

Let's Get



Is your fabric “in shape”—fit for the rigors of end use? Can physical testing tell you if it is?

Physical property tests are designed to subject fabrics and sewn products to rigors that are at least as harsh as those they will be exposed to during their useful life. Testing those physical properties and giving them a “work out” can help determine ultimate fabric performance and durability.

“All test methods have limitations,” says Lisa Strachan, business development manager for testing instrumentation supplier James H. Heal & Co. Ltd. “The key is finding the test method that best simulates the real life issues that customers will face.”

Most of the basic physical tests “predict consumers’ satisfaction when the item is worn (or used) and laundered after point of sale,” notes Norma Keyes of Cotton Incorporated. The goal is to eliminate or minimize “catastrophic” failures in the early use life (typically three or five wear/care intervals), she says.

Physical

A large, irregular tear in a red fabric, revealing a white surface underneath. The tear is roughly oval-shaped with frayed edges, and the white surface appears to be a different material or a void in the fabric.

By Maria C. Thiry

Like physical fitness tests for the human body, physical tests for fabric measure strength, flexibility, and endurance:

- **Strength:** tensile, tear
- **Flexibility:** stretch and recover, bending rigidity
- **Endurance:** abrasion, pilling



Universal wear tester. Courtesy Cotton Incorporated. Staff photo/K.O'Toole.

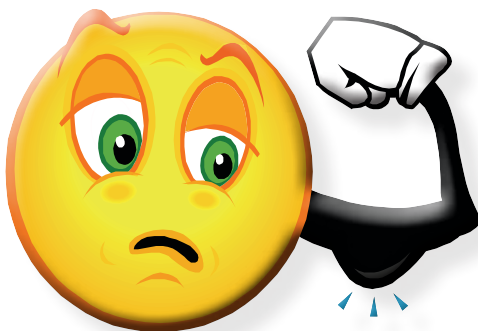
tensile, tear, and pilling test failures can cause the most problems down the line. "If resistance requirements are not met, extensive R&D is needed to improve the fabric while ensuring that the other properties of fabric are not worsened," she says.

Tensile strength and abrasion problems can be "catastrophic failures," agrees Ian Strudwick, technical manager at testing lab Shirley Technologies Ltd. He looks at it from the point of view of manu-

facturing. By "catastrophic" he means that these failures cannot be rectified in garment manufacture. A failure of seam performance may seem just as bad initially. "However," says Strudwick. "Poor seam performance can be improved by careful seam selection."

Yet another point of view, held by Seemanta Mitra, director of business development and technical services for testing lab Intertek, is that end use determines which testing failure will indicate the most problems down the line. Adequate stretch may be vital for a woman's swimsuit, but less important for a blouse.

Knowing which properties to test is only half the battle. Choosing the right test—or the right modifications—is important too.



Problem Areas

Which physical properties are really most important? Jayakumar Gopalakrishnan, AATCC and ASTM consultant, takes the consumer's point of view. "Failures easily discerned by customers...are more important than problems that customers cannot identify," he says.

Vibhavari Bhagwat, national quality assurance manager for testing lab TÜV SÜD, looks at it another way: the worst failures are those that can't be fixed. Tests are meant to identify problems before they reach the customers, but even prior to sale, some are easier to fix than others. Bhagwat says that

Abrasion Tests	
Test	Use
Wyzenbeek	Upholstery
Taber	Pile fabrics, especially corduroy
Martindale abrasion	Apparel fabrics



Cross-training

Not all the tests currently used to measure the physical properties of fabric were originally devised for textiles. “Many of the tests that we conduct on

textiles are based on mechanical tests [for] materials other than textiles [such as for paper],” says Jayakumar.

Especially when new products and materials come along, like Kevlar, notes Adi Chehna, president of Textile Tech Services, existing test methods and equipment may not measure their particular attributes well. “Then we have to modify the testing protocols to measure the properties of the new materials,” says Chehna. “These changes are often triggered by new technology.” For example, Mitra says that most stretch and recovery tests have requirements based on spandex, but today spandex is not the only stretch fiber available, so the stretch and recovery test requirements need to be modified.

Pilling Tests

Relative harshness:



Harshest

Test

Random
Tumble
Pilling

Use

Used for jerseys, T-shirts, other knitted items which are usually subjected to most laundering and harshest wear.
—Mitra



Martindale
Pilling

Best for woven/knitted medium weight fabrics less than 3 mm in thickness wherein the intended end use of the garment involves abrasion in general use, mostly bottom wear and armhole area.
—Bhagwat



ICI Pilling

Gentler to fabric than the random tumble pill tester. For high-quality animal fiber sweaters.
—Roaldi

Least harsh

Existing test methods must be modified all the time, to cope with new technology or to simply improve them. Bhagwat calls for simplification of ASTM D3882 Standard Test Method for Bow and Skew in Woven and Knitted Fabrics. “As it is, it’s difficult to trace the course line for knit structures such as dark-colored (navy, black) pique,” she says.

Mitra says that the random tumble pilling test is too harsh a test, and doesn’t accurately reflect real use and care conditions. “It gives too many false failures,” he says, and urges its modification.

Staff photo/K. O’Toole.

Staff photo/K. O’Toole.

Courtesy SDL Atlas.



New Moves

Sometimes not merely a modification of an existing test, but a brand new test is necessary. Ellen Roaldi, senior global technical consulting specialist for Bureau Veritas, believes the industry needs to define methodology to test children's apparel for safety hazards. "We need consensus on tests with the perspective on safety and not just quality performance," she says. "Right now, the industry has adapted toy standards in this area."

Currently, Keyes says, in ASTM Committee D13 Textiles, a task group is working on new standards for stretch fabrics. Keyes says that originally, tear and stretch properties were developed for fabrics without stretch yarns. "The apparel market has a significant volume of fabrics that have stretch yarns," notes Keyes, so the test-making task group is responding with new standards.

"The need for new test methods is a dynamic process," says Jayakumar, who fears that test-making groups are too slow in their processes to keep up with the fast-paced industry. "Unfortunately, our current

standards development procedure is very long and by the time a method is ready to test a parameter, the product for which such a test was developed is out of vogue," he says. "This has led to retailers developing their own methods. This in turn means test methods most times do not have proper repeatable and reproducible results, which lead to major problems for manufacturers."



Pneumatic burst test. Courtesy Cotton Incorporated. Staff photo/K.O'Toole.

"We should know the pulse of the market and try and develop methods that the market needs," says Jayakumar. "Methods developed by us (test-making bodies) have better accuracy and precision. Speed is key and negative [comments in the balloting process for new test methods] that are not [based on] scientific [deficiencies] need to be resolved as untenable and closed fast."

Strachan agrees, and adds that "the industry has moved faster in the last 20 years, but testing hasn't." Today's cardinal virtue is speed-to-market, and Strachan says that anything that can get test results into the brands' hands quicker is vital. "They need tests that get results quicker," she says. "We've got to come up with new ideas, because otherwise some people may be tempted to cut corners in testing because of time pressures." 



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