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Master
Specification
No. 184

DEPARTMENT OF COMMERCE
BUREAU OF STANDARDS
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UNITED STATES GOVERNMENT MASTER SPECIFICATION FOR LACE LEATHER

FEDERAL SPECIFICATIONS BOARD SPECIFICATION No. 184

This specification was officially promulgated by the Federal Specifications Board on June 30, 1924, for the use of the Departments and Independent Establishments of the Government in the purchase of lace leather.

CONTENTS

43779°—25

I. TYPES

This specification covers lace leather in the form of cut laces and whole sides. Three types of tannage are included: (*a*) Alum tanned, (*b*) Indian tanned, and (*c*) chrome tanned.

II. MATERIAL AND WORKMANSHIP

1. Hides.—Shall be brined or green salted cattle hides.

2. Tannage.—Shall be alum, Indian (alum struck with gambier), or chrome.

III. GENERAL REQUIREMENTS

1. Definition of Side.—A side shall mean a full half hide with the forehead trimmed off at the eye; tail not more than 2 inches long; shanks trimmed off at the knees, and snout cut off.

2. Selection.—The leather, either in cut laces or sides, shall be free from cuts, brands, open holes, deep scratches, or other defects which impair its serviceability or materially affect its cutting value.

3. Finish.—Shall be full grain, shall not be split, and shall be free from loose flesh.

4. Cutting of the Laces.—Shall be lengthwise of the hide.

IV. DETAIL REQUIREMENTS

1. Thickness.—Shall follow, in general, the natural hide variations. Shall not exceed the maximum given in Table 1 for cut laces and 0.125 inch for sides.

2. Area of Sides.—Shall be between 14 and 20 square feet.

3. Widths of Laces.—Shall be as given in Table 1. Shall be uniform and not less than specified.

4. Length of Laces.—Shall be approximately as given in Table 1.

5. Tensile Strength of Laces.—Shall be not less than given in Table 1. Test laces from sides shall meet the requirements given in Table 1 for one-half-inch laces.

Table 1.—*Widths, lengths, thicknesses, and tensile strengths for cut laces*

Width (in inch)	Approximate length	Maximum thickness	Tensile strength
	Feet	*Inch*	*Pounds*
¼	5	0.100	65
5/16	5	.100	95
⅜	6	.100	125
7/16	6	.100	155
½	6	.125	170
5/8	7	.125	205
¾	7	.125	230
⅞	7	.125	280
1	7	.125	350

6. Stretch.—Shall not exceed 20 per cent.

7. Crackiness.—The grain shall not crack.

8. Degree of Chrome Tannage.—The leather shall meet the boiling test for chrome-tanned lace leather.

9. Chemical Requirements.—Shall be in accordance with the requirements in Table 2.

Table 2.—*Chemical requirements (moisture-free bases)*

Tannage	Constituent	Minimum	Maximum
		Per cent	*Per cent*
All	Grease (petroleum ether extract)	20	33
Alum and Indian	Ash		6
	Aluminum oxide		3
Chrome	Chromic oxide		6

V. METHODS OF INSPECTION AND TESTS

1. Inspection to Determine Compliance with Specification.—Shall be at point of manufacture when practicable, but the right is reserved to inspect at point of delivery, in which case material, if rejected, shall be removed by the contractor at his own expense.

2. Sampling.—(*a*) *Cut Laces.*—Cut laces for test purposes shall be taken at random from each width inspected as follows: Three for lots of less than 500 feet, 5 for lots of between 500 and 1,500 feet, 9 for lots between 1,500 and 3,000 feet, and 12 for lots of 3,000 feet and over.

(*b*) *Sides.*—When purchased in the form of sides, two laces for test purpose, one-half inch in width, shall be cut, in the presence of the inspector, from along the back from one of every five sides, one-half to 1 inch from the edge of the side.

3. Tensile Strength.—The test for tensile strength shall be made on the full length of the lace either in a tension machine or by the dead-weight method. Same material to be saved and used for chemical analysis.

4. Stretch.—Parallel gauge marks, 3 feet apart, shall be marked on the sample. When a load equal to one-half the strength required in Table 1 for the width being tested has been applied the distance between the marks shall be measured immediately and the percentage stretch calculated.

5. Crackiness.—Shall be determined by bending and creasing the leather, grain side out, into the sharpest single fold possible by hand.

6. Boiling Test.—Sample of chrome tanned lace leather shall be boiled in water for five minutes, after which time it shall show no evidence of curling. When removed and dried it shall not show evidence of shrinking.

7. Moisture.—Dry 10 g of leather for 16 hours at a temperature between 95 to 100° C.

8. Grease (Petroleum Ether Extract).—Extract 5 to 10 g of air-dry leather in a Soxhlet or other suitable apparatus until free from grease, using petroleum ether boiling below 80° C. Evaporate off ether and dry to approximately constant weight.

9. Ash.—Incinerate 5 g of leather in muffle furnace at 600° C. Cool in desiccator and weigh. If furnace is not available, carbonize sample, add hot water and pulverize, filter through an ashless filter paper, ignite filter and residue, add filtrate, evaporate to dryness and ignite at low heat. Cool and weigh.

10. Aluminum Oxide.—Mix residue from ash determination with approximately 4 g of equal parts of potassium carbonate and sodium carbonate in a platinum crucible and fuse for 30 minutes. Dissolve the cooled fusion in hot water and enough dilute HCl to make solution acid. If solution is not clear, filter and ash filter and residue in platinum crucible, treat with 1 g of fusion mixture, in same manner as above, adding second solution to the first. Add ammonium chloride in the proportion of 5 g to 200 cc of the solution or an equivalent amount of HCl, add a few drops of methyl red (0.2 per cent alcoholic solution) and heat just to boiling. Carefully add dilute ammonium hydroxide dropwise until the color of the solution changes to a distinct yellow. Boil the solution for one or two minutes and filter at once. Wash the precipitate thoroughly with hot 2 per cent ammonium chloride or nitrate solution. Dissolve the precipitate with hot dilute HCl, add ammonium chloride and reprecipitate. Ignite in a platinum crucible and after the carbon is all burned off blast for five minutes, cover the crucible and place it in a desiccator until cool. Weigh covered as rapidly as possible.

11. Chromic Oxide.—Ash 3 g of leather. Mix the ash well with 4 g of a mixture of equal parts of sodium carbonate, potassium carbonate, and powdered borax glass and fuse for 30 minutes. Dissolve the cooled fusion in hot water with enough HCl to make the solution acid. Filter. If there is any residue on the filter, ash it and treat the ash with 1 g of the fusion mixture in the same manner as the original ash, adding the solution to the first. Make up to 500 cc. To 100 cc of this solution in an Erlenmeyer flask add 5 cc HCl and determine Cr_2O_3 as follows:

Add 10 cc of a 10 per cent solution of potassium iodide. After one minute run in from a burette 0.1 *N* sodium thiosulphate until the iodine color has nearly disappeared; then add a few cubic centimeters of starch solution (1 g per liter) and titrate to the disappearance of the blue. One cc of 0.1 *N* thiosulphate is equivalent to 0.002533 g. Cr_2O_3.

VI. PACKING AND MARKING

1. Packing.—Cut laces shall be packed in bundles containing 100 linear feet. Sides shall be packed in accordance with commercial practice unless otherwise specified in the request for bids.

2. Marking.—Each bundle of laces shall be marked with the name of the contractor, name of material, width, and contract, order, requisition, or schedule number. Each bundle of sides shall be marked in the same manner and, in addition, each side shall be marked to show its area in square feet.

VII. ADDITIONAL INFORMATION

1. Request for Bids.—Shall specify the type of lace desired, the width and number of linear feet required in the case of cut laces, and the number of square feet required in the case of sides.

2. Shipping.—Shall be in accordance with the instructions of the purchaser.

VIII. GENERAL SPECIFICATIONS

No details specified.

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