

Specified Requirements of Water-Vapor Permeable and Liquid-Water Impermeable Textiles

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Version: 2.0

1. Purpose and Scope

This criterion is used to verify the performance of water-vapor permeable and liquid –water impermeable (breathable and waterproof) textiles in water-vapor permeability, water resistance and general requirement.

2. Terminology

Water-vapor resistance, Ret: the water-vapor pressure difference between the two faces of a material.

3. Classification

3.1 The grading for the textile performance in water-vapor resistance, Ret.

Table 1. The Ret grading.

Water-vapor resistance, Ret ($m^2 \cdot Pa/W$)	Grade	Classification
Water-vapor resistance, Ret < 6	5	Excellent
$6 \leq$ Water-vapor resistance, Ret < 13	4	Very Good
$13 \leq$ Water-vapor resistance, Ret < 27	3	Good
$27 \leq$ Water-vapor resistance, Ret < 40	2	Moderate
$40 \leq$ Water-vapor resistance, Ret < 50	1	Fair

3.2 The grading for the textile performance in water resistance

Table 2. The grading of water resistance.

Water resistance (mmH ₂ O)	Grade	Classification
15000 < water pressure	5	Excellent
$8000 \leq$ water pressure < 15000	4	Very Good
$4000 \leq$ water pressure < 8000	3	Good
$2000 \leq$ water pressure < 4000	2	Moderate
$300 \leq$ water pressure < 2000	1	Fair

3.3 General requirement

Table 3. General requirement for textiles

Testing Item	Requirement	Tested by
Durability of home laundering	Assess the appearance after wash firstly. If no damage occurs, determine the water resistance. Wash times depend on the type	ISO 6330
Flexing Resistance	Assess the damage after 20000 flexes	ISO 7854
Adhesive Strength	Larger than 200 g/cm	ISO 2411

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4. Test method

4.1 Test method for the textile performance in water-vapor resistance

Refer to ISO 11092, the testing condition shall be set at 35°C, 40±3 % relative humidity and air speed to 1 m/s, adjust the hot plate to the temperature of 35°C. Test specimens shall be placed flatly in the hot plate, record the heat flux of hot plate reaching the steady state, calculate the water-vapor resistance of tested specimens.

4.2 Test method for the textile performance in water resistance

Refer to ISO 811, the water shall be distilled or fully deionized water maintained at either 20±2°C or 27±2°C, the rate of increase of water pressure shall be 60±3 cmH₂O/min, record the water pressure at which the water penetrates the fabric at the third place is noted.

4.3 Test method for the textile performance in durability of home laundering

Refer to ISO 6330 procedure 6A, wash by wascator (tumble washer) and dry flat; or choose ISO 6330 procedure 7A alternatively.

4.4 Test method for the textiles performance in flexing resistance

Refer to ISO 7854 method C, cut specimens in size of 22cm×19cm with longer dimension paralleling to the longitudinal and transverse direction of the material respectively. Each test piece shall be sewn into a cylindrical shape 19cm long × 6.4cm inside diameter. Condition the specimens in the -20°C for 24 hours, mount the cylindrical test piece between the two discs. One disc shall be capable of moving at 152 compression strokes per minute; the second disc shall be at the speed of 200 twist insertions per minute. Set the apparatus in motion and stop it after specified number of flexes, assess the flexing damage.

4.5 Test method for the textile performance in adhesive strength

Refer to ISO 2411, take five test specimens cut with the length parallel to the longitudinal and transverse direction respectively. Separate the layers of test specimen 5cm along with its longer dimension. Clamp each side by the jaw of the tensile strength testing machine, separating the layer of specimen in the specified speed to determine the adhesive strength. Where the layer is not sufficiently strong to be stripped, choose the seal of HIPSTER, model no. HP168 or other correspondent with the good adhesive property, bonded with the layer of test specimen by heat to determine the adhesive strength accordingly. When the three-layered material is tested, each combination shall be tested respectively and choose the lower adhesive strength in bonding to be reported.

5. Mark

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Table 4. Type of breathable and waterproof textiles

Type	Ret	Water resistance	Durability	Flexing resistance	Adhesive Strength
I	Above 4	Above 4	10 times washing grade 4 of water resistance	No change	Above 200g/cm
II	Above 2	Above 5	10 times washing grade 4 of water resistance	No change	Above 200g/cm
III	Above 3	Above 3	5 times washing grade 3 of water resistance	No change	Above 200g/cm
IV	Above 2	Above 4	10 times washing grade 3 of water resistance	No change	Above 200g/cm
V	Above 2	Above 2	5 times washing grade 1 of water resistance	No change	Above 200g/cm
VI	Above 2	Above 3	5 time washing grade 2 of water resistance		Above 200g/cm
VII	Above 4	Above 2	5 times washing grade 2 of water resistance		Above 200g/cm

6. Reference

ISO 11092 Textiles -- Physiological effects -- Measurement of thermal and water-vapor resistance under steady-state conditions (sweating guarded-hotplate test)

ISO 811 Textile fabrics -- Determination of resistance to water penetration-hydrostatic pressure test

ISO 6330 Textiles -- Domestic washing and drying procedures for textile testing

ISO 7854 Rubber-/ or plastics-coated fabrics -- Determination of resistance to change by flexing

ISO 2411 Rubber-/ or plastics-coated fabrics -- Determination of coating adhesion

Remark:

Table 5. Suggest end use for different type

Type	Suggest end use
I	Extreme weather cloth
II	Fishing cloth
III	Climbing wear, ski wear
IV	Rain coat(breathable, water proof)
V	Wind jacket, Jacket
VI	Wind jacket, Jacket
VII	Wind jacket, Jacket

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