



## TEXTILES QUALITY CONTROL STANDARDS AND TESTING PROCEDURES

At Herman Miller all materials undergo two forms of testing. Initial testing is done when a new product, process, or supplier is accepted. These tests lead to the development of quality standards, which our suppliers take responsibility for meeting. From that point on, materials are checked on a random basis to see that suppliers adhere to the quality standards. Quality is checked at suppliers, as materials are received in our facilities, and throughout production.

All Herman Miller textiles are tested for their ability to stand up to the kind of wear they are likely to get in actual use, including fire retardancy, elongation, strength, and color transfer. Qualities such as surface texture, pattern, ability to absorb or reflect light, ability to conform to product, and ability to respond within an environment when placed next to woods, laminates, glass, carpeting, painted surfaces, or other textiles are also taken into consideration.

When possible, our test procedures conform to the methods established by the American Society for Testing and Materials (ASTM). Herman Miller strives to meet and exceed all industry standards pertaining to our products.

The Association for Contract Textiles (ACT) has developed five symbols that assure contract fabrics perform up to industry standards and pass all applicable testing. These symbols are included on all Herman Miller textile swatch cards where applicable:



**Flame resistance** (fabric's ability to resist burning)



**Croaking resistance** (fabric's colorfastness)



**Ultra-violet light resistance** (fabric's resistance to fading)



**Physical properties** (fabric's resistance to pilling, seam slippage, and tearing)



**Abrasion** (fabric's ability to withstand surface wear from rubbing)



**Flame resistance**  
(Fabric's ability to resist burning)

Note: Test is dictated by the intended end use for the fabric.

### Application

Upholstery

Panels and Upholstered Walls

### Passes

Vertical Flame Test - California Bulletin 117 Section E

Tunnel Test - ASTM E 84 (unadhered method)

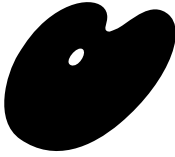
### Vertical Flame Test:

Fabric is mounted in a vertical holder and exposed to an open flame for a specified amount of time. Once the flame is removed, the after flame and char length of the test sample are measured against various code standards to establish a classification.

### Tunnel Test:

Fabric is clamped (unadhered method) or glued (adhered method) to a substrate, which is placed on the ceiling of test chamber and ignited by a flame below. Fabric is then evaluated for the density of the smoke formed, the amount of fuel contributed and the extent of the flame spread. Rating is established based on these factors.

Note: Some Herman Miller textiles are also given NFPA 260 (tests upholstered seating fabrics for their resistance to surface ignition). Furthermore, all seating and systems products, panels, and tiles in a given fabric must meet the product flammability requirements as specified in the applicable product PRs or SIs.



***Crocking resistance***  
*(Fabric's colorfastness)*

**Application**

Upholstery

Panels and Upholstered Walls

**Passes**

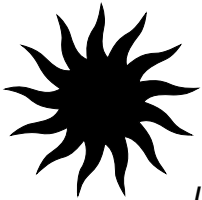
AATCC 8 Dry Crocking, Class 4 minimum  
Wet Crocking, Class 3 minimum

AATCC 8, Class 3 minimum

To measure for colorfastness to crocking, the fabric to be tested is rubbed with squares of white cotton fabric (wet and dry) under controlled pressure for a specified number of times. The amount of color transferred to the white test squares is matched to a control chart and a rating is established.

Class 5 = no color transfer

Class 1 = high degree of color transfer



***Ultra-violet light resistance***  
*(Fabric's resistance to fading)*

**Application**

Upholstery

Panels and Upholstered Walls

**Passes**

AATCC 16A or AATCC 16E  
Class 4 minimum at 40 hours

AATCC 16A or AATCC 16E  
Class 4 minimum at 40 hours

To measure for colorfastness to light, the fabric to be tested is exposed under specific conditions to a controlled light source which simulates the sun's rays. At timed intervals, the test swatch is compared to a gray scale and the degree of fading is rated.

Class 5 = no fading

Class 1 = high degree of fading



### **Physical properties**

*(Fabric's resistance to pilling, seam slippage, and tearing)*

#### **Application**

Upholstery

#### **Passes**

Brush Pill ASTM D3511, 3 minimum

Breaking Strength ASTM D3597-D1682-64  
50 lbs. Minimum in warp & weft

Seam Slippage ASTM D3597-D434  
25 lbs. minimum in warp & weft

Panels and Upholstered Walls

Breaking Strength D5034 Grab Method  
35 lbs. Minimum in warp & weft

Seam Slippage ASTM D3597-434  
25 lbs. Minimum in warp & weft

#### **Brush Pill Test:**

Evaluates pilling, which occurs when loose fibers work to the surface after the fabric is subjected to abrasion.

Nylon bristles are used to rub the surface of the fabric for a specific amount of time. The number of balls or pills that form on the surface of the fabric are counted, and the fabric is rated accordingly.

Class 5 = no pilling

Class 1 = severe pilling

#### **Breaking Strength Test:**

Measures fabric's ability to resist tearing or breaking when subjected to tension.

Fabric is gripped by clamps at one end while weight is applied to pull it from the other end. (Performed in both the warp and filling directions.) The number of pounds required to cause the fabric to break or tear determines the rating.

50 lbs. minimum = upholstery

35 lbs. minimum = panel and vertical surface fabrics

#### **Seam Slippage Test:**

To evaluate condition of fabric when pulled apart at a sewn seam.

A seam is sewn in the fabric, which is then clamped at one end and pulled by weights at the other end. (Performed in both warp and filling directions.) The weight is increased until seam separates a specified distance. The number of pounds required to cause this separation determines the rating.

25 lbs. minimum = upholstery

25 lbs. minimum = panel and vertical surface fabrics



### **Abrasion**

*(Fabric's ability to withstand surface wear from rubbing)*

#### **Application**

Upholstery

Heavy Duty Upholstery

#### **Passes**

ASTM 3597 modified (#10 cotton duck)  
15,000 double rubs Wyzenbeek method

ASTM D4966 (21 oz. weight)  
20,000 rubs Martindale method

ASTM 3597 modified (#10 cotton duck)  
30,000 double rubs Wyzenbeek method

ASTM D4966 (21 oz. Weight)  
40,000 rubs Martindale method

#### **Wyzenbeek Test (modified):**

Fabric is pulled taut and rubbed in both the warp and filling directions, using a piece of cotton duck fabric as the abradant. The number of cycles, or double rubs, endured before the fabric shows "noticeable wear" is counted and determines the fabric's abrasion rating.

15,000 = general contract upholstery

30,000 = heavy duty upholstery

#### **Martindale Test:**

Fabric is mounted flat and rubbed in a figure eight-like motion using a piece of worsted wool cloth as the abradant. The number of cycles endured before the fabric shows an objectionable change in appearance is counted and determines the fabric's abrasion rating.

20,000 = general contract upholstery

40,000 = heavy duty upholstery

For further information on testing and quality control standards, please contact your Herman Miller Customer Service Representative.