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

FED. STD. NO. 148A
December 10, 1964
Change Notice 2
October 25, 1968

FEDERAL STANDARD

CLASSIFICATION, IDENTIFICATION, AND TESTING OF FEATHER FILLING MATERIAL

The following changes in Federal Standard No. 148A dated December 10, 1964, have been approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. Changes and additions:

1.1 Section 2. Paragraphs 2.2.1, 2.2.8, 2.3.1 and 2.3.6 modified.

1.2 Method 1. Requirements for eliminating possible electrostatic buildup included.

1.3 Method 9. Minor changes throughout to improve the test.

1.4 Method 13. Launderability of Feather Filling Material added.

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

FSC 8320

FED. STD. NO. 148a
Section 1
December 10, 1964

FEDERAL STANDARD

CLASSIFICATION, IDENTIFICATION, AND TESTING OF FEATHER FILLING MATERIAL

Authority. *This standard is issued pursuant to the Federal Property and Administration Services Act of 1949, as amended, and its application to the purchase of commodities referred to herein is mandatory on all Federal agencies.*

SECTION 1
SCOPE AND CONTENTS

1. SCOPE

1.1 This standard defines, illustrates, and determines by standard procedure, the attributes of feather filling materials.

2. CONTENTS

2.1 The contents of this standard are as follows:

Section

CLASSIFICATION AND DEFINITIONS

2. CLASSIFICATION; FEATHER FILLING MATERIALS

2.1 Waterfowl feather filling materials.

2.1.1 Waterfowl feathers.

2.1.1.1 Waterfowl down.

2.1.2 Landfowl feather filling materials.

2.1.2.1 Landfowl feathers.

2.2 Definitions and illustrations of attributes of waterfowl feather filling materials.

2.2.1 Waterfowl feathers. The plumage or outgrowth forming the contour and external covering of a goose or duck, or any mixture thereof, consisting of quills and barbs; and which has not been processed in any manner other than by washing, dusting, fractionation chemical treatment and sterilization (see figs. 1, 6, 7, 10, 13, 14, 15).

2.2.1.1 Quill. The major stem of a feather consisting of the quill shaft and the quill point (see fig. 1).

2.2.1.1.1 Quill shaft. The portion of the quill from which the barbs emanate (see fig. 1).

2.2.1.1.2 Quill point. The basal portion of the quill immediately proximal to the barb structure (see figs. 1, 11).

2.2.1.2 Barb. A primary branch emanating from the quill shaft of feathers, plus its barbules, being coarse in structure and appearance when compared with down barbs (see figs. 2, 3, 11).

2.2.1.2.1 Vane. Smooth, relatively solid collection of barbs emanating from the quill shaft (see D, fig. 1).

2.2.1.2.2 Barbule. A branch of the barb plus its nodes and/or prong (see figs. 3, 4, 11).

2.2.1.2.2.1 Node. A protuberance or swelling appearing on barbules (see figs. 4, 5).

2.2.1.2.2.2 Prong. Short spiny outgrowths emanating from barbules (see fig. 5).

2.2.1.2.2.3 Internode. The portion of the barbule between the distal end of one node and the basal end of another (see figs. 4, 5).

2.2.2 Small waterfowl feathers. Whole waterfowl feathers, other than quill feathers, crushed or damaged feathers, which are less than two and one-half inches in length (see fig. 6).

2.2.3 Quill feathers. Wing and tail feathers commonly known and referred to as quills (see fig. 7).

2.2.4 Nestling feathers (pin feathers). A feather not fully developed, having no distinguishable quill, but with relatively short coarse barbs emanating from a sheath (see figs. 8, 10).

2.2.4.1 Sheath. A covering at the basal end of nestling feathers which holds together the feather-like structure emanating from it (see figs 8, 10).

2.2.5 Damaged feathers. Waterfowl feathers which are materially broken, damaged by insects or otherwise injured (see fig. 9).

2.2.6 Plumule. Downy waterfowl plumage with underdeveloped soft and flaccid quill; with barbs indistinguishable from those of down (see fig. 10).

2.2.7 Feather fiber. The barb of feathers which have been completely separated from the quill shaft and any aftershaft, and which are not joined or attached to each other (see fig. 12).

2.2.8 Pure down. The plumage or outgrowth forming the undercoating of waterfowl, consisting of the light fluffy filaments (barbs) growing from one quill point, but without any quill shaft (see figs. 10, 11).

2.2.8.1 Down barbs. Soft filamentous structure emanating from the quill point of the down (see figs. 2, 11).

2.2.8.2 Down fiber. The detached barbs from down and plumules or detached barbs from the basal end of feather quill shafts which are indistinguishable from the barbs of down plumes (see fig. 12).

2.2.9 Non-waterfowl feather fiber. The feathers of any kind of fowl other than goose or duck.

2.2.10 Non-waterfowl feather fiber. The barbs of feathers other than goose or duck which have been completely separated from the quill shaft and any aftershaft, and which are not joined or attached to each other.

2.2.11 Residual matter. Residual matter is defined as quill pith, feather fragments, trash, and foreign matter (see fig. 12).

2.2.12 Secondhand feather filling material. Material which has previously been used in any product or used for any purpose.

2.3 Definitions and illustrations of attributes of landfowl feather filling materials.

2.3.1 Landfowl feathers. The plumage or outgrowth forming the contour and external covering of any breed of domesticated chicken consisting of quill and barbs which have not been processed in any manner other than by washing, dusting, fractionation chemical treatment and sterilization (see figs. 16, 17, 18, 19, 20, 23, 24).

2.3.1.1 Quill. The major stem of a feather consisting of the quill shaft and quill point (see figs. 1, 16, 17).

2.3.1.1.1 Quill shaft. The portion of the quill from which the barbs emanate (see figs. 1, 16, 17).

2.3.1.1.2 Quill point. The basal portion of the quill immediately proximal to the barb structure (see figs. 1, 17).

2.3.1.2 Barb. A primary branch emanating from the quill shaft, plus its barbules, being relatively coarse in structure and appearance. In landfowl feathers the barbs as they immediately emanate from the quill shaft often exhibit a ladder-like-effect. This ladder-like structure is more common to fluff barb type landfowl feathers (see figs. 2, 16, 17).

2.3.1.2.1 Vane. Smooth relatively solid collection of barbs emanation from the quill shaft and located pricipally on the distal end of the quill shaft (see fig. 17).

2.3.1.2.2 Fluff barbs. Relatively soft, fluffy collection of barbs emanating from the basal end of the quill shaft (see fig. 16).

2.3.1.2.3 Barbule. A branch of the barb plus its nodes and/or prongs (see fig. 4).

2.3.1.2.3.1 Node. A protuberance or swelling appearing on barbules (see fig. 4).

2.3.1.2.3.2 Prong. Short spiny outgrowths emanating from barbules.

2.3.1.2.3.3. Internode. The portion of the barbule between the distal end of one node and the basal end of another (see fig. 4).

2.3.2 Small landfowl feathers. Whole landfowl feathers other than quill feathers, crushed or damaged feathers which are less than 2 inches in length (see fig. 19).

2.3.3 Quill feathers. Wing and tail feathers commonly known and referred to as quills (see fig. 20).

2.3.4 Nestling feather (pin feather). A feather not fully developed, having no distinguishable quill, but with short coarse barbs emanating from a sheath (see fig. 8, 18).

2.3.4.1 Sheath. A covering at the basal end of nestling feathers which hold together the feather-like structure emanating from it (see fig. 8, 18).

2.3.5 Aftershaft. A small feather growing from the base of the quill shaft typical of landfowl feathers (see fig. 16).

2.3.6 Damaged feathers. Landfowl feathers other than stripped or crushed, which are materially broken, damaged by insects, or otherwise injured (see fig 22). When crushed or stripped feathers occur in a mixture of whole feathers they shall be classified as damaged feathers.

2.3.7 Stripped feathers. The barbs of feathers stripped from the quill shaft but not separated into feather fiber.

2.3.8 Feather fiber. The barbs of feathers which have been completely separated from the quill shaft and any aftershaft and which are not joined or attached to each other (see fig. 22).

2.3.9 Crushed feathers. Landfowl feathers which have been processed by a crushing, chopping or curling machine which has changed the original form of the feathers without removing the quill (see fig. 21).

2.3.10 Residual matter. Residual matter is defined as quill pith, feather fragments, trash, and foreign matter (see fig. 22).

2.3.11 Turkey feathers. Feathers from any breed of domesticated turkey (see fig. 23).

2.3.12 Secondhand filling material. Material which has previously been used in any product or used for any purpose.

2.4. Definitions of attributes applicable to both classifications of feather filling materials.

2.4.1 Percentage composition. The percentage composition of any mixture of feather filling materials, as specified in material specifications, is the percentage of conditioned weight of the segregated component in relation to the total conditioned weight of the test specimen.

2.4.2 Filling power. Filling power is a measure of the capacity of a unit weight of feather filling material to fill a given volume at a low pressure and is related to the space filling capacity, fluffability, resiliency, and ability of the material to maintain a large volume under low pressure.

2.4.3 Oxygen number. The oxygen number of feather filling materials is a measure of the degree of cleanliness as determined by the amount of oxidizable water soluble and fine suspended matter which is present in a water extract of the materials.

2.4.4 Extractable matter. The extractable matter content of feather filling materials serves as an indication of the amount of natural finish and free foreign extractable matter present. It also serves to indicate the presence of additive finishes such as wax or oil.

2.4.5 Brittleness. The brittleness of feather filling materials serves as an indicator of the resiliency of the materials and their susceptability to fracture or break during use.

2.4.6 Turbidity. The turbidity of feather filling materials serves as a measure of the degree of cleanliness as determined by the amount of fine suspended organic and inorganic material not removed during cleaning operations.

2.5 Definitions applicable to sampling and testing.

2.5.1 General. For the purpose of this standard and all material specifications referred hereto, the following definitions shall apply:

2.5.1.1 Specimen. The fraction or the whole of a sample unit, or a representative sample of material evolved from the identical process as the product.

2.5.1.2 Test. The act of evaluating a given property or characteristic of a single sample unit, by taking one or more measurements according to prescribed procedure.

2.5.1.3 Test result. The result of one or more test determinations on a sample unit in accordance with prescribed testing procedures.

2.5.1.4 Sample unit (for test purposes). The total quantity of material necessary to obtain one test result for each of the properties and characteristics specified in the material specification. In feather filling materials this will usually be specified in grams of materials, randomly selected from the sample unit. Each individual test will consist of a new portion of the sample unit.

2.5.1.5 Reproducibility of test methods.

2.5.1.5.1 Inherent reproducibility. The consistency of repeated evaluation of a property of homogeneous material obtained under controlled conditions by a single operator-equipment combination, expressed as the dispersion of the individual test results about their average. This inherent reproducibility is a standard for the performance of a single operator-equipment combination.

2.5.1.5.2 Over-all reproducibility. The consistency of evaluations of a property of uniform material obtained under controlled conditions by different operator-equipment combinations, expressed as the dispersion of the various test results about the over-all average. This over-all reproducibility, which includes the inherent reproducibility, is a measure of the dependability of the test method.

2.5.1.6 Acceptable quality level (AQL). The largest allowable percentage of sample unit in any lot whose test results fall outside the specification limits.

FILLING POWER

1. SCOPE

1.1 This method is intended for determining the space filling capacity of feathers, feather fibers, feather products, down and mixtures thereof and is determined as the height of a given weight of material under a predetermined load.

2. TEST SPECIMEN

2.1 The specimen shall consist of 22.68 ± 0.05 grams of material prepared as specified in 5.1.

3. NUMBER OF DETERMINATIONS

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

4. APPARATUS (see fig. 1 and fig. 2).

4.1 Cylinder. The cylinder shall be a rigid aluminum tube 12.75 inches ± 0.01 inch inside diameter and 20 to 21 inches in length. The inner wall shall have a finish no rougher than a number 63 finish when measured by the GE surface roughness scale or equivalent. The cylinder shall be set in a vertical position and shall be open at both ends with means of supporting the base end rigidly on a horizontal surface. This horizontal surface shall be capable of being leveled. It is convenient to have the cylinder detachable from the base for facilitating specimen removal. A removable perforated cover with air-blowing unit attached thereto shall be provided for use in retaining the specimen during air fluffing. If a phenolic bonded cylinder is used, the cylinder wall shall be grounded in such a way as to eliminate electrostatic buildup within the cylinder.

4.2 Piston. The piston shall be made of rigid material and shall weigh 118.0 ± 0.5 grams (Balsa wood with a stiff, smooth paper contact surface of expanded rubber has been found satisfactory for this purpose). The piston shall have a diameter of 12.55 ± 0.01 inch with the edge beveled to 1/8 inch. The exact center of the piston shall be well defined for measuring purposes. A device for lowering the piston in a horizontal position shall be provided. This may be accomplished by suitably attaching strings or by other manual or mechanical means. The piston shall be uniformly centered within the cylinder so that it shall not contact the inside surface of the cylinder.

4.3 Measuring device. The device shall consist of a smooth thread, with small plumbs as counter-weights, one of the plumbs serving as the depth indicator. The thread shall run over two pulleys so that one plumb will drop directly on the center of the piston while the other will run along a vertically fixed centimeter scale graduated in units of 0.1 centimeter. The centimeter scale shall be mounted so that the zero position is uppermost and directly adjacent to the lowest point of the depth indicator plumb when the other plumb is touching the center of the piston at the bottom of the cylinder.

4.4 Fluffing device. A fluffing device (air blower assembly, see fig. 2), shall be utilized for thoroughly fluffing or loosening the specimen. The blower shall be so designed that the arms rotate at a speed of 1100 ± 100 revolutions per minute at an air gage pressure of 50 ± 2 pounds.

4.5 Analytical balance. An analytical balance capable of weighing accurately to the nearest 0.01 gram.

4.6 Stop watch.

4.7 Conditioning container.

5. PROCEDURE

5.1 Preparation of specimen. Approximately 85 grams of material shall be fluffed in the filling power apparatus for 2 minutes at 50 ± 2 pounds air gage pressure. The material shall then be exposed under standard atmospheric conditions in the unpacked state in a screened container composed of a solid bottom with screened sides and top for not less than 3 days nor more than 5 days. The material shall be mixed with a rod once a day to insure complete relaxation and conditioning.

5.2 Determination of zero reading. Slowly lower the piston until it rests on the bottom of the empty cylinder. Lower the plumb until it touches the top surface of the piston. The depth is read directly adjacent to the lowest point of the indicator plumb on the centimeter scale to the lowest point of the indicator plumb on the centimeter scale to the nearest 0.1 centimeter. This measurement shall be read to the nearest 0.1 centimeter. This shall be repeated until two consecutive identical readings are obtained. This measurement shall be read to the nearest 0.1 centimeter and shall be considered as "the zero depth (depth of empty cylinder)" and in calculation of results is indicated as "A."

5.3 Fluffing. The test specimen (see 2.1) shall be placed in the cylinder and air blown for approximately 10 seconds at 50 ± 2 pounds air gage pressure to thoroughly mix and fluff the specimen.

5.4 Volume measuring. Immediately after fluffing, the piston shall be slowly lowered onto the material. When there is a definite slackening of the supporting strings, a stopwatch shall be started. The plumb shall be lowered so that at the end of a one-minute interval, it just touches the center of the top surface of the piston. The depth shall be read directly from the centimeter scale to the nearest 0.1 centimeter and shall be considered "volume depth" and in calculation of results is indicated as "B." Each specimen shall be refluffed and measured three times for depth. In event the piston is supported at an angle, the measurement shall be taken from the same point as above.

6. CALCULATION OF RESULTS

Filling capacity = B - A

Where: A = zero depth (depth of empty cylinder).
B = volume depth.

7. REPORT

7.1 The report shall be based on the volume at the designated time pressure level. The distance between inside surface of the bottom of the cylinder and the bottom surface of the piston shall be reported. This shall be obtained by subtracting the zero reading obtained in 5.2 from the depth obtained in 5.4. A measure of the height of the material under the piston shall be considered its filling power.

7.2 The filling power of the sample unit shall be the average of the results obtained from the specimens tested and shall be reported to the nearest 0.1 centimeter.

NOTE. The following is a source for an aluminum cylinder which will meet these requirements.

Rotodyne Manufacturing Corp.
Building 12
Brooklyn Navy Yard 11205
ATTN: Mr. Maurice Wertheim

DETERMINATION OF CHROMIC OXIDE OF FEATHER FILLING MATERIALS

1. SCOPE

1.1 This method is intended for use in quantitatively determining the chromic oxide content of treated feather filling material.

2. TEST SPECIMEN

2.1 The specimen shall consist of note less than 5 grams of feather filling material.

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 REAGENTS

4.1 Apparatus.

4.1.1 Analytical balance.

4.1.2 Scissors.

4.1.3 Iodine flask.

4.1.4 Muffle furnace.

4.1.5 Porcelain curcible.

4.1.6 Watchglass.

4.1.7 Burette.

4.1.8 Circulating air oven.

4.2 Reagents.

4.2.1 Perchloric acid, 60-72 percent.

4.2.2 Potassium iodide solution (10 grams potassium iodide dissolved in distilled water and diluted to 100 milliliters).

4.2.3 Sodium thiosulfate, 0.1N solution (dissolved 25 grams of $Na_2S_2O_3 \cdot 5H_2O$ in distilled water, add 0.1 gram of Na_2CO_3 and dilute to 1 liter).

4.2.4 Starch indicator solution (make a paste of one gram of soluble starch in about 10 milliliters of water, add 90 milliliters of water and boil for one minute with stirring, cool and add one drop of chloroform).

4.2.5 Phosphoric acid, 40 percent (add 45 milliliters of 85 percent phosphoric acid to 55 milliliters distilled water).

4.2.6 Sulphuric acid (specific gravity 1.83).

4.2.7 Nitric acid (specific gravity 1.42).

5. PROCEDURE

5.1 Preparation of test specimen. Approximately 28 grams of material from the sample unit for testing shall be cut into 1/16 inch pieces. Not less than 5.0 grams from the test sample shall be transferred to a tared weighing container and the specimen dried in a forced circulating air oven to a constant weight at $105^{\circ} \pm 5^{\circ}C$. The weight of the tared porcelain crucible shall be subtracted from the constant weight value obtained from the container and specimen and the difference recorded as "W."

5.1.1 Weighings. All weighings shall be determined to the nearest 0.001 gram.

5.2 The weighed specimen shall be placed in a cold muffle furnace or pre-carbonzied over a burner prior to placing in a hot furnace. The temperature of the furnace shall gradually be raised to 950°± 50°C. and maintained at this temperature for 60 minutes. Remove the crucible and contents, cool in a desiccator and weigh. Replace in the furnace at 950°± 50°C. for 30 minutes and repeat the cooling and weighing procedure until a constant weight is obtained, (± 0.01 gram). If it is difficult to obtain a constant weight, the residue shall be leached with hot distilled water and filtered through an ashless filter paper. The filter paper shall be placed in the crucible and ashed. The filtrate shall be added to the crucible and evaporated. The crucible shall then be put back in the muffle furnace and heated, cooled and weighed as above until a constant weight (± 0.01 gram) has been obtained.

5.3 The crucible containing the ash shall be placed sidewise in a 400 milliliter beaker and 15 milliliters of sulphuric acid (specific gravity 1.83), 4 milliliters of nitric acid (specific gravity 1.42), and 10 milliliters of 60-72 percent perchloric acid added in order. (Caution: Perchloric acid should never be used without the accompanying use of sulphuric and nitric acids. Improper use of concentrated perchloric acid can lead to violent and serious explosions!) The crucible shall be tipped so that the reagents are in contact with the ash. The beaker shall be covered with a watchglass, the contents heated to white fumes (approximately 190°C.) and the heating continued until the solution turns a clear red-orange color. Heat an additional two minutes to insure complete oxidation of chromium. During the heating, any particles adhering to the beaker that are not washed down with condensed acid shall be washed down with additional sulphuric acid. The total amount of acid should not exceed 60 milliliters. If the reation becomes too vigorous, remove heat until reaction subsides and then continue heating.

5.4 If a green color persists after 5 minutes of white fumes, the solution should be discarded and the determination started over. The same porcelain crucible should not be used more than 5 times or less if porcelain shows evidence of being attacked. Caution: Do not evaporate to dryness.

5.5 The solution shall be cooled to room temperature and transferred to a 500 milliliter Iodine flask. Distilled water shall be added to make a volume of about 100 milliliters and the solution boiled until all chlorine is removed, as indicated by a negative test when starch-iodide paper is held in the vapors. Do not let the volume go below 75 milliliters. The solution shall be cooled and made up to 100 milliliters with distilled water at room temperature. Thirty (30) milliliters of 40 percent phosphoric acid (to complex iron) and 10 milliliters of 10 percent potassium iodide solution shall be added. The flask shall be stoppered, shaken by hand and allowed to stand in the dark for 2 minutes with about 10 milliliters of distilled water in the funnel section to retain escaping iodine fumes. After 2 minutes, the stopper shall be removed allowing the distilled water to enter the flask. The solution shall then be titrated with 0.1N sodium thiosulphate solution, using starch indicator near the end of the titration. The number of milliliters of standard thiosulphate solution required shall be recorded as "A."

6. CALCULATION OF RESULTS

6.1 The chromic oxide in the specimen shall be calculated as follows:

$$\text{Chromic Oxide } (Cr_2O_3) \text{ percent} = \frac{A \times N \times 0.02533}{W} \times 100$$

Where: A is the number of milliliters of standard thiosulfate solution required to titrate the specimen.
N is the normality of the thiosulfate solution.
W is the weight of specimen, grams.

7. REPORT

7.1 The chromic oxide in specimen shall be the average of the results obtained and shall be reported to the nearest 0.1 percent. Individual test results utilized in obtaining the average shall be reported.

LAUNDERABILITY OF FEATHER FILLING MATERIAL

1. SCOPE

1.1 This method is intended for determining the launderability of feather filling materials.

2. TEST SPECIMEN

2.1 The specimen shall be a 17 x 6 inch cotton balloon cloth bag (see 5.1) containing 1 ounce of feather filling material.

3. *NUMBER OF DETERMINATIONS*

3.1 The number of cycles of laundering (see 5.3), the specific evaluations and number of determinations for each criteria shall be as specified in the applicable procurement document.

4. APPARATUS: REAGENTS

4.1 Apparatus.

4.1.1 Wash Wheel. A cylindrical wash wheel of the reversing type shall be used. The wheel (cage) shall be 20 to 24 inches diameter and 20 to 24 inches inside length. There shall be three fins each approximately three inches wide extending the full length of the inside of the wheel. One fin shall be located every 120 degrees around the inside diameter of the wheel. The wash wheel shall rotate at a speed of 30 $\pm$ 4 revolutions per minute and shall reverse a minimum of 3 times per minute. The water inlets shall be large enough to permit filling the wheel to an 8 inch level in less than 2 minutes and the outlet shall be large enough to permit *discharge of the same amount of water in less than 2 minutes.* The wash wheel shall be equipped with a pipe for injecting live steam that shall be capable of raising the temperature of water at an 8 inch level from 100° to 140°F. in less than 2 minutes. The water shall be thermostatically controlled to maintain the required temperature specified in 5.2.

4.1.1.1 The wash wheel shall be equipped with a thermometer or other equivalent equipment for determining the temperature of the water during the washing and rinsing procedures, and with an outside water gage.

4.1.2 Preheating tank or other device. A preheating device to supply water in quantity within $\pm$ 4°F. of the required temperature (5.2).

4.1.3 Extractor. A centrifugal extractor with a perforated basket, approximately 11 inches deep by 17 inches in diameter, with an operating speed of approximately 1500 revolutions per minute.

4.1.4 Drier. A drier of the rotary, tumble type having a cylindrical basket approximately 36 inches in diameter and 24 inches in length rotating at 35 $\pm$ revolutions per minute. The drier shall be capable of maintaining a minimum stack temperature of 120°F. during the entire drying cycle of the standard load. The stack temperature shall be measured 20 $\pm$ 2 inches from the exhaust opening of the drier.

4.1.5 Measuring device. Scale or balance capable of measuring accurately to 0.5 gram.

4.2 Reagents.

4.2.1 Synthetic detergent. Meeting the requirements of MIL-D-43362, Detergent, Laundry (Anionic - A Standard for Testing).

4.2.2 Sour. Meeting the requirements of P-S-683, Sour, Laundry (Fluroidated), type I, (mixture of sodium silicofluoride and sodium acid fluoride).

4.2.3 Water of not over 50 parts per million hardness.

5. PROCEDURE

5.1 Preparation of specimen. The one ounce specimen of feathers shall be sewn in a 17 x 6 inch cotton balloon cloth bag conforming to MIL-C-332, type I, class 2, care shall be taken in constructing the bag to insure that seams are tight and strong to prevent against loss of feather material.

5.2 Feathers laundering procedure. Water of not over 50 parts per million hardness at a required temperature (within ± 4°F.) shall be introduced into the wash wheel to the designated level. The schedule of table I shall be followed. At the end of each operation, the machine shall be stopped, drained without removing the load, and refilled to the required level before starting again. At the beginning of the fifth operation, water shall be admitted into the wash wheel to a level of 8 inches, the laundry sour added in the quantity required, and the machine run 4 minutes before stopping and draining. After laundering, the specimen shall be extracted for 5 minutes and then dried in the tumble drier (4.1.4) at a stack temperature of 130°F.-180°F. for 30-45 minutes.

TABLE I

Operation	Composition	(Inches) Water Level	(°F.) Temperature	Time (Minutes)
1. Suds	Synthetic Detergent (25 grams)	7	100	5
2. Suds	Synthetic Detergent (15 grams)	7	100	5
3. Rinse		8	100	3
4. Rinse		8	100	3
5. Rinse	Sour (24 grams)	8	100	$\frac{4}{20}$

5.3 Laundering cycles. When the requirements in the end item specification require more than one laundering, the complete cycle of washing, extraction and drying shall be performed the number of times specified.

5.4 Pressing.

5.4.1 Unless otherwise specified in the material specification, the specimens shall not be moistened or pressed.

5.5 Evaluation of feather filling material. The criteria employed in evaluating the feather filling material shall be as specified in the applicable end item specification.

6. REPORT

6.1 Launderability of feather filling materials. The reporting of results in the evaluation of launderability of feather filling material shall be as specified in the applicable procurement document.

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