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BUREAU OF STANDARDS

Letter
Circular
LC 143

(Revised to February 1, 1923)

T E X T I L E S

(Official distribution is restricted to public service libraries, technical journals, and experts who cooperate in the work. Others may purchase the publications from the Superintendent of Documents, Government Printing Office, Washington, D.C., at the prices appended.)

Number	Title	Price
T19*	Physical Testing of Cotton Yarns, by W. S. Lewis. April 1, 1913. 31 pp.	
C45*	The Testing of Materials (textiles included). November 1, 1913.	
T57*	Difference in weight between Raw and Clean Wools, by W. S. Lewis, September 28, 1915. 5 pp.	
T68*	Standardization of Automobile Tire Fabric Testing, by W. S. Lewis and C. J. Cleary, March 17, 1916. 18 pp.	
M19	Proceedings of the Second Annual Textile Conference, held at the Bureau of Standards, Washington, May 31-32, 1917. 87 pp.	
T96*	Comparative Tests of Stitches and Seams, by W. S. Lewis. June 25, 1917. 7 pp.	
C41	Testing and Properties of Textile Materials. September 20, 1918, 3d edition. 15 pp.	5¢
T231	Tentative Standard Test Methods and Percentages of Oil and Moisture in Hair Press Cloths, by F. R. McGowan and C. W. Schoffstall. March 10, 1923. 20 pp.	5¢

Hair press cloth is used in the oil-pressing industries in the extraction of the oil from the pulpy matter. Hair fibers are more generally used than others on account of the resiliency required. Since the fabric is bought on a weight basis, the moisture and oil which are added to permit efficient manufacturing become important items. This paper

*Out of print. May be consulted at leading libraries.

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outlines means of ascertaining the various contents. The petroleum ether extraction method is used for obtaining the oil content. The results of testing 27 samples are given. The standard percentages obtained are as follows: Moisture, 11 per cent; oil, 5 per cent; water-soluble material, 2 1/2 per cent.

C149 A Standardized Method of Measuring the Size of Hosiery. February 1, 1924. 5 pp. . . . . 5¢

As a result of cooperation of the National Association of Hosiery and Underwear Manufacturers, methods of measuring the size of hosiery were investigated, and a standard method based on the suggestions of the Bureau of Standards was selected by a committee of manufacturers. Inquiries to a number of manufacturers and users brought out the fact that no large class of them used the same method of measuring. This resulted in a great confusion of marked sizes on hosiery. The standard method described in this paper has been adopted by the manufacturers, and the Government departments through the Federal Specifications Board, and is being introduced to the retailers and consumers.

T253 Standardization of Hosiery Box Dimensions, by Charles W. Schoffstall and E. M. Schenke. March 1, 1924. 13 pp. . . . . 10¢

Hosiery boxes in use at the present time are represented by photographs and a series of graphs which show waste, defects in packing, breakage, etc. A list of the proposed standard dimensions is given for men's, ladies', and children's hosiery boxes. It is estimated that a reduction of 76 to 83 per cent of the number of present sizes will result from the adoption of these standards. A new method of packing men's hosiery is shown. The results to be obtained from the adoption of standard hosiery boxes are discussed.

C169 Methods of Calculating Hosiery Shipping Case Dimensions. August 13, 1924. 37 pp. . . . . 10¢

Methods for calculating the dimensions of the most suitable arrangement of hosiery boxes which will require a minimum surface area of the shipping case, using both the proposed standard inside dimensions of hosiery boxes and boxes of other dimensions, are given. The development of the equations of a minimum surface of a hexahedron for a given volume is shown in the Appendix to be, when

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with sides a, b, and c, where k and c are constants,

$$c = \frac{2k}{k+1}$$

Use is made of this in selecting the most economical case. The minimum areas are grouped and, in addition, the most common sizes are listed for the use of the manufacturer of all styles of hosiery. Considerations for the use of these dimensions are discussed. The saving resulting from the reduction of the surface area in the design of the case is the feature brought out by this paper.

T264 Development of the Standard Numbered Cotton Duck Specification, by Charles W. Schoffstall and Russell T. Fisher. September 26, 1924. 21 pp. . . . . 10¢

This investigation was carried on by the Bureau of Standards in cooperation with the Cotton Duck Association through its technical committee. A study of various samples of numbered duck, ranging for the medium texture from 2/0 to 6, and for the hard texture from 2/0 to 12 was made. The various test methods are shown. For breaking strength, the strip and three types of grab methods were used, 1 by 1 by 3 inches, 1 by 2 by 3 inches, and 1 by 1 by 1 inch. The 1 by 1 by 3 inch grab method was selected for the standard breaking strength method of test. The results are listed in construction and breaking strength tables with various graphs to illustrate the significance of the data. The study of the results shows how the specifications were formulated. There is given the final specification for numbered cotton duck.

T273 Performance Tests of a Liquid Laundry Soap Used With Textile Materials, by F. R. McGowan, F. W. Smither, and C. W. Schoffstall. October 8, 1924. 26 pp. . . 10¢

This study was made to compare the properties of a liquid laundry soap with other washing and scouring agents with respect to shrinkage in weight and dimensions, fading of dye, and changes in construction and feel. Tests were run on various textile materials, including knitted fabrics, wool fabrics, mohair yarns, and wool fleeces. The laundry practice was both mild and severe to cover the range of usual practices in laundry operations. It was found that the liquid laundry soap was superior in each of the tests.

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T266 Measurement of Heat Insulation and Related Properties of Blankets, by P. D. Sale and A. F. Hedrick. December 5, 1924. 17 pp. . . . . 10¢

The principal factors influencing the heat insulating properties of fabrics are discussed. Apparatus is described and methods proposed for the measurement of this and other related properties of blankets, viz., permeability to air and water vapor. Standard test conditions are recommended simulating those to which fabrics are subjected in service. Data illustrative of the several tests made on new blankets, typical of the variety to be obtained in the trade, are presented. The heat-insulating value of blankets is correlated with thickness, weight, and density of the specimens. It is planned to supplement this paper by a following publication, Specifications for Constructing and Operating the Heat Transmission Apparatus, and later by a more thorough analysis of experimental data, only a part of which has been presented herein.

T268 A Study of Silk Waste Used for Cartridge Bag Cloth, with an Appendix on the General Classification of Waste Silk, by F. R. McGowan, Charles W. Schoffstall, and A. A. Mercier. December 4, 1924. . . . . 15¢

A study was made of the waste silk used in the spun silk industry in comparison with the waste silk purchased by the Government for the manufacture of cartridge bag cloth, in order to find if the surplus of this cartridge bag waste silk which remained on hand after the war was of use in connection with the normal textile requirements of the country. It was shown that this cartridge bag waste silk was not suitable for use in the usual spun silk processes of manufacture. Since this necessitated a continuance of the manufacture of this material on a system which combined the cotton and woolen systems of manufacture as was the case during the war, a commercial use adaptable to the normal requirements of the country was extremely desirable. A fabric was woven using this material as a single yarn in the warp direction, unsized, with a wool yarn as the filling. Tests showed the resulting fabric to be suiting material well balanced in regard to wear. The general types of spun silk are given and the system of grading is outlined in the appendix. Figures show the various grades of spun silk and the waste silk used for cartridge bag cloth.

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T269 Specifications for Constructing and Operating Heat-Transmission Apparatus for Testing Heat-Insulating Value of Fabrics, By P. D. Sale. December 16, 1924 13 pp. . . . . 10¢

The information contained in this paper may be useful to those interested in textile testing, or the building of apparatus for this purpose, others contemplating investigational work in this field, and to the general public who desire information as to how such tests can be made.

This paper is really a supplement to Technologic Paper No. 266, which deals with the general problem of Heat Insulating Properties of Fabrics. Detailed specifications for the construction and operation of an apparatus which has proven satisfactory for this type of test is given herein. Electric wiring diagrams are given for the power and measurement circuits. Instructions and precautions for making measurements and for manipulation are illustrated by a sheet of data and a plot of this for a typical run.

T277 Comparative Wearing Qualities of Pima and Ordinary Cotton Used in Mail Bags, by F. R. McGowan, Charles W. Schoffstall, and A. A. Mercier. February 2, 1925. 11 pp. . . . . 10¢

The general characteristics of Pima cotton are discussed, together with the reasons for attempting to find new uses for this type. The purpose of this investigation was to compare mail bags made from Pima cotton with those made from ordinary cotton in the regular catcher-pouch service. The details of the organization used for making the yarn is given. The tests and results are described and discussed. The conclusion from this investigation is that Pima cotton mail bags stand the service wear decidedly better than ordinary cotton bags.

T278 Effect of Twist on the Physical Properties of a Number 7s Yarn, by F. R. McGowan, Charles W. Schoffstall, and A. A. Mercier. February 11, 1925. 11 pp. . . . . 10¢

This investigation was made to determine the most suitable twist for manufacturing the yarn to be used in the Pima post office bag investigation. Data were obtained on the relation of the twist to the breaking strength, diameter of the yarn, yarn count, contraction, and angle of twist. While these data were not sufficiently extensive to attempt to fix definite formula for these relations, it is thought

that the tabular and graphical relation studied in this investigation will be useful for the cotton manufacturer. The most suitable twist for the yarn to be used in the Pima mail bags was found to be about 12 turns per inch.

T280 Reclamation of Gasoline Used in Dry Cleaning, by C. C. Hubbard. March 31, 1925. 13 pp. . . . . 5¢

This paper outlines and discusses briefly the processes that have been used in the dry-cleaning industry for the "purification" and recovery of gasoline from the material that has become dirty in use. Results are reported of experimental studies in the laboratory and in dry-cleaning plants and of large-scale tests in dry-cleaning plants, using activated carbon and an aqueous solution of trisodium phosphate, definite temperature range, settling, and finally decantation of the colorless, recovered solvent. The process also provides for the recovery of the gasoline retained by the sludge.

T282 Technology of Cotton Machinery, Part 1, Calculations on Pickers, by A. A. Mercier. April 2, 1925. 30 pp. 10¢

A study was made of the calculations on cotton pickers which may be applied to similar machines in the industry or to like machines used in experimental or research work. Methods are given for finding (a) the revolutions per minute of pulleys, rolls, and various moving parts; (b) the ratio between surface speeds of rolls; (c) the production resulting from the revolutions of the calender or delivery rolls and weight of lap; and (d) the amount of beating given the cotton. The speed of the beater is used as a basis or starting point when calculating the speed of rolls and fans.

The machines from which the diagrams were taken are of the ordinary commercial type and represent machines put out by two manufacturers of well-known cotton mill machinery. The calculations are put into the form of tables and charts, permitting the formulation of "organizations" with ease and rapidity. The speeds are used in connection with production, the draft with regard to the weight of the lap, and the blows per inch are determined with regard to the amount of cleaning the cotton will receive. The settings of feed rolls and grids to the beater have not been considered in these calculations. The production of the pickers is tabulated

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for beater speeds from 500 to 1,500 revolutions per minute, when using feed pulleys from 5 to 15 inches in diameter and for laps weighing from 5 to 20 ounces per yard. Various drafts, draft constants, and blows per inch are also included in the calculations.

T293 Relative Merits of Cotton and Jute Cement Sacks, by Robert J. Morris. August 7, 1925. 22 pp. . . . . 10¢

This paper contains information concerning the tests made and the apparatus used in determining the relative merits of one type of cotton osnaburg and several types of jute burlap sacks used as containers for Portland cement. A brief description is given of the physical tests made, such as breaking strength, thread count, length, width, stretch, and, of greater importance, the resistance to failure from dropping or rough handling; also of the practical tests made, such as the service test, for which the sacks were put into actual service; the hot-cement test, in which the sacks were filled with hot, freshly ground cement; the humidity test, in which samples were exposed to various atmospheric conditions; and the moisture test, during which the sacks of cement were subjected to excessively damp conditions. The results of all these tests are given in tabular and graphical form. From these data the type of sack with the most serviceability was chosen.

T300 Development of a Standard Bending Test for Rope Yarns, by Charles W. Schoffstall and Robert C. Boyden. December 1, 1925. 10 pp. . . . . 10¢

In considering the properties of cordage the need for physical tests other than those for breaking strength was evident. Accordingly, a study of other methods of test which would more nearly simulate service conditions was undertaken. Apparatus to test the effect of bending a rope yarn was designed and built. The yarn under tension is bent over a cross arm a certain number of oscillations per minute. An auxiliary instrument was designed which would enable the transfer of the specimen from the rope or coil to the clamps of the apparatus without changing the original twist. The variables of the apparatus were studied and a method of test formulated.

SPECIFICATIONS ON TEXTILES

The following specifications for textile materials, or used in connection with textiles, have been promulgated by the Federal Specifications Board. A complete list of all specifications promulgated by the Board may be obtained by addressing the Federal Specifications Board, Bureau of Standards, Washington, D.C.

Copies of these specifications may be obtained free of charge from the Federal Specifications Board until the supply of mimeographed copies is exhausted. The specifications in printed circular form may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D.C., at 5 cents each, with the exception of C283, which is 20 cents.

F.S.B. No.	Bureau Circular No.	Title
28	125	Soap powder
29	126	Salt water soap
31	128	Chip soap
32	129	Ordinary laundry soap
38b	114	Cotton rubber lined fire hose (couplings and gaskets)
40b	--	Gas hose
41	--	Pneumatic hose
42	--	Dredging sleeves
43	--	Air-brake and signal hose and gaskets
44b	--	Divers hose
45	--	Spray hose
46b	--	Tender hose (corrugated)
48b	--	Water and wash deck hose
49b	268	Steam hose
50a	--	Water suction hose (smooth bore)
53	136	Numbered cotton duck
54	--	Asbestos millboard
61	--	Manila rope
81	156	Coal tar saturated rag felt for roofing and waterproofing
92	149	Measuring sizes of hosiery
93	--	Asbestos-copper gaskets, corrugated
94a	243	Asbestos metallic cloth sheet packing
95	--	Asbestos valve stem packing
96a	241	Compressed asbestos sheet packing
97a	242	Asbestos metallic cloth gaskets
99	--	Fabric condenser tube packing
100	--	Fiber packing for lubricating and fuel oil
101a	239	Flax packing
110a	236	Cloth insertion rubber packing

F.S.B. No.	Bureau Circular No.	Title
158	--	Hair felt
159	166	Light weight duck (Army duck, grey)
160	167	Tent duck (special construction for bleaching or dyeing, grey)
167	186	Typewriter ribbons
168	187	Hectograph ribbons
169	188	Computing and recording machine ribbons
185	--	General service bed
186	--	Standard hospital bed
187	--	Surgical bed
188	--	Folding hospital cot
190	--	Liberty steel cot
191	--	Brush, blacking and dauber
192	--	Brush, casting
193	--	Brush, clothes scrubbing
194	--	Brush, cuspidor
195	--	Brush, dauber, long paddle
196	--	Brush, deck scrubbing
197	--	Brush, hand floor scrubbing
198	--	Brush, hair, military
199	--	Brush, radiator dusting
200	--	Brush, shaving
201	--	Brush, sidewalk
202	--	Brush, tooth
203	--	Brush, window
204	--	Broom, rattan push
205	--	Broom, rattan (upright)
206	--	Broom, scrubbing
208	--	Duster, counter
209	191	Battleship linoleum
210	190	Plain, inlaid and printed linoleum
220a	249	Cloth inserted hot water bottle
226a	254	Cloth inserted ring cushions
233a	253	Rubber sheeting
234a	250	Cloth inserted fountain syringe
240	--	Folding canvas cot
245	195	Powdered soap (for laundry use)
246	193	Liquid soap (for laundry use)
251a	255	Cheesecloth for wiping purposes
252a	258	Cheesecloth, unbleached
253a	257	Cheesecloth, bleached or semi-bleached
254a	256	Brown denim (shrunk)
255a	259	Brown denim (unshrunk)
256a	265	Indigo blue denim (shrunk)
257a	266	Indigo blue denim (unshrunk)
258a	270	Mercerized cotton airplane cloth, grade A

F.S.B. No.	Bureau Circular No.	Title
259	261	Colored cotton rags for wiping machinery (sterilized)
260	267	Wiping cloths
261	264	White cotton rags for wiping machinery (sterilized)
262a	262	Cotton waste, white
263a	263	Cotton waste, colored
264a	260	Wool waste, colored
286	197	Indelible marking ink for fabrics
288	--	Cotton, absorbent
289	--	Gauze, plain
294	--	Asphalt-saturated woven cotton fabric for waterproofing
298	--	Bandage, gauze, compressed
299	--	Bandage, plain gauze roller, assorted
300	--	Bandage, plaster of paris
301	272	Brown cotton sheeting
302	278	Brown wide cotton sheeting
303	273	Bleached wide cotton sheetings
304	274	Bleached cotton sheets (medium and high count sheeting)
305	277	Bleached cotton pillow cases
332	--	Whisk brooms
333	--	Corn brooms
344	--	Cheesecloth remnants for wiping purposes
345	293	General specification for textile materials (Methods of physical and chemical tests)
367	--	Window shades, shade cloth, rollers, slats, cords, and accessories
384	283	Stitches and seams

LETTER CIRCULARS

The following letter circulars may be obtained free of charge by addressing the Bureau of Standards, attention of the Textile Section, Washington, D.C.

LC 1 Notes on the Relation of the Crimp of the Filling to the Contraction in Width after Weaving.

LC 143 List of Publications on Textiles

LC 161 Waterproofing Cotton Goods

LC 193 Influence of Sheeting upon the Heat-retaining Properties of Blankets