doors may be supported in a horizontal plane during this test.
d) A force gauge or other force measurement device shall be attached to the center of the pull area. If more than one pull exists, test each pull area independently.

20.3 Test Procedure
Measure the maximum force that will open the extendible element/equipment surface or door from its fully closed position to its fully extended/fully opened position.

20.4 Acceptance Level
The force shall not exceed 50 N (11.2 lbf.).
Appendix A  -- Load Ease Test Bag -- Typical Construction

Example: 406 mm (16 in.) diameter bag
# TEST BAG

<table>
<thead>
<tr>
<th>DET NO</th>
<th>DESCRIPTION</th>
<th>MATERIAL</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SIDE PANEL</td>
<td>22 OZ. VINYL COATED POLYESTER</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>BOTTOM PANEL</td>
<td>22 OZ. VINYL COATED POLYESTER</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>INSIDE PANEL</td>
<td>22 OZ. VINYL COATED POLYESTER</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>REINFORCEMENT</td>
<td>22 OZ. VINYL COATED POLYESTER</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>WEBBING</td>
<td>51 MM (2 IN) WIDE POLYESTER, ABRASION GRADE, TENSILE</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>STRENGTH OF 1315 KG (2900 LB)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>THREAD</td>
<td>POLYESTER #305</td>
<td>X</td>
</tr>
<tr>
<td>7</td>
<td>STEEL RINGS</td>
<td>10 MM (0.4 IN) DIA. STOCK X 61 MM (2.4 IN) WIDE X</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>79 MM (3.1 IN) HIGH</td>
<td></td>
</tr>
</tbody>
</table>

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Appendix A (Continued) -- Load Ease Test Bag -- Typical Construction
Appendix A (Continued) -- Load Ease Test Bag -- Typical Construction
Appendix A (Continued) -- Load Ease Test Bag -- Typical Construction
TEST BAG

TEST BAG CONSTRUCTION:

1. THE BAG IS TO BE SEWN TO BE 406 MM [16 IN] OUTSIDE DIAMETER AND 406 MM [16 IN] DEEP.
2. THE BAG IS CONSTRUCTED AS SHOWN ON ALL SHEETS.
3. THE TWO LIFTING STRAPS ARE OF 51 MM [2 IN] WIDE POLYESTER WEBBING SEWN IN AT 90° TO ONE ANOTHER ON THE OUTSIDE OF THE BAG.
4. THEY EXTEND DOWN ONE SIDE OF THE BAG, UNDER THE BOTTOM AND UP THE OTHER SIDE.
5. THE STEEL LIFTING RINGS ARE SEWN INTO THE FOUR ENDS OF THE TWO STRAPS.

End of Document