

The Committee for Conformity Assessment of Accreditation and Certification on
Functional and Technical Textiles

Specified Requirement of Moisture Transferring & Quick
Drying Textiles

Document Number: FTTS-FA-004

Confidential Level:

Publish Date: 2003/08/29

Revise Date: 2011/08/02

Case Development Unit: Normative Validation Implementation Team

Issuing Seals:

Case Development	Review	Approval
Normative Validation Implementation Group	Convener	Chairman

The Committee for Conformity Assessment of Accreditation and Certification on
Functional and Technical Textiles
Document Version Resume

Specified Requirements of Moisture Transferring & Quick Drying Textiles		Document Number: FTTS-FA-004	
Ver.	Revision reason and content summary	Revise page	Revise date
1.0	Newly issued		
2.0	Revise according to the decision of the Review Committee on 2005/01/27: Add grade labeling mode on tags, grade 5: AAAAA, grade 4: AAAA, grade 3: AAA, grade 2: AA.	7	2005/03/03
3.0	Revise according to the decision of the Review Committee on 2011/08/02		2011/08/02

This Standard is property of "Committee for Conformity Assessment on Accreditation and Certification of Functional and Technical Textiles". Please remain the original meanings and contents when using and respect the intellectual property rights contented therein. The Standard may be amended through the issuance. Please use the current edition.

Specified Requirements of Moisture Transferring & Quick Drying Textile	Document No. FTTS-FA-004																				
	Version: 3.0																				
<p>1. Purpose and Scope</p> <p>This criterion is applicable to evaluate the ability of moisture transferring and quick drying textiles in perspiration (simulated by water) transferring and quick drying.</p> <p>2. Terminology</p> <p>2.1 Moisture Transferring and Quick Drying Textiles: to keep the skin dry and comfortable when wearing, textiles should be able to absorb liquids and moisture, and transfer, evaporate and dry perspiration.</p> <p>2.2 Moisture diffusion ability: diffusion velocity of water droplets on textiles, namely the capability of immediately absorb and transfer liquids and moisture.</p> <p>2.3 Moisture drying ability: drying velocity of textiles after absorption of liquids and moisture.</p> <p>2.4 Textile absorbency speed – dripping method: absorbency velocity results from testing the velocity of textiles absorption of liquids and moisture, by dripping a water droplet on the sample, and evaluating the time needed for no reflection of the water droplet.</p> <p>2.5 Textiles absorbency speed – Byreck method: for testing velocity of water absorbency in textiles, the sample is hung vertically and immersed in a water bath for a specified time interval; water absorption rate of the textile is determined by the height of wicking (mm).</p> <p>3. Classification</p> <p>3.1 The grading for the textiles performance in water diffusion ability</p> <p style="text-align: center;">Table 1. The grading of water diffusion ability</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2" style="text-align: center;">Index of diffusion area in 20 seconds</th> <th rowspan="2" style="text-align: center;">Grade</th> </tr> <tr> <th style="text-align: center;">Knitted</th> <th style="text-align: center;">Woven</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">$X \geq 1500$</td> <td style="text-align: center;">$X \geq 2600$</td> <td style="text-align: center;">5</td> </tr> <tr> <td style="text-align: center;">$1200 \leq X < 1500$</td> <td style="text-align: center;">$2000 \leq X < 2600$</td> <td style="text-align: center;">4</td> </tr> <tr> <td style="text-align: center;">$900 \leq X < 1200$</td> <td style="text-align: center;">$1300 \leq X < 2000$</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">$500 \leq X < 900$</td> <td style="text-align: center;">$400 \leq X < 1300$</td> <td style="text-align: center;">2</td> </tr> <tr> <td style="text-align: center;">$X < 500$</td> <td style="text-align: center;">$X < 400$</td> <td style="text-align: center;">1</td> </tr> </tbody> </table>		Index of diffusion area in 20 seconds		Grade	Knitted	Woven	$X \geq 1500$	$X \geq 2600$	5	$1200 \leq X < 1500$	$2000 \leq X < 2600$	4	$900 \leq X < 1200$	$1300 \leq X < 2000$	3	$500 \leq X < 900$	$400 \leq X < 1300$	2	$X < 500$	$X < 400$	1
Index of diffusion area in 20 seconds		Grade																			
Knitted	Woven																				
$X \geq 1500$	$X \geq 2600$	5																			
$1200 \leq X < 1500$	$2000 \leq X < 2600$	4																			
$900 \leq X < 1200$	$1300 \leq X < 2000$	3																			
$500 \leq X < 900$	$400 \leq X < 1300$	2																			
$X < 500$	$X < 400$	1																			
The Committee for Conformity Assessment of Accreditation and Certification on Functional and Technical Textiles	Revise Date:																				
	Publish Date:																				

This Standard is property of "Committee for Conformity Assessment on Accreditation and Certification of Functional and Technical Textiles". Please remain the original meanings and contents when using and respect the intellectual property rights contented therein. The Standard may be amended through the issuance. Please use the current edition.

Specified Requirements of Moisture Transferring & Quick Drying Textile	Document No. FTTS-FA-004
	Version: 3.0

3.2 The grading for the textiles performance in drying ability

Table 2. The grading of drying ability

Remained water ration at the 40 th minute (%)		Grade
Knitted	Woven	
$X < 13$	$X < 3$	5
$13 \leq X < 26$	$3 \leq X < 10$	4
$26 \leq X < 35$	$10 \leq X < 20$	3
$35 \leq X < 50$	$20 \leq X < 37$	2
$X \geq 50$	$X \geq 37$	1

3.3 The grading for the textiles performance in absorbency speed – dripping method

Recommendation: to meet the performance requirement of moisture transferring and quick drying textiles in absorbency, for knitted fabric the average time for no reflection of water droplet shall not be more than 2 seconds; for woven fabric the average time shall not be more than 5 seconds.

3.4 The grading for textiles performance in absorbency speed – Byreck method

To meet the requirement, both woven and knitted fabrics will have to reach the following standards in both warpwise (wale) and fillingwise (course) wicking heights.

Table 4. The grading of absorbency speed

Wicking height (mm)	Grade
Woven/knitted fabric	
warpwise (wale)/fillingwise (course) direction	
$X \geq 130$	5
$100 \leq X < 130$	4
$80 \leq X < 100$	3
$50 \leq X < 80$	2
$X < 50$	1

The Committee for Conformity Assessment of Accreditation and Certification on Functional and Technical Textiles

Revise Date:

Publish Date:

This Standard is property of "Committee for Conformity Assessment on Accreditation and Certification of Functional and Technical Textiles". Please remain the original meanings and contents when using and respect the intellectual property rights contented therein. The Standard may be amended through the issuance. Please use the current edition.

Specified Requirements of Moisture Transferring & Quick Drying Textile	Document No. FTTS-FA-004
	Version: 3.0
<p>4. Testing Method (Summary)</p> <p>4.1 Testing method for the textiles performance in water diffusion ability</p> <p>4.1.1 Definition: rate of diffusion of water droplets on textile surface, it also represents instant conductivity of water (perspiration) absorbency in textiles.</p> <p>4.1.2 Scope: for textiles that emphasize fast water absorbency and transferring ability, including woven, knitted and non-woven fabrics, with no limitation to color, construction and density. This test is not applicable to terry or pile fabric and heavy-weight fabric.</p> <p>4.1.3 Test conditions: according to CNS 5611, standard conditions shall be in $20\pm 2^{\circ}\text{C}$, $65\pm 2\%$ relative humidity.</p> <p>4.1.4 Sample preparation: according to CNS 12915, section 3.</p> <p>4.1.5 Procedure: place the sample with front side (or absorbing layer for double or multi-layered fabric) up, flatten out without tension and focused by a CCD camera. Drip a 0.2 mL water droplet from 1cm above the surface of sample with a micropipette. Diffusion images of the water droplet are captured by the image analysis system respectively at 5th, 10th, 20th, 30th, 60th and 90th second, and diffusion areas are calculated in mm^2. Repeat the process in five different zones of the sample, calculate the average and draw the diffusion rate curve. Select diffusion area (mm^2) results at the 20th-second as "Diffusion Area Index (DAI)".</p> <p>4.1.6 Report:</p> <ol style="list-style-type: none"> (1) Average diffusion area index (mm^2) (2) Test method: FTTS-FA-004 (3) If necessary, the result shall be indicated as the result of "not washed" or "washed after X-times". Recommended washing number is 5, as per AATCC 135-1995. <p>4.2 Testing method for the textiles performance in drying ability</p> <p>4.2.1 Definition: the drying (or evaporation) rate of textiles wetted by water (perspiration)</p> <p>4.2.2 Scope: for woven, knitted or non-woven textiles emphasizing quick-drying ability when wetted by water (perspiration)</p> <p>4.2.3 Condition: according to CNS 5611, standard conditions shall be in $20\pm 2^{\circ}\text{C}$, $65\pm 2\%$ relative humidity.</p> <p>4.2.4 Sample preparation: according to CNS 12915, section 3.</p> <p>4.2.5 Procedure: sample is cut to 5cm×5cm squares and placed front side up in the weighing plate of a three-decimal precision microbalance (precision 0.001g or above); the computerized system records dry weight as W_f (in gram). Use a micropipette to drip a 0.2 mL water droplet 1cm above the center of the testing square, and record the wet weight as W_o (in grams). Record the changing weight of water, W_i (in grams) with a 1-minute or 10-minute intervals continuously for the length of the test time (100 minutes).</p>	
The Committee for Conformity Assessment of Accreditation and Certification on Functional and Technical Textiles	Revise Date:
	Publish Date:

This Standard is property of "Committee for Conformity Assessment on Accreditation and Certification of Functional and Technical Textiles". Please remain the original meanings and contents when using and respect the intellectual property rights contented therein. The Standard may be amended through the issuance. Please use the current edition.

Specified Requirements of Moisture Transferring & Quick Drying Textile	Document No. FTTS-FA-004
	Version: 3.0
<p>Calculate the “Remained Water Ratio” (RWR) formula, which represents the change of water remaining in the sample through time. Draw the evaporation rate curve from 100% to 0%, and choose the 40th minute RWR as the assessment index for this test.</p> <p>Remained water ratio at the 40th minute (%) = $(W_i - W_f) / (W_o - W_f) \times 100\%$</p> <p>If necessary, the result shall be indicated as the result of “not washed” or “washed after X-times”. Recommended washing number is 5, as per AATCC 135-2010.</p> <p>4.2.6 Report:</p> <p>(1) RWR of the 40th minute (%)</p> <p>(2) Test Method: FTTS-FA-004</p> <p>(3) If necessary, the result shall be indicated as the result of “not washed” or “washed after X-times”. Recommended washing number is 5, as per AATCC 135-2010.</p> <p>4.3 Test method for the textiles performance in absorbency speed – dripping method</p> <p>4.3.1 Definition: absorbency speed is to test the speed with which a fabric can absorb a drop of water, conducted by dripping a water droplet on the sample and estimating the time for no reflection of the water droplet.</p> <p>4.3.2 Scope: for woven, knitted or non-woven textiles which emphasize the moisture transferring and quick-drying ability as wetted by water (perspiration).</p> <p>4.3.3 Condition: according to CNS 5611, the standard conditions shall be in 20±2°C, 65±2% relative humidity.</p> <p>4.3.4 Sample preparation: according to CNS 12915, section 3.</p> <p>4.3.5 Procedure: prepare five 20cm×20cm square samples randomly and mount them on the embroidery hoops. Place the hoop about 1cm below the tip of the burette and drip a 0.04 mL droplet. Record the elapsed time, starting from the droplet falling onto the surface of sample, is gradually absorbed, until the mirror reflection diminished and only a wet spot is left with a stopwatch; record unit up to 0.5 seconds.</p> <p>4.3.6 Report:</p> <p>(1) classification of test</p> <p>(2) tested side of the material</p> <p>(3) individual absorbency speed (seconds) (the time with no light reflection of water droplet on fabric) and average speed (seconds)</p> <p>(4) test method: refer to CNS 13905 (Methods of test for water absorbency of textiles), JIS L 1907-1994 and AATCC 70-2000</p> <p>If necessary, the result shall be indicated as the result of “not washed” or “washed after X-times”. Recommended washing number is 5, as per AATCC 135-2010.</p>	
The Committee for Conformity Assessment of Accreditation and Certification on Functional and Technical Textiles	Revise Date:
	Publish Date:

This Standard is property of “Committee for Conformity Assessment on Accreditation and Certification of Functional and Technical Textiles”. Please remain the original meanings and contents when using and respect the intellectual property rights contented therein. The Standard may be amended through the issuance. Please use the current edition.

Specified Requirements of Moisture Transferring & Quick Drying Textile	Document No. FTTS-FA-004
	Version: 3.0
<p>4.4 Test method for the textiles performance in absorbency speed – Byreck method</p> <p>4.4.1 Definition: for testing velocity of water absorbency in textiles; the sample is hung vertically and immersed in a water bath for a specified time interval; water absorption rate of the textile is determined by the height of wicking (mm).</p> <p>4.4.2 Scope: mainly for all textiles with the exclusion of high absorbency fabrics.</p> <p>4.4.3 Condition: according to CNS 5611, the standard conditions shall be in $20\pm 2^{\circ}\text{C}$, $65\pm 2\%$ relative humidity.</p> <p>4.4.4 Sample preparation: according to CNS 12915, section 3.</p> <p>4.4.5 Procedure: the devices and instruments consist of: water bath (width smaller than the supporting frame of the horizontal bar); supporting frame of horizontal bar (for fixing the horizontal bar that hangs vertically into the water bath); horizontal bar (water proofed, made of materials that allow sample mounting); scales (as specified in CNS 7548). From the samples, take five 200mm×25mm samples parallel to warp and weft, and five samples parallel to wale and course respectively. Mount the samples onto the horizontal bar supported over the water bath (as specified in CNS 9179, the temperature is $20\pm 2^{\circ}\text{C}$. If the water surface is difficult to read, a small amount of water soluble dye can be added). Lower the horizontal bar and adjust it, so the lower ends of the samples are immersed for 10 minutes in the water (depth 0.5cm). Record the wicking height of capillarity up until 1mm.</p> <p>The test result shall be expressed by mean value of the five measurements of the height of water raised in warpwise/wale and fillingwise/course directions respectively, and rounding off to an integer according to CNS 2925.</p> <p>4.4.6 Report: classification of test, name of dye (when water soluble dye is used), water absorbency speed in warpwise/wale and fillingwise/course directions (mm/10min) and the mean value of respective water absorbency speed (mm).</p>	
The Committee for Conformity Assessment of Accreditation and Certification on Functional and Technical Textiles	Revise Date:
	Publish Date:

This Standard is property of "Committee for Conformity Assessment on Accreditation and Certification of Functional and Technical Textiles". Please remain the original meanings and contents when using and respect the intellectual property rights contented therein. The Standard may be amended through the issuance. Please use the current edition.

Specified Requirements of Moisture Transferring & Quick Drying Textile	Document No. FTTS-FA-004
	Version: 3.0

5. Mark

Type (*1)	Diffusion ability	Drying ability	Absorbency speed (Dripping) (*2)	Absorbency speed (Byreck)	Classification
I	5	5	Pass	5	Excellent
II	4	4	Pass	4	Very Good
III	3	3	Pass	3	Good

*1: minimum value is used to determine “type” in each test grade of the same sample group.

*2: average time for no light reflection of water droplet shall be less than 2 seconds for knitted fabric and less than 5 seconds for woven fabric to meet the performance requirement of moisture transferring and quick drying textiles in absorbency speed.

6. References

- | | |
|----------------------|--|
| 6.1 CNS 13905 L 3246 | Method of Test for Absorbency of Textiles-5.1.1 (Dripping)
Method of Test for Absorbency of Textiles-5.1.2 (Byreck) |
| 6.2 JIS L 1907-2010 | Test Methods for Water Absorbency of Textiles-7.1.1 (Dripping)
Test Methods for Water Absorbency of Textiles-7.1.2 (Byreck) |
| 6.3 AATCC 79-2000 | Absorbency of Bleached Textiles |

7. Supplement

This standard has been reviewed by the convener of the Normative Validation Implementation Group, presented to the chairman of the Committee for approval then issuing, to be implemented from announcement day.

Appendix

The Committee for Conformity Assessment of Accreditation and Certification on Functional and Technical Textiles	Revise Date:
	Publish Date:

This Standard is property of “Committee for Conformity Assessment on Accreditation and Certification of Functional and Technical Textiles”. Please remain the original meanings and contents when using and respect the intellectual property rights contented therein. The Standard may be amended through the issuance. Please use the current edition.