

**Test Method of Specified Requirements of
Charcoal Contained Filler Fiber Textiles for
Warmth Retention**

FTTS-FA-016 (Version 2.0)

FTTS-FA-016 Charcoal Contained Filler Fiber Textiles for Warmth Retention

1. Scope

This criterion is applicable to the evaluation and testing of products that use charcoal contained filler fiber textiles for warmth retention as a major feature, including various bedding products such as quilts, pillows and quilted bedspreads as well as various clothing products such as quilted jackets and quilted pants.

Remark: The applicant should provide the sample used for the comparison with the testing sample should have the same grade, composition, and weave construction as the testing sample except the charcoal contained filler fiber.

2. Terminology

Charcoal contained filler fiber textiles for warmth retention” refer to the products that claim warmth –retaining effects through the incorporation of Charcoal contained synthetic fibers as fillers, including various bedding products such as quilts, pillows and quilted bedspreads as well as various clothing products such as quilted jackets and quilted pants.

3. Performance specification

Qualified products under this criterion are classified into two types:

3.1 Type A: Charcoal contained filler fiber textiles that meet the qualification requirements (as outlined in Table 1) for Far Infrared Features.

Table 1. Qualification requirements for charcoal contained filler fiber textiles that claim Far Infrared effects

Evaluation	Qualification Requirements
Qualitative Analysis of Charcoal Content	Treat the fiber specimen based on CNS2339 L3050 (Method of Test for Mixing Ration of Fibers Mixtures). Dissolve the synthetic components of the fiber. Collect the insoluble objects and observe them via SEM-EDX or micro-Raman spectroscopy; we shall be able to find the element carbon.

Far Infrared Features	Far Infrared Spectral Emissivity	The stable average emissivity of light waves with the wavelength of 2~22μm is not less than 0.80 as measured by Far Infrared spectrophotometer.
	Temperature-Increasing Feature	Difference in temperature between the test specimen and the control specimen is not less than +2.0°C.
Must meet all requirements outlined above		

3.2 Type A+: Charcoal contained filler fiber textiles that meet the qualification requirements (as outlined in Table2) for Far Infrared Features warmth-retaining features.

Table 2. Qualification requirements for charcoal contained filler fiber textiles that claim Far Infrared effects and warmth-retaining effects

Evaluation		Qualification Requirements
Qualitative Analysis of Charcoal Content		Treat the fiber specimen based on CNS2339 L3050 (Method of Test for Mixing Ration of Fibers Mixtures). Dissolve the synthetic components of the fiber. Collect the insoluble objects and observe them via SEM-EDX or micro-Raman spectroscopy; we shall be able to find the element carbon.
Far Infrared Features	Far Infrared Spectral Emissivity	The stable average emissivity of light waves with the wavelength of 2~22μm is not less than 0.80 as measured by Far Infrared spectrophotometer.
	Temperature-Increasing Feature	Difference in temperature between the test specimen and the control specimen is not less than +2.0°C.
Warmth-retaining Features	Thermograph	Average difference in skin temperature of specific body part while wearing the test specimen as opposed to wearing the control specimen is not less than +0.5°C.
	Monitor Test	
Must meet all requirements outlined above		

Performance specification

Type	Qualification Requirements
A	Charcoal Contained Filler Fiber Textiles Pass The Far Infrared Features Test
A+	Charcoal Contained Filler Fiber Textiles Pass The Far Infrared Features and The Warmth-retaining Features Tests

4. Test method :

The test method of charcoal contained filler fiber textiles and the shape and specification of specimens are as outlined in Table 3 and Table 4.

Table 3. The method for testing charcoal contained filler fiber textiles

Test Item		Measuring Equipment and Method	Remarks
Qualitative Analysis with Carbon		Filter	
		SEM-EDX	
		Micro-Raman Spectroscopy	
Far Infrared Features	Far Infrared Spectral Emissivity	Infrared Spectrophotometer and Blackbody Furnace	Test reports needed to indicate the test temperature
	Temperature-Increasing Feature	45° Parallel irradiation	
Warmth-retaining Features	Skin Temperature	Temperature Recorder	
		Thermal Imager	

Table 4. The shape and specification of specimens

Test Item	Test Specimen
Qualitative Analysis with Carbon	Fiber specimen 20 g
Far Infrared Features	Test specimen (tiled to be opaque) area 5cmx5cm at least
Warmth-retaining Features	Weight error between test specimen and control specimen $\leq \pm 5\%$

4.1 Qualitative analysis with carbon:

4.1.1 Dissolve 20 grams of fiber test specimens at least as CNS 2339 L3050.

4.1.2 Filter dissolved specimens and collect residuum.

4.1.3 Observing residuum with SEM-EDX or micro-Raman spectroscopy (Note 1) to determine whether they contain carbon or not.

(Note 1): Carbon will show the peak on 1580 cm^{-1} in micro-Raman spectroscopy.

4.2 Radiation measurement method

According to FTTS-FA-010 far infrared textiles test method

4.3 Temperature-increasing feature

According to FTTS-FA-010 far infrared textiles test method

4.4 Warmth-retaining features

According to FTTS-FA-010 far infrared textiles test method