



Standard Specification for Rubber-Coated Cloth Hospital Sheeting¹

This standard is issued under the fixed designation D 3738; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This specification covers rubber-coated cloth sheeting intended for use in the protection of mattresses on hospital beds.

1.2 The values stated in SI units are to be regarded as the standard.

1.3 The following safety hazards caveat pertains only to the test methods portion, Section 9, of this specification. *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

D 573 Test Method for Rubber—Deterioration in an Air Oven²

D 751 Test Methods for Coated Fabrics³

D 3393 Specification for Coated Fabrics—Waterproofness³

2.2 U.S. Government Document:

Food and Drug Administration, Code of Federal Regulations, Title 21, Part 177 or Part 182⁴

3. Ordering Information

3.1 Orders for rubber-coated cloth sheeting should specify in the contract or purchase order the following information:

3.1.1 Quantity of cloth per finished roll (6.1),

3.1.2 Sample size and frequency for testing (7.1),

3.1.3 Certification (12.1),

3.1.4 Marking necessity (13.1), and

3.1.5 Special packaging (14.1).

4. Materials and Manufacture

4.1 Materials:

¹ This specification is under the jurisdiction of ASTM Committee D11 on Rubber and is the direct responsibility of Subcommittee D11.37 on Coated Fabrics and Rubber Thread.

Current edition approved Sept. 28, 1984. Published December 1984. Originally published as D 3738 – 78. Last previous edition D 3738 – 78.

² *Annual Book of ASTM Standards*, Vol 09.01.

³ *Annual Book of ASTM Standards*, Vol 09.02.

⁴ Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

4.1.1 The base cloth shall be hospital sheeting woven from cotton yarn, synthetic yarn, or a blend of cotton and synthetic yarn.

4.1.2 The coating compound shall be natural rubber, synthetic rubber, or a mixture of natural and synthetic rubbers suitably formulated and colored with a white pigment to meet the requirements of this specification.

4.2 *Manufacture*—The base cloth (4.1.1) shall be coated uniformly on both sides with equal amounts of the coating compound (4.1.2). The coated fabric may be dusted with a talc that does not support mildew growth. The coated cloth shall be vulcanized to meet the physical requirements of Table 1 and the chemical requirements specified in this specification.

5. Chemical Requirements

5.1 *Resistance to Phenol and Isopropyl Alcohol*—Coated cloth shall show no evidence of softening, tackiness, hardening, peeling, or blistering when subjected to a 5 % phenol-water solution and a 70 % isopropyl alcohol-water solution in accordance with 9.7 and 9.8.

5.2 *Steam Sterilization*—Coated cloth shall show no evidence of softening, tackiness, hardening, peeling, or blistering when subjected to steam sterilization in accordance with 9.10.

6. Length of Roll

6.1 Unless otherwise specified in the contract or purchase order, cloth shall be furnished in rolls, 55 m (60 yd) of cloth per roll. The roll shall contain no more than three pieces and no piece shall be less than 5.5 m (6 yd) in length.

7. Workmanship, Finish, and Appearance

7.1 Coated cloth shall not have any of the following defects:

7.1.1 Cuts, tears, or holes (including pinholes).

7.1.1.1 Pinholes shall be detected by holding the 3 m (3 yd) samples (8.1) in front of an illuminated bulb (60 W minimum) while examining the entire area for the defects described in 7.1.

7.1.2 Uncoated areas.

7.1.3 Thinly coated areas.

7.1.4 Separation of cloth from coating.

7.1.5 Cracked coating.

7.1.6 Lumps or blisters.

7.1.7 Color, not white and uniform.

7.1.8 Curled or rolled edges.

TABLE 1 Physical Properties

Characteristic	
Coating thickness:	
min, mm (in.)	0.33 (0.013)
max, mm (in.)	0.46 (0.018)
Breaking strength:	
Warp, N (lbf)	222 (50)
Fill, N (lbf)	222 (50)
Adhesion rubber to cloth, N/m (lbf/in.)	613 (3.5)
Waterproofness test	no leakage

7.1.9 Dirt, spots, or stains.

7.1.10 Offensive odor.

7.1.10.1 Normal aromatic odors usually associated with cured-rubber coatings shall not be classified as offensive. Compounding materials shall be permitted in accordance with Code of Federal Regulations, Title 21, Food and Drug Administration Part 177, indirect food additions, polymers or Part 182—Substances Generally Recognized as Safe (GRAS) and that meet the extraction requirements of Section 77.2600 Rubber Articles Intended for Repeated Use.

8. Sampling

8.1 Unless otherwise specified in the contract or purchase order, the number of rolls from which a 3-m (3-yd) full-width sample is to be selected should be in accordance with Table 2. Test specimens shall be prepared for the various tests from all samples.

9. Test Methods

9.1 *General*—Tests for coated-cloth bedding shall conform to Test Method D 751 whenever applicable.

9.2 *Significance*—The phenol, alcohol, and steam-sterilization tests determine how well-coated rubber cloth resists chemical deterioration and are useful in predicting how the coated cloth will perform in actual service.

9.3 *Coating Thickness*—Determine the coating thickness on the cloth by measuring the thickness of the uncoated base cloth and then the thickness of the coated cloth. The micrometer used to measure the thickness shall have graduations not exceeding 0.02 mm (0.001 in.), and the pressure exerted by the foot on the specimen shall be 22 ± 5 kPa (3.2 ± 0.7 psi). The thickness of the coating shall conform to Table 1.

9.4 *Breaking Force*—Determine the breaking force in accordance with Procedure A of Test Method D 751.

9.5 *Adhesion Test*—Determine the coating adhesion strength in accordance with Test Method D 751.

9.6 *Waterproofness Test*—Test as in Specification D 3393. Flex each specimen five times within 1 min by applying and releasing a pressure of 175 ± 15.0 kPa (25 ± 2 psi). After the fifth flex maintain the pressure at 175 ± 15.0 kPa for 5 min. No leakage shall occur. Leakage shall be defined as the appearance of water at one or more spots in the test area.

TABLE 2 Samples Required

Lot Size, Rolls	Samples Required
10 or less	2
11 to 350	3
351 and over	5

9.7 Phenol Resistance Test:

9.7.1 Cut a specimen 150 mm (6 in.) square from the test sample (7.1), immerse in a 5 % phenol-water solution, and hold for 166 ± 1 h at $23 \pm 2^\circ\text{C}$ ($73.4 \pm 3.6^\circ\text{F}$). Wash the specimen with soap and water and rinse with water. Blot the washed specimen dry with filter paper or other absorbent material prior to the 5 % phenol-solution immersion. The container shall be large enough to allow the liquid to circulate freely. Cover the container tightly to prevent excessive evaporation of the liquid.

9.7.2 At the end of immersion period, remove the specimen from the solution, rinse with water, and dry with a suitable absorbent material. Prior to examining the specimen for evidence of softening, tackiness, hardening, peeling, or blistering, allow the sample to rest for 2 h.

9.8 Alcohol Resistance Test:

9.8.1 Cut a specimen 150 mm (6 in.) square from the test sample (7.1), wash with soap and water, rinse, and dry with a suitable absorbent material, such as filter paper. Place the specimen in a glass container and cover with a 70/30 % isopropyl alcohol-water-solution at $23 \pm 2^\circ\text{C}$ ($73.4 \pm 3.6^\circ\text{F}$) for $22 \pm \frac{1}{4}$ h. Cover the container tightly to prevent evaporation.

9.8.2 At the end of the immersion period, remove the specimen from solution, rinse with water, and dry with a suitable absorbent material. Examine the specimen for any evidence of softening, tackiness, hardening, peeling, or blistering.

9.9 *Accelerated Aging Test*—Cut a specimen 200 by 100 mm (8 by 4 in.) from the test sample (7.1) and place in an air circulating oven that conforms to Test Method D 573 maintained at $70 \pm 1^\circ\text{C}$ ($158 \pm 2^\circ\text{F}$) for seven days. After completion of the aging, the specimen shall not have become stiff, brittle, tacky, or discolored.

9.10 Steam Sterilization Test:

9.10.1 Cut a specimen 300 mm (12 in.) square from the test sample (7.1). Fold the specimen once to give a rectangle 300 by 150 mm (12 by 6 in.) and fold again to give a square 150 mm (6 in.).

9.10.2 Wrap the specimen in four or five layers of cotton gauze or cheesecloth and suspend or place the sample on a perforated shelf in the steam chamber. Admit the steam to the chamber at a rate that will raise the temperature within 5 min to $125 \pm 2^\circ\text{C}$ ($257.8 \pm 3.6^\circ\text{F}$). At this temperature the steam in the chamber shall not contain more than 1 volume of air per 1000 volumes of steam. Start the sterilization period at the time the chamber reaches the required temperature. The specimen shall remain at the required temperature for $20 \pm \frac{1}{2}$ min. At the end of the sterilization period, remove the specimen from chamber and allow to cool for 20 min at room temperature. Repeat the steaming and cooling cycling a total of five times. At the end of the fifth cycle, cool the specimen to room temperature and condition it for not less than 16 h nor more than 96 h. Visually examine the specimen for signs of stiffness, brittleness, tackiness, cracking, or discoloration.

10. Rejection and Rehearing

10.1 Material that fails to conform to the requirements of this specification may be rejected. Rejection should be reported to the producer or supplier promptly and in writing. In case of

dissatisfaction with the results of the test, the producer or supplier may make claim for a rehearing.

11. Certification

11.1 When specified in the purchase order or contract, a producer's or supplier's certification shall be furnished to the purchaser that the material was manufactured, sampled, tested, and inspected in accordance with this specification and has been found to meet the requirements. When specified in the purchase order or contract, a report of the test results shall be furnished.

12. Product Marking

12.1 Unless otherwise specified in the contract or purchase

order, cloth shall be marked on a label or tag with the manufacturer's name or trademark and the dimensions.

13. Packaging

13.1 Unless otherwise specified in the contract or purchase order, the coated cloth shall be protected for shipment and storage in accordance with the manufacturer's standard practice.

14. Keywords

14.1 hospital sheeting; rubber-coated cloth

The American Society for Testing and Materials takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org).