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Cotton Module Cover Material Performance

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Developed by the ASABE Cotton Engineering Committee, PM-23/7/3. Approved by the ASABE Power and Machinery Division. Adopted as an ASABE standard August 2012; revised December 2013.

Keywords: Cotton, Exposure, Flexure, Module, Moisture resistance, Performance

1 Scope

1.1 This performance standard applies to materials used to manufacture covers intended to protect cotton modules after harvest from rain and wind exposure during outdoor storage by minimizing the fiber quality damage and fiber loss that can occur under poor storage conditions. Module covers are typically used over multiple harvest seasons where they experience exposure to wind and ultraviolet (UV) radiation (sunlight). Of these two degradation sources, mechanical motion from wind and other sources has been found to be the dominant factor. This standard specifies a minimum ability to maintain water penetration resistance following mechanical flexing.

1.2 Module cover materials may be constructed of natural or man-made fibers, tapes, film (woven or extruded) or combination of fibers that may be coated and have ultraviolet inhibitors added. Although covers will include sections of materials that are connected by seams, reinforcements, and/or have fused intersections and have grommets inserted to tie down or secure the cover onto a cotton module with ropes or cords, this performance standard only applies to the material used to form the top surface of the module cover.

1.3 The physical test requirements for materials used in module covers are those that can predict functional protection and reasonable durability for extended periods of use. The tests are intended to evaluate the degradation of resistance to water penetration after repeated mechanical flexing (similar to wind motion).

1.4 This standard was developed and applies to material covers for rectangular-shaped cotton modules.

2 Referenced Documents

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies unless noted. For undated references, the latest approved edition of the referenced document (including any amendments) applies.

2.1 ANSI/ASAE

S392 Cotton Module Builder and Transporter Standard

2.2 AATCC Standard

AATCC Test Method 20 Fiber Analysis: Qualitative

AATCC Test Method 42 Water Resistance: Impact Penetration Test

2.3 ASTM International Standards

D 3775 Test Method for Warp (End) and Filling (Pick) Count of Woven Fabrics

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D 3776 Test Methods for Mass Per Unit Area (Weight) of Fabric

E 96 Test Methods for Water Vapor Transmission of Materials

F 392 Test Method for Flex Durability of Flexible Barrier Materials

2.4 National Cotton Council: "Just Tarp It: Selecting a Module Cover" brochure, 2004

2.5 Cotton Incorporated: "Seed Cotton Module Handling and Storage," 2010

3 Terminology

3.1 cotton module, n.: a compressed bundle of cotton bolls removed from plants at harvest that form a unit of a specific dimension for storage in fields prior to transportation to a cotton ginning facility.

3.2 cover, n.: *for cotton module,* protective material or combinations of materials sufficient in dimensions and form to protect a cotton module from exposure to rain and wind, and thus minimize fiber and seed quality damage or loss prior to the ginning process.

3.3 cover model, n.: *of a module cover,* a uniquely designed module cover described by a manufacturer, wholesaler or retailer as a marketable product identified by a model designation that is included on the label attached to the cover.

3.4 cover top material, n.: *for a cover model,* the material (film, coated woven, etc.) selected by the manufacturer to form the portion of the cover intended to resist water penetration into the cotton module during precipitation events.

4 Uses and Significance

4.1 This standard specifies minimum physical testing criteria for two levels (acceptable and superior) of performance for module cover materials in providing resistance to moisture penetration. This standard offers manufacturers and distributors of module covers a guideline for the development and selection of candidate materials for use in the cotton industry and is intended to discourage the marketing of covers manufactured with inferior quality material.

4.2 Field exposure trials would be the ultimate test scenario for evaluating the performance of cotton module covers. Different cotton growing regions across the U.S. have different climates, environmental exposures, and practices that cannot be fully covered in one performance specification standard. Laboratory tests that mimic use situations are an accepted practice that allows for comparable materials or products to be evaluated on the same basis.

4.3 Module covers typically are used in field application for a season lasting for weeks or months, and then stored for use again during a subsequent harvest season. Module covers typically are used for two or more seasons, and degradation of the water penetration resistance by ambient exposure can result in loss of cotton fiber and seed quality and associated market value. Therefore, the prediction of satisfactory performance is related to the durability of module covers and the cover top materials from which they are manufactured. Other factors, including storage conditions and handling, can affect the performance of covers. See information in Referenced Document 2.4 for proper care guidelines.

4.4 It should be recognized that materials can be produced with an almost infinite number of combinations of construction variables (types of fibers, percentage of fibers, fabric count per unit distance, and chemicals). The user of module covers may find acceptable products that do not conform to all of the requirements in Section 8. Hence, no single performance specification can possibly apply to all of the various module cover materials that could be utilized for this end use.

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