CHANGE NOTICES ARE NOT CUMULATIVE AND SHALL BE RETAINED UNTIL DIVJ TIME AS THE ENTIRE STANDARD IS REVISED

FED. TEST METHOD STD. NO. 311
CHANGE NOTICE 1
August 27, 1971

FEDERAL TEST METHOD STANDARD

LEATHER, METHODS SAMPLING AND TESTING

The following changes to Fed. Method Std. No. 311, dated January 15, 1969, have been approved by the Commissioner, Federal Supply Service, General Services Administration for the use of all Federal agencies.

1. Delete Section 2 and substitute the attached Section 2.

2. Delete Section 4 and substitute the attached Section 4.

3. Delete methods: 1011, 1021, 3021, 3031, 3121, 6002, and 6621 and substitute the following attached revised methods: 1011.1, 1021.1, 3021.1, 3031.1, 3121.1, 6002.1, and 6621.1.

RETAIN THIS COVER PAGE AND INSERT BEFORE THE SCOPE AND CONTENTS PAGE OF THIS STANDARD

FSC 8300

SECTION 2

INDEX OF TEST METHOD

2.1 Alphabetical Index of Test Methods.

2.2 Numerical Index of Test Methods.

GROUP 1000 -DIMENSIONAL MEASUREMENTS

METHOD NO.	TITLE
1011.1	Thickness, Unit
1021.1	Thickness, Specimen
1111	Area, Unit, Weight Method
1121	Area, Unit, Template Method
1211	Width and Length, Unit
1231	Apparent Density of Leather

GROUP 2000 - STRENGTH TESTS

2021	Breaking Force or Tensile Strength, and Elongation; Dumbbell Strip Method
2031	Breaking Force and Elongation, Grab Method
2051	Bursting Strength, Plunger Method
2111	Tearing Strength, Tongue
2121	Tearing Strength, split
2131	Tearing Strength, Buckle
2141	Tearing Strength, Stitch, Single Hole
2151	Tearing Strength, Stitch, Double Hole
2161	Tearing Strength, Slot Tear
2211	Resistance to Grain Crack, Mullen Test

GROUP 3000 - PERFORMANCE TESTS

METHOD NO.	TITLE
3011	Colorfastness (Resistance to Rubbing), AATCC Crockmeter
3021.1	Staining
3031.1	Colorfastness (Resistance to Rubbing), Precision Crockmeter
3111	Tackiness
31.21.1	Blocking
3202	Finish Stability
3203	Corrosive Effects of Leather
3211	Resistance to Perspiration
3221	Resistance to Perspiration (White Chrome Leather)

GROUP 4000 - MECHANICAL TESTS

4011	Cracking, Vise
4021	cracking, Hand
4111	Piping
4211	Stiffness
4411	Compressibility

GROUP 5000 - BIOLOGICAL TESTS

GROUP 6000 - CHEMICAL TESTS

METHOD NO.	TITLE
6518	Chromic Oxide, Wet Oxidation
6521	Chromic Oxide, Calorimetric Method
6531	Iron and Aluminum Oxides
6541	Magnesium Sulfate (Epsom Salt)
6551	Lead Salts, Presence of
6621.1	pH Value of Leather
6631	Combined Tannin and Degree of Tannage
6711	Paranitrophenol, Calorimetric Method
6811	Gasoline-Water Separation
GROUP 7000 - THERMAL TESTS	
7011	Shrinkage Temperature
7031	Area Stability of Leather
7211	Cracking, Low Temperature
GROUP 8000 - WATER RESISTANCE TESTS	
8011	Permeability, Water Vapor
8021	Dynamic Water Resistance of Leather by the Maeser Water Penetration Tester
8111	Water Absorption, Static Method
8112	Water Absorption, Tumble Method
8121	Water Resistance, with Tap Tester

METHOD NO.	TITLE
8131	Dynamic Water Resistance of Shoe Upper Leather by the Dow Coming Leather Tester
8141	Water Absorption, Insoles
8231	Water Marks on Grain Leather

SECTION 4

SAMPLING FOR INSPECTION

4.1 Scope

4.1.1 This section establishes sampling plans for inspection by attributes of leather and fabricated leather articles. The term "inspection" is used throughout the specification to signify the process of measuring, examining, testing, or otherwise comparing the unit of product. The term "sampling" is used to signify lot-by-lot acceptance sampling. The essential feature is that a product is grouped into lots, each of which is accepted or rejected in its entirety on the basis of the performance of a sample or samples taken from it.

4.2 General sampling procedure.

4.2.1 Formation of lots or batches. Prior to sampling, the product shall be assembled into identifiable lots or batches, or in any such other reamer as may be specified in the applicable procurement document. Each lot or batch (see 3.3.7 of section 3) shall, as far as is practicable, consist of units of product of a single type, grade, class, size, and composition manufactured under essentially the same conditions. Unless otherwise specified in the material specification, the number of units of product comprising a lot shall not exceed the equivalent of 25,000 square feet of leather.

4.2.1.1 The leather in any one lot should be produced:

(a) From units of product of similar size and type.

(b) From functionally equivalent tanning and finishing materials.

(c) From a single production method.

(d) From sequential production batches.

4.2.1.2 Presentation of lots or batches. The formation of the lots or batches, the lot or batch size, and the manner in which each lot or batch is to be presented and identified by the supplier shall be designated or approved by the responsible authority. As necessary, the supplier shall provide adequate and suitable storage space for each lot or batch, equipment needed for proper identification and presentations, and personnel for all handling of product required for drawing of samples.

4.3 Sampling for inspection. The sample required for inspection of the lot shall be taken in accordance with a random process, i.e., a process which gives each item in the lot the same chance of being included in the sample. To this end, the sampling procedure should conform as far as practicable to the following rules:

Rule 1: Units shall be taken from locations scattered throughout the lot to insure that all units for a sample will not be taken from the same portion of the lot, such as a single carton, layer, tier, etc.

Rule 2: Units shall be taken without regard to quality.

4.4 Sampling for examination of visual, dimensional, and tactile characteristics.

4.4.1 Sample size. Uhless otherwise specified in the material specification, the number of units to be taken from a lot for the purpose of visual, dimensional or tactile characteristics examination shall be in accordance with table Ia, Ib, or Ic.

4.4.1.1 Normal inspection. Nomal inspection (table Ia) shall be used at the start of inspection unless otherwise directed by the procuring agency.

4.4.2 Continuation of inspection. Normal, tightened or reduced inspection shall continue unchanged on successive lots except where the switching procedures specified in 4.4.3 require change.

TABLE Ia.

Sampling provisions for normal inspection for examination of visual, dimensional and tactile characteristics of non-fabricated and fabricated leather articles.

Lot size	Sample size	Acceptance number	Rejection number
50 or less	5	0	1
51 to 150	20	1	2
151 to 280	32	2	3
281 to 500	50	3	4
501 to 1200	80	5	6
1201 to 3200	125	7	8
3201 to 10,000	200	10	11
10,001 to 35,000	315	14	15
35,001 and over	500	21	22

TABLE Ib.

Sampling provisions for tightened inspection for examination of visual, dimensional and tactile characteristics of non-fabricated and fabricated leather articles

Lot size	Sample size	Acceptance number	Rejection number
50 or less	8	0	1
51 to 280	32	1	2
281 to 500	50	2	3
501 to 1200	80	3	4
1201 to 3200	125	5	6
3201 to 10,000	200	8	9
10,001 to 35,000	315	12	13
35,001 and over	500	18	19

TABLE Ic.

Sampling provisions for reduced inspection for examination of visual, dimensional and tactile characteristics of non-fabricated arid fabricated leather articles

Lot size	Sample size	Acceptance number	Rejection number
50 or less	2	0	1
51 to 150	8	0	2
151 to 280	13	1	3
281 to 500	20	1	4
501 to 1200	32	2	5
1201 to 3200	50	3	6
3201 to 10,000	80	5	8
10,001 to 35,000	125	7	10
35,001 and over	200	10	13

4.4.3 Switching procedures.

4.4.3.1 Normal to tightened. When normal inspection is in effect, tightened inspection (table Ib) shall be instituted when two out of five consecutive lots have been rejected on original inspection l ., ignoring resubmitted lots for this procedure).

4.4.3.2 Tightened to normal. When tightened inspection is in effect, normal inspection shall be instituted when five consecutive lots have been considered acceptable on original inspection.

4.4.3.3 Normal to reduced. When normal inspection is in effect, reduced inspection (table Ic) shall be instituted when all of the following conditions are satisfied:

a. The preceding 10 lots have been on normal inspection and none have been rejected on original inspection.

b. The total number of defective or defects in the samples from the preceding 10 lots is equal to or less than the following applicable limit:

No. of sample units	Maximum number of defective or defects to qualify for reduced inspection
80 - 199	0
200 - 319	2
320 - 499	4
500 - 799	7
800 - 1249	14
1250 - 1999	24
2000 - 3149	40
3150 - 5000	67

c. Production is at a steady rate.

d. Reduced inspection is considered desirable by the responsible authority.

4.4.3.4 Reduced to normal. When reduced inspection is in effect, normal inspection shall be instituted if any of the following occur on original inspection:

a. A lot is rejected; or

b. A lot iS considered acceptable but exceeds the applicable acceptance number listed in table Ic; or

c. Production becomes irregular or delayed; or

d. Other conditions warrant that normal inspection be instituted.

4.4.4 Rejection of lot on the basis of examination of the sample. A lot should not be tested for physical and chemical characteristics if the number of defective units in the sample equals or exceeds the rejection number. If the number of defective units in the sample is less than the rejection number, the lot should be sampled for physical and chemical characteristics. to detemine its acceptability.

4.5 Sampling for physical and chemical tests. The sample required for testing the lot for physical and chemical characteristics shall be selected from the sample for visual, dimensional, or tactile characteristics. Each item of the sample, regardless of its visual, dimensional, or tactile characteristics, shall be given an equal chance of being included in the sample for testing.

4.5.1 Sampling for testing of nonfabricated leather.

4.5.1.1 Sample size. Unless otherwise specified in the material specification, 15 units of product shall be selected at random from each lot for the purpose of testing. For lots consisting of less than 15 units of product, each unit shall be sampled for test.

4.5.1.2 Location of test area. An 8 by 8 inch (200 by 200 mm) area of the unit of product from which pieces shall. be taken for use in preparing specimens for physical and chemical tests is shown in figure 2. The piece taken from the test area shall be of sufficient size and shape to furnish all the specimens required by the material specification for tests. The specimens for strength tests shall be taken from the 8 by 8 inch (200 by 200 mm) test area as close to point "a" as is practicable. The piece shall be marked to indicate the side that is parallel to the backbone. The size and shape of the specimen for test cut from the piece shall be as specified in the applicable test method or in the material specification. Uhless otherwise specified in the applicable test method or in the detail specification, the specimen for the test shall be cut with the long dimension perpendicular to the backbone.

4.5.1.2.1 Skins. The test area shall correspond to that for cattlehides as shown in figure 2, except that it shall begin at a point 1 inch (25.4mm.) from the backbone line and 3 inches (75 mm.) from the root of the tail. Pieces for test shall be cut from only one side of the backbone of each skin.

4.5.1.2.2 Hides. The test area shall correspond to that shown in figure 2. Pieces for test shall be cut from only one side of the backbone of each hide.

4.5.1.2.3 Sides, crops, backs, and bends. The test area shall correspond to that shown in figure 2. Double bends and belting butts shall be sampled on only one side of the backbone.

4.5.1.2.4 Bellies. The test area shall correspond to area "X" of figure 2. The middle of the area shall be approximately midway between "D" and "E". If physical tests are required, the area may be enlarged to 5 by 7 inches (125 mm. by 175 mm.).

4.5.1.2.5 Double Shoulders. The test area shall correspond to area "Y" of figure 2. The middle of the area shall be approximately midway between "B" and "E". If physical tests are required, the area may be enlarged to 5 by 7 inches (125 mm. by 175 mm.).

4.5.1.2.6 Pieces of bellies and shoulders for testing. When bellies and shoulders are purchased in separate units, pieces for use in chemical tests shall be taken from the areas marked "X" and "Y" respectively in figure 2, and composited as specified in method 6002. When physical tests are required, the "X" and "Y" areas shall be enlarged to 5 by 7 inches (125 mm. by 175 mm.) and specimens for testing taken from that area.

4.6 Sampling for testing of fabricated leather articles.

4.6.1 Sample size. Unless otherwise specified in the detail specification, the number of sample units to be taken from a lot for the purpose of physical and chemical tests shall be in accordance with table II.

TABLE II.

Lot size (units)	Sample size
50 or less	2
51 to 500	3
501 to 3200	5
3201 and over	8

4.6.1.1 Sampling for testing physical characteristics. Unless otherwise specified in the material specification> specimens for each physical property for which requirements are specified shall be taken as described in the applicable test method.

4.6.1.2 Sampling for testing chemical properties. Unless otherwise specified in the material specification or applicable test method, chemical properties for which requirements are specified shall be determined on the composite sample that has been prepared in accordance with method 6002.

4.7 Acceptance of lot.

4.7.1 Unless otherwise specified in the applicable procurement document, a lot shall be considered as meeting the requirements of that document if the following conditions are fulfilled:

(1) After examination of the lot, the number of defective units is less than the applicable rejection number.

(2) The results of physical and chemical test determinations performed-on the sample unit or composite sample satisfy the requirements set forth in the procurement document.

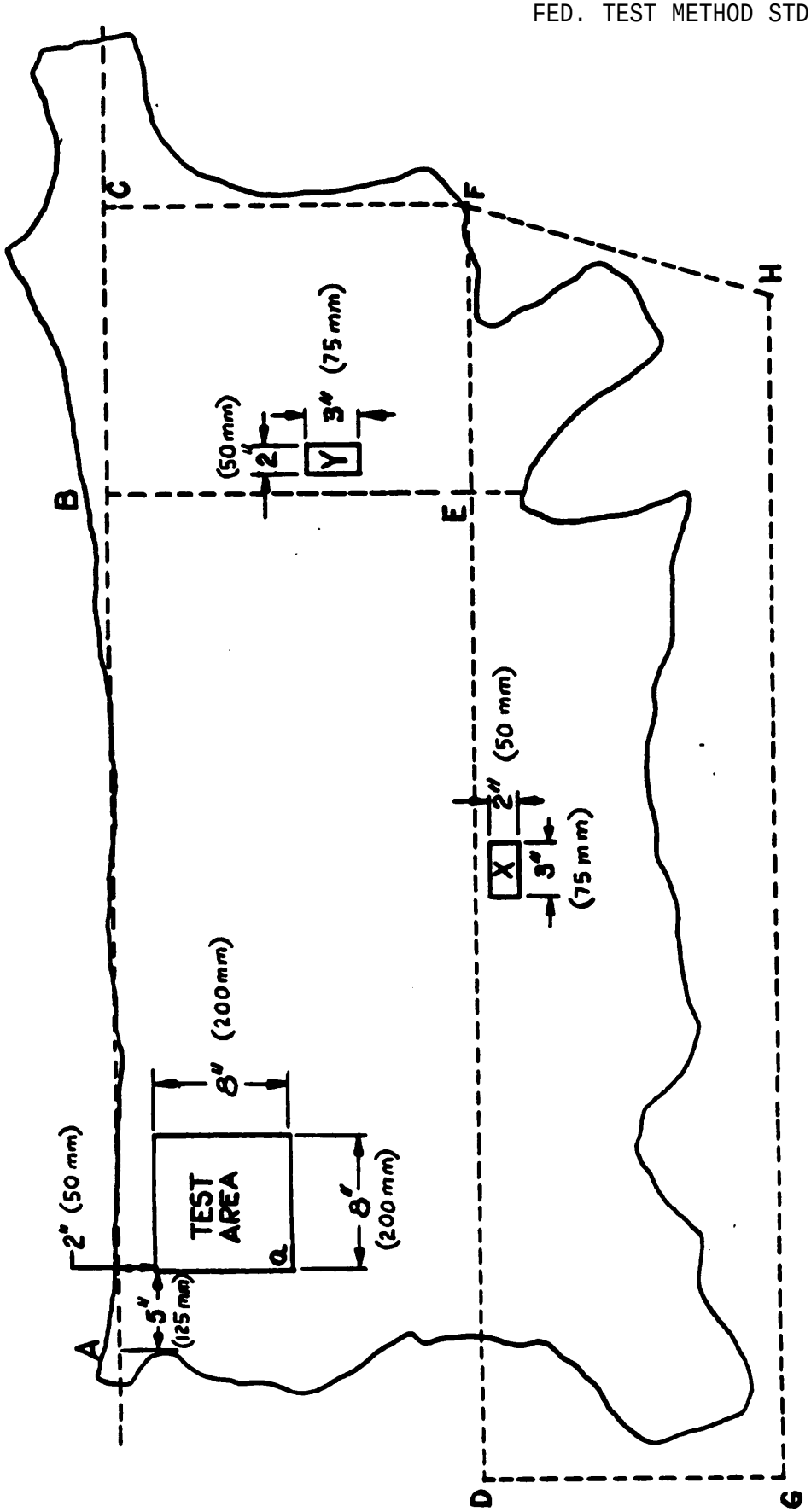

FIGURE 2 - LOCATION OF TEST AREA

FIGURE 2.

THICKNESS, UNIT

1. SCOPE

1.1 This method is intended for determining the thickness of units of leather such as hides, skins, crops, backs, bends, belting butts, belting butt ends, sole leather bends, single shoulders, double shoulders, bellies, side upper leather, cut soles, counters, glove leather, chamois, etc.

2* TEST SPECIMEN

2.1 The test specimen shall consist of a unit of leather.

3. NUMBER OF DETERMINATIONS

3.1 Unless otherwise specified, five measurements shall be made at points equally spaced over the unit.

4. APPARATUS

4.1 Gage, spring-type, graduated in 0.5 mm. or finer on one side and in 0.5 ounce (1/128 inch) on the other side of the needle indicator, having a flat presser foot 10.2 ± 0.6 mmm. diameter. The spring shall exert a force of 454 ± 20 g. on the foot when the gage reads 2 ounces and 907 ± 20 g. when the gage reads 12 ounces (see 7.1).

4.2 Gage, standard wedge-type, having the two legs graduated alternately from 1 to 14 and from 1-1/2 to 13-1/2 irons, inclosing an angle of about 4 degrees and 0.425 ± 0.005 mm. thick, preferably made from stainless steel (see 7.2).

4.3 Gage, one inch (25.4 mm.) micrometer caliper, with ball attachment and graduations in thousandths of an inch (see 7.3).

5. PROCEDURE

5.1 Non-fabricated leather.

5.1.1 Leather other than sole leather.

5.1.1.1 Uhless otherwise specified in the material specification, measurements shall be made with the gage described in 4.1.

5.1.1.2 The portion of the specimen to be measured shall be placed between the anvil and the presser foot of the gage in such a manner that the portion of the specimen to be measured is in contact with the whole area of the anvil. With the specimen held in this position, the thumb lever of the gage shall be compressed so that the gage reads 15 ounces. The lever shall then be released allowing the gage presser foot to snap onto the leather. The thickness shall be estimated to the nearest 0.1 mm. or to the nearest 0.25 ounce. The thickness shall be measured at equally spaced places along and at least 15 cm. from the backbone. The initial measurement on whole hides and sides shall be at a point 13 cm. from the root of the tail, and the final point of measurement shall extend no farther than 13 cm. into the neck area. The initial measurement on calf, kid, goat, and sheep skins shall be at a point 7 cm. from the root of the tail, and the final point of measurement shall extend no farther than 7 cm. into the neck area.

5.1.1.3 If the dimensions are such that the gage will not reach from the edge to the point at which the thickness is desired, the specimen shall be folded upon itself with the flesh inside. The thickness of the folded specimen shall be measured and one half of this measurement shall be taken as the thickness.

5.1.2 Sole leathers.

5.1.2.1 Unless otherwise specified in the material specification, measurements shall be made with the gage described in 4.2.

5.1.2.2 The cut edge of the specimen shall be inserted between the legs of the gage so that the plane of the leather is perpendicular to the plane of the gage and bisects the angle formed by the legs of the gage. The gage shall be pushed over the edge of the specimen far enough to make firm contact with both surfaces of the leather, but not cause any visible deformation of the specimen. The thickness shall be read to the nearest 1/2 iron at the point where the specimen contacts the legs of the gage. The thickness shall be measured as follows:

5.1.2.2.1 Bellies. The specimen shall be gaged at two locations 15 cm. to either side of the point opposite the center of the main width of the belly.

5.1.2.2.2 Shoulders (double). The specimen shall be gaged at two places on the cut edge opposite the neck. Each measurement shall be made at 15 cm-from the backbone.

5.1.2.2.3 Shoulders (single). The specimen shall. be gaged at one place on the cut edge opposite the neck and 15 cm from the backbone line.

5.1.2.2.4 Belting butt bends. The specimen shall be gaged at two places on the cut edge at the shoulder end. Each measurement shall be made at a point 15 cm. from the backbone.

5.1.2.2.5 Bends. The specimen shall be gaged at three places along the backbone starting 30 cm. from the root of the tail and at 15 cm. intervals from that point toward the shoulder end.

5.1.2.2.6 Backs, sides and crops. The specimen shall be gaged in no less than five places along the backbone, starting 30 cm. from the root of the tail and at 15 cm. intervals from that point toward the shoulder end.

5.2 Fabricated leather articles.

5.2.1 General.

5.2.1.1 Unless otherwise specified in the material specification, measurements shall be made with the gage described in 4.1, or if the specimen is rounded, the micrometer gage described in 4.3 shall. be used.

5.2.1.2 Uhless otherwise specified in the material specification, the specimen shall be measured as described in 5.1.1.2, except that measurements shall be made at three places spaced equidistant along the longitudinal center line of the specimen.

5.2.2 cut soles.

5.2.2.1 Unless otherwise specified in the material specification, measurements shall be made with the gage described in 4.2.

5.2.2.2 The smooth edge of the specimen shall be placed between the legs of the gage so that the plane of the leather is perpendicular to the plane of the edge and bisects the angle formed by the legs of the gage. The gage shall be pushed over the edge of the specimen far enough to make firm contact with both surfaces of the leather, but not far enough to cause any visible defamation of the specimen. At the point where the specimen contacts the legs of the gage, the thickness shall be read from the scale to the nearest l/2 iron.

5.2.2.3 Unless otherwise specified in the material specification, measurements shall be made on the toe, inside ball, and outside ball.

6. REPORT

6.1 The thickness of the specimen shall be the average of the results obtained from all measurements made on the specimen. Individual results utilized to obtain the average shall be reported. No individual measurement shall be less than the minimum or greater than the maximum specified.

6.2 The thickness of the specimen as determined in 5.1.1 and 5.2.1 shall be reported to the nearest 0.1 mm. or 0.25 ounce.

6.3 The thickness of the specimen as determined in 5.1.2 and 5.2.2 shall be reported to the nearest 1/2 iron.

7. NOTES

7.1 The gage described in 4.1 may be purchased from the Woburn Machine Co., 201 Main Street, Woburn, Mass. 01801.

7.2 The gage described in 4.2 may be purchased from the USM Corporation, 140 Federal Street, Boston, Mass. O211O.

7.3 The micrometer gage and ball attachment described in 4.3 maybe purchased from the L.S. Starrett Co., Athol, Mass. 01331.

THICKNESS, SPECIMEN

1. SCOPE

1.1 This method is intended for determining the thickness of specimens of leather used for various physical tests.

2. TEST SPECIMEN

2.1 The specimen shall be of the size and shape required in the applicable physical test method.

3. NUMBER OF DETERMINATIONS

3.1 Unless otherwise specified in the detail physical test method, each specimen shall be measured.

4. APPARATUS

4.1 The apparatus shall consist of a micrometer with two dials, the smaller one divided into 10 increments of 1 mm. and the larger one divided into 100 increments of 0.01 mm. each. The micrometer shall have a flat anvil not less than 10 ± 0.5 mm. in diameter and a flat presser foot 10 ± 0.5 mm. in diameter which exerts a force of 393 ± 10 g. (equivalent to 500 g. per cm^2). The surfaces of the anvil and presser foot shall be parallel. The reading shall be expressed in 0.01 mm. units and shall be taken 5 seconds after contact (see 7.1).

5. PROCEDURE

5.1 General. The specimen shall be placed on the anvil of the micrometer and the presser foot lowered gently (not dropped) until it contacts the surface of the leather. The thickness of the specimen shall be read from the dial and the value recorded. Unless otherwise specified in the detail physical test method, 3 measurements, equally spaced over the specimen, shall be made.

5.2 Tensile strength specimen. The procedure shall be as described in

5.1, except that the specimen shall be measured at 3 places along the longitudinal center line of the specimen, at the center and approximately 2.54 cm. on each side of the center.

6. RESULTS

6.1 Unless otherwise stated in the detail physical test method, the thickness of the specimen shall be the average of the measurements made.

6.2 The thickness of the specimen shall be reported to the nearest 0.01 mm., unless otherwise specified.

7. NOTES

7.1 The apparatus described in 4.1 may be purchased from the Frank E. Randall Co., 248 Ash Street, Waltham, Mass. 02154

STAINING

1. SCOPE

1.1 This method is intended for determining whether leather bleeds (exudes coloring matter) in intimate contact, with wet surfaces as indicated by staining produced on wet cloth in contact with the leather.

2. TEST SPECIMEN

2.1 The specimen shall be a square of leather 1 by 1 inch (25 by 25 mm.) cut from the sample unit of leather.

3. NUMBER OF DETERMINATIONS

3.1 Unless otherwise specified in the material specification, one specimen from each sample unit shall be tested.

4. APPARATUS AND MATERIALS

4.1 Apparatus

4.1.1 One or more assemblies consisting of a flat glass or non-absorbent square, same size as transfer pad, and a suitable weight placed on top of the square. The combined weight shall be 62.5 ± 1 g. (An assembly consisting of a plastic or glass plate and a 1 fluid ounce glass jar with plastlc lid, to which the appropriate amount of lead shot or steel balls is added, has been found to be suitable. The plate and jar may be held together by a suitable cement or pressure sensitive adhesive tape).

4.1.2 A flat bottomed heat-resistant plastic container or other similar material with cover (see 7.1) of sufficient size to accommodate a maximum of 15 specimens. A container 1.2 inches (300 mm) long, 9 inches (230 mm) wide and 4 inches (100 mm) high has been found to be suitable.

4.1.3 A forced circulating-air oven capable of maintaining the required temperature of 70 ± 2°C.

4.1.4 Balance, single beam or high speed.

4.2 Materials.

4.2.1 Unless otherwise specified in the material specification, the color transfer cloth shall be a pad of white cloth approximately 5 cm. square, made of 4 layers of desized, bleached, 96 by 100, combed yarn, cotton lawn" cloth The cloth shall contain no bluing or optical bleach. (see 7.2)

5. PROCEDURE

5.1 The leather specimen and the color transfer pad shall be brought to moisture equilibrium in accordance with Standard Atmospheric Conditions (see Section 5). The conditioned pad shall be weighed to the nearest 0.05 g. After weighing, the pad shall be wetted with enough distilled water to double the weight of the conditioned pad. (NOTE: The dry weight of the conditioned pad is usually 1.0 to 1.1 g. and the weight of the wet pad is usually 2.0 to 2.2 g.) If necessary, excess water shall. be removed from the pad in order to attain the proper weight. The wet pad shall be placed on the bottom of the plastic container and the leather specimen shall be placed approximately in the center of the pad. Unless otherwise specified, the grain side of the leather shall be in contact with the pad. The load assembly shall be immediately placed on top of the specimen. Care should be taken to assure the plastic or glass square portion of the load assembly completely covers the specimen and transfer pad . The container shall be covered and placed on a shelf in the circulating-air oven at 70 ± 2°C. The container with specimens shall be left in the oven at 70 ± 2°C for one hour. At the end of the required time, the container shall be taken from the oven. The pad shall be removed and allowed to dry at a temperature of 23 ± 2°C. The stain on the pad shall be rated by matching it with the color on the AATCC Color Transference Chart (see 7.3) that is closest to it in chromaticity and hue. The numerical value on the AATCC chart that is applicable to the matching color shall be recorded. The color matching shall be done in indirect light l The test results shall. be recorded to the nearest whole figure.

6. REPORT

6.1 Staining shall be reported as specified in the material specification or in accordance with paragraph 5.1.

7. NOTES

7.1 A suitable plastic container can be obtained from the regional distributors of the Tri-State Molding Co., Box 337, Henderson, Kentucky 42420.

7.2 Color transfer cloth which meets the requirements of this method may be purchased from Testfabrics, Inc., 55 Van Dam Street, New york, NY 100I3.

7.3 The AATCC Color Transference Chart can be obtained from the AATCC National Headquarters, P. O. Box 12215, Research Triangle Park, N. C. 27709.

COLORFASTNESS (RESISTANCE TO RUBBING), PRECISION CROCKMETER

1. SCOPE

1.1 This method is intended for determining whether or not color may be transferred from the surface of leather to other surfaces by rubbing. Dry and wet pieces of cloth are rubbed against the leather and the resistance to the transfer of color is determined by examining the pieces of cloth for staining. Two methods are provided for evaluating the amount of color transfer.

2. TEST SPECIMEN

2.1 The specimen shall be a disc 76 mm. diameter, although larger specimens may be tested, cut from the unit of leather. One specimen is required for testing with a dry cloth and one for testing with a wet cloth .

3. NUMBER OF DETERMINATIONS

3.1 Unless otherwise specified in the material specification, two specimens from each sample unit shall be tested.

4. APPARATUS AND MATERIALS

4.1 Crockmeter consisting of a table upon which the specimen is placed, a hold down device capable of being locked or held down by the operator after the specimen is placed on the table, and a detachable pressure foot which slides into a chassis (see 7.1).

4.1.1 The pressure foot shall have a neoprene pad 5/8 inch (16.0 mm.) in diameter with a rounded edge, 1/64 inch (0.397 mm.) radius, cemented in a recess in the face of the foot.

4.1.2 The chassis shall be held to the apparatus by means of two moveable parallel levers, each with four stainless steel ball bearings. Uhless otherwise specified in the material specification, the assembled chassis and pressure foot shall bear down on the specimen with a load of 1 pound (453.6 g.).

4.1.3 The chassis shall be connected to an electric motor which makes the pressure foot describe a circle of 1-1/2 inches (38 mm) diameter on the specimen while rotating on its own axis in the opposite direction. After 20 revolutions at a speed of 60 rpm, the pressure foot shall have been rotated one complete revolution.

4.1.4 A counter or signaling device shall be mounted on the apparatus so as to indicate the passing of 20 revolutions of the pressure foot.

4.2 Color transfer cloth.

4.2.1 White. Unless otherwise specified in the material specification, the color transfer cloth shall be a bleached, desized, 96 by 100, combed yarn, cotton lawn cloth cut into 2 inch (51 mm) squares. The cloth shall contain no bluing or optical bleach (see 7.2).

4.3 Distilled water.

4.4 Munsell Neutral Value Scale N2/ to N9.5/ when evaluation by method "C"is specified in the material specification (see 7.3).

4.5 AATCC Color Transference Chart (see 7.4).

5. PROCEDURE

5.1 Uhless otherwise specified in the material specification, the specimen shall be mounted on the table of the testing machine with the finished side up.

5.2 Unless otherwise specified in the material specification, the eval uation of the resistance to crocking shall be by method "C", as described in 5.6.2.

5.3 When a standard or comparison sample of leather is required in the material specification, the evaluation of the resistance to crocking shall be by method "A" as described in 5.6.1.

5.4 Dry test. The specimen shall be mounted flat on the table of the crockmeter and secured with the hold down device. A piece of test cloth shall be mounted on the pressure foot so that it is securely held in place by a rubber ring without forming wrinkles across the face of the pressure foot. The pressure foot with the test cloth shall be lowered onto the specimen. The testing machine shall be set in operation and stopped when the pressure foot has completed 20 complete revolutions. The test cloth shall then be removed and evaluated as specified.

5.5 Wet test. The test cloth shall be wetted with distilled water. The excess water shall be shaken out by hand and the cloth shall be allowed to drain for not more than 5 minutes before using (see 7.5). The moistened cloth shall be mounted over the end of the pressure foot and-the test carried out immediately as specified in 5.4, using a new specimen of leather. At the end of the rubbing operation, the cloth shall be removed and dried in air.

5.6 Evaluation. Staining of the dry and wet cloths shall be considered in rating the resistance to crocking, and the results shall be evaluated by method "A" or "C".

5.6.1 Method "A", standard or comparison sample of leather. The crock cloths from the dry and wet tests on the test specimen shall be compared with the crock cloths from the dry and wet tests of the standard or comparison specimens and evaluated as follows:

Satisfactory - Equal or superior to the standard or comparison specimen in resistance to crocking.

Unsatisfactory - Inferior to standard or comparison specimen in resistance to crocking.

5.6.2 Method "C", Evaluation Scale. The stain on the dry and wet crock cloths shall be rated by matching it with the color on the Munsell Neutral Value Scale or AATCC Color Transference Chart that is closest to it in chromaticity and hue. The numerical value on the Munsell Scale or AATCC Chart that is applicable to the matching color shall be recorded. Intermediate values shall be reported in steps of 0.5.

6. REPORT

6.1 When a standard or comparison sample of leather is specified, the resistance to crocking shall be reported as "pass" (satisfactory) or "fail" (unsatisfactory).

6.2 When the MunselL Value is specified in the material specification, the resistance to crocking shall be reported as the Munsell Value most closely matching the stain on the color transfer cloth.

6.3 The wet and dry crocking resistance of each sample unit shall be reported separately.

7. NOTES

7.1 Crockmeter may be purchased from Milwaukee School of Engineering, Institute of Leather Technology, 432 Kilbourn Ave., Milwaukee, Wisconsin 53202.

7.2 Color transfer cloth which meets the requirements of this method may be purchased from Testfabrics, Inc., 55 Van Dam Street, New York, New York 10013

7.3 The Munsell Neutral Value Scale (Matte Finish) may be purchased from the Munsell Color Company, 2441 North Calvert St., Baltimore, Maryland 21218.

7.4 The Color Transference Chart may be purchased from the AATCC. National Headquarters, P.O. Box 12215, Research Triangle Park, N. Carolina 27709.

7.5 No more than 15 test cloths shall. be wetted at any one time. Any cloth specimens not tested immediately shall be placed in a container preferably over water, tightly sealed and stored in a cool place. Prolonged storage in this manner is not recommended, and in no case should mildewed or moldy cloths be used for testing.

BLOCKING

1. SCOPE

1.1 This method is intended for determining the resistance of leather to blocking under specific conditions of temperature, humidity, and pressure.

2 . TEST SPECIMEN

2.1 The test specimen shall be a rectangle approximately 10 by 2.5 cm. cut from the sample unit of leather.

3. NUMBER OF DETERMINATIONS

3.1 Unless otherwise specified in the material specification, one specimen from each sample unit shall be tested.

4. APPARATUS

4.1 Conditioning container. Museum jar (with lid) hating outside dimensions 16 cm. high, 1.2 cm long and 10 cm. wide or other suitable container having height of 16 cm. and a total volume of approximately 1300 cubic centimeters.

4.1.1 Non-corrosive wire rack that will adequately support a glass rod or rod of other suitable material from which the specimens shall be suspended. The height of the rack shall be not less than 14.5 cm.

4.2 Petri dish, 100 by 15 mm., with cover.

4.3 Weight, 2000 g.

4.4 Forced circulating air oven capable of maintaining the specified temperature.

5. PROCEDURE

5.1 A hole shall be punched in the specimen two millimeters from one end. The specimen shall be suspended in a museum jar or other suitable container

bypassing a piece of wire through the hole so that the bottom of specimen is not lower than 11 cm. from the top of the container. The jar or other container shall be filled with tap water at 23 ± 2°C to a level no higher than 1.5 cm. from the bottom of the hanging specimen. The lid shall be placed on the container and the specimen shall be allowed to condition for 16 ± 1 hours . Nat more than one group of 5 specimens may be suspended on one wire and not more than 3 groups of specimens may be conditioned at one time in the same container.

5.2 After conditioning, the specimen shall be removed from the container and quickly (to preserve conditioning) folded grain to grain to form a 5 by 2.5 cm. rectangle. The folded specimen shall then be placed in an inverted petri dish cover. The bottom of the dish shall then be placed concentrically within the inverted cover so as to cover the specimen evenly.

5.3 A 2000 g. weight shall be placed on top of the dish. The whole assembly shall then be placed in an oven at 80 ± 3°C for two hours and then removed. The dish with weight shall be removed from the assembly and the specimen shall be allowed to cool for 30 minutes.

5.4 The cooled and folded specimen shall be examined by slowly pulling the fold apart by hand. The specimen shall be examined for ease of separation, grain damage, and finish peeling.

6. REPORT

6.1 The resistance of leather to blocking shall be reported as pass or fail. Specimens which separate with ease and which show no grain damage pass the test. Specimens which separate with difficulty, requiring force to separate the fold, and which show finish peeling fail the test.

PREPARATION OF COMPOSITE SAMPLE

1. SCOPE

1.1 This method is intended for use in preparing a representative composite sample of leather in a form suitable for chemical analysis.

2. COMPOSITE SAMPLE

2.1 The composite sample shall consist of approximately equal portions from each sample unit of the sample for test. The areas selected must be free from visual defects such as cuts, scratches 'and other obvious flaws.

2.2 Uncontaminated or unaltered remnants or trimmings from physical test pieces, may be used for chemical analysis (see 5.1). In the case of cut soles, leather scrap obtained when such cutting is done in the presence of a Government inspector may be composite, prepared as described in 4.1, and used as the specimen for chemical analysis.

3. APPARATUS

3.1 The apparatus shall be as follows:

3.1.1 Scissors, knife, or other tool.

3.1.2 Balance. The balance shall be capable of weighing to an accuracy of 1 g.

3.1.3 Wiley mill (or equal).

3.1.4 Sieve. The sieve shall have a 4 mm. size mesh.

3.1.5 Bottle or other container.

4. PROCEDURE

4.1 Each portion from each sample unit shall be weighed on a balance and

adjusted to within 1 g. of each other. All portions taken shall be cut into, pieces approxtitely l/2 inch (13mm.) square, mixed well, and ground in a Wiley mill (or equal) (see 5.2) until all the material has passed through a 4 mm. sieve. The ground material shall be mixed well and stored at room temperature in a dry, tightly stoppered container Specimens for the tests in group 6000 shall be taken from this composite sample.

5. NOTES

5.1 Do not use samples that have been used for tests in groups 3000, 5000, and 8000.

5.2 Utmost care should be utilized in assuring that the mill is thoroughly cleaned prior to use to avoid contamination of the composite sample.

pH VALUE OF LEATHER

1. SCOPE

1.1 This method is intended for determining the pH value of a distilled water extract of all types of leather.

2. TEST SPECIMEN

2.1 The specimen for test shall be 2 to 5 g of leather from the composite sample, method 6002.

3. NUMBER OF DETERMINATIONS

3.1 Unless otherwise specified in the material specification, two specimens from the composite sample shall be tested.

4. APPARATUS, REAGENTS, AND METHODS CITED

4.1 Apparatus.

4.1.1 Potentiometric pH apparatus.

4.1.1.1 The pH meter shall include a glass electrode, a calomel reference electrode, and a potentiometer that will measure electromotive force and indicate pH directly with a precision of 0.1 pH units and a reproducibility of 0.05 pH units.

4.1.2 Glass stoppered Erlenmeyer flasks, 1000 and 250 cc.capacities.

4.2 Reagents.

4.2.1 Water. Distilled water shall. be boiled for 30 minutes to remove carbon dioxide. The flask shall be cooled to room temperature and stoppered. The pH of the carbon-dioxide-free distilled water shall be between 6.2 and 7.0 at 25°C and the residue shall be 0.5 mg. or less when 100 ml. are evaporated and dried in a platinum dish at 100°C.

4.2.2 Standard buffer solutions (see 7.1).

4.2.2.1 Hydrochloric acid potassium chloride buffer (pH 2 at 20°C). Distill concentrated hydrochloric acid cautiously and weigh out 1.2073 g. of the distillate. Dilute with distilled water and add 3.730 g. of potassium chloride. Dilute to 1000 cc.

4.2.2.2 Potassium hydrogen tartrate buffer (PH 3.56 at 25°C). Add 1 g of $KHC_4H_4O_6$ to 100 cc. of distilled water at approximately 30°C; shake vigorously for several minutes; cool to 25°C; decant and filter to remove any suspended salt. Add a crystal (about 0.1 g.) of thymol as preservative.

4.2.2.3 Potassium hydrogen phthalate buffer (pH 4.01 at 25°C). Dissolve 10.21 g. of $KHC_8H_4O_4$ (ACS primary standard) in distilled water and dilute to 1000 cc.

4.2.2.4 Phosphate buffer (pH 6.86 at 25°C). Dissolve 3.40 g. of monobasic potassium phosphate KH_2PO_4 (ACS primary standard) and 3.55 g. of anhydrous disodium hydrogen phosphate Na_2HPO_4 in distilled water and dilute to 1000 cc.

4.2.2.5 Borax buffer (pH 9.18 at 25°C). Dissolve 3.81 g. of sodium tetraborate decahydrate ($Na_2B_4O_7 \cdot 10\ H_2O$) in distilled water and dilute to 1000 cc.

4.2.2.6 Alkaline phosphate buffer (pH 11.72 at 25°C). Dissolve 1.42 g. of anhydrous disodium hydrogen phosphate Na_2HPO_4 in 100 cc. of a 0.1N carbonate-free solution of sodium hydroxide NaOH and dilute to 1000 cc. with distilled water.

4.3 Methods cited.

4.3.1 Method 6002. Preparation of Composite Sample.

5. PROCEDURE

5.1 The specimen weighed to the nearest 0.1 g. shall be transferred to a disintegrator (see 7.2) with 20 times its weight of distilled water added and disintegrated by mixing at high speed for 1 minute. The disintegrated leather shall then be transferred to a 250 cc.e glass stoppered Erlenmeyer flask without rinsing. The flask shall be stoppered and let stand at 23 ± 1°C with occasional agitation for not less than 4 hours nor more than 18 hours. The mixture shall then be transferred to a clean beaker without rinsing.

5.2 Before the pH of the solution is measured, the instrument shall be turned on, allowed to warm up thoroughly, and brought to electric balance in accordance with the manufacturer's instructions. The glass and calomel electrodes and the beaker shall be washed 3 times with distilled water and dried gently with clean absorbent tissue. A fresh liquid junction shall be formed. The temperature dial of the meter shall be adjusted to the proper setting.

5.3 Two standard buffer solutions that range above and below the anticipated pH of the test solution shall. be selected. The electrodes shall be immersed in the first buffer solution (at the same temperature as the test solution), and the meter adjusted to the balance point. The pH shall be read directly from the dial. Successive portions of the buffer shall be taken until the instrument remains in balance within 0.05 pH units.

5.4 The electrodes shall be washed 3 times with distilled water and a fresh liquid junction formed. The electrodes shall be immersed in the second buffer, the instrument adjusted to the new balance point, and the pH read from the dial. The setting of the asymmetry potential knob shall not be changed. Additional portions of the second buffer shall be used until successive readings are in close agreement. The assembly shall be judged to be operating satisfactorily if the readings obtained for the second buffer solution agree with the assigned pH of that buffer within a 0.1 pH unit.

5.5 After the meter has been standardized with the 2 buffer solutions, the electrodes shall be washed 3 times with distilled water, and a new liquid junction formed. The electrodes shall be immersed in the test solution and the pH value obtained directly from the dial.

6. REPORT

6.1 The pH of the specimen shall be the average of the results obtained from the specimens tested, and shall be reported to the nearest 0.05 pH unit. Individual results utilized in obtaining the average shall be reported.

7. NOTES

7.1 Buffer salts prepared in accordance with National Bureau of Standards recommendations are sold by reputable laboratory supply houses and may be used.

7.2 Food and beverage blenders such as Waring, Oster, Hoover and Sunbeam have been found to be satisfactory.

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