

**ANSI A100.1-2018**  
**Revision of ANSI/WCMA A100.1-2014**

**STANDARD**  
**FOR SAFETY OF**  
**WINDOW COVERING PRODUCTS**

**SPONSOR**



**WINDOW COVERING MANUFACTURERS ASSOCIATION, INC.**



**American National Standards Institute**  
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AMERICAN NATIONAL STANDARD

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## **FOREWORD**

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## 1 SCOPE

**1.1 Background:** The members of the Window Covering Manufacturers Association, Inc. (WCMA), recognizing that unfortunate accidents, including strangulation, have occurred among young children using certain products made or imported by members of the industry, have prepared this Standard in cooperation with the U.S. Consumer Product Safety Commission (CPSC).

This Standard is not intended to inhibit, but rather to encourage, the development of devices and methods that shall further improve the safety of products manufactured by industry members. Manufacturers and other users of this Standard are requested to submit suggestions for improvements to WCMA.

Members of WCMA, in recognition of continuing improvements to be made, shall sponsor appropriate revisions to this Standard on a regular basis.

**1.2** This Standard applies to all interior window covering products. The items covered include the products listed in 1.3.

**1.3** Types of window covering products documented in this standard include, but are not limited to, cellular shades, horizontal blinds, pleated shades, roll up style blinds, roller shades, sheer shades, Roman style shades, traverse rods (including products that are used with traverse rods, e.g., curtains and drapes), panel tracks, and vertical blinds. These products can be manufactured and distributed as either stock or custom products. (See Section 3 for definitions of these terms.)

## 2 GENERAL

**2.1 Objective:** The objective of this Standard is to provide requirements for products documented in this standard in 1.2 and 1.3 that reduce the possibility of injury, including strangulation, to young children from the bead chain, cord, or any type of flexible Loop.

**2.2 Values:** Required values given in this Standard are given in U.S. units. The SI (metric) equivalents are approximate.

**2.3 Tolerances:** Where only plus or minus values are given, they are permitted to be exceeded or reduced as appropriate at the option of the manufacturers. Linear dimensions expressed without specific tolerances or not marked maximum or minimum shall be plus or minus 1/32 in (1 mm).

**2.4 Reference Documents:** All documents referenced are included in Appendix A: Reference Documents.

**2.5 Products:** Product types are described and / or illustrated in Appendix H: Product Illustrations.

## 3 DEFINITIONS

Genus	ID	Term	Definition
1. Window Covering products	1.01	Cellular Shades	Multiple layers of material formed into tubes or cells, whose operation consists of raising and lowering.
	1.02	Horizontal Blinds	Rigid horizontal slats, suspended from a headrail by Ladders, and whose operation may include tilting, raising and lowering.
	1.03	Pleated Shades	Single or multiple layers of material with permanent pleats in a horizontal orientation, whose operation consists of raising and lowering.

	1.04	Roll Up Style Shade	A flexible sheet with an external cord, whose operation consists of pulling up or releasing the cord to roll up or lower the sheet from the bottom or top, as the case may be.
	1.05	Roller Shade	Flexible sheets of material attached to a roller and a means of supporting the roller, whose operation consists of furling or unfurling the material from the roller.
	1.06	Roman Style Shades	Flexible fabric with rings, clips, or attachment devices, aligned in columns and spaced, through which cords or Wide Bands run from the headrail to the lowest ring or bottom rail, so that the fabric folds or gathers during operation as the cord or Wide Band is pulled towards the headrail.
	1.07	Traverse Rod	A rod or track upon which drapes or panels are attached that slide open and closed
	1.08	Vertical Blinds	Rigid or flexible sheet vertical slats suspended from a headrail, and whose operation may include traversing and rotating.
2. Cord-related components	2.01	Accessible Cords	Cord that can be contacted by the test probe following the test procedures in Appendix C: Test Procedure for Accessible Cords.
	2.02	Band	A thin strip of material which is wider than it is thick and is utilized in the function or operation of a window covering product. If a band is not classified as a Wide Band, then for testing purposes, the band is considered equivalent to a cord.
	2.03	Bead Chain	A cord with series of small spheres made of plastic or metal
	2.04	Cord	A long slender flexible material.
	2.05	Cord Connector	A device or technique used to join several individual cords.
	2.06	Cord Lock	A device that temporarily holds the window covering product at a desired height during operation.
	2.07	Cord Release Device	A passive device which releases a Loop when subjected to a specified load.
	2.08	Cord Retraction Device	A passive device which winds and gathers cords when tension is no longer applied by the user.
	2.09	Cord Shroud	A device or material added to limit the accessibility of a cord or formation of a Hazardous Loop.
	2.10	Free Standing Cord Loop	A Loop formed by an Inner Cord that does not diminish in size when the force used to create the Loop is removed.
	2.11	Guide Cord	A fixed or static Cord intended to restrict and/or guide window covering product components.
	2.12	Hazardous Loop	A Loop that allows the head probe to pass through it when tested per Appendix D: Hazardous Loop Test Procedure.
	2.13	Inaccessible Operating Cord	Operating Cords that are inaccessible as determined per the test requirements in Appendix C: Test Procedure for Accessible Cords.
	2.14	Inner Cord	The portion of a Cord which transfers force from the user interface to components during operation.
	2.15	Inner Cord Stop Device	A device that prevents the Accessible Inner Cords from being pulled to create a free-standing Loop.
	2.16	Ladder	A system that is typically constructed of Cord but can also be made of fabric with decorative facings that are used in horizontal blinds that support and determine spacing between slats.
	2.17	Loop	A bounded opening formed by any configuration of Cords and/or window covering material.

	2.18	Cord and Bead Chain Restraining Device	A device that prevents the creation of a Hazardous Loop from an Accessible Continuous Operating Cord.
	2.19	Operating Cord	The portion of a Cord which the user manipulates directly during operation. Operation includes, but is not limited to, lifting, lowering, tilting, rotating, and traversing.
	2.20	Short Static or Access Cord	An Operating Cord or Band that is fixed in length in any state (free or under tension), to be a length equal to or less than 8 inches, typically attached to a bottom rail to enable access to operate the shade.
	2.21	Retractable Cord	An Operating Cord that extends when pulled by a user, and retracts to a shorter length when the user releases the Cord.
	2.22	Tassel	A device used to terminate and cover the end of an Operating Cord.
	2.23	Tension Device	A device that is used to maintain tension on the Cord or Bead Chain Loop.
	2.24	Wide Band	A Band that meets the specifications outlined in 6.8.
3. Non-Cord product component	3.01	Active Device	A device that is activated and operated by the direct interaction of the user.
	3.02	Bottom Rail	Component at the bottom of a window covering that acts as an attachment point for the ends of Inner Cords or provides weight to insure proper operation.
	3.03	Headrail	Component at the top of a window covering that supports the product while mounted and allows Operating and Inner Cords to be routed through it.
	3.04	Passive Device	Component that operates without the direct interaction of the user.
	3.06	Wand	A rigid material, used for manual operation.
4. Method of operating a window covering product	4.01	Cycle	A single complete instance of operation, which may include raise, lower, traverse, and rotate.
	4.02	Operating systems, Continuous Loop	A single Cord or Bead Chain formed in a continuous Loop to perform operation.
	4.03	Operating systems, Cord Loop Lift for Roll Up Shades	A Standard Operating system whose Accessible Cords go through the headrail, extend down to the bottom of the product, wrap around the bottom, extend back up to the top and terminate by attaching to the headrail.
	4.04	Operating systems, Cordless	An operating system that does not require an Operating Cord, or whose Operating Cord is inaccessible, as defined in 2.13. A cordless product may still have Accessible Inner Cords.
	4.05	Operating systems, Motorized	A Cordless Operating system that includes a motor and control system.
	4.06	Operating systems, Single cord	A single Operating Cord to perform operation.
	4.07	Operating systems, Standard	Two or more Operating Cords performing the function of both the Operating Cord and Inner Cord.
	4.08	Permanent (marking)	A marking or label that cannot be removed, or which tears, or that damages the surface to which it is attached during an attempt to manually remove it without the aid of tools or solvents.
	4.09	Sequential Process	An operation that requires two or more independent steps to be performed in a specific order.



5. Method of distributing window covering product	5.01	Custom Blinds, Shades, and Shadings	Any window covering that is not classified as a stock window covering.
	5.02	Stock Blinds, Shades, and Shadings:	<p>A specific stock keeping unit or SKU, which is completely or substantially fabricated (as defined below) in advance of being distributed in commerce (as that term is defined in 15 U.S.C. Sect. 2052(a)(7) and in advance of any specific consumer request for that product. The SKU can either be sold “as is” or modified or adjusted by the seller, manufacturer, or distributor before or after being distributed in commerce and it would still be considered a Stock Blind, Shade and Shading.</p> <p>“Substantially fabricated” would include products pre-assembled in advance of a consumer order or purchase. Pre-assembled products that are modified or adjusted by the seller, manufacturer or distributor before or after being distributed in commerce will still be considered as “substantially fabricated” if they require, but is not limited to, any of the following: adjustments to size, attachment of the top rail and/or bottom rail, and/or tying of Cords to secure the Bottom Rail to finish the assembly of the product.</p> <p>Stock Blinds, Shades, and Shadings shall not be considered Custom Blinds, Shades, and Shadings solely because of the method of distribution (e.g., Internet sales) or the size of the purchasing order (e.g., for multi-family housing developments).</p>

## 4 PRODUCT REQUIREMENTS

**4.1 Allowable Lead Content:** Exterior components of the window covering which are 12 in (31 cm) or more below the bottom of the headrail shall be produced with no more than 0.01% lead by weight (100 ppm) and follow the methodology and exemptions described in the Consumer Product Safety Improvement Act of 2008, Public Law 110-314, 122 Stat. 3016, and regulations promulgated thereunder.

**4.2 Small Parts:** Any safety component or device that is intended to separate from the product shall meet the requirements of Federal Standard: 16 CFR Part 1501 (see Appendix A: Reference Documents).

### 4.3 Operating Systems

**4.3.1 Stock Blinds, Shades, and Shadings:** Where more than one method is utilized, at least one shall meet the applicable requirement in Section 6.

**4.3.1.1 Cordless Operating System:** (includes Motorized Operating Systems)

**4.3.1.1.1** The product shall have no Operating Cords.

**4.3.1.2 Short Static or Access Cords**

**4.3.1.2.1** The product shall have a Short Cord.

**4.3.1.3 Inaccessible Operating Cords**

**4.3.1.3.1** The Operating Cords shall be inaccessible as determined per the test requirements in Appendix C: Test Procedure for Accessible Cords.

**4.3.2 Custom Blinds, Shades, and Shadings:** Where more than one method is utilized, at least one shall meet the applicable requirement in Section 6.

**4.3.2.1 Cordless Operating System:** (includes Motorized Operating Systems)

4.3.2.1.1 The product shall have no Operating Cords.

**4.3.2.2 Short Static or Access Cords**

4.3.2.2.1 The product shall have a Short Cord.

**4.3.2.3 Inaccessible Operating Cords**

4.3.2.3.1 The Operating Cords shall be inaccessible as determined per the test requirements in Appendix C: Test Procedure for Accessible Cords.

**4.3.2.4 Single Retractable Cord Lift System**

4.3.2.4.1 The product shall contain a permanently attached Cord Retraction Device that meets the requirements in 6.2. All window covering products with Accessible Operating Cords require warning labels and warning tags as described in 5.1 and 5.2.

**4.3.2.5 Continuous Loop Operating System:** Where more than one method is utilized, at least one shall meet the applicable requirement in 6. All window covering products with Accessible Operating Cords require warning labels and warning tags as described in 5.1 and 5.2.

4.3.2.5.1 The product shall contain a Cord Tension Device that meets the requirements in 6.4.

4.3.2.5.2 The product shall contain a Cord or Bead Chain Restraining Device that meets the requirements of 6.5.

4.3.2.5.3 The product shall contain a Rigid Cord Shroud that meets the requirements of 6.3.2

**4.3.2.6 Standard Operating System:** All window covering products with Accessible Operating Cords require warning labels and warning tags as described in 5.1 and 5.2.

**4.3.2.6.1 Multi-Cord Lift System:** Where more than one method is utilized, at least one shall meet the applicable requirement in 6.

4.3.2.6.1.1 The product shall have one or more separate Operating Cords.

4.3.2.6.1.2 If the product joins 2 Cords, the Cord Connector must separate and meet the requirements in Appendix B and the requirements in 6.1.

4.3.2.6.1.3 If the product joins 3 or more Operating Cords

4.3.2.6.1.3.1 If the Cord Connector does not meet the requirements of Appendix B and 6.1 as a cord release device, it must limit the exposed Loop above the Cord Connector to less than 3 in (76 mm) below the bottom of the Cord Lock when the bottom rail is in the fully lowered position.

4.3.2.6.1.4 The product shall contain a Rigid Cord Shroud Device that meets the requirements in 6.3.2

**4.3.2.7 Cord Loop Lift Operating System:** All window covering products with Accessible Operating Cords require warning labels and warning tags as described in 5.

4.3.2.7.1 If the product is a Roll Up Style Shade, Accessible Inner Cords shall meet the requirements in 6.1 and Appendix E: Test for Roll Up Style Blind Inner Cord Release Device.

**4.4 Operating Cord Length:** For all products with Accessible Operating Cords which are free hanging (not restrained), the default Cord length should be no more than 40% of the product height when the window covering is fully deployed for maximum privacy. The exception is when a custom length is required to ensure user accessibility.

#### 4.4.1 Tilt or Rotational Cords for horizontal and vertical blinds

4.4.1.1 Wand tilt is the default operating system and Cord tilt is an allowable customer option.

4.4.1.2 Cord length for Cord tilt must meet the requirements as indicated in 4.4 above when the louvers are oriented such that the two Operating Cords are equal in length. The exception is when a custom length is needed to ensure user accessibility.

#### 4.5 **Inner Cords:** All products with Inner Cords must meet the requirements in Appendix C and Appendix D

4.5.1 If the product has Shrouded Inner Cords they must meet requirements in section 6.3.

4.5.2 If the product has Inner Cord Stop Devices or Cord Connectors, it must meet requirements in 6.7

4.6 **Cord Cleats:** For all products with Accessible Operating Cords which are free hanging (not restrained) and not Short Cords, Cord Cleats must be provided with instructions for use and mounting.

## 5 LABELING AND OPERATIONAL TAG REQUIREMENTS

5.1 **Labeling:** Manufacturers shall provide warning labels on all window coverings described in 4.3.2.4, 4.3.2.5, 4.3.2.6, and 4.3.2.7. All warning labels and warning tags shall comply with the requirements below and shall adhere to ANSI Z535 standards (see Appendix A: Reference Documents), and shall be provided in both English and Spanish. If a single long label containing both languages is used instead of two separate labels, only one set of pictograms is required.

5.1.1 **Generic Warning Bottom Rail Label(s):** The signal word (“Warning” in English and “Advertencia” in Spanish) shall be in all uppercase letters measuring not less than 5/16 in (8 mm) in height and preceded by an ANSI safety alert symbol (an equilateral triangle surrounding an exclamation point) of at least the same size. The rest of the warning message text shall be in both uppercase and lowercase letters (sentence capitalization), with capital letters measuring not less than 1/8 in (3 mm) (English) or 3/32 in (2 mm) (Spanish). The warning label shall include a pictogram that represents the hazard of a Cord wrapping around a young child’s neck as depicted in the example below. The label shall be a permanent marking affixed to all products with Accessible Operating Cords. The label shall be placed on the bottom rail of the window covering, and printed in a color that contrasts the bottom rail color. For products without bottom rails, the label shall be placed in an alternative location on the product, to be determined by the manufacturer or importer, that is visible to the user. The generic warning label(s) shall read as follows:



5.1.2 **Generic Warning Bottom Rail Label for Narrow Product:** A warning label of reduced size may be used only on product less than 18 in (457 mm) wide or where space limitations prevent the use of label(s) described in 5.1.1 The signal word (“Warning” in English and “Advertencia” in Spanish) shall be in all uppercase letters measuring not less than 5/32 in (4 mm) and preceded by an ANSI safety alert symbol (an equilateral triangle surrounding an exclamation point) of at least the same size. The rest of the warning message text shall be in both uppercase and lowercase letters (sentence capitalization), with capital letters measuring not less than 1/16 in (2 mm). The warning label shall include a pictogram that represents the hazard of a

Cord wrapping around a young child's neck as depicted in the example above. The label shall be a permanent marking affixed to all products with Accessible Operating Cords. The label shall be placed on the bottom rail of the window covering, and printed in a color that contrasts the bottom rail color. For products without bottom rails, the label shall be placed in an alternative location on the product, to be determined by the manufacturer or importer, that is visible to the user. The generic warning label(s) shall read as shown in 5.1.1.

**5.1.3 Labels for Merchandising for Custom Corded Products:** A warning label is to be placed on product merchandising materials which includes, but is not limited to, the sample book and the website (if the website is relied upon for promoting, merchandising, or selling on-line). The warning label shall include pictograms that represent the hazard of a Cord wrapping around a young child's neck as depicted in the example below. The warning label shall be placed conspicuously on the merchandising materials. For the United States, the languages shall be English and Spanish.



5.1.3.1 The signal word ("Warning" in English, and "Advertencia" in Spanish) shall be in all uppercase letters measuring not less than 5/16 in (8 mm) and preceded by an ANSI safety alert symbol (an equilateral triangle surrounding an exclamation point) of at least the same size. The rest of the warning message text shall be in both uppercase and lowercase letters (sentence capitalization), with capital letters measuring not less than 1/8 in (3 mm). The generic warning label(s) shall read as shown in 5.1.3.

**5.2 Operational Warning Tags:** The manufacturer shall provide an operational warning tag on the product. This tag shall include, at a minimum, all information presented in the following operational warning tags based on the characteristics of the product or the safety devices included on the product. The "Warning" word shall be typeset no less than 5/16 in (8 mm) in capital letters and preceded by the ANSI safety alert symbol (an equilateral triangle surrounding an exclamation point). The rest of the message is in upper and lower case with the capital letters not less than 1/8 in (3 mm). The warning tag shall include a pictogram that represents the hazard of a Cord wrapping around a young child's neck as depicted in the example below. The warning tag(s) shall be used on all window covering products that have Accessible Operating Cords.


### 5.2.1 All Accessible Operating Cords

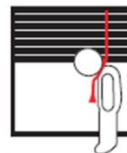
**WARNING**



**Window Blind Cord Can STRANGLE Your Child**

- Children can strangle in the loop above the cord bead.
- Children can climb furniture to reach cords.
- Move crib and furniture away.
- Shorten cords to prevent reach.
- Keep cords separate. Twisted or knotted cords can create a loop.
- Keep all cords out of children's reach.

**ADVERTENCIA**



**La cuerda de la persiana puede ESTRANGULAR su niño**

- Los niños se pueden estrangular en el lazo por encima del cordón.
- Los niños pueden subir los muebles para alcanzar las cuerdas.
- Mueva la cuna y los muebles.
- Acorte las cuerdas para evitar el alcance.
- Mantenga las cuerdas separadas. Los cordones retorcidos o anudados pueden crear un lazo.
- Mantenga todas las cuerdas fuera del alcance de los niños.


### 5.2.2 Tension Device Warning Tag (attach to Cord or Tension Device)

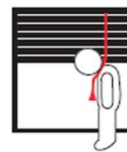
**WARNING**



**Window Blind Cord Can STRANGLE Your Child**

- Children can climb furniture to reach cords.
- Move crib and furniture away.
- Keep all cords out of children's reach.
- Attach tension device to wall or floor.
- Fasteners provided with the tension device may not be appropriate for all mounting surfaces.
- Use appropriate anchors for the mounting surface conditions.

**ADVERTENCIA**



**La cuerda de la persiana puede ESTRANGULAR su niño**

- Los niños pueden subir los muebles para alcanzar las cuerdas.
- Mueva la cuna y los muebles.
- Mantenga todas las cuerdas fuera del alcance de los niños.
- Conecte el dispositivo de tensión a la pared o al suelo.
- Los sujetadores provistos con el dispositivo de tensión pueden no ser apropiados para todas las superficies de montaje.
- Utilice anclajes apropiados para las condiciones de la superficie de montaje.

### 5.2.3 Roll Up Style Shade

This warning tag must be attached to the lower most section of the Inner Cord of a Roll Up Style Shade that has Accessible Cord(s) and be visible from the front of the shade upon installation.



**5.3 Manufacturer Label:** There shall be a permanent label(s) or marking on all finished window covering products identifying:

5.3.1 The readily distinguishable name, city, and state of the manufacturer or importer of record or fabricator

5.3.2 The month and year of manufacture.

5.3.3 The designation of the window coverings as “Custom” or “Stock”, per the definitions in 3, using a “C” or the word “Custom” or an “S” or the word “Stock”, respectively.

5.3.4 Custom products must also include customer order information (e.g., customer name or customer order number) to match the product with a specific order.

5.3.5 This label is to be located within or on the headrail or on the roller tube so it can be easily referenced by the user or inspecting agency.

## 6 TESTS AND PARAMETERS

**6.1 Cord Release Devices:** Cord Release Devices are tested differently according to whether they are applied to single Loop Operating Cords, multiple Loop Operating Cords, or for Roll Up Style Shades. Cord release devices shall be tested in accordance with Appendix B: Test Procedure for Cord Release Device or Appendix E: Test for Roll Up Style Shade Inner Cord Release Device. If a window covering contains more than one type of Operating Cord or Inner Cord assembly, the relevant test of Appendix B: Test Procedure for Cord Release Device or Appendix E: Test for Roll Up Style Shade Inner Cord Release Device must be applied separately to each type of Cord.

**6.1.1 Operating Cords:** If a release device is applied to a single Loop Operating Cord or multiple Loop Operating Cords, perform the test as directed in Appendix B: Test Procedures for Cord Release Device.



**6.1.2 Inner Cords of Roll Up Style Shades:** For a release device applied to an Inner Cord of a Roll Up Style Shade, perform the test as directed in Appendix E: Test for Roll Up Style Shade Inner Cord Release Device

**6.2 Cord Retraction Devices:** Permanent or internally design Cord Retraction Devices shall adhere to the following:

6.2.1 The Cord Retraction Device shall passively retract the Cord when there is no tension on the Operating Cord.

6.2.2 The Cord Retraction Device shall have a service life of 5,000 cycles after exposed portion or components have been subjected to 500 hours of UV exposure per AATCC Test Method 16-2004, Option 3.

**6.3 Cord Shroud:** Cord Shrouds are designed to limit accessibility of Inner Cords or Operating Cords and shall adhere to the following:

6.3.1 Evaluated as an assembly or individual cords as determined by Appendix C: Test Procedure for Accessible Cords and tested in accordance with Appendix D: Hazardous Loop Test Procedure.

6.3.2 The components of the Cord Shroud assembly shall be exposed to 500 hours of UV per AATCC Test Method 16-2004, Option 3 and then tested for durability.

6.3.2.1 Rigid Design- Evaluate for durability, impact, and operation per 6.6.

6.3.2.2 Non-Rigid Design – for Inner Cords only- evaluate all connection points which must not separate and expose Inner Cords at less than 5 lbs pull force.

**6.4 Tension Devices:** Tension Devices for Cord or Bead Chain Loops shall adhere to the following:

6.4.1 The Tension Device shall be attached to the Cord or Bead Chain Loop by the manufacturer and require a sequential process or tools to be removed. It shall be designed, placed and shipped such that, unless properly installed or altered from the shipped condition with sequential process or tools, it prevents the window covering from operating.

6.4.2 The Tension Device in conjunction with the product shall be designed so when not properly installed will, at least partially, prevent the window covering from functioning for light control or privacy.

6.4.3 The Tension Device shall be supplied with fasteners and instructions to attach to wood substrates. The Tension Device shall also be supplied with information about attaching to drywall and metal substrates. The fasteners shall have a minimum fastener manufacturer-rated or tested release force of 20 lb (89 N).

6.4.4 The Tension Device, in conjunction with the product, shall be designed for durability to meet the following test requirements:

**6.4.4.1 Operational Cycle Test:** Cycle test Tension Device in conjunction with the product as supplied by the manufacturer and mounted with the supplied anchors/fasteners to an appropriate vertical or horizontal surface as recommended by the manufacturer for 3,000 cycles with a delay interval of a standard 2 min. between each cycle. Standard speed of 1.0 - 1.5 ft/sec (31- 46 cm/sec), unless otherwise specified by the manufacturer.

**6.4.4.2 UV Stability:** Subject five separate Tension Devices (assemblies) and five separate sets of mounting components to 500 hours UV per AATCC Test Method 16-2004, , Option 3 and the table below:

Sample Number	Testing Required
1	6.4.4.2; 6.4.4.3
2	6.4.4.2; 6.4.4.4 (perpendicular direction)

3	6.4.4.2; 6.4.4.4 (substrate 1)
4	6.4.4.2; 6.4.4.4. (substrate 2)
5	6.4.4.2; 6.4.4.4. (substrate 3)

**6.4.4.3 Impact Test:** Impact test according to ASTM D5420, with Gardner tester IG-1120 using striker # IG-1243 using 15 in-lb (1.7 joule) on the Tension Device and separately on attachment components (if any). A drawing should be provided with the part(s) indicating the location and direction for impact but at a minimum of horizontal and perpendicular to the mounting surface.

6.4.4.3.1 Place one of the UV-exposed Tension Device (assemblies) into test fixture and provide impact as stated above, both parallel and perpendicular to the mounting direction. Deformation of the parts is acceptable, but any cracking or dislodged parts are considered a failure.

6.4.4.3.2 Place one of the UV-exposed mounting components into test fixture and provide impact as stated above on the portion of the product that mounts to the wall (or other mounting surface). Deformation of the parts is acceptable, but any cracking or dislodged parts are considered a failure.

**6.4.4.4 Loop Cord and Bead Chain Durability Testing:** The Cord or Bead Chain Loop shall be tested to ensure installation is maintained on the Loop Cord for the life of the product.

According to the manufacturer's provided instructions and hardware, mount one each of the UV-exposed Tension Devices & mounting components / Loop assemblies to the following vertical surfaces: drywall, wood, and metal.

6.4.4.4.1 Subject the Cord or Bead Chain Loop to a force of 5 lb (22.2 N) for 5 seconds both parallel and perpendicular to the mounting surface by pulling on the Loop Cord.

6.4.4.4.2 The Loop Cord or Bead Chain, in conjunction with the Tension Device and mounting hardware, should maintain integrity for ten tests in each direction and on each vertical surface type: drywall, wood, and metal.

**6.5 Loop Cord and Bead Chain Restraining Device:** Loop Cord and Bead Chain Restraining Devices shall adhere to the following:

6.5.1 The Loop Cord and Bead Chain Restraining Device shall be designed and installed on the window covering product by the manufacturer to limit the operating Cord Loop length from creating a Hazardous Loop

6.5.2 The components of the Loop Cord and Bead Chain Restraining Device shall be tested for durability and safety using the following:

6.5.2.1 **Operational Cycle Test:** Test the Loop Cord and Bead Chain Restraining Device in conjunction with the product as supplied by the manufacturer and mounted as recommended by the manufacturer to an appropriate surface for 3,000 cycles with a delay interval of a standard 2 min. between each cycle. Standard speed of 1.0 - 1.5 ft/sec (31-46 cm/sec), unless otherwise specified by the manufacturer.

6.5.2.2 **UV Stability:** Subject three of the Loop Cord and Bead Chain Restraining Devices (and mounting components (if any) to 500 hours UV per AATCC Test Method 16-2004, Option 3 and the table below:

Sample Number	Testing Required
---------------	------------------



1	6.5.2.2; 6.5.2.3; 6.5.2.4
2	6.5.2.2; 6.5.2.4
3	6.5.2.2; 6.5.2.5

**6.5.2.3 Impact Test:** Impact test according to ASTM D5420, with Gardner tester IG-1120 using striker # IG-1243 using 15 in-lb (1.7 joule) on the Loop Cord and Bead Chain Restraining Device and attachment components (if any). A drawing should be provided with the part(s) indicating the location for impact but at a minimum of horizontal and perpendicular to the window covering product.

6.5.2.3.1 Place another of the UV-exposed Loop Cord and Bead Chain Restraining Device (assemblies) into test fixture and provide impact as stated above on the portion of the product which contains the Loop Cord or Bead Chain. Deformation of the parts is acceptable, but any cracking or dislodged parts are considered a failure.

6.5.2.3.2 Place mounting parts (if any) into test fixture and provide impact as stated in 6.6.2.4 on the portion of the device that mounts to the body of the window covering product or to the wall (or other mounting surface). Deformation of the parts is acceptable, but any cracking or dislodged parts are considered a failure.

**6.5.2.4 Loop Cord and Bead Chain Restraining Device Durability Testing:** The Cord or Bead Chain Loop shall be tested to ensure proper functionality is maintained on the Loop Cord or Bead Chain for the life of the product.

6.5.2.4.1 Mount the window covering with the attached UV-exposed Loop Cord and Bead Chain Restraining Device to a rigid surface according to manufacturer's testing instructions.

6.5.2.4.2 Locate the approximate midpoint of the accessible combined Loop. Using the test fixture as shown in Appendix D: Hazardous Loop Test Procedure, subject the Cord or Bead Chain Loop to a force of 5 lb (22.2 N) for 5 seconds both parallel and perpendicular to the window covering.

6.5.2.4.3 Determine if the Loop Cord and Bead Chain Restraining Device assembly can maintain integrity of the assembly according to design intent.

#### **6.5.2.5 Hazardous Loop Testing Procedure for Loop Cord and Bead Chain Restraining Devices**

6.5.2.5.1 Place the Hazardous Loop Test Stand Assembly (Figure D2) at the location of the Cord or Bead Chain restraining device and Operating Cord of the window covering and adjust the vertical height so that the Restraining Arm Assembly (Figure D2 #17,15,16) aligns with the approximate midpoint of the accessible combined Loop to be tested. Place the Restraining Arm (Figure D2 Item #16) against the Cord or Bead Chain restraining device.

6.5.2.5.2 Ensure the scale measuring distance traveled on the Force Gauge Arm Subassembly is set to zero (Figure D2 Item 1). Zero the Force Gauge and then loop the Accessible Cord or Bead Chain onto both hooks of the Force Gauge Arm Subassembly (Figure D5 Item #1.1).

6.5.2.5.3 Set the Force Gauge to "Continuous Readout" and over a time period of 5 seconds +/- 1 second, gently pull the Horizontal Arm (Figure D5 Item #1.8) of the Force Gauge Arm Subassembly away from the window covering to create an open Loop until the Force Gauge indicates a tension force of 5 lb (+/- 0.25 lb) (22.2 N +/- 1.1 N) or the Scale (Figure D5 Item #1.4) indicates a pulled distance of 25 in (+/- 0.25 in) (63.5 cm +/- 0.6 cm), whichever comes first. Lock the Horizontal Arm in place using the Brake Assembly (Figure D-5 Item #1.10).

6.5.2.5.4 Using the head probe in Figure D1 determine whether the head probe can pass through the opening created between the Hooks and the Restraining Arm with an insertion force of 10lb (44.5 N) or less, perpendicular to the plane of the opening.

6.5.2.5.4.1 If the head probe cannot pass through the Loop under the conditions above, the opening is not a Hazardous Loop.

6.5.2.5.4.2 If the head probe can pass through the Loop under the conditions above, the Loop is considered a Hazardous Loop.

**6.6 Rigid Cord Shroud:** A Rigid Cord Shroud device shall adhere to the following:

6.6.1 The Rigid Cord Shroud Device shall be designed and installed on the window covering product by the manufacturer to limit Operating Cord accessibility

6.6.2 The components of the Rigid Cord Shroud Device shall be tested for durability and safety using the following:

6.6.2.1 **UV Stability:** Subject three of the Rigid Cord Shroud Devices (and mounting components, if any) to 500 hours UV per AATCC Test Method 16-2004, Option 3 and the table below:

Sample Number	Testing Required
1	6.6.2.1; 6.6.2.2;
2	6.6.2.1; 6.6.2.3

6.6.2.2 **Operational Cycle Test:** Test the Rigid Cord Shroud Device in conjunction with the product as supplied by the manufacturer and mounted as recommended by the manufacturer to an appropriate surface for 3,000 cycles with a delay interval of a standard 2 min. between each cycle. Standard speed of 1.0 - 1.5 ft/sec (31- 46 cm/sec), unless otherwise specified by the manufacturer.

6.6.2.3 **Impact Test:** Impact test according to ASTM D5420, with Gardner tester IG-1120 using striker # IG-1243 using 15 in-lb (1.7 joule) on the Rigid Cord Shroud device and attachment components (if any). A drawing should be provided with the part(s) indicating the location for impact but at a minimum one horizontal and one perpendicular to the window covering product.

6.6.2.3.1 Place the UV-exposed Rigid Cord Shroud Device (assemblies) into test fixture and provide impact as stated above on the portion of the product which contains the Operating Cord at a point that provides or translates function of the Operating Cord. Deformation of the parts is acceptable, but any cracking or dislodged parts are considered a failure.

6.6.2.3.2 Place mounting parts (if any) into test fixture and provide impact as stated in 6.6.2.3 on the portion of the device that mounts to the body of the window covering product. Deformation of the parts is acceptable, but any cracking or dislodged parts are considered a failure.

**6.7 Inner Cord Stop Device or Cord Connector:** The Inner Cord Stop Devices or Cord Connector, in conjunction with the product, shall be tested in the following order and meet the following requirements:

6.7.1 **Operational Test:** With the Inner Cord Stop Device securely attached to the Cord, the window covering shall be raised and lowered smoothly 1,000 times (non-Horizontal Blind window covering 3,000 times), with an interval of at least 15 seconds between each cycle. The Inner Cord Stop Device shall move less than 1 in (25 mm) from its original position on the Cord. (If the Cord fails, replace.)

**6.7.2 Impact Test:** Window covering products that do not incorporate a device preventing “free fall” of the window covering shall be capable of withstanding 1,000 “free fall” impacts from the fully raised to the fully lowered position, on a maximum sized window covering.

**6.7.3 UV Stability and Compression Test:** Subject a separate Inner Cord Stop Device to 500 hours UV per AATCC Test Method 16-2004, Option 3. The Inner Cord Stop Device shall not break from being subjected to a 25 lb (111 N) compression test, specified in ASTM F963. A drawing should be provided with the part(s) indicating the location and direction for impact testing.

**6.8 Wide Lift Bands:** Wide Lift Bands shall be treated as Cords unless they meet the requirements for a Wide Lift Band, and when used, shall adhere to the following requirements:

6.8.1 Bands shall be a minimum width of 3.5 in.

6.8.2 Bands should be constructed of a material that has a wide lift band safety factor of 16.0 (in-kg) or greater

6.8.2.1 Wide Lift Band safety factor shall be calculated by the following parameters.

6.8.2.1.1 Width (inches) of material measured when flat (measured in inches).

6.8.2.1.2 Stiffness of band tested in accordance with ASTM D4032, with pneumatic actuator, digital gage with 25 kgf capacity (measured in kg).

6.8.2.1.3 Wide Lift Band safety factor is the simple product of the numerical values achieved in 6.8.2.1.1 and 6.8.2.1.2.

## **APPENDIX A: REFERENCE DOCUMENTS**

### **Reference Documents**

#### **American Association of Textile Chemists and Colorists (AATCC)**

AATCC TEST Method 16-2004 Option 3- Colorfastness to Light

Available from American Association of Textile Chemists and Colorists, AATCC, P. O. Box 12215, One Davis Drive, Research Triangle Park, North Carolina, 27709-2215, fax +1 919 549 8933, [www.aatcc.org](http://www.aatcc.org)

#### **American National Standards Institute (ANSI)**

ANSI Z535.1-2006 (r2011) - Safety Color Code

ANSI Z535.2-2006 (r2011) - Environmental and Facility Safety Signs

ANSI Z535.3-2006 (r2011) - Criteria for Safety Symbols

ANSI Z535.4-2006 (r2011) - Product Safety Signs and Labels

ANSI Z535.5-2006 (r2011) - Accident Prevention Tags (for temporary hazards)

Available from American National Standards Institute, 25 West 43rd Street 4th Floor, New York, NY 10036, +1 212 642 4900, [www.ansi.org](http://www.ansi.org)

#### **ASTM International**

ASTM D4032-08 Standard Test Method for Stiffness of Fabric by the Circular Bend Procedure

ASTM D5420-10 Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact)

ASTM F963-11 - Standard Consumer Safety Specification for Toy Safety

Available from ASTM International, 100 Barr Harbor Drive, PO Box c700, West Conshohocken, PA 19428-2959, +1 610 832 9500, [www.astm.org](http://www.astm.org)

#### **Code of Federal Regulations (CFR)**

16 CFR Part 1501 - Method for Identifying Toys and Other Articles Intended for Use by Children Under 3 Years which Present Choking, Aspiration, or Ingestion Hazards Because of Small Parts

Available from U.S. Consumer Product Safety Commission, Washington, DC 20207, +1 800 638 2772, [www.cpsc.gov](http://www.cpsc.gov)

#### **European Standards**

EN 71-3:1994/ A1:2000/AC:2002 of the European Committee for Standardization entitled Safety of Toys – Part 3

## **APPENDIX B: TEST PROCEDURE FOR CORD RELEASE DEVICE**

### **Single Loop and Multiple Loop Cord Release Device – Operating Cords**

#### **B1 Equipment**

B1.1 Standard test fixture per instructions and drawing in Figures B-1, B-2. Force gauge rated to at least 10 lb (44.5 N), with a maximum hold feature.

#### **B2 Set-up of Test Fixture**

B2.1 Mount the standard test fixture so that the force gauge is positioned over the fixture centerline when viewed from the front and approximately at the mid-point when viewed from the side. Position the fixture or mount the force gauge so that the hook of the gauge is 5.75 to 6.25 in (146 mm to 159 mm) above the fixture upper surface.

#### **B3 Loop Definition & Preparation**

B3.1 **Single Loop Cord Release Device** Attach device to Cord ends to define a Loop 3.5 feet (107 cm) in circumference plus or minus 1 in (2.5cm). Trim excess Cord. If appropriate, assemble segments of device. On the opposite end of the Loop from the device, tie a small Loop and hook onto force gauge.

B3.2 **Multiple Loop Cord Release Device** Number (tag and label) each individual Cord. Form all Cord Loop combinations according to procedure for multiple Cord Release devices.

#### **B4 Loop Test & Acceptance**

B4.1 Slide the Loop over the test fixture. Twist the device 360 degrees (one full revolution). Draw force gauge vertically up at a speed between 0.1 and 1.0 in per second (2.5 mm to 25 mm per second). The device being tested shall release within 10 seconds from its initial contact with the lower portion of the test fixture. Record force at separation. Repeat for 50 devices.

B4.2 The average shall not exceed 5.0 lb (1.63 kg, 13.3 N.) release force to separate the 50 devices tested, and all samples shall have a release force below 7.0 lb (2.27 kg, 22.2 N) for the device to be accepted. In the event that not more than 2% of the combinations tested produce an initial release force measurement in excess of 7.0 lb (22.2 N), such combinations may be retested and if, upon retesting, their release force measurements fall below 7.0lb (22.2 N), they shall be deemed acceptable.

#### **B5 Loop Forming Procedure for Multiple Cord (Multiple Loop) Devices**

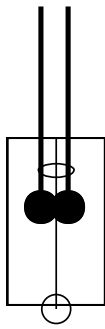
B5.1 Configurations for EACH device ('tassel') vary according to:

B5.1.1 Multiple CORDS (from 2 to N).

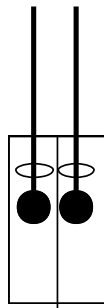
B5.1.2 Multiple SEGMENTS in the device, from 1 to a number equal to the cord count, N.

B5.1.3 Multiple ATTACHMENTS between individual Cords and device parts, from 1 (a single fixture point for the entire Cord bundle) to N, one individual fixture for each of N Cords. Note that 'Attachments' refers to distinguishable connection points of Cords to the assembled device, not just to non-separating connections of individual Cords to any separated device segments.

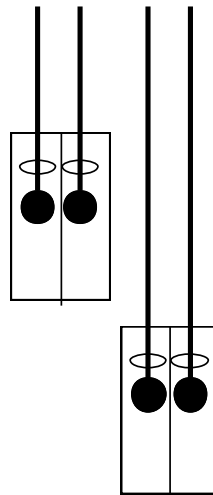
Schematic illustrations of examples from this set are provided below:



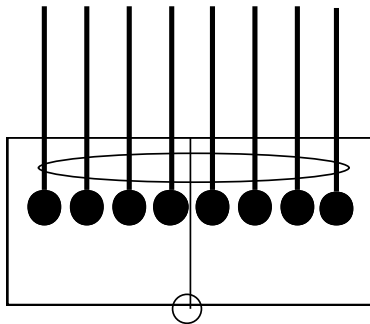
CASE 2111:  
2 CORDS  
1 SEGMENTS (hinged)  
1 ATTACHMENT (hole)  
1 DEVICE



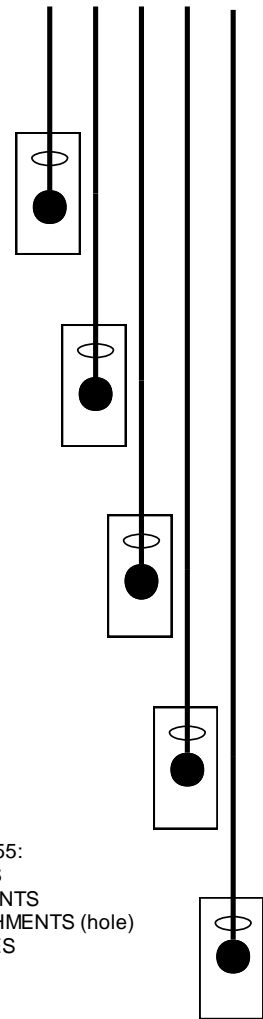
CASE 2221:  
2 CORDS  
2 SEGMENTS (not hinged)  
2 ATTACHMENTS (holes)  
1 DEVICE



CASE 4442:  
4 CORDS  
4 SEGMENTS (not hinged)  
4 ATTACHMENTS (holes)  
2 DEVICES



CASE 8111:  
8 CORDS  
1 SEGMENTS (hinged)  
1 ATTACHMENT (hole)  
1 DEVICE



CASE 5555:  
5 CORDS  
5 SEGMENTS  
5 ATTACHMENTS (hole)  
5 DEVICES

## **B6 Cord Arrangements for Testing Multiple Loop Cord Devices**

B6.1 A CROSSING is defined as a displacement of one or more Cords relative to others, between load and device that cannot be undone by twisting the device as a whole. Any simple twisting of any number of Cords all together within a single Attachment does not produce a crossing.

B6.2 Limits of Load Crossings: This procedure addresses only single crossings, as any system of three or more Cords can be braided, or subjected to multiple, successive crossings between load and device to overcome any separating load, preventing device release function.

## **B7 Test Loop Formation for Multiple Loop Cord Devices**

B7.1 For each device with N Cords (1, 2, 3, ..., n) and A attachments (i, ii, iii, ..., a), regardless of segment count; each of the following **Crossed & Uncrossed Cord** arrangements must be loaded according to Sections B2, B3, and B4 and must produce separation of the loaded Cord Loop within allowable force limits listed there.

**B7 Uncrossed Cords** Separate each Cord individually to form one side of a loading Loop with all other Cords together forming the other side of the Loop. Each pair of Cords must be separated from the others to form a loading Loop. Each triplet of Cords must be separated from the others to form a loading Loop. Continue separation sequence (group of 4 Cords, 5 Cords, etc.) until the count of separated Cords has exceeded half the total Cord count.

**B8 Crossed Cords** Cross one Cord in turn, from each attachment, between every other pair of Cords not sharing that same attachment, forming a loading Loop with the crossing Cord and crossed Cords as opposite sides of the loading Loop. Cross each pair of Cords NOT sharing an attachment between every other pair in the system, forming a loading Loop with the crossing Cord and crossed Cords as opposite sides of the loading Loop. Cross any triplets of Cords NOT sharing an attachment through every other pair of Cords in the system, forming a loading Loop with the crossing Cord and crossed Cords as opposite sides of the loading Loop. For each case, apply. Continue this sequence (groups of 4 Cords, 5 Cords, etc.) until all sets of crossing Cords have been tested.

## **B9 Schematic Illustrations of Multiple Cord Loading Configurations (Crossings)**

B9.1 Schematics are presented below for all crossings for loading arrangements through 4 Cords.

### **B9.1.1 NOTES ON SCHEMATICS:**

B9.1.1.1 Each Cord is numbered. Unless noted on figure, numbers are arbitrary, but consistent.

B9.1.1.2 Numbers shown in circles represent Cord, entering device from above.

B9.1.1.3 Large circle represents device

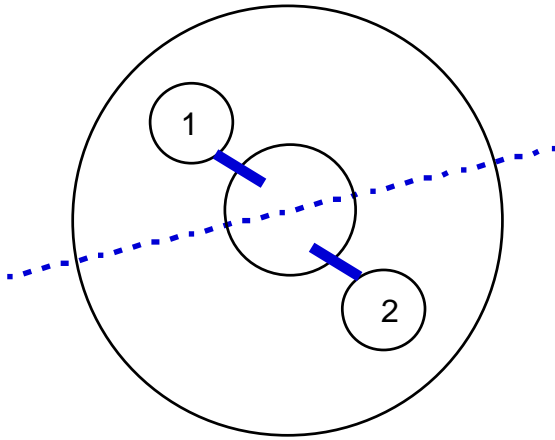
B9.1.1.4 Un-numbered circles represent attachments to device

B9.1.1.5 Heavy lines represent Cords between load and device

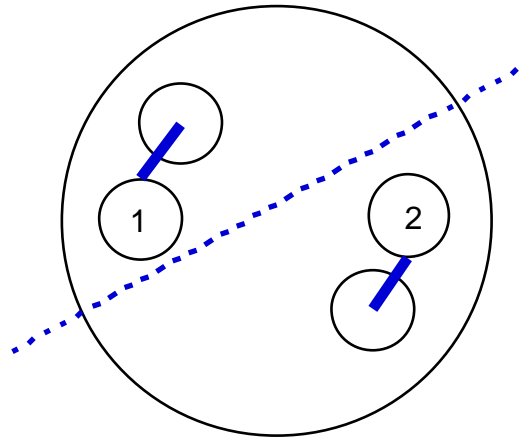
B9.1.1.6 Cord numbers shown outside device circle represent Cords crossed OVER other Cords shown, and below load

B9.1.1.7 Dashed line represents load line (axis of test fixture)

## Two Cords One Attachment Two Cords Two Attachments

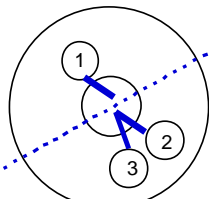


B3.4.3 - 2A

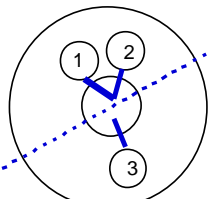


B3.4.3 - 2B

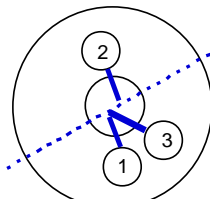
## Three Cords One Attachment



B3.4.4 - 1A

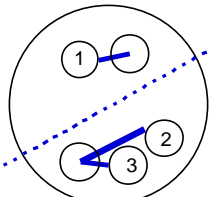


B3.4.4 - 1B

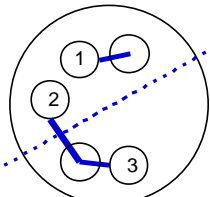


B3.4.4 - 1C

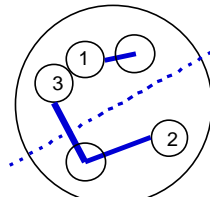
## Three Cords Two Attachments



B3.4.4 - 2A

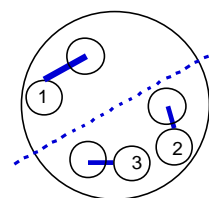


B3.4.4 - 2B

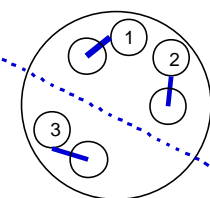


B3.4.4 - 2C

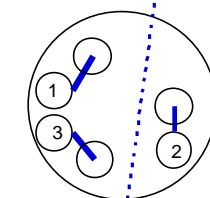
## Three Cords Three Attachments



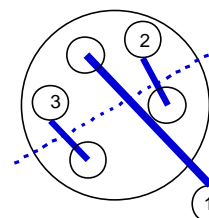
B3.4.4 - 3A



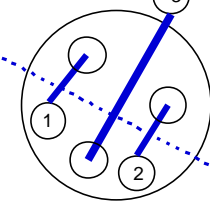
B3.4.4 - 3B



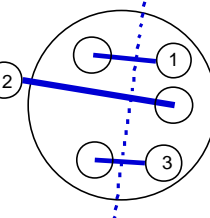
B3.4.4 - 3C



B3.4.4 - 3D



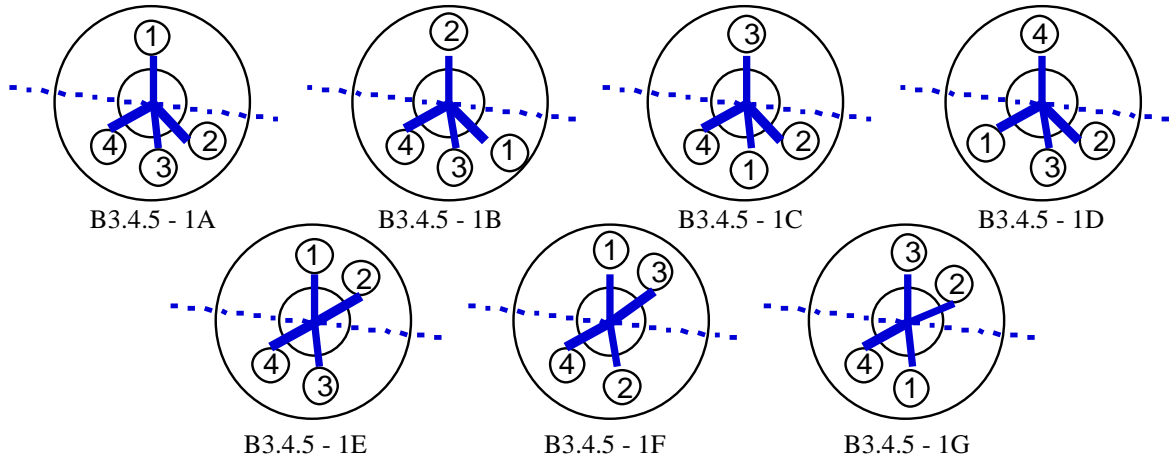
B3.4.4 - 3E



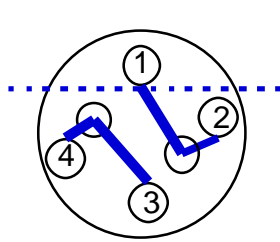
B3.4.4 - 3F



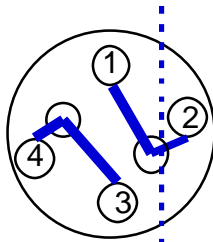
### Four Cords One Attachment



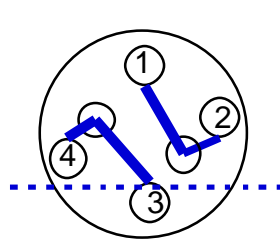
## Four Cords Two Attachments



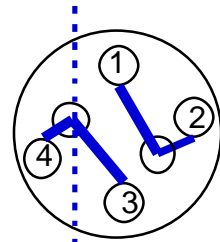
B3.4.5 - 2A



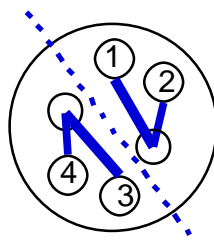
B3.4.5 - 2B



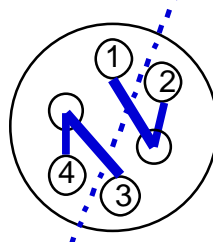
B3.4.5 - 2C



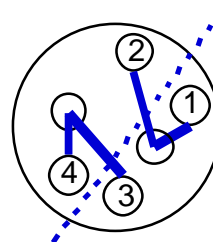
B3.4.5 - 2D



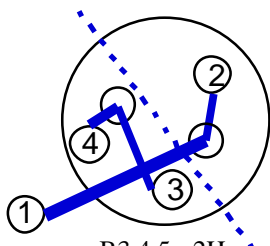
B3.4.5 - 2E



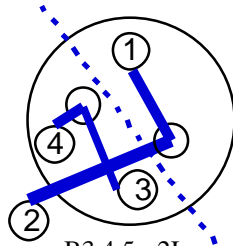
B3.4.5 - 2F



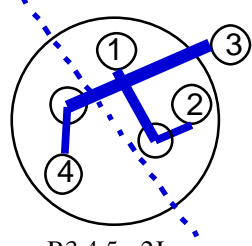
B3.4.5 - 2G



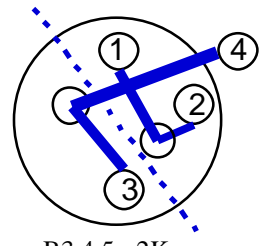
B3.4.5 - 2H



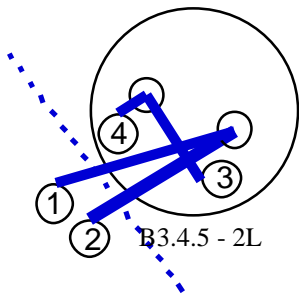
B3.4.5 - 2I



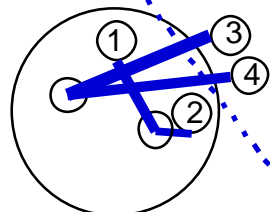
B3.4.5 - 2J



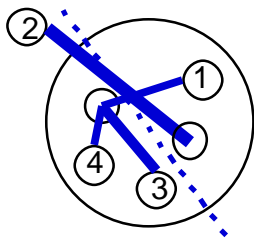
B3.4.5 - 2K



B3.4.5 - 2L



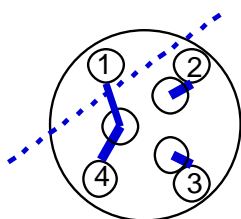
B3.4.5 - 2M



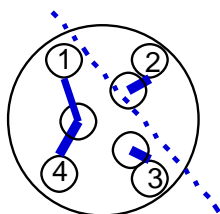
B3.4.5 - 2N

(TEST THIS ARRANGEMENT ALSO, IF ATTACHMENTS  
DIVIDE 4 CORDS INTO GROUPS OF 3 & 1, NOT 2 & 2 -  
#2 ASSIGNED TO SINGLE-CORD ATTACHMENT;  
#1, #3, #4 ARE IDENTICAL FOR ANY CROSSING BY #2)

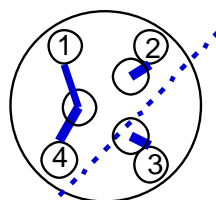
## Four Cords Three Attachments



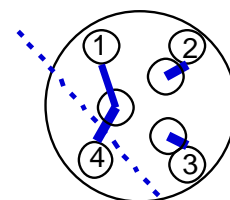
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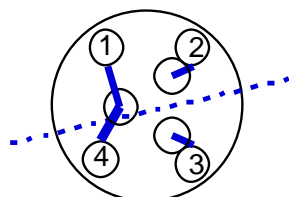
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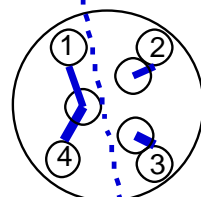
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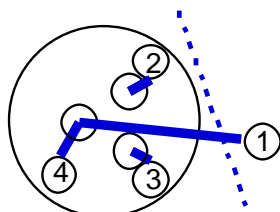
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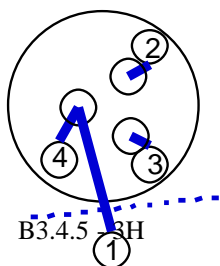
B3.4.5 - 3E



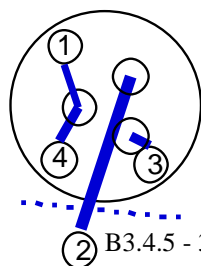
B3.4.5 - 3F



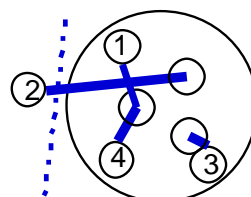
B3.4.5 - 3G



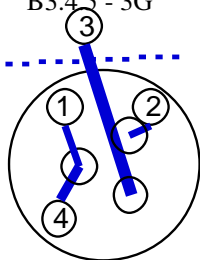
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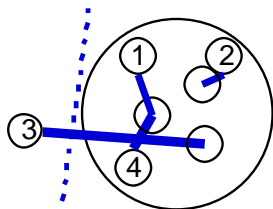
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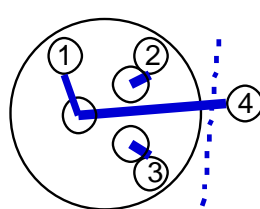
B3.4.5 - 3J



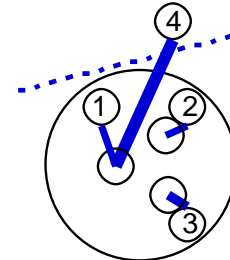
B3.4.5 - 3K



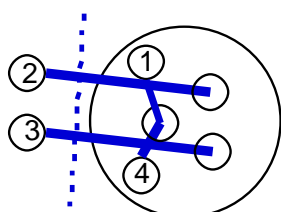
B3.4.5 - 3L



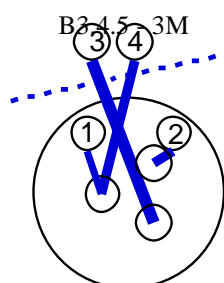
B3.4.5 - 3M



B3.4.5 - 3N

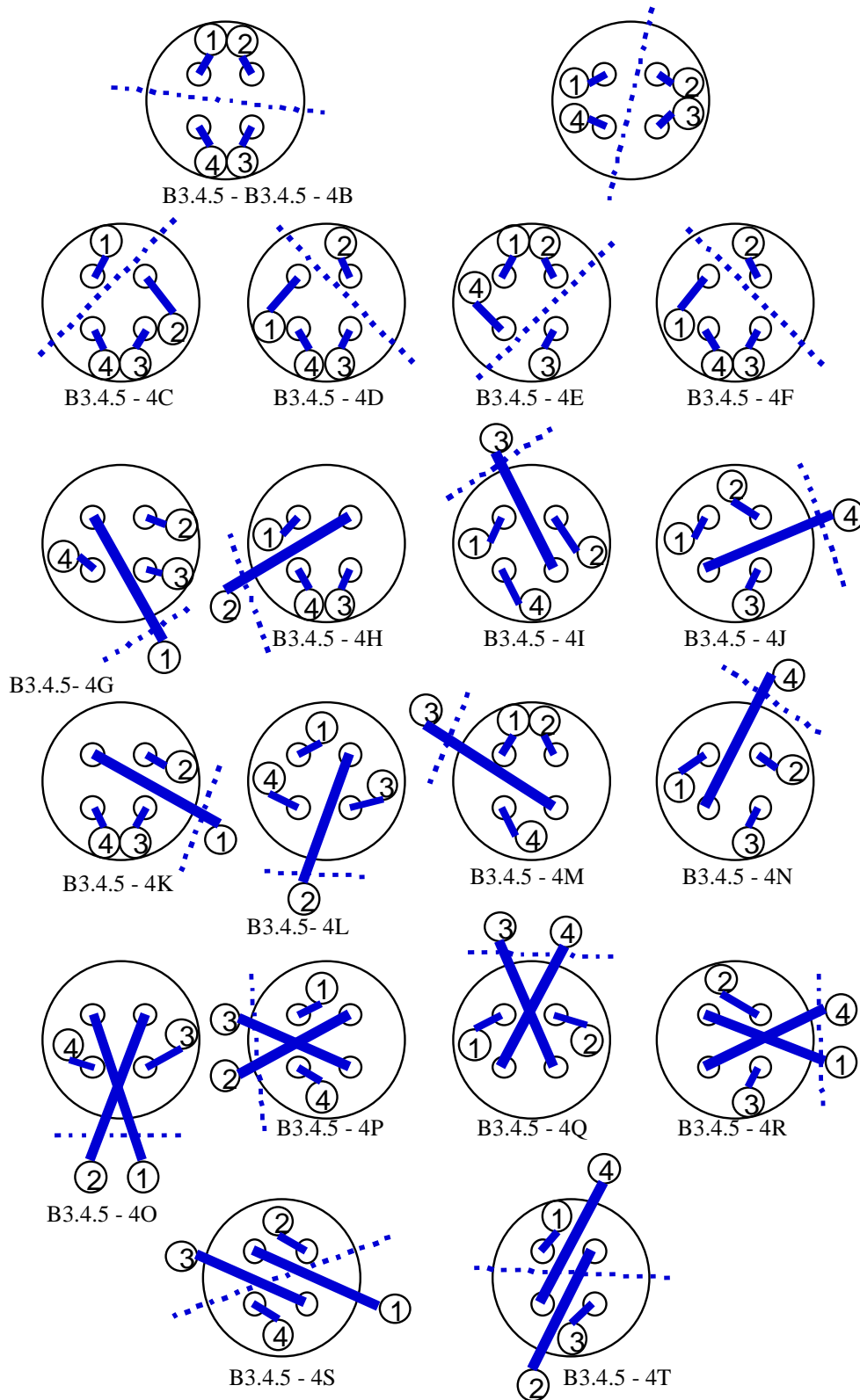


B3.4.5 - 3O



B3.4.5 - 3P

## Four Cords Four Attachments



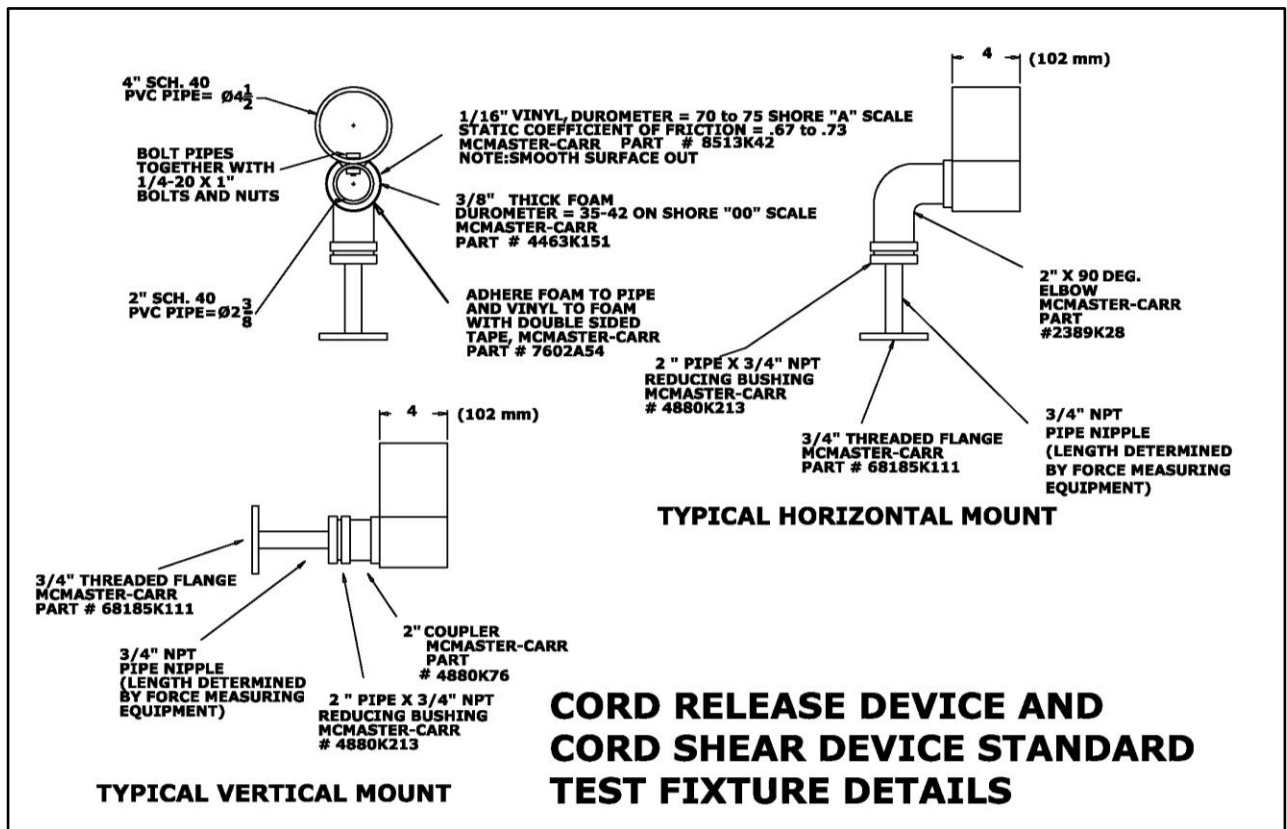


Figure B1 – TEST FIXTURE CONSTRUCTION

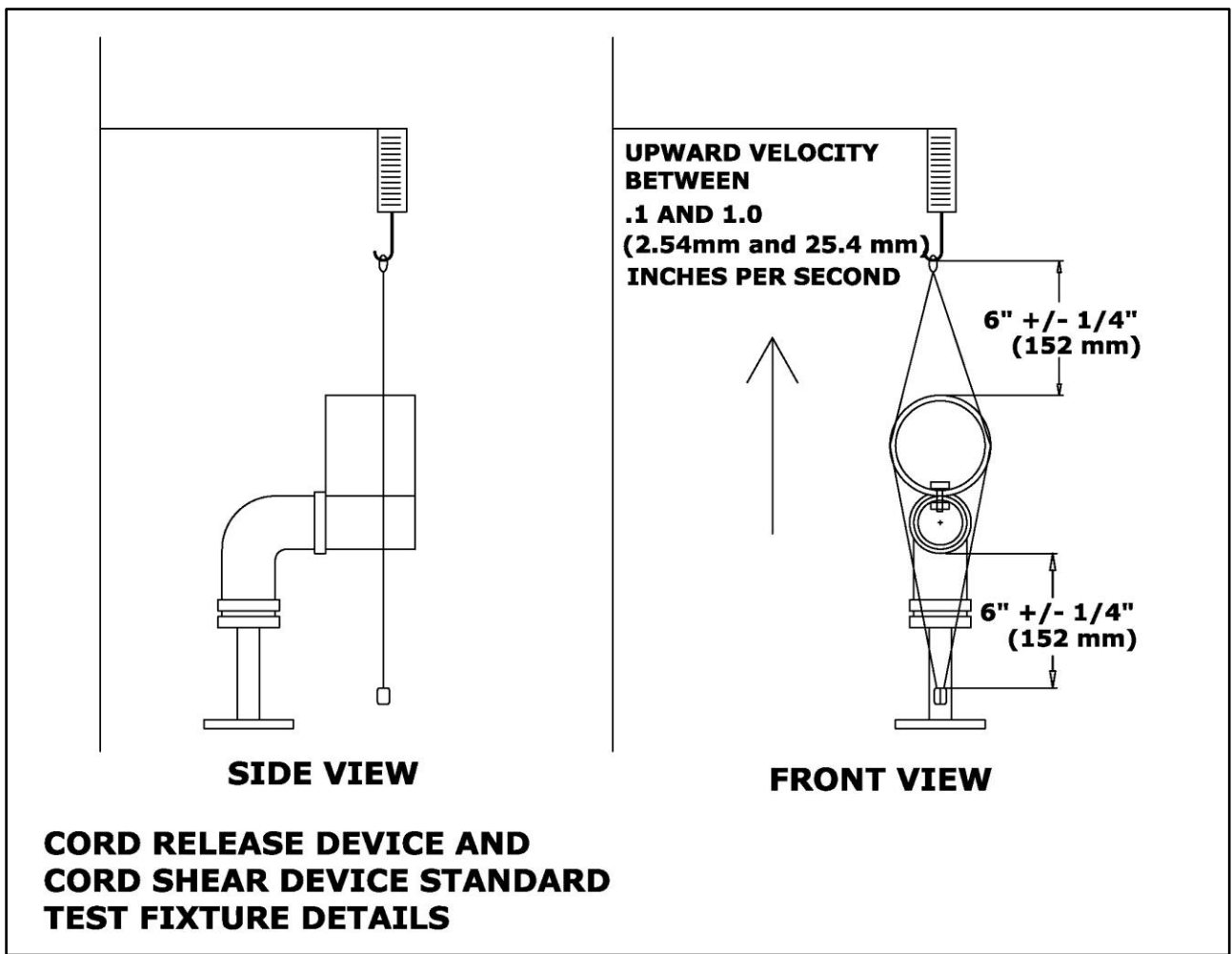


Figure B2 – TEST FIXTURE LOADING

## APPENDIX C: TEST PROCEDURE FOR ACCESSIBLE CORDS

Appendix C describes test requirements for determining the accessibility of Cords on the front, rear, bottom, or sides of properly installed window covering product.

The Inner Cords on a window covering product that are within 12 in (31 cm) of the bottom of the headrail are considered not accessible.

Test method is determined by the window covering construction type as described in C2.1

### C1 Shade Mounting and Preparation

C1.1 Hang the window covering on a mounting rail using brackets according to manufacturer's installation instructions. The shade is to be tested in the fully lowered position

C1.1.1 Allow enough room around the mounted window covering to perform the Accessible Cord test.

### C2 Inner Cord Test with Cord Accessibility Probe

C2.1 Determine if the window covering is to be tested to the "Open" or "Closed" construction test procedure.

Open Construction window covering products have one of the following:

- Inner Cords that are exposed from the front, rear, bottom or sides of the window covering which are typical of Roman, horizontal, and pleated window coverings.
- Cords that are enclosed between layers of the window covering without segmented sections allowing access to any portion of the interior from any opening.

Closed Construction has Inner Cords that are enclosed within segmented layers of the product which is typical of Cellular Shade. Access is limited to only that section of the Cord in an individual segment.

**C2.1.1 "Open" construction:** Determine if any opening in the window covering, more than 12 in (31 cm) below the bottom of the headrail, allows touching of the Inner Cords with the Inner Cord accessibility probe (Figure C1).

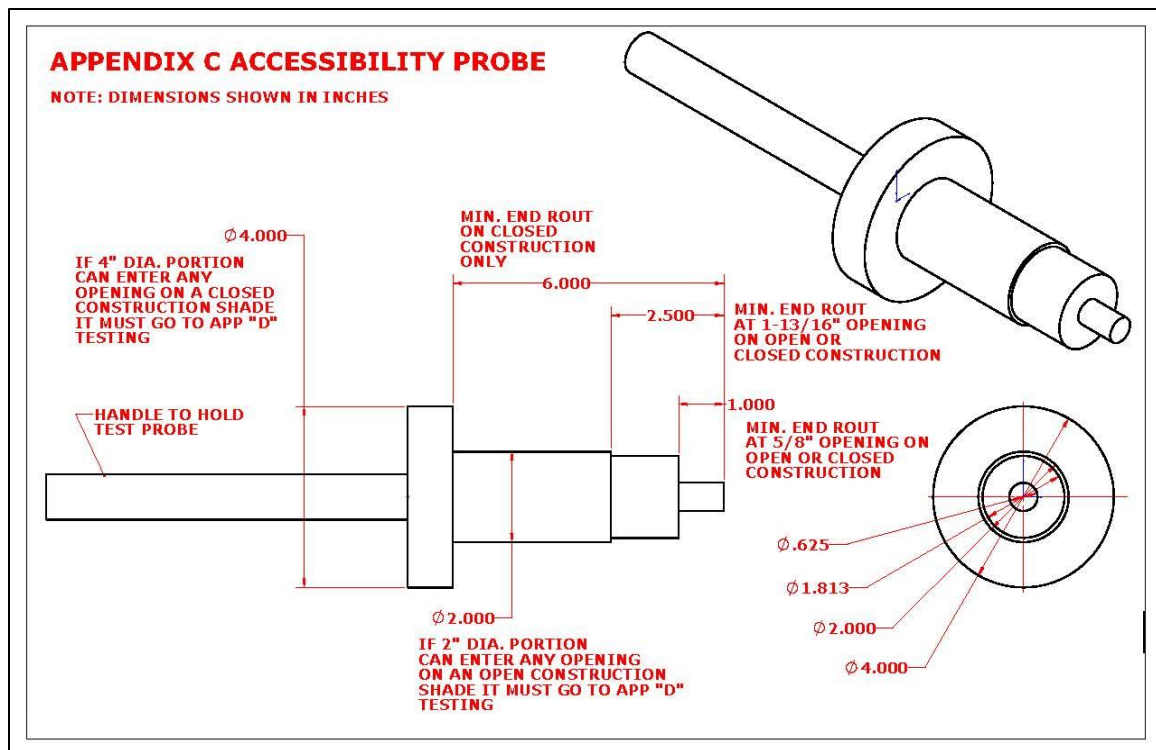
C2.1.1.1 If the Inner Cord accessibility probe can touch any Cords before reaching the 2 in (51 mm) diameter section the Cords are considered accessible and must be tested to Appendix D: Hazardous Loop Test Procedure.

C2.1.1.2 If the 2 in (51 mm) diameter section of the Inner Cord accessibility probe can be inserted into any opening then the Cords are considered accessible and must be tested to Appendix D: Hazardous Loop Test Procedure.

**C2.1.2 "Closed" construction:** Determine if any opening in the window covering, more than 12 in (31 cm) below the bottom of the headrail, allows touching of the Inner Cords with the Inner Cord accessibility probe (Figure C1).

C2.1.2.1 If the Inner Cord accessibility probe can touch any Cords before reaching the 4 in (102 mm) diameter section the Cords are considered accessible and must be tested to the Appendix D: Hazardous Loop Test Procedure.

C2.1.2.2 If the 4 in (102 mm) diameter section of the Inner Cord accessibility probe can be inserted into any opening then the Cords are considered accessible and must be tested to Appendix D: Hazardous Loop Test Procedure.



**Figure C1 – CORD ACCESSIBILITY PROBE**

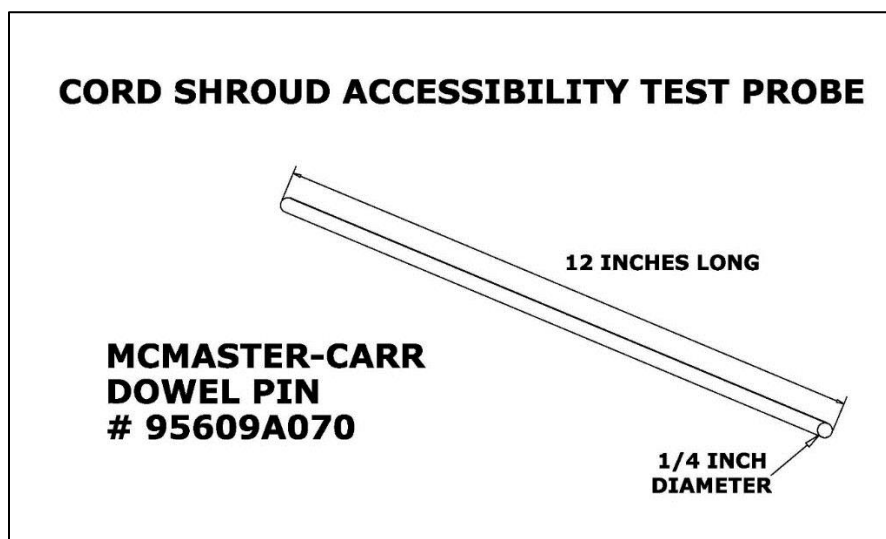
Note: See Appendix G: Rationale and Background Information,

### C3 Operating Cords

C3.1 Any Operating Cord that can be contacted by the Cord accessibility probe (Figure C1) is considered an Accessible Cord.

### C4 Cord Shroud Accessibility Test with Cord Shroud Accessibility Probe

C4.1 Cord Shrouds with openings smaller than 1/4" diameter, are to be tested with the Cord, per Appendix D. Cord Shrouds with openings larger than 1/4" diameter, are to be tested independently of the Cord, per Appendix D.



**Figure C2 – CORD SHROUD ACCESSIBILITY PROBE**

Note: See Appendix G: Rationale and Background Information,



## **APPENDIX D: HAZARDOUS LOOP TEST PROCEDURE**

Appendix D describes test requirements for the Accessible Inner Cords of all window covering types and the potentially Hazardous Loop or opening that may be created between an Inner Cord and the window covering material by manipulation of the Inner Cord and / or window covering material. If a Hazardous Loop is formed following the Appendix D: Hazardous Loop Test Procedure, the product is non-compliant.

### **D1 Window Covering Mounting and Preparation**

D1.1 Hang the window covering on a mounting rail using brackets according to manufacturer's installation instructions.

D1.1.1 It is recommended that enough room is allowed all around the mounted window covering for the test fixture and Cord-pull allowance.

D1.1.2 It is recommended that allowances are made for various heights of either window covering or test fixture and tests at multiple vertical positions on the window covering, either by raising or lowering the entire window covering, or by adjusting the level of the test fixture.

D1.1.3 All Inner Cords which are accessible from the front, sides, bottom, or rear of the window covering and are 12 in (31 cm) or more below the bottom of the headrail, are subject to these tests.

D1.1.3.1 If the openings between the Accessible Inner Cord and the window covering material are similar in design, the tests shall be conducted on a minimum of one Inner Cord near the side edge of the window covering and one Inner Cord towards the horizontal center of the window covering for each configuration tested.

D1.1.3.2 If the openings between the Accessible Inner Cord and the window covering material are similar in design, the tests shall be conducted on a minimum of the bottom most row of openings and the middle row of openings.

D1.1.4 At each position on the window covering product where Cords are tested, all combinations of Cords and combined Loops shall be tested separately.

D1.1.5 Test procedure D2 shall be performed with the window covering in the fully lowered position.

D1.1.5.1 If the sample contains a top-down, bottom-up operation feature, Procedure D2 shall be performed with the bottom rail fully lowered and the middle rail up against the headrail (window covering fully covering the window).

D1.1.6 Loops that are formed by excessive or intricate manipulations, including damaging the product or using tools, of the Accessible Cord shall be exempt from testing.

### **D2 Creation of a Hazardous Loop**

D2.1 Orient the Hazardous Loop test stand assembly, shown in Figure D2 through Figure D6, such that the hooks (Figure D5 Item #9.5) on the force gauge arm subassembly (Figure D5) will be able to pull the Accessible Inner Cord to form or enlarge a Loop (see Figure D7). The direction of pull will be perpendicular to surface of the window covering product, and away from the surface.

D2.1.1 If the Inner Cord is only accessible from the side of the window covering, then the fixture shall be oriented such that it will apply the pull force perpendicular to that side surface of the window covering (or parallel to the front of the window covering). If the Inner Cord is accessible from the back or front of the window covering, then the fixture shall be oriented such that the pull force is applied perpendicular to that surface of the window covering. Likewise, if the Inner Cord is only accessible from the bottom of the

window covering, the pull force should be applied in a vertical direction, perpendicular to the bottom surface. The restraining arm (Figure D2 Item #16) shall be placed against the window covering.

D2.1.2 If the same Inner Cord section is accessible from two or more directions, testing shall be conducted by pulling the Inner Cord in the direction that would result in the largest Loop opening. It may be necessary to conduct the evaluation more than once to determine the direction that would result in the largest Loop opening on certain window covering designs.

D2.2 Place the Hazardous Loop test stand assembly at the surface of the window covering and adjust the vertical height so that the restraining arm aligns with the opening to be tested.

D2.2.1 If testing a Roman or Roll Up Style Blind, the restraining arm shall be placed in between the Inner Cord and the window covering material at the opening to be tested.

D2.2.2 When testing all other styles of window coverings, the restraining arm shall be placed against both the window covering material and the Inner Cord, just slightly above the opening to be tested.

D2.3 Ensure the scale measuring distance traveled on the force gauge arm subassembly is set to zero (Figure D2 Item 1). Zero the force gauge and place the force gauge in continuous read-out mode. Loop the Accessible Cord onto both hooks of the force gauge arm subassembly (Figure D5 Item #1.1).

D2.3.1 While looping the Cord onto both hooks, the force exerted on the Cord or the force registered on the force gauge may exceed 5 lb (22.2 N) to obtain the required set-up configuration.

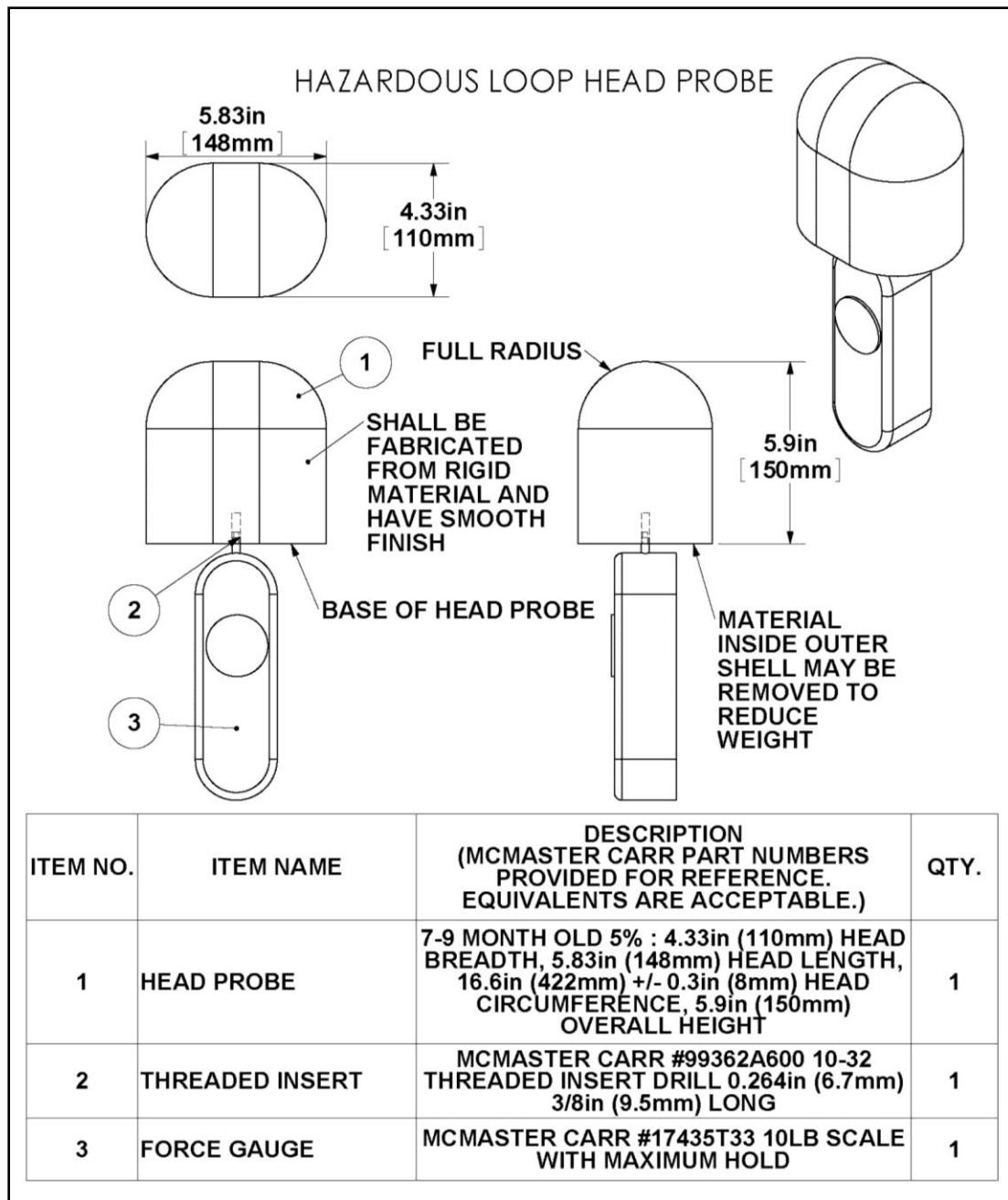
D2.3.2 The coating on the hooks (Figure D5 Item #1.6) is Tygon tubing with a durometer 69A that is intended to simulate human skin. In the event that the tubing becomes worn or damaged, replace it with new tubing.

D2.4 Over a time period of 5 seconds  $\pm$  1 second, gently pull the horizontal arm (Figure D5 Item #1.8) of the force gauge arm subassembly away from the window covering to create an open Loop until the force gauge indicates a tension force of 5 lb  $\pm$  0.25 lb (22.2 N  $\pm$  1.1 N) or the scale (Figure D5 Item #1.4) indicates a pulled distance of 25 in  $\pm$  0.25 in (63.5 cm  $\pm$  0.6 cm), whichever comes first. Lock the horizontal arm in place using the brake assembly (Figure D-5 Item #1.10).

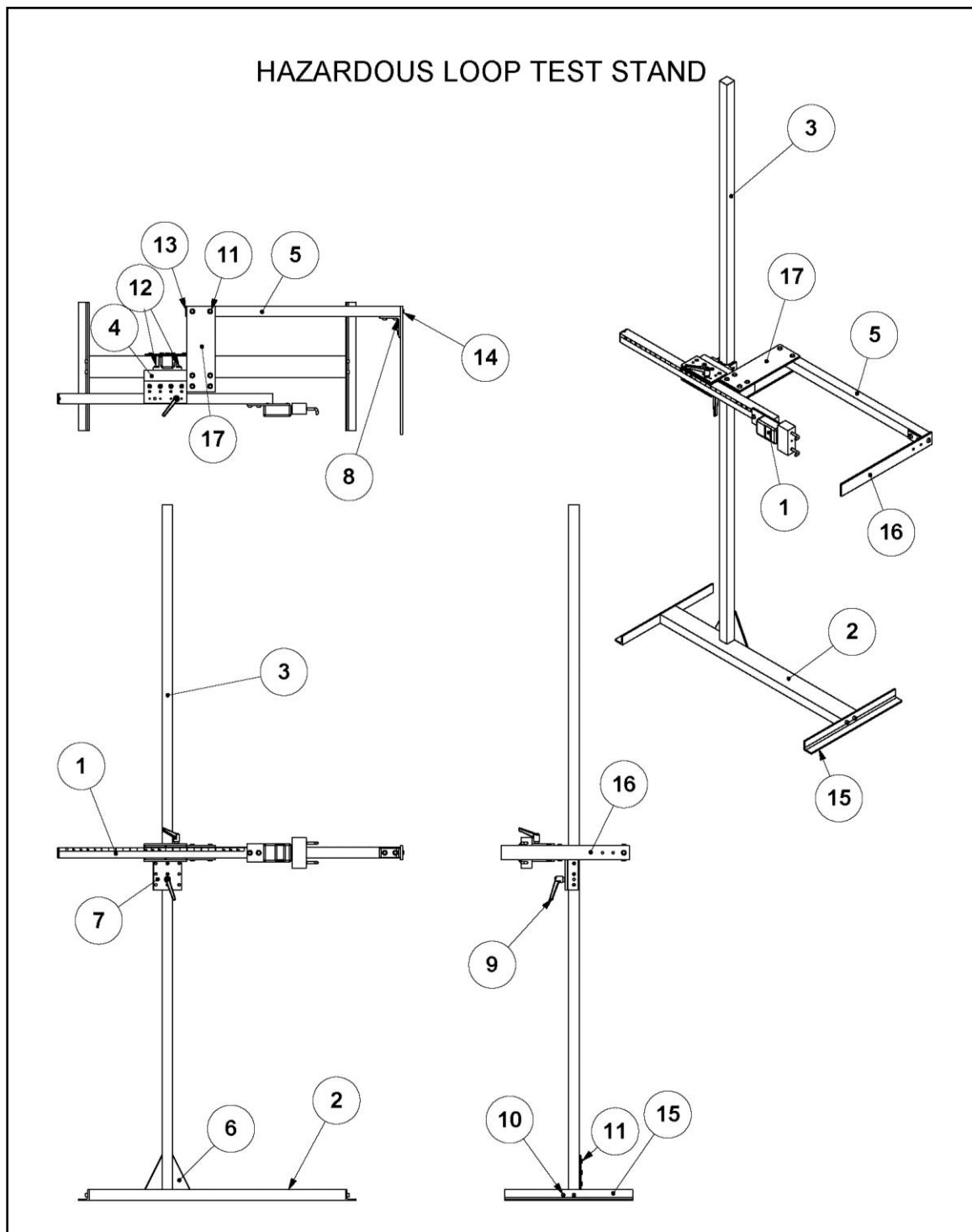
D2.5 Using the head probe (Figure D1) determine whether the head probe can pass through the opening created between the hooks and the restraining arm with an insertion force of 10 lb (44.5 N) or less, perpendicular to the plane of the opening

D2.5.1 If the head probe cannot pass through the Loop under the conditions above, the opening is not a Hazardous Loop.

D2.5.2 If the head probe can pass through the Loop under the conditions above, the Loop is considered a Hazardous Loop.



**Figure D1 – HAZARDOUS LOOP HEAD PROBE**



**Figure D2 – HAZARDOUS LOOP TEST STAND ASSEMBLY**

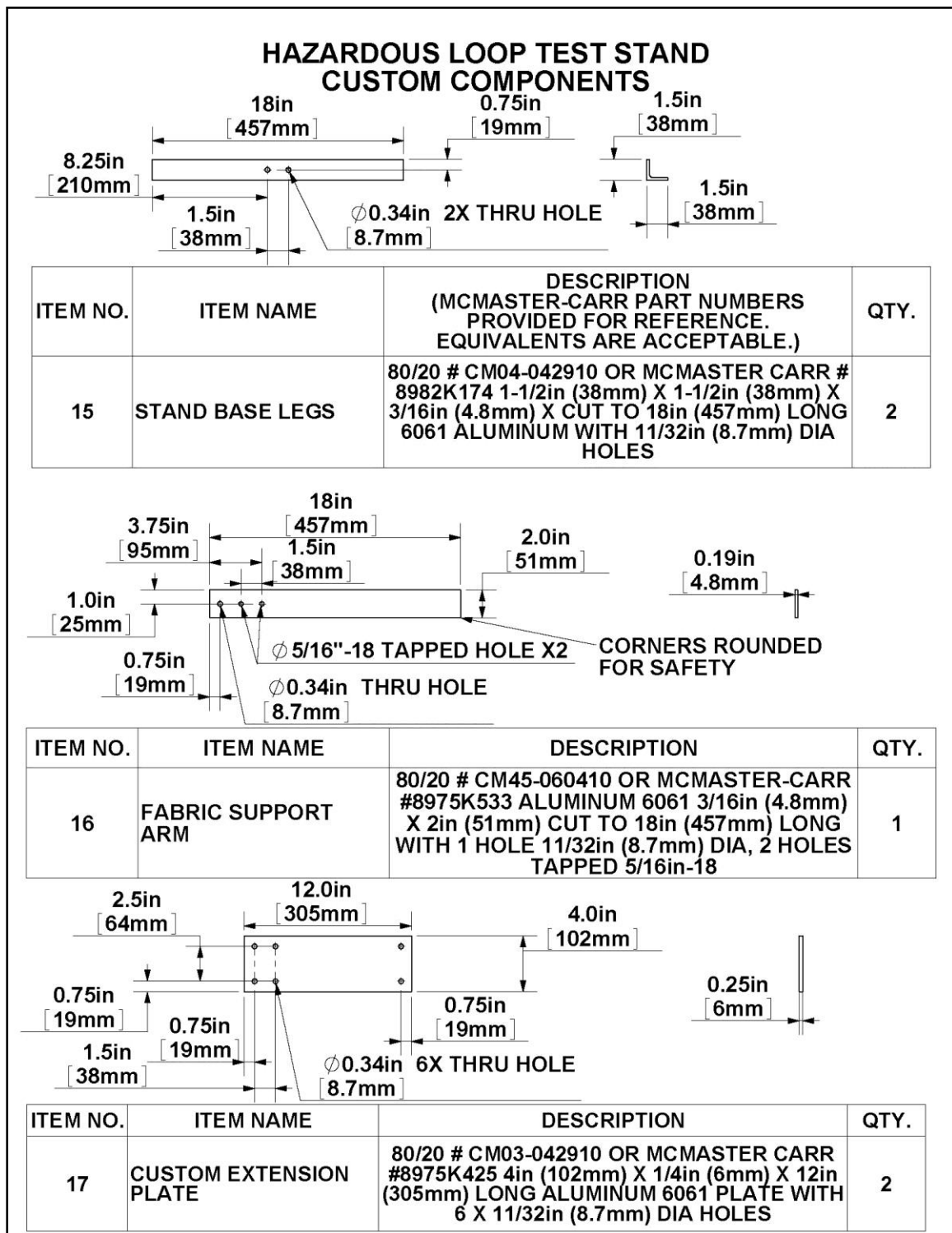
## HAZARDOUS LOOP TEST STAND ASSEMBLY BILL OF MATERIALS

80/20 COMPONENTS CAN BE ORDERED AS KIT# WCMA060410  
BERTELKAMP AUTOMATION, INC  
6321 BAUM DRIVE  
KNOXVILLE TN 37919  
800-251-9134  
INFO@BERTELKAMP.COM

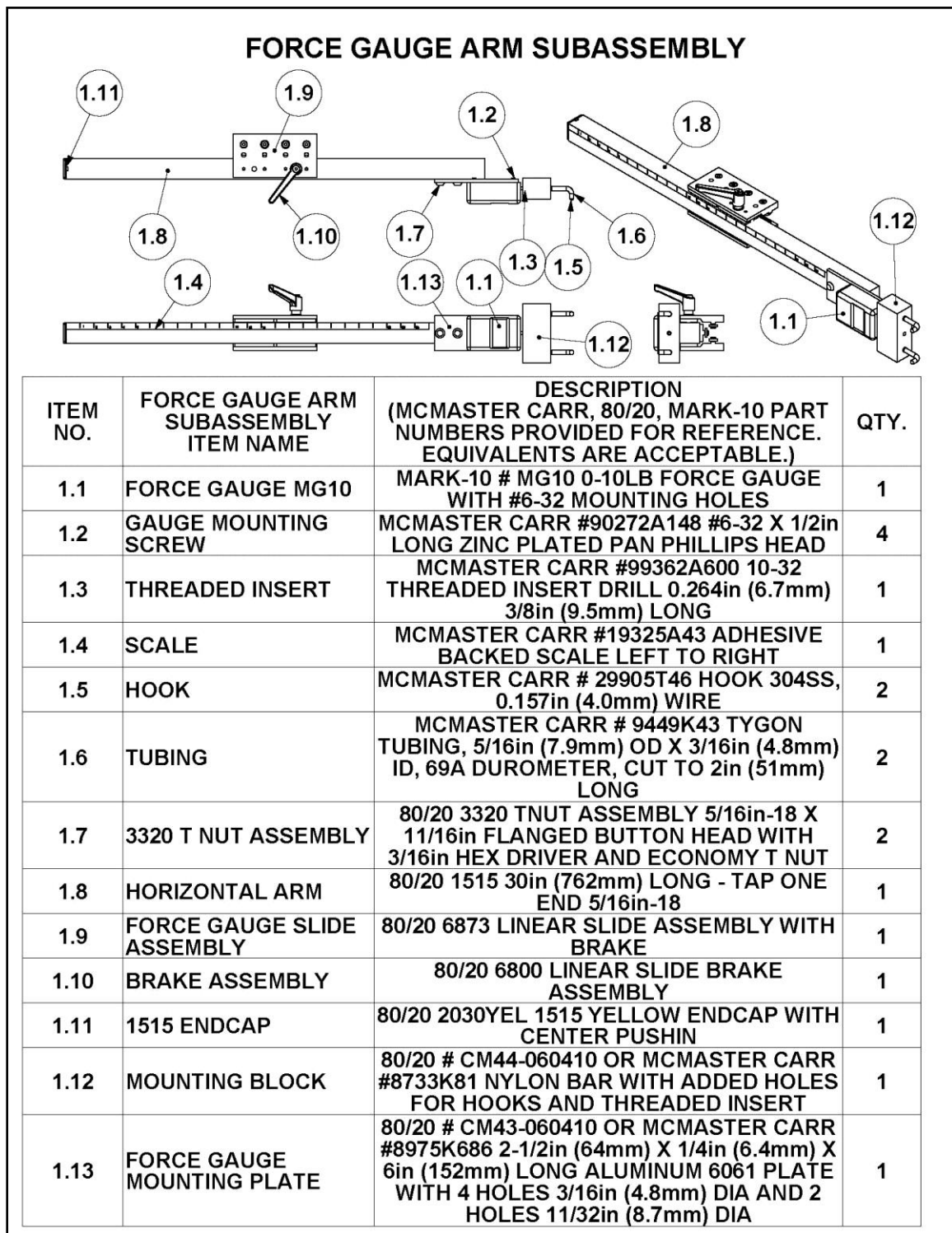


ITEM NO.	ITEM NAME	DESCRIPTION (MCMaster CARR, 80/20 PART NUMBERS PROVIDED FOR REFERENCE. EQUIVALENTS ARE ACCEPTABLE.)	QTY.
1	FORCE GAUGE ARM SUBASSEMBLY	80/20, MCMaster CARR, MARK-10 COMPONENTS - SEE SEPARATE ASSEMBLY DRAWING FOR COMPONENTS	1
2	STAND BASE	80/20 1530 36in (914mm) LONG - TAP BOTH ENDS 5/16in-18	1
3	UPRIGHT	80/20 1515 96in (2438mm) LONG	1
4	SLIDE MOUNT	80/20 1530 10in (254mm) LONG	1
5	HORIZONTAL ARM	80/20 1515 30in (762mm) LONG - TAP ONE END 5/16in-18	1
6	JOINING PLATE 4312	80/20 4312 7 HOLE JOINING PLATE	1
7	VERTICAL ADJUSTMENT SLIDE	80/20 6526 LINEAR SLIDE WITH BRAKE	1
8	CORNER BRACE	80/20 4301 4 HOLE CORNER BRACE	1
9	BRAKE ASSEMBLY	80/20 6800 LINEAR SLIDE BRAKE ASSEMBLY	1
10	MACHINE SCREW	80/20 3122 SOCKET HEAD CAP SCREW 5/16in-18 1in LONG	4
11	3320 T NUT ASSEMBLY	80/20 3320 TNUT ASSEMBLY 5/16in-18 X 11/16in FLANGED BUTTON HEAD WITH 3/16in HEX DRIVER AND ECONOMY T NUT	21
12	3439 T NUT ASSEMBLY	80/20 3439 TNUT ASSEMBLY 5/16in-18 X 3/4in BUTTON HEAD WITH 3/16in HEX DRIVER AND ECONOMY T NUT	2
13	1515 ENDCAP	80/20 2030YEL 1515 YELLOW ENDCAP WITH CENTER PUSHIN	1
14	3340 BUTTON HEAD SCREW	80/20 3340 5/16in-18 X 1/2in FLANGED BUTTON HEAD WITH 3/16in HEX DRIVER	3
15	STAND BASE LEGS	80/20 # CM04-042910 OR MCMaster CARR # 8982K174 1-1/2in (38mm) X 1-1/2in (38mm) X 3/16in (4.8mm) X CUT TO 18in (457mm) LONG 6061 ALUMINUM WITH 11/32in (8.7mm) DIA HOLES	2
16	FABRIC SUPPORT ARM	80/20 # CM45-060410 OR MCMaster CARR #8975K533 ALUMINUM 6061 3/16in (4.8mm) X 2in (51mm) CUT TO 18in (457mm) LONG WITH 1 HOLE 11/32in (8.7mm) DIA, 2 HOLES TAPPED 5/16in-18	1
17	CUSTOM EXTENSION PLATE	80/20 # CM03-042910 OR MCMaster CARR #8975K425 4in (102mm) X 1/4in (6mm) X 12in (305mm) LONG ALUMINUM 6061 PLATE WITH 6 X 11/32in (8.7mm) DIA HOLES	2

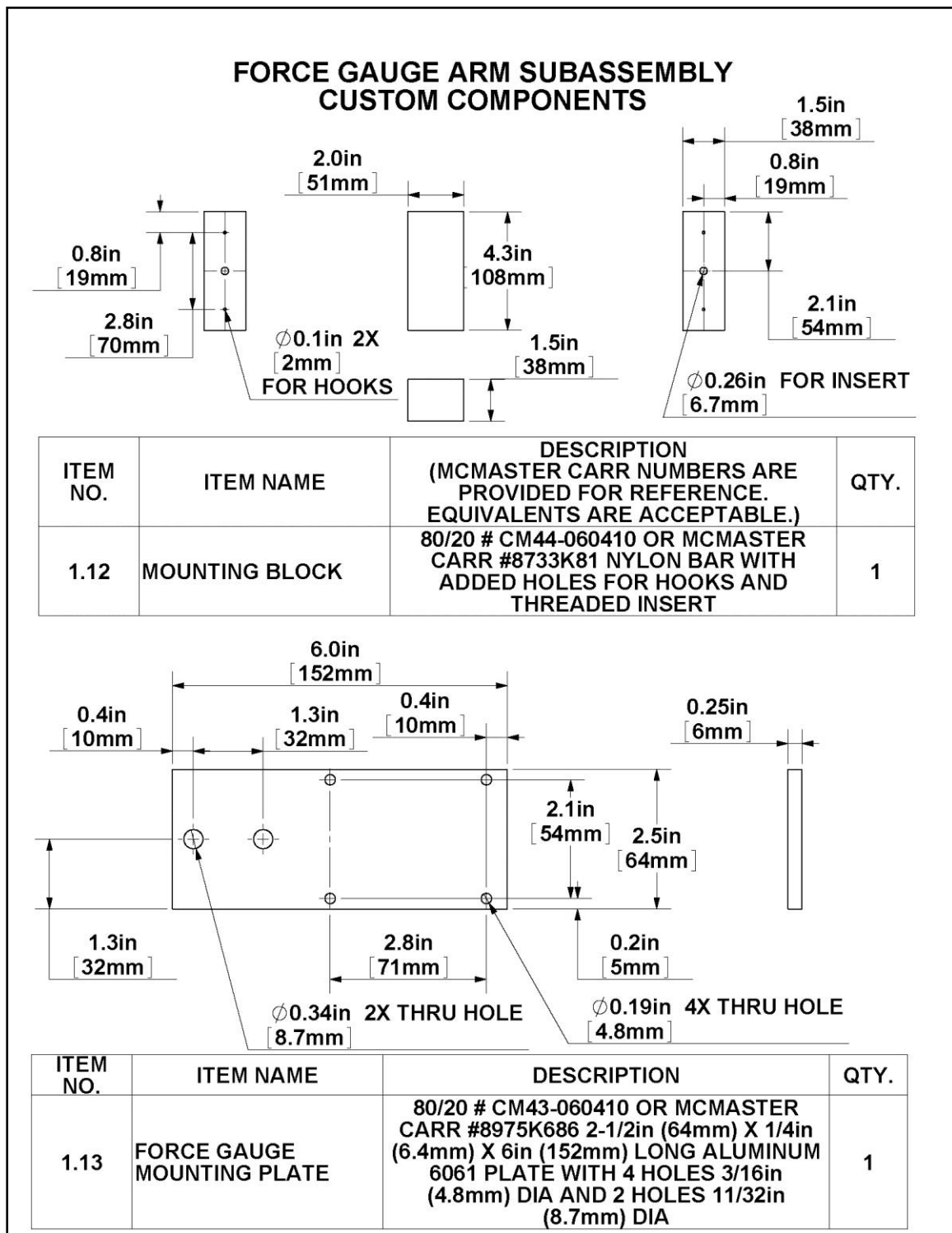
**Figure D3 – HAZARDOUS LOOP TEST STAND BILL OF MATERIALS**



**Figure D4 - HAZARDOUS LOOP TEST STAND CUSTOM COMPONENTS**

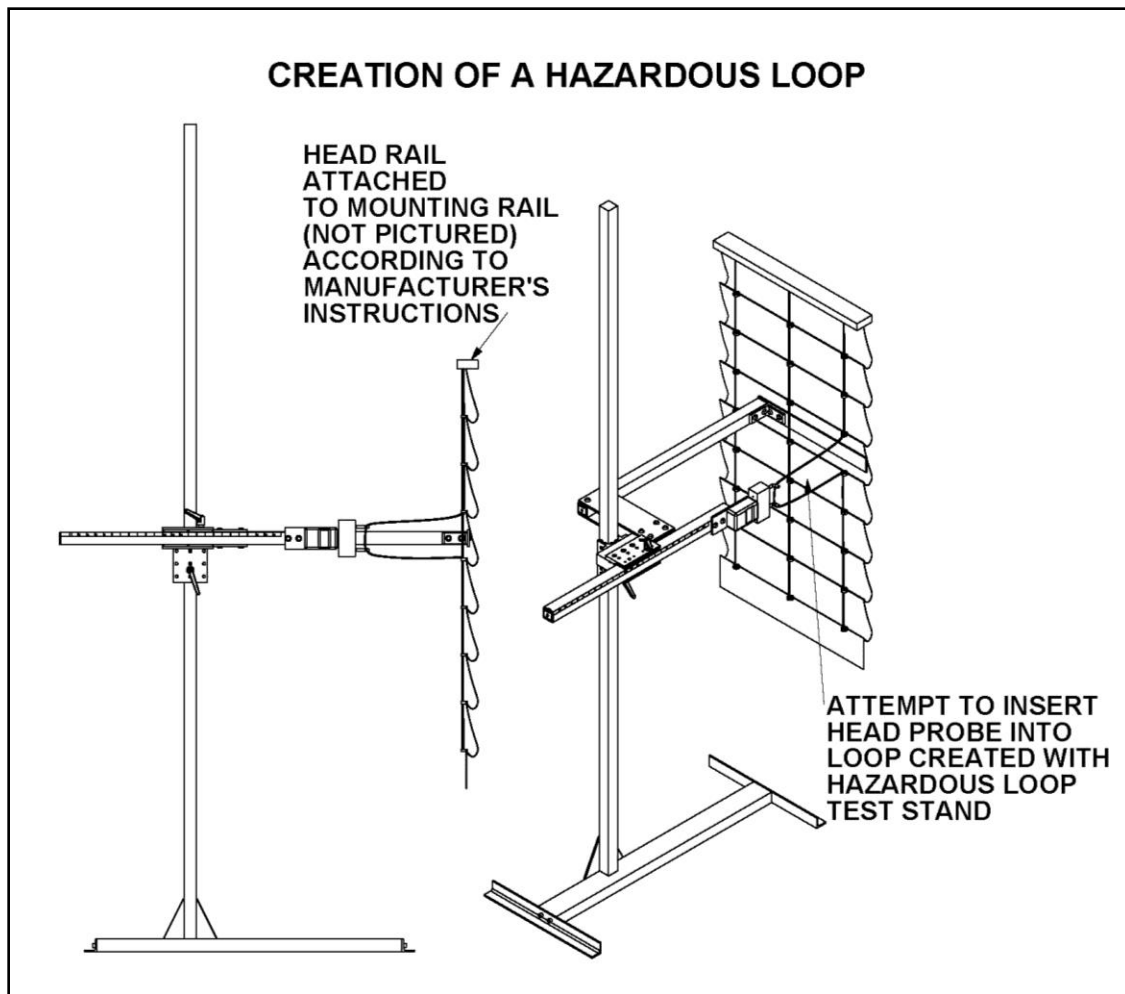


**Figure D5 – HAZARDOUS LOOP TEST STAND FORCE GAUGE ARM SUBASSEMBLY  
BILL OF MATERIALS**



**Figure D6 – HAZARDOUS LOOP TEST STAND FORCE GAUGE ARM SUBASSEMBLY  
CUSTOM COMPONENTS**





**Figure D7 – HAZARDOUS LOOP TEST STAND AND A ROMAN STYLE SHADE**

## APPENDIX E: TEST FOR ROLL UP STYLE SHADE INNER CORD RELEASE DEVICE

### E1 Equipment

E1.1 Standard Test Fixture per instructions and drawing in Figures E1 and E2.

E1.2 Length of representative Inner Cord 10 ft (3 m) long. The Cord should be representative of the Cord to be used with the release device under component test E2.

E1.3 Force gauge rated to at least 10 lb (44.5 N), with at least 0.05-lbf (0.2 N) resolution, with a maximum hold feature.

**E2 Release Device Test** This test assesses the average and maximum release force of the release device itself.

#### E2.1 Set-Up of Test Fixture

E2.1.1 Attach the Standard Test Fixture to the force gauge such that the cylindrical member is free to articulate.

#### E2.2 Test Set-up

E2.2.1 Attach the release device to a rigid mounting surface in a manner representative of the way the release device is attached to a window covering assembly, as shown in Figure E3.

E2.2.2 Anchor one end of the Cord to the rigid mounting surface in a manner representative of the window covering assembly.

E2.2.3 Attach the other end of the Cord to the release device. If necessary, assemble the release device according to manufacturer's instructions.

#### E2.3 Device Test & Acceptance

E2.3.1 Engage the test fixture cylinder with the hanging Loop in the manner depicted in Figure E3.

E2.3.2 Zero the force gauge and draw force gauge vertically downward at a speed between 0.1 and 1.0 in per second (2.5 mm to 25 mm per second). The device being tested shall release less than 10 seconds from the time tension develops in the Cord.

E2.3.3 Record force at separation.

E2.3.4 Repeat E2.3.1 through E2.3.3 for a total of 12 each release devices.

E2.3.5 Repeat E2.3.1 through E2.3.4 for a total of 12 each release devices, but pull at an angle of 30° outward from the vertical mounting plane of the fixture, as shown in Figure E4.

E2.3.6 Repeat E2.3.1 through E2.3.4 for a total of 12 each release devices, but pull at an angle of 30° laterally to the left of vertical, in the vertical plane of the fixture, as shown in Figure E5.

E2.3.7 Repeat E2.3.1 through E2.3.4 for a total of 12 each release devices, but pull at an angle of 30° laterally to the right of vertical, in the plane of the fixture, as shown in Figure E6.

E2.3.8 The average shall not exceed 3.0 lbf (13.3 N) release force to separate the devices on the 48 devices tested, and all samples shall have a release force below 5.0 lbf (22.2 N) for the device to be accepted. In the event that not more than one of the devices tested produces an initial release force measurement in excess of 5.0 lbf (22.2 N), such devices may be retested and if, upon retesting, their release force measurements fall below 5.0 lbf (22.2 N), the device shall be deemed acceptable.

**E3 Test of Assembled Window Covering** This test assesses the performance of the release device as part of a window covering assembly.

### **E3.1 Set-up of Test Fixture**

E3.1.1 Attach the Standard Test Fixture to the force gauge as illustrated in Figure E1.

### **E3.2 Test Set-up**

E3.2.1 Hang the window covering on a mounting rail using hardware according to the manufacturer's instructions. Mount the rail high enough to allow the window covering to be fully lowered while allowing sufficient room below the lower-most portion of the assembly for the force gauge with attached test fixture.

### **E3.3 Loop Definition & Preparation**

E3.3.1 Test window covering with release device assembled according to the manufacturer's instructions.

### **E3.4 Loop Test & Acceptance**

E3.4.1 Position the window covering in the fully lowered position. Lower the Cord to be tested an additional amount to allow engagement of the test fixture with the Loop below the bottom rail, as shown in Figure E7.

E3.4.2 If necessary, tie off or otherwise restrain the Loop end not connected to the release device, for example by engaging the Cord Lock, in order to secure the Loop end from pulling out of the headrail.

E3.4.3 If necessary, assemble the release device according to manufacturer's instructions.

E3.4.4 Loop the bottom of the Loop over the Test Fixture on the force gauge, as shown in Figure E7.

E3.4.5 Zero the force gauge and draw the force gauge vertically downward at a speed between 0.1 and 1.0 in per second (2.5 mm to 25 mm per second). The device being tested shall release less than 10 seconds from the time tension develops in the Cord.

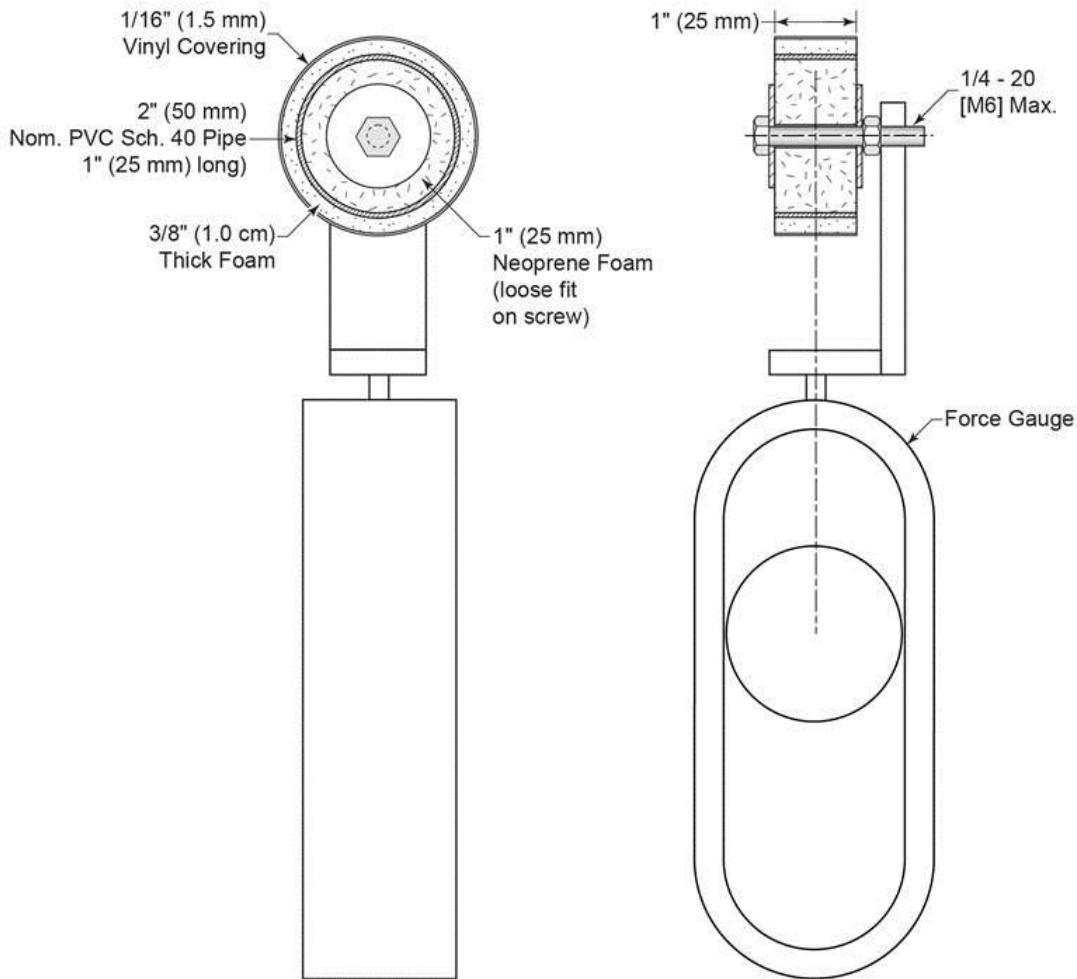
E3.4.6 Record force at separation.

E3.4.7 Repeat E3.4.3 through E3.4.6 two (2) times for a total of three releases.

E3.4.8 Repeat steps E3.4.3 through E3.4.7, according to the arrangement shown in Figure E8 by pulling along a line 30° outward from the mounting plane of the window covering.

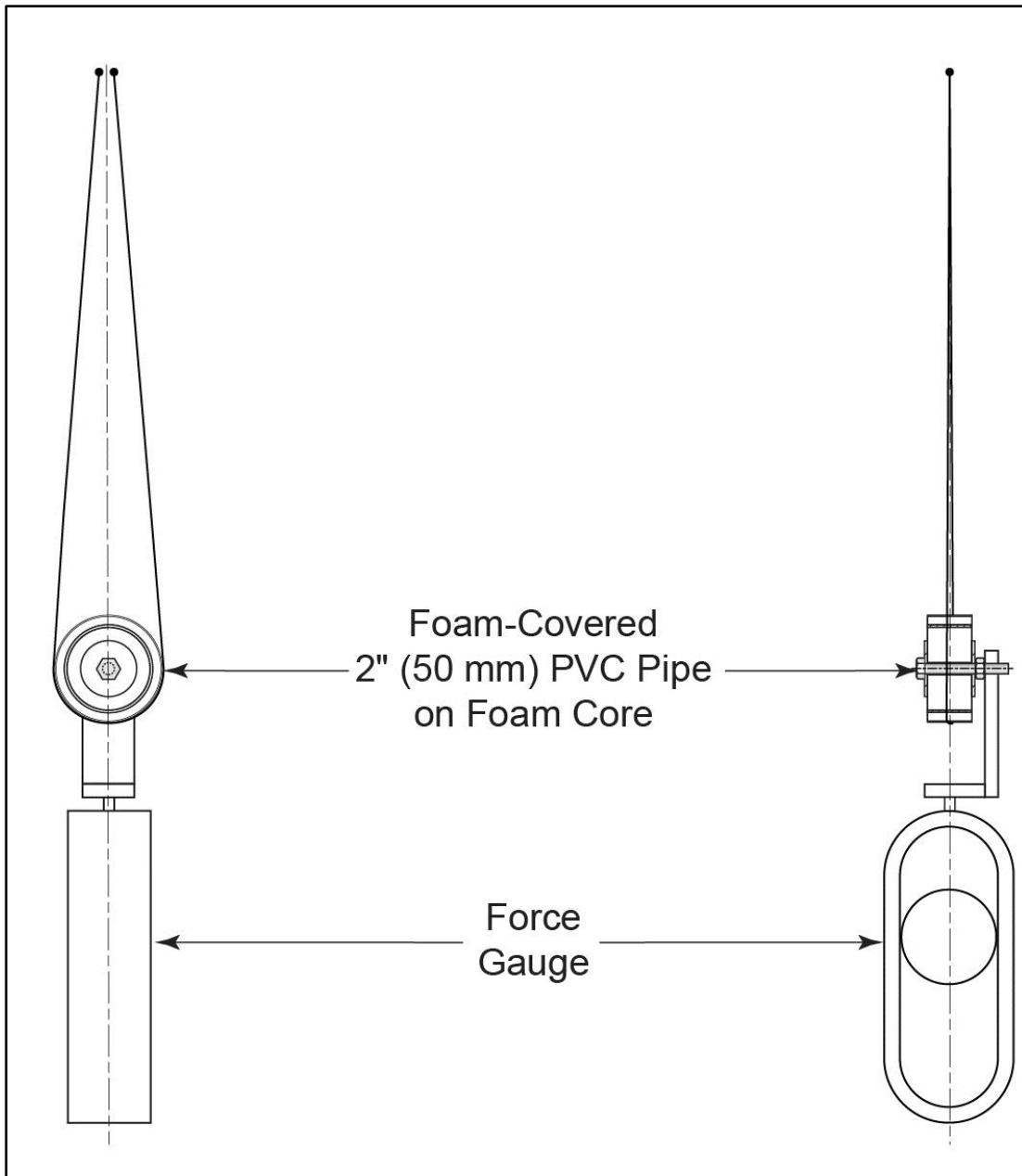
E3.4.9 Repeat steps E3.4.3 through E3.4.7, but pull along a line with 30° angle from the vertical to the left or right (as appropriate for whether the release device is on the left or right of the window covering assembly) in the arrangement depicted in Figure E9.

E3.4.10 The average shall not exceed 3.0 lb(13.3 N) release force to separate the device, and all samples shall have a release force below 5.0 lb ( 22.2 N) for the release device to be accepted. In the event that not more than *one test* produces an initial release force measurement in excess of 5.0 lb (22.2 N), such test may be repeated and if, upon retesting, the release force measurement falls below 5.0 lb (22.2 N), the device shall be deemed acceptable.

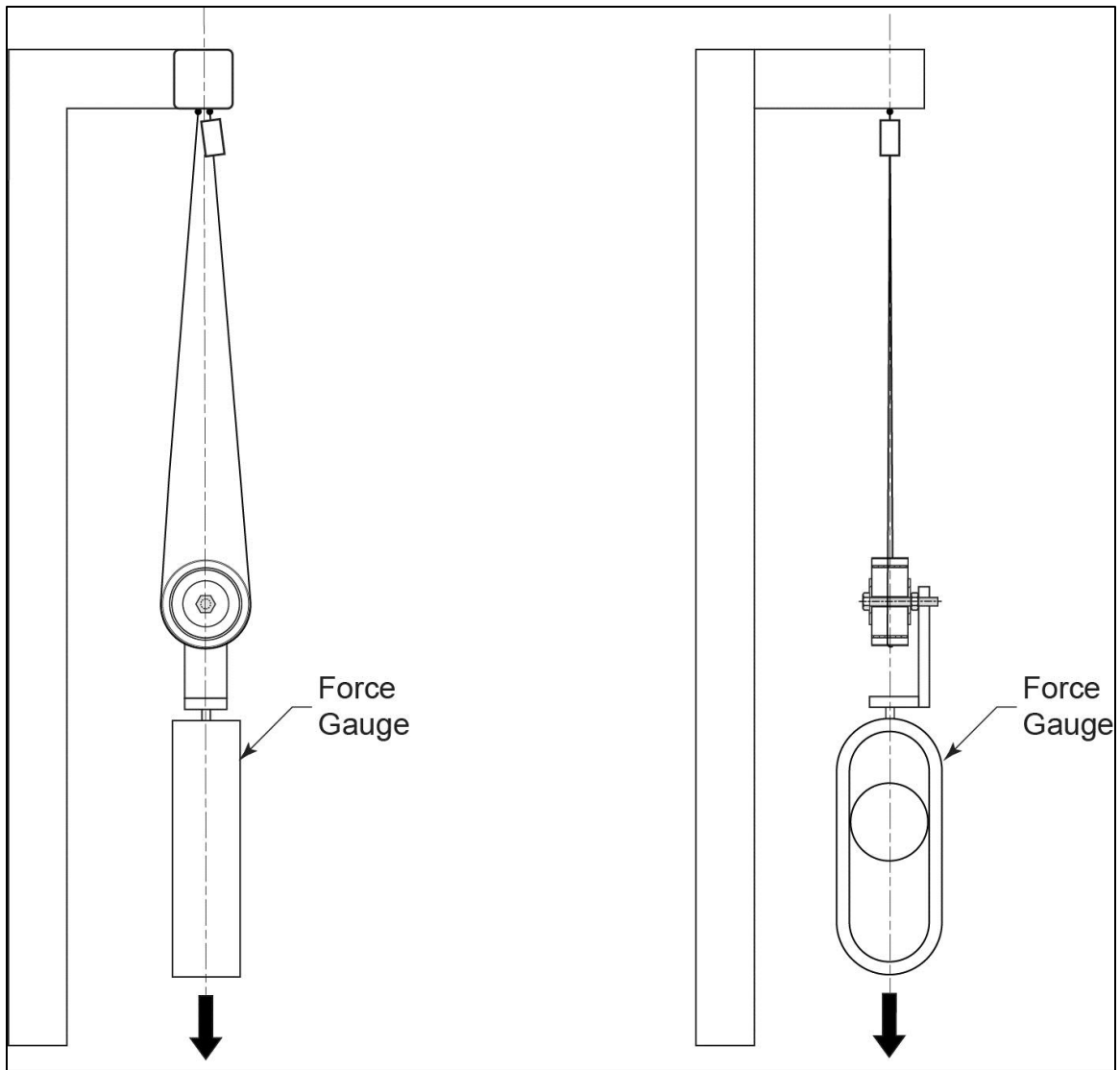


Component	McMaster-Carr Part No. (equivalents are acceptable)
3/8" (9.5 mm) neoprene foam, Durometer 35-42 on Shore D0 scale	4463K151
1/16" (1.5 mm) vinyl sheet, Durometer 70-75A	8513K43
1" (25 mm) neoprene foam firmness (25% deflection): 9-13 psi (60-90 kPa) (firm)	8647K89
Force gauge, 10-lb scale, 0.05-lbf (20-gf) resolution, with peak-hold feature	17435T33

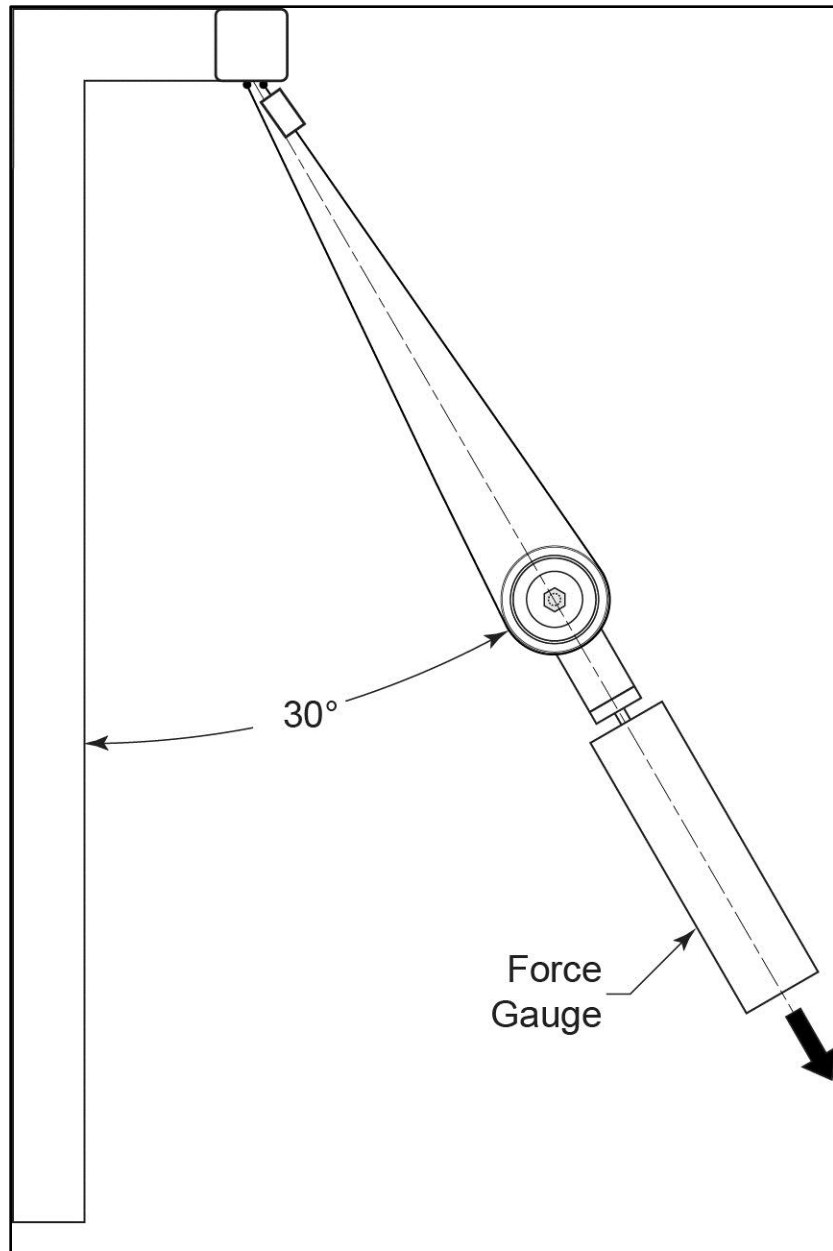
**Figure E1**



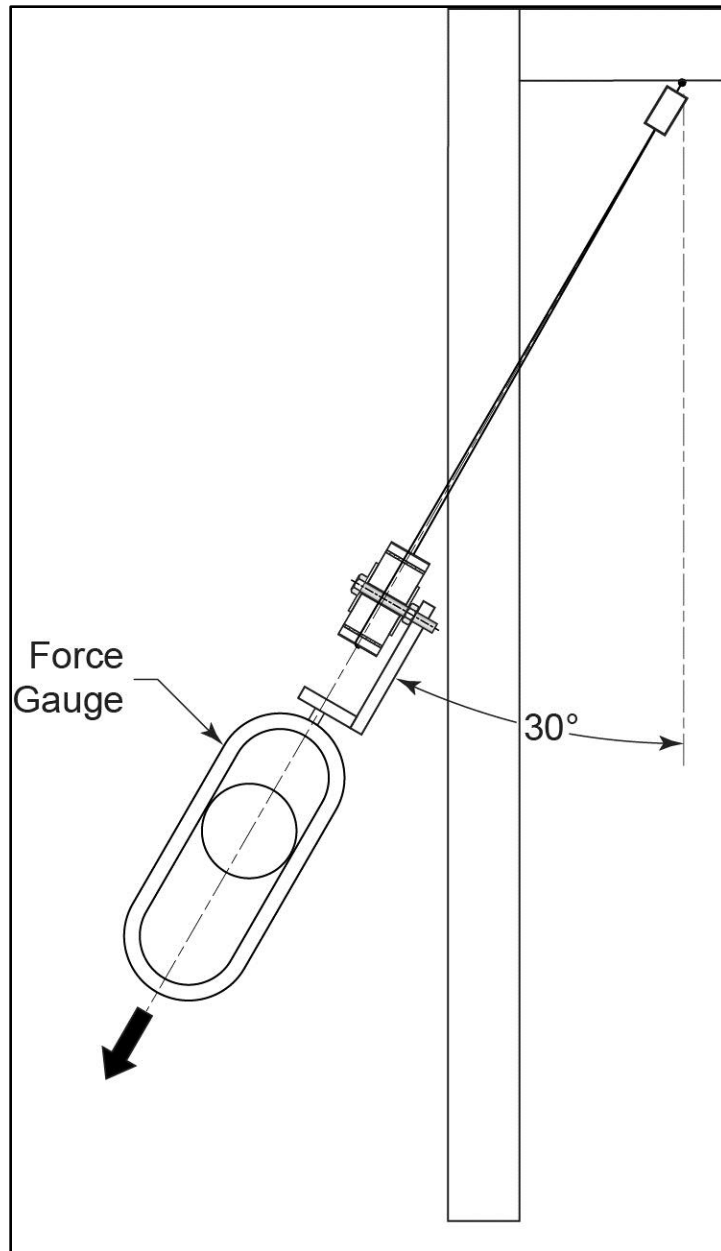
**Figure E2**



**Figure E3**

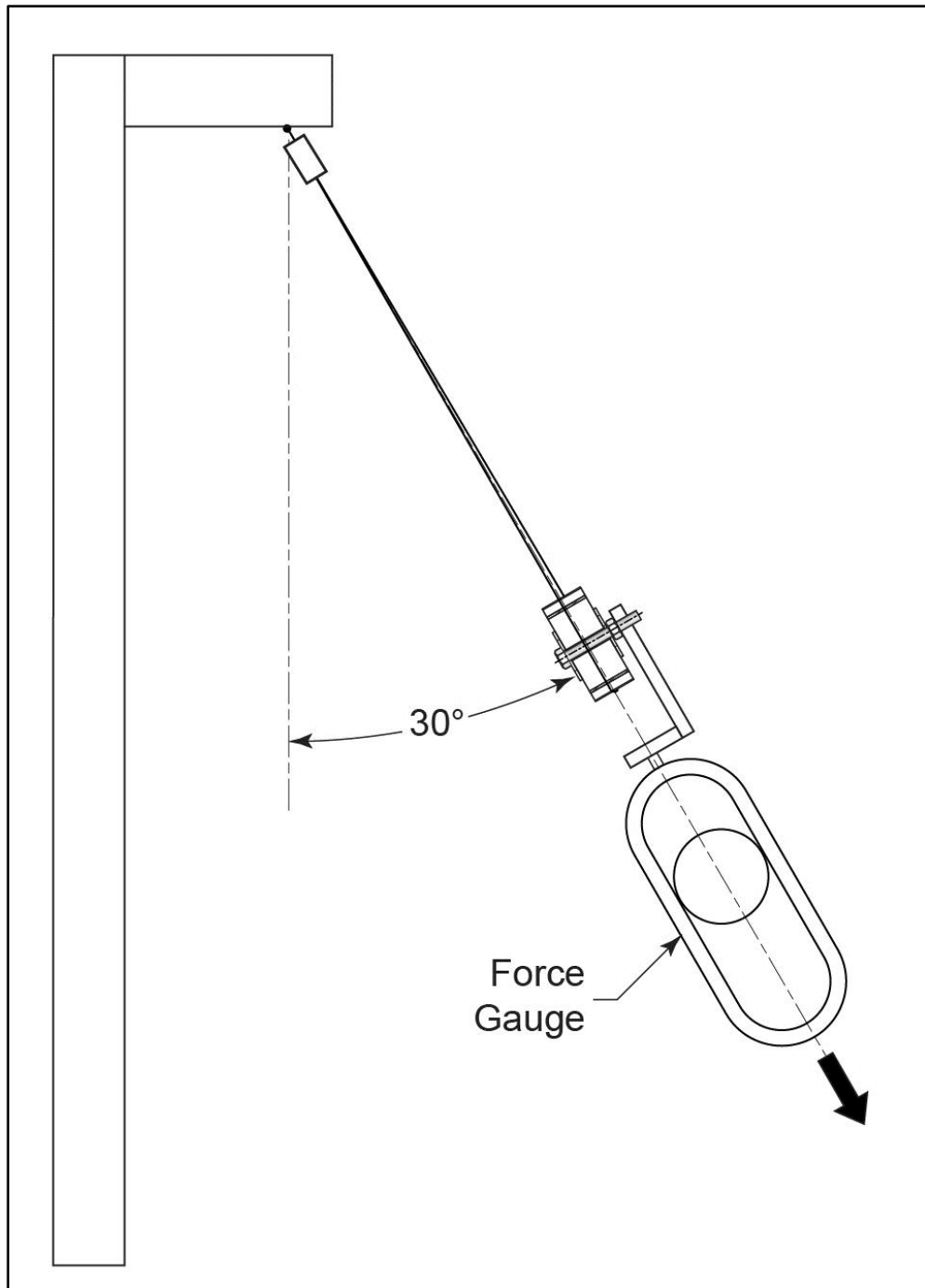


**Figure E4**

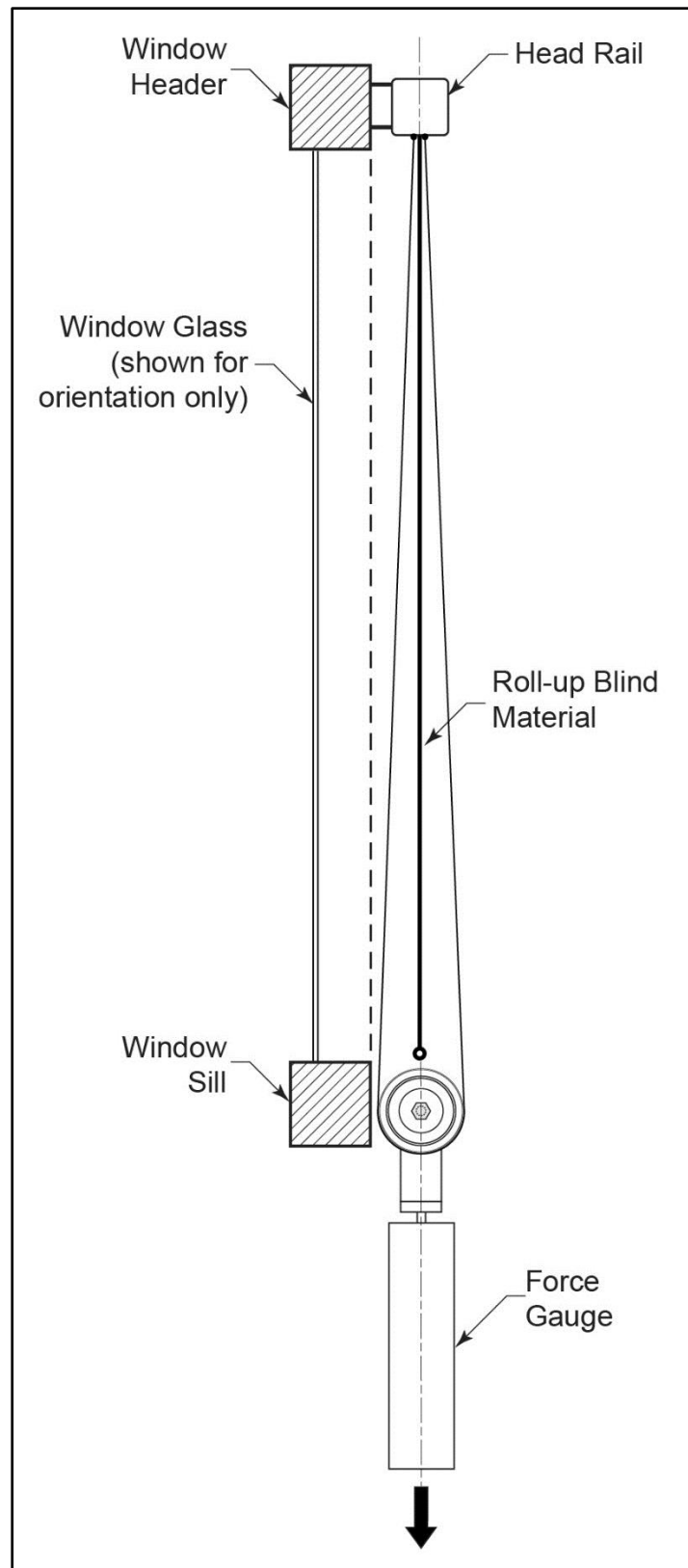


**Figure E5**

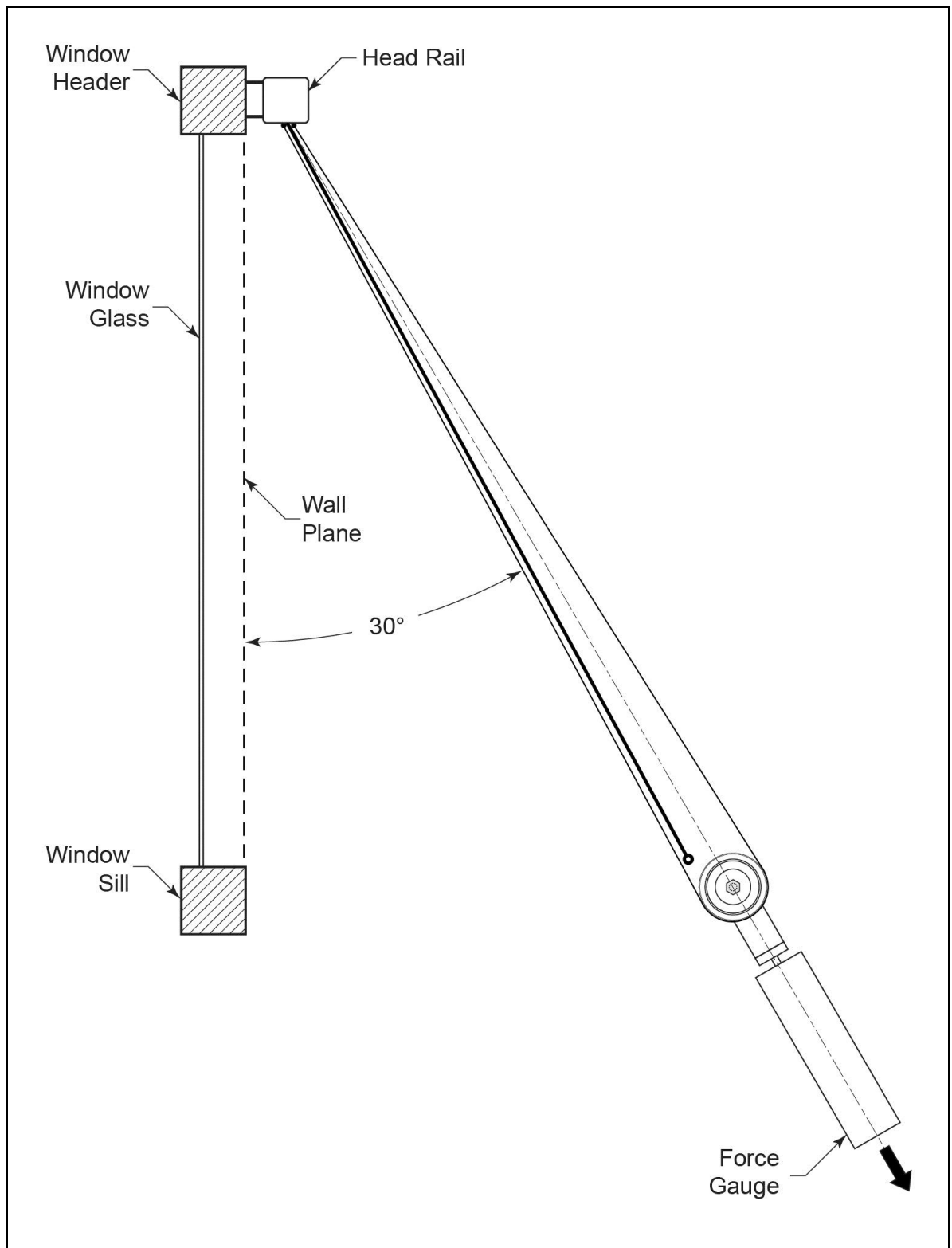




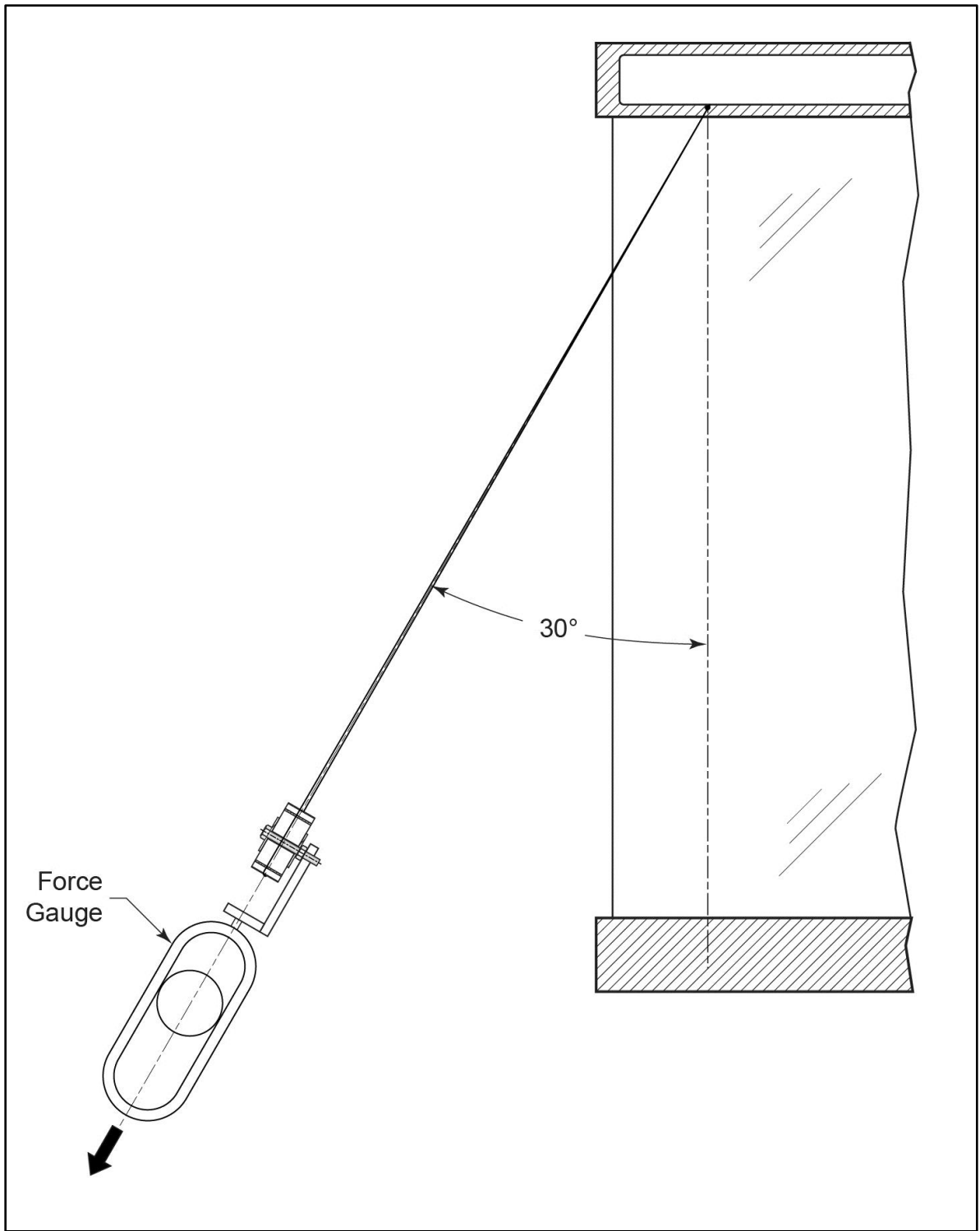
**Figure E6**



**Figure E7**



**Figure E8**



**Figure E9**

## **APPENDIX F: RATIONALE AND BACKGROUND INFORMATION**

Appendix F describes the rationale and / or background information for select provisions of the standard.

### **F1 Section 4.4 Default options for Operating Cord Length and Wand Tilt**

F1.1 Cord Length- In prior versions of the standard, Operating Cord length has not been standardized. Previous Cord lengths often ranged from 50% to 100% of window covering height. The default Operating Cord length of 40% was established based on anthropometric data that considers accessibility and ability to grasp and pull a Cord by most users on a window covering mounted at standard height of 80" above the floor. To ensure accessibility for all consumers, an exception is allowed for custom lengths.

F1.2 Wand Tilt- Wands require fine hand manipulations to operate (twisting motion). To ensure accessibility and ease of operation for users, the option for Cord tilt is allowed for circumstances where Cord operation is preferred over wand tilt by the user.

### **F2 Sections 6.7.1 and 6.7.2 Maximum Free-Standing Cord Loop**

F2.1 The 4 in (102 mm) diameter is based on a 6 in (152 mm) Loop equivalent.

### **F3 Section 6.8 Wide Lift Bands**

F3.1 The WCMA engaged an independent laboratory to verify that "wide" lift bands reduce risk of strangulation when used in place of an Inner Cord. Test results showed a relationship between width and stiffness of the material and influence on pressures to occlude an airway during simulation. Based on data and discussion of the testing, a safety factor of 16.0 was determined to be acceptable. The wide lift band safety factor (in-kg) is calculated by multiplying the width of the wide lift band (measured in inches) by the stiffness of the wide lift band (measured in kgf). Stiffness values of the wide lift band were measured using test method ASTM 4032-2008, pneumatic actuator, digital gage with a 25kgf (115 N) capacity.

### **F4 Figure C1, Cord Accessibility Probe**

F4.1 The 6 in (152 mm) end depth is based on anthropometric data and historical information.

F4.2 The 5/8 in (16 mm) diameter is based on a child inserting his/her index finger into the opening and curl his/her finger to grasp the Cord. The distance from the tip of index finger to the middle joint is approximately same as the inside grip diameter (5<sup>th</sup> percentile 2.5-3.5 year olds<sup>1</sup>), which is added to the index finger diameter (5<sup>th</sup> percentile 2-3.5 year olds<sup>2</sup>).

F4.3 The 1 in (25 mm) depth is the rounded number for the tip of index finger to the middle joint explained above.

F4.4 The 1 13/16 in (46 mm) diameter is based on the opening needed to grasp the Cord if a child inserts his/her hand in a straight position up to the thumb crotch. Hand circumference at the palm (mean 2-2.5 year old child<sup>3</sup>) is added to the opening needed to grasp the Cord with index finger (inside grip diameter of a 5<sup>th</sup> percentile 2.5-3.5 year old).

F4.5 The 2.5 in (64 mm) depth is the thumb crotch – middle finger length for 5<sup>th</sup> percentile 2-3.5 year old<sup>2</sup>.

<sup>1</sup> Owings, C.L., Norcutt, R.H., Snyder, R.G., Golomb, D.H. & Lloyd, K.Y. (1977). Gripping Strength Measurements of Children for Product Safety Design. Prepared for the U.S. Consumer Product Safety Commission, Washington, D.C.

<sup>2</sup> Snyder, R.G., Schneider, L.W., Owings, C.L., Reynolds, H.M., Golomb, D.H., & Schork, M.A. (1977). *Anthropometry of Infants, Children and Youths to Age 18 for Product Safety Design* (Report No. UM-HSRI-77-17). Prepared for the U.S. Consumer Product Safety Commission, Washington, D.C.

<sup>3</sup> BSI (1990) as cited in Norris, B., & Wilson, J. R. (1995). *CHILDATA: The handbook of child measurements and capabilities –Data for design safety*. London: Department of Trade and Industry.

**F5** Figure C2, Cord Shroud Accessibility Probe

F5.1 The ¼ in (6 mm) diameter is based on: 0.33 in (8 mm) is the 5<sup>th</sup> percentile 2-year-old's index finger diameter in Snyder's study<sup>2</sup>.

**F6** Section D2.4, Head Probe

F6.1 Tension force of 5 lb (22.2 N) is based on Section 4.14.1 Cords, Straps, and Elastics in ASTM F963.

F6.2 Insertion force of 10 lb (44.5) is based on Section 8.22 Test for Loops and Cords in ASTM F963.

F6.3 16.6 in (42.2 cm) is representative of the 5th percentile 7-9 month old, measurements provided by <http://ovrt.nist.gov/projects/anthrokids> and shape provided by Intertek CT scan images

## APPENDIX G: TESTING SUMMARY, PRODUCT ILLUSTRATIONS

### Not Part of ANSI/WCMA A100.1

#### Component Testing and Window Covering Product Testing Summary

Section	Component Testing	Window Covering Product Testing
4.1	Lead testing <ul style="list-style-type: none"><li>• Components such as finish on bottom rail, textiles, louvers, slats</li></ul>	
4.2	Small component testing for choking hazard <ul style="list-style-type: none"><li>• Safety component or device that is intended to separate</li></ul>	
5		All window covering products Appropriate warning labels, tags, and instructions
6.1	Cord release device <ul style="list-style-type: none"><li>• Cord separation test / Appendix B</li></ul>	
6.2		Any fully assembled window covering products that rely on cord Retraction Devices <ul style="list-style-type: none"><li>• Retraction test, 6.2.1</li><li>• Cycle test, 6.2.2</li></ul>
6.3		Any fully assembled window covering products that rely on Cord Shroud devices <ul style="list-style-type: none"><li>• Accessibility test- Appendix C</li><li>• Creation of Hazardous Loop- Appendix D, if required</li></ul> Non-rigid Cord Shroud <ul style="list-style-type: none"><li>• Force for attachment points, 6.3.2.2</li></ul>
6.4	Cord Tensioner <ul style="list-style-type: none"><li>• UV stability test, 6.4.4.2</li><li>• Impact test, 6.4.4.3</li><li>• Durability, 6.4.4.4</li></ul>	Any fully assembled window covering products that rely on Tension Devices <ul style="list-style-type: none"><li>• Evaluate for shipped condition, 6.4.1</li><li>• Test for partial inoperability, 6.4.2</li><li>• Operational test, 6.4.4.1</li></ul>
6.5	Looped Cord and Bead Chain Restraining Device <ul style="list-style-type: none"><li>• UV Stability, 6.5.2.2</li><li>• Impact, 6.5.2.3</li><li>• Durability, 6.5.2.4</li></ul>	Any fully assembled window covering products that rely on Loop Cord or Bead Chain restraining devices <ul style="list-style-type: none"><li>• Operational test, 6.5.2.1</li><li>• Hazardous Loop testing, 6.5.2.5</li></ul>
6.6	Rigid Cord Shroud Device <ul style="list-style-type: none"><li>• UV Stability, 6.6.2.1</li><li>• Impact, 6.6.2.3</li></ul>	Any fully assembled window covering products that rely on Rigid Cord Shroud devices <ul style="list-style-type: none"><li>• Operational test, 6.6.2.2</li></ul>

6.7	Inner cord stop devices <ul style="list-style-type: none"> <li>• UV Stability &amp; Compression test, 6.7.3</li> </ul>	Any fully assembled window covering products with Inner Cord stop devices <ul style="list-style-type: none"> <li>• Operational test, 6.7.1</li> <li>• Impact test, 6.7.2</li> </ul>
6.8	Wide lift band materials <ul style="list-style-type: none"> <li>• Band width, 6.8.1</li> <li>• Materials stiffness, 6.8.2</li> </ul>	
Appendix B	Test procedure for Cord Release Device <ul style="list-style-type: none"> <li>• Single Loop B.3.1</li> <li>• Multiple Loop B.3.2</li> </ul>	
Appendix C		Test Procedure for Accessible Cords <ul style="list-style-type: none"> <li>• Operating Cords</li> <li>• Inner Cords</li> </ul>
Appendix D		Hazardous Loop Test Procedure Inner cord test D3
Appendix E	Roll Up Style Shade Cord Release Test <ul style="list-style-type: none"> <li>• Cord Release Device as component</li> </ul>	Roll Up Style Shade Cord Release Test <ul style="list-style-type: none"> <li>• Cord Release Device on assembled product</li> </ul>



**APPENDIX H: Illustrations of common Window Coverings, operating systems, and options**  
(Images may not represent all styles of window coverings and these are for illustration purposes only).

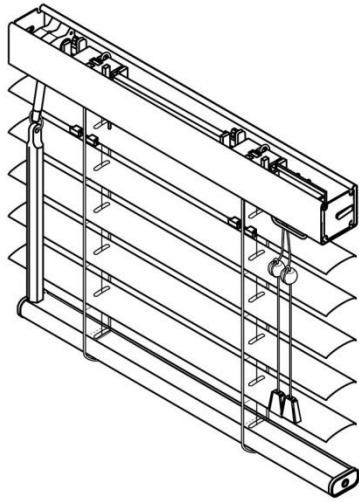


FIGURE H1 Horizontal Blinds

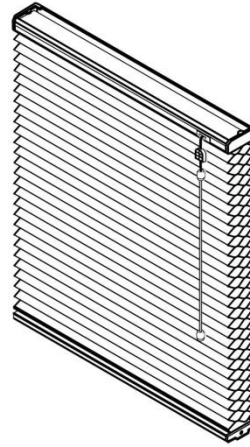


FIGURE H2 Cellular Shade

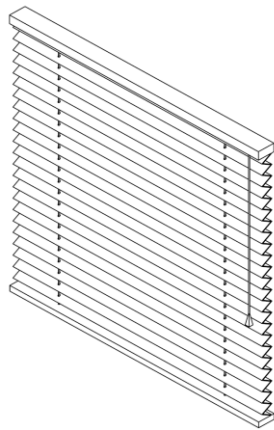


FIGURE H3 Pleated Shade

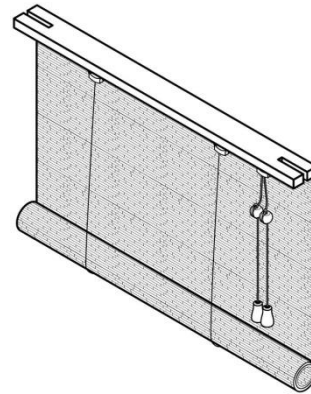


FIGURE H4 Roll Up Style Blind

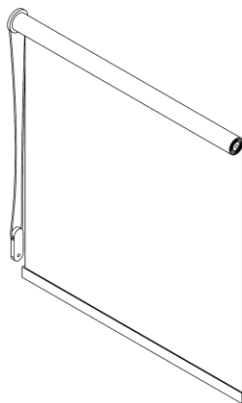


FIGURE H5 Roller Shade

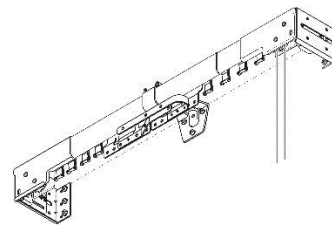


FIGURE H6 Traverse Rod

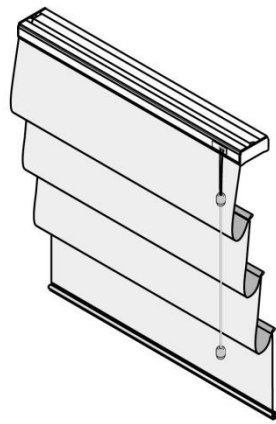


FIGURE H7 Roman Style Shade

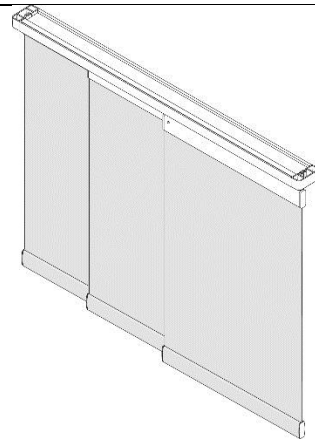


FIGURE H8 Panel Track

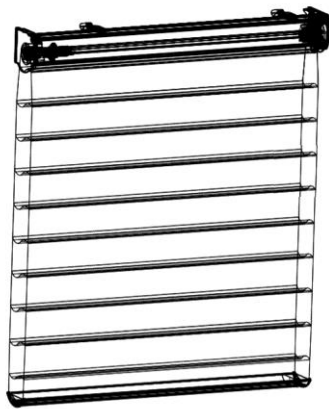


Figure H9 Sheer Shade

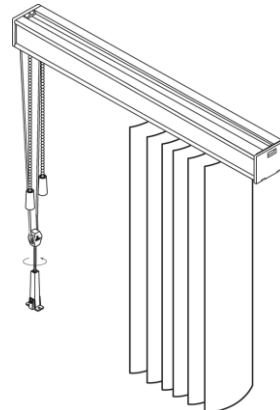


Figure H10 Vertical Blind

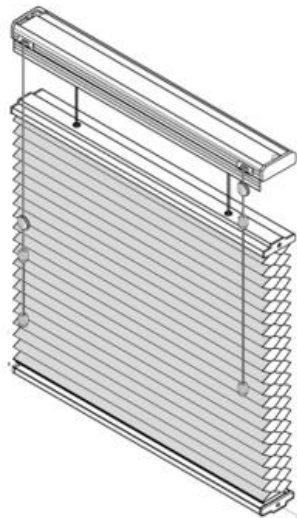
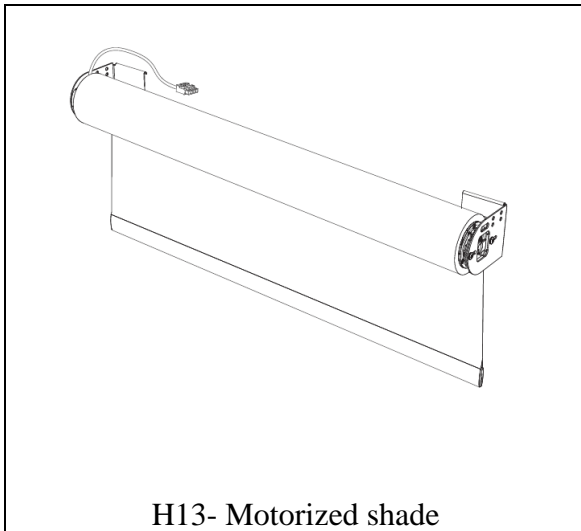


Figure H11- BUTD Shade



Figure H12 bead chain restraining device



H13- Motorized shade