Textile Testing

A broad range of tests are carried out throughout the textile industry which measure the performance and specification of the raw materials used and finished goods produced.

This section looks at some of the main tests undertaken on finished fabrics, which evaluate how the fabric performs across different areas. The British Standard 2543: 1995 is a broad based standard defined as "The specification for woven and knitted fabrics for upholstery" which sets performance limits for abrasion, colour fastness and strength (tear and tensile). These and some of the other main tests for fabrics are described below. Please note that flammability testing forms a separate section.

Abrasion resistance - Martindale (BS 5690: 1991 (1997))

In this test, undertaken on a Martindale machine, the fabric is rubbed against a worsted fabric to simulate wear and tear.

The apparatus records the number of cycles - or rubs - to which the fabric has been exposed until a physically significant end point is reached. The end point is when three threads on the fabric have worn to the extent of actually breaking and the abrasion value is the number of cycles completed at the time of breaking. The fabric is abraded at a pressure of 800g/12 Kilo Pascals and abradants are changed every 50,000 cycles.

Within BS 2543, five classifications and associated fabric performance levels are specified for various types of end usage:

Intended Duty	Minimum cycles to physically significant end point
OD = Occasional domestic	6,000
LD = Light domestic	15,000
GD = General domestic	20,000
SD = Severe domestic/ general contract	30,000
SC = Severe contract	40,000

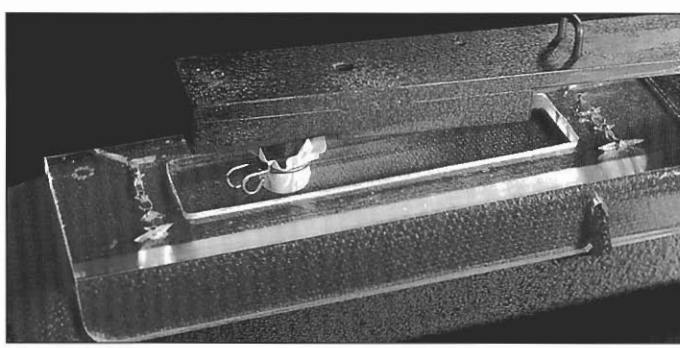
Resistance to pilling

This test establishes the fabric's tendency to form pills (bobbles) using the Martindale abrasion machine. Two samples of fabric are tested, one being removed from the machine after 2000 cycles and the other after 6000 cycles. Both samples are then graded on a scale of 1 - 5 (using BS5811: 1986), "1" indicating severe change and "5" no

change. The worst grade of the two samples is taken as the result.

Colour fastness

Colour fastness is a measure of how permanent a colour is on fabric. Colour can be adversely affected by a number of factors including exposure to light, to water and to normal wear and tear. Various tests assess how the colour is affected by these different parameters and a numerical value is then established to indicate the degree of colour change.



Colour fastness to light (BS 1006: 1990)

In this test, a prepared specimen of fabric is half covered and exposed to artificial ultraviolet light along with a scale of light sensitive blue dyed wool standards designed to fade after different time periods. Only the uncovered part of the test sample will be subject to any fading. Typical exposure time is 100 hours which represents approximately four years' daylight.

The light fastness is evaluated on a scale of 1 - 8 using the blue dyed wool standards, where "1" indicates very low light fastness (maximum colour change) and "8" indicates very high light fastness (minimum colour change). According to BS 2543, upholstery fabrics should display a minimum rating of "5" regardless of end usage.

Colour fastness to rubbing (BS 1006: 1990)

This test is undertaken on a crock meter, whereby the fabric specimen is subjected to rubbing with a sample of standard undyed cotton fabric in order to check for colour transfer.

Two tests are involved, one using the rubbing cloth dry, the other with the cloth wetted. The rubbing cloth is placed on the finger of the crock meter and moved back and forth across the fabric sample ten times at a steady speed.
The rubbing cloth is then evaluated using standard "Grey Scales" for staining, on which "1" signifies maximum staining and "5" no staining. According to BS 2543, for all grades of end use, fabrics must show a maximum staining of "3 - 4" for dry rubbing and "3" for wet rubbing.

Colour fastness to water

This test, carried out using a perspirometer, is used to determine if any colour transfer occurs when wet fabrics come into contact.

The fabric sample is fully immersed in deionised water together with strip of multi-fibre fabric (as its name suggests, this is a strip containing materials of different compositions).

Each item is then placed in the perspirometer and left for four hours in a pre-heated oven at 37°C. The multi-fibre strip is then assessed for colour staining using the standard Grey Scales.

Tensile (breaking) strength (BS 2576: 1986)

Fabric samples are clamped in the jaws of a tensile tester and pulled apart until they break. Three samples are tested across the warp and three across the weft and the average breaking strength established is expressed in Newtons. BS 2543 states that tensile strength should be as follows for the different grades of intended duty:

Occasional domestic = 300N
Light domestic/General domestic = 350N
Severe domestic/Severe contract = 400N

Tear strength (BS 4303: 1968)

This test measures the force required to continue a tear which has already been started in the fabric. A cut is made in a rectangular sample to form two "tongues" and reference lines are marked to indicate the point the tear is to be continued to. One tongue is then placed in the upper jaw of a tensile tester, the other tongue in the lower jaw, and the

two jaws opened to continue the tear to the reference line. The average tear strength is then calculated.

Again, BS 2543 specifies minimum tear strength for different uses:

Occasional domestic/Light domestic = 15N
General domestic/Severe domestic = 20N
Severe contract = 25N