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**U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE**

SPECIFICATION

CHAPS, CHAINSAW

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers the requirements for nylon covered, aramid chainsaw chaps.

1.2 Classification. The chaps shall be of one type in the following sizes, as specified (see 6.2).

Size 32 - 32 inches long

Size 36 - 36 inches long

Size 40 - 40 inches long

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those in effect on the date of the invitation for bids or request for proposal.

SPECIFICATIONS

FEDERAL

A-A-55301 - Webbing, Textile, Bulked Nylon

V-T-295 - Thread, Nylon

DDD-L-20 - Label: For Clothing, Equipage and Tentage (General Use)

MILITARY

MIL-W-4088 - Webbing, Textile, Woven Nylon

MIL-T-5038 - Tape, Textile and Webbing, Textile, Reinforcing, Nylon

MIL-F-10884 - Fasteners, Snap

Beneficial comments (recommendations, additions, deletions) and any pertinent data that may be used in improving this document should be addressed to: USDA Forest Service, Missoula Technology and Development Center, Building 1, Fort Missoula, Missoula, MT 59804-7294 by using the Specification Comment Sheet at the end of this document or by letter.

FSC 8415

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USDA FOREST SERVICE

5100-86 - Cloth, Duck, Nylon (Polyurethane Coated)

STANDARDS

FEDERAL

FED-STD-123 - Marking for Shipment (Civil Agencies)

FED-STD-191 - Textile Testing Methods

FED-STD-376 - Preferred Metric Units for General Use By the Federal Government

MILITARY

NASM27980 - Fasteners, Snap, Style 2

(Unless otherwise indicated, copies of federal and military specifications and standards are available from the Defense Automated Printing Service, Building 4D, 700 Robbins Ave., Philadelphia, PA 19111-5094.)

2.1.2 Other Government documents. The following other Government documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues shall be those in effect on the date of the solicitation.

DRAWINGS

USDA FOREST SERVICE

MTDC-823 - Chaps, Chainsaw, Construction Details

MTDC-824 - Chaps, Chainsaw, Patterns

(Copies of Forest Service drawings are available from the preparing activity (6.9).)

LAWS AND REGULATIONS

Rules and Regulations Under the Textile Fiber Products Identification Act

(Copies are available from the Federal Trade Commission, Pennsylvania Ave. at Sixth St. N.W., Washington, DC 20402-9328.)

2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those in effect on the date of the invitation for bids or request for proposals.

AMERICAN SOCIETY FOR QUALITY CONTROL (ASQC)

ANSI/ASQC Z1.4 - Sampling Procedures and Tables for Inspection By Attributes

(Copies are available from the American Society for Quality Control, 611 East Wisconsin Ave., Milwaukee, WI 53202.)

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AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- D 1974 - Standard Practice for Methods of Closing, Sealing, and Reinforcing Fiberboard Shipping Containers
- D 3786 - Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics—Diaphragm Bursting Strength Tester Method
- D 3787 - Bursting Strength of Knitted Goods - Ball Burst Test
- D 3951 - Standard Practice for Commercial Packaging
- D 5118 - Standard Practice for Fabrication of Fiberboard Shipping Boxes
- D 6193 - Standard Practice for Stitches and Seams

(Copies are available from ASTM, 100 Barr Harbor Dr., West Conshohocken, PA 19428-2959.)

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC., AGENT

National Motor Freight Classification

(Copies are available from the American Trucking Associations, Inc., 2200 Mill Rd., Alexandria, VA 22314.)

(Non-Government standards and other publications normally are available from the organizations that prepare and distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. Unless otherwise specified (see 6.2), samples shall be subjected to first article inspection (see 6.3) in accordance with 4.3.

3.2 Materials and components. Materials and components shall be as specified herein and in the referenced drawings, MTDC-823 and MTDC-824.

3.2.1 Woven aramid cloth.

3.2.1.1 Fiber. The fiber shall be an approved high modulus (greater than 800 grams per denier) aramid fiber. The fiber shall be virgin.

3.2.1.2 Yarn. The warp and filling yarns shall be continuous filament, 1140 denier (nominal).

3.2.1.3 Color. The color of the aramid cloth shall be natural as produced from the fiber provided by the manufacturer. No bleach or color modifier shall be used.

3.2.1.4 Physical requirements. The physical requirements of the finished cloth shall be as specified in table I when tested as specified in 4.5.1.

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Table I. Physical requirements for woven aramid cloth.

Characteristics	Requirements	
	Min.	Max.
Weight (oz per square yard)	4.8	5.2
Yarns per inch		
Warp	16	
Fill	16	
Breaking strength (pounds)		
Warp	578	
Fill	578	
Thickness (inch)	0.009	0.011

3.2.1.5 Weave. The weave shall be crowfoot (see 6.5).

3.2.1.6 Finish. The finish shall be scoured or unscoured.

3.2.1.7 Fiber identification. The woven aramid cloth shall be labeled, ticketed, or invoiced for fiber content in accordance with the Rules and Regulations Under the Textile Fibers Products Identification Act.

3.2.2 Needled aramid felt cloth. The fiber shall be an approved aramid fiber needled for compactness and cohesion (see 6.4). The aramid fiber shall be virgin staple, natural color, nominal 1.5 denier precision cut 1-1/2, 2, or 3 inches in length. The finished cloth shall be made of fiber only, with no added resins or materials. The physical requirements of the needled aramid felt cloth shall be as specified in table II when tested as specified in 4.5.1.

Table II. Physical requirements for needled aramid felt cloth.

Characteristics	Requirements	
	Min.	Max.
Weight (oz per square yard)	3.15	3.85
Breaking strength (pounds)		
Warp	15	
Fill	30	
Thickness (inch)	0.009	0.011
Bursting strength (lb.) (1/)		
Diaphragm	120	
Ball	200	

1/ Two requirements are cited, the contractor may meet either one.

3.2.2.1 Fiber identification. The needled aramid felt cloth shall be labeled, ticketed, or invoiced for fiber content in accordance with the Rules and Regulations Under the Textile Fibers Products Identification Act.

3.2.3 Cloth, inner and outer shell. The nylon cloth shall conform to Type II of 5100-86. The color shall be dark green to match the standard shade sample (see 6.6).

3.2.4 Nylon webbing.

3.2.4.1 1-15/16 inch. The 1-15/16 inch webbing shall conform to type XXIV, class 2 of MIL-W-4088. The color shall be black.

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3.2.4.2 1-inch. The 1-inch webbing shall conform to type III or type III alternate of A-A-55301. The color shall be black.

3.2.5 3/4 inch binding tape. The 3/4 inch binding tape shall conform to type III of MIL-T-5038. The color shall be black.

3.2.6 Thread, nylon. The thread shall conform to type II, class A of V-T-295. Thread for all stitching shall be size F, except that size E is optional for bartacking. The color for all thread shall be black.

3.2.7 Plastic buckles. The plastic buckles shall be black acetal plastic. Where more than one source is listed, the mating components making up a single item shall be manufactured by the same company to ensure compatibility of the components (see 6.5).

3.2.7.1 Buckles, 1 and 2 inch. The 1 inch buckle shall conform to ITW Waterbury Side Release Buckle, part no. 101-0100; National Molding Corp. Mojave Side Squeeze Buckle, part nos. 5000/5001 (male/female); or American Cord & Webbing part no. BSR-1 inch. The 2 inch buckle shall conform to ITW Waterbury Side Release Buckle, part no. 101-0200; National Molding Corp. Lock Monster Buckle, part nos. 5433/5431 (male/female); or American Cord & Webbing part no. BSR-2 inch.

3.2.8 Snap fastener. The snap fastener shall conform to style 2, 24 line, size 1, and Number 2 finish of MIL-F-10884. The button shall be MS-27980-1B, the socket shall be MS-27980-6B, the stud shall be MS-27980-7B, and the eyelet shall be MS-27980-8B.

3.2.9 Labels.

3.2.9.1 Identification and cleaning label. The combination identification and cleaning label shall be a sewn-on coated cloth label conforming to type VI, class 14 of DDD-L-20 except the size of inscription characters shall be a minimum of 18 point (approximately 1/4 inch). The contents shall dictate label size and shall be as follows:

CHAPS, CHAINSAW

NSN [...]^{1/}

USFS SPEC. 6170-4F

CONTRACT NO. [...]^{1/}

[Manufacturer's name]^{1/}

DATE OF MANUFACTURE: [mm/yy]^{1/}

CLEANING

DIRT - LET DRY; REMOVE WITH STIFF BRISTLE BRUSH.

**LIGHT OIL - BRUSH WITH WARM WATER DETERGENT SOLUTION;
RINSE THEN DRY.**

**HEAVY OIL - DEGREASE WITH PERCHLOROETHYLENE; BRUSH
WITH SPRAY CLEANERS OR DETERGENT AND WATER;
RINSE THEN DRY.**

DO NOT BLEACH!

^{1/} The contractor shall insert the applicable information indicated.

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3.2.9.2 Label margins. All labels shall be provided with a 1/4 ±1/16 inch blank margin on all four sides for sewing purposes.

3.2.9.3 Date of manufacture. The date of manufacture shall be the month and year the item is manufactured (see 3.4) in a mm/yy format.

3.2.10 User brochure. A copy of Inspecting and Repairing Your Chain Saw Chaps shall be inserted into the packaging of each pair of chain saw chaps (see 5.2 and 6.6). The brochure shall be printed on 8-1/2 by 11 inch sheets of white, 60 pound offset paper stock and folded as into a six-panel brochure. Printing shall be with black ink. All half tone photographs shall be reproduced in 100 line screen ruling or better. A camera-ready copy of this brochure will be provided to the contractor by the preparing activity (see 6.9) upon request.

3.3 Construction. The construction shall conform in all respects to the referenced drawings, MTDC-823 and MTDC-824 (2.1.2) and as specified herein.

3.3.1 Stitches, seams, and stitchings. All stitching, except bartacking, shall conform to type 301 of ASTM D 6193, 6 to 8 stitches per inch.

3.3.1.1 Type 301 stitching. Ends of stitching shall be backstitched or overstitched not less than 1 inch (1/2 inch for box-x) except where ends are turned under or caught in other seams or stitching. Thread tensions shall be maintained so there will be no loose stitching resulting in loose bobbin or top thread or excessively tight stitching resulting in puckering of the materials sewn. The lock shall be imbedded in the materials sewn.

3.3.1.1.1 Repairs of type 301 stitching. Repairs of type 301 stitching shall be as follows (when making the following repairs, the ends of the stitching are not required to be backstitched):

- a. When thread breaks or bobbin runouts occur during stitching, except presewing, the stitching shall be repaired by restarting the stitching a minimum of 1 inch (1/2 inch for box-x) back of the end of the stitching.
- b. Except for prestitching, thread breaks or two or more consecutive skipped or runoff stitches noted during inspection of the item (inprocess or end item) shall be repaired by overstitching. The stitching shall start a minimum of 1 inch in back of the defective area (1/2 inch on box-x), continue over the defective area to a minimum of 1 inch into existing stitching. Loose or excessively tight stitching shall be repaired by removing the defective stitching, without damaging the materials, and restitching in the required manner.

3.3.1.2 Bartacking. Bartacking shall be free from thread breaks and loose stitching. Unless otherwise specified, bartacks shall be as follows:

<u>Length</u>	<u>Width</u>	<u>Tolerances</u>		<u>Stitches Per Bartack</u>
		<u>Length</u>	<u>Width</u>	
3/4 inch	1/8 inch	±1/16 inch	±1/32 inch	42

3.3.1.3 Automatic stitching. Automatic machines may be used to perform any of the stitch patterns provided the requirements for the stitch pattern, stitches per inch, and size and type of thread are met; and at least three or more tying, overlapping, or backstitches are used to secure the ends of the stitching.

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3.3.1.4 Thread ends. All thread ends shall be trimmed to 1/4 inch maximum length.

3.3.1.5 Lubrication of thread. There shall be no lubrication of the thread by any means, before or during sewing (see 4.3.2).

3.3.1.6 Stitching margins. Unless otherwise specified, all stitching margins shall be 1/8 inch.

3.3.2 Pad construction. During chap construction there shall be no sewing, tacking, or fastening of cloth layers allowed other than the stitching shown on drawing MTDC-823 (see 4.3.2).

3.3.3 Setting of snap fasteners. A hole shall be prepunched to receive the button and eyelet components of the snap fasteners. The hole shall be smaller than the outside diameter of the button and eyelet barrels so that the barrel must be forced through the hole. The hole shall not be punched in the setting operations with the button or eyelet barrels. The fasteners shall be securely clinched without cutting the adjacent materials and no more than three splits shall occur in the button or eyelet barrels.

3.3.4 Fusing ends of webbing and tape. All ends of nylon webbing and binding tape shall be fused before assembly for stitching. The apparatus used to fuse webbing and binding tape ends shall provide enough heat to create a smooth edge and with the cut ends of all webbing and binding tape yarns fused together.

3.3.5 Location marks. Location marks may be drilled, providing the drill diameter does not exceed 0.076 inch (see 4.3.3). All drill holes shall be covered on the finished item. Printed markings shall not be more than 1/32 inch in width.

3.3.6 Repairs. Repairs such as mends, darns, patches, or splices are not permitted on the chaps.

3.3.7 Piecing. No piecing or splicing shall be allowed on the chaps.

3.3.8 Replacement of defective components. During the spreading, cutting, and manufacturing process, components having material defects or damages that are classified as defects in 4.3.4.1 and 4.3.4.2 shall be removed from production and replaced with nondefective and properly matched components.

3.3.9 Coated cloth surface. The coated side of the cloth shall face the inside of the completed chaps.

3.4 Markings. The letters "FSS", the numbers for the size, and the month and year of manufacture (see 3.2.9.3) shall be silk-screened with a black marking medium in accordance with type IV, class 9 of DDD-L-20. The month and year of manufacture markings shall be located on the back of the right leg positioned as the "FSS" is positioned on the front of the right leg. Unless otherwise specified, the letters and numbers in these markings shall be 2 inches high and 1 inch wide. Fastness of the class 9 markings shall be as specified for the class 5 markings. The color of the cloth components shall not be visible under the markings.

3.5 Dimensions. All dimensions except pattern sizes are finished dimensions, unless otherwise specified.

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3.6 Patterns. Standard patterns for textile components other than tape or belt webbing are shown full scale on drawings and provide allowances for all seams and shall be used for making working patterns. The working patterns shall be identical to Government standard patterns, which shall not be altered in any way. All parts shall be within 1/8 inch of the locations shown on the patterns.

3.7 Deviations and waivers. Deviations and waivers to the materials or construction specified herein shall not be allowed unless authorized in writing by the contracting officer.

3.8 Workmanship. All items shall conform to the quality of product established by this document. The occurrence of defects shall not exceed the applicable acceptable quality levels. There shall be no defects that affect use, appearance, or serviceability.

3.9 Metric products. Products manufactured to metric dimensions will be considered on an equal basis with those manufactured using inch/pound units, provided they fall within the tolerances specified using conversion tables contained in the latest revision of FED-STD-376, and all other requirements of this specification are met.

3.10 Recovered materials. The contractor/offeror is encouraged to use recovered materials to the maximum extent possible in accordance with paragraph 23.403 of the Federal Acquisition Regulation (FAR).

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations or tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his/her own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in this specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection as part of manufacturing operations is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.1.2 Responsibility for dimensional requirements. Unless otherwise specified in the contract or purchase order, the contractor is responsible for ensuring that all specified dimensions have been met. When dimensions cannot be examined on the end item, inspection shall be made at any point or at all points in the manufacturing process necessary to ensure compliance with all dimensional requirements.

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4.1.3 Certification of compliance. Unless otherwise specified, certificates of compliance supplied by the manufacturer of the item, component, or material, listing the specified test method and test results obtained, may be furnished in lieu of actual lot by lot testing performed by the contractor (see 4.3.2). When certificates of compliance are submitted, the Government reserves the right to check test such items to determine the validity of the certification.

4.2 Sampling for inspections and tests. Sampling for inspections and tests shall be made in accordance with ANSI/ASQC Z1.4. The inspection level and acceptable quality level (AQL) shall be as specified. All chainsaw chaps manufactured at one time shall be considered a lot for purposes of acceptance inspection and test. A sample unit shall be one pair of chainsaw chaps with attached tool kit.

4.3 Quality conformance inspections. Each end item lot shall be sampled and inspected as specified in 4.3.4.1 and 4.3.4.2. The packaging shall be inspected as specified in 4.4. Unless otherwise specified (see 6.2), the first articles submitted in accordance with 3.1 shall be inspected as specified in 4.3.4.1 and 4.3.4.2 except that packaging is not required when first articles are presented. The presence of any defect or failure to pass any test shall be cause for rejection of the first article.

4.3.1 Component and material inspection. In accordance with 4.1, components and materials shall be inspected in accordance with all the requirements of referenced documents, drawings, and standards unless otherwise excluded, amended, modified, or qualified in this specification or applicable purchase document.

4.3.1.1 Examination of aramid cloth for visual defects. The required yardage shall be examined on one side only (alternating every other roll) and defects classified in accordance with table III. The defects found during this examination shall be counted regardless of their proximity to each other, except where two or more defects represent a single local condition of the cloth, in which case only the more serious defect shall be counted. A continuous defect shall be counted as one defect for each lengthwise yard or fraction thereof in which it occurs. The sample unit shall be 1 linear yard of cloth. The sample size shall be based upon inspection level II. The sample size and the lot size shall be expressed in units of 1 yard each. The number of rolls from which the sample is to be selected shall be as specified below. The acceptable quality level (AQL), expressed in terms of defects per hundred units (yards), shall be 4.0 for major defects and 10.0 for combined major and minor defects. In addition, all rolls of needled aramid felt cloth shall be examined end-to-end in front of pass through lighting for evidence of thin or thick areas.

Lot size in yards	Sample size in rolls
Up to and including 1,300 (1/)	3
1,301 through 3,200	5
3,201 through 8,000	7
8,001 through 22,000	10
22,001 through 110,000	15
110,001 and over	25

1/ If a lot contains fewer than 3 rolls, each roll shall be examined.

4.3.1.1.1 Intermediate inspection. The woven cloth and needled felt cloth shall be examined before fabrication in accordance with applicable provisions of 4.3.1.1.

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TABLE III. Examination of aramid cloths for visual defects

Examine	Defect	Classification	
		Major	Minor
Woven aramid cloth	Hard crease or wrinkle		X
	Cut, hole, or tear	X	
	Broken or missing yarn		X
	Open or thin place	X	
	Mixed yarn		X
	Spot or stain through fabric, clearly visible ^{1/}		X
	Woven-in waste 1/8 inch or larger in diameter		X
	Abrasion mark		X
	Baggy or woven cloth		X
	Any mend or darn		X
Needled aramid felt cloth	Any hole, cut or break (tear)	X	
	Crease or wrinkle embedded	X	
	Uneven resulting in thin, thick or weak place, clearly visible ^{1/}	X	
Fiber content	Spot or stain clearly visible ^{1/}		X
	Fiber content label missing, label illegible or wrong text		X

^{1/} At normal inspection distance (approximately 3 feet).

4.3.2 Certification. Unless otherwise specified (see 6.2), as part of first article presentations and lot inspections, it shall be acceptable for the contractor to provide certificates of compliance for all materials and components in lieu of actual lot by lot testing, except as specified in 4.3.2.1. The contractor shall also furnish a certificate of compliance for the requirement of 3.3.1.5 prohibiting use of thread lubricants before or during sewing. In addition, when the contractor changes component or material suppliers, a new certification based on actual test results shall be required. All certificates shall include as a minimum:

- Specification, type, class, form where applicable
- Quantity purchased
- Purchase source, address, and telephone number
- Purchase date
- Lot number traceable to materials used in production
- Contract number

4.3.2.1 Test values. The contractor shall provide actual test values for the characteristics of the woven aramid cloth (3.2.1), needled aramid felt cloth (3.2.2), and inner and outer shell cloth (3.2.3) for each new lot purchased. Such test reports, traceable to each lot used in production of the chaps, shall be maintained at the inspection point specified in the contract. Copies of these test reports shall be made available to the Government representative upon request.

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4.3.3 In-process inspection. Inspection shall be made at any point or during any phase of the manufacturing process to determine whether cut lengths, cut parts, markings for location of components, and location of assembled component parts are in accordance with specified requirements. This examination shall include inspection of the pad assemblies to assure that two layers of needled felt aramid cloth are assembled in alternating layers with the woven aramid cloth on top. The pads shall also be inspected for evidence of fabric defects or splicing and unspecified stitching or fastening. Inspection shall be made to determine that holes drilled for location marking do not exceed 0.076 inch diameter and are placed in such a manner that each shall be covered in the finished item (see 3.3.5). Whenever nonconformance is noted, corrections shall be made to the parts affected and lot in process. Components that cannot be corrected shall be removed from production.

4.3.4 End item examination.

4.3.4.1 End item visual examination. The end items shall be examined for the defects listed in table IV on a lot by lot basis. The lot size shall be expressed in units of complete chainsaw chaps. The inspection level shall be II, and acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 2.5 for major defects and 15.0 for combined major and minor defects. Unless otherwise specified, defects shall be scored on an individual basis, i.e., each seam, each stitching end, each dimension, etc.

TABLE IV. End item visual defects

Examine	Defect	Classification	
		Major	Minor
Nylon duck cloth	Not class specified	X	
	Any hole (except location marks), cut, or tear	X	
	Any abrasion mark, smash, slub, broken or missing yarn, multiple float, or open place, clearly visible at normal inspection distance (3 feet)	X	
	Needle chew	X	
	NOTE: Needle holes visible as the result of broken or skipped stitching or stitching that has been removed shall not be considered as needle chews providing that the holes are spaced as in normal stitching.		
	Color not as specified	X	
	Any outer shell or tool kit part shaded		X
	Shade bar, fine or coarse filling bar		X
	Coating defective or partially omitted		X

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TABLE IV. End item visual defects (continued)

Examine	Defect	Classification	
		Major	Minor
Webbing and tape	Size or type not as specified	X	
	Color not as specified		X
	Any hole, cut, tear, or smash	X	
	Abrasion mark, slub, broken end or pick		X
	Cut ends not fused or not fused as specified		X
	Not firmly and tightly woven	X	
	Edges frayed or scalloped	X	
	Multiple floats		X
Binding tape	Size or type not as specified	X	
	Color not as specified		X
	Loosely applied but not exposing raw edge of material		X
	Loosely applied exposing raw edge of material	X	
Thread	Not specified type, class, subclass or size	X	
	Any thread lubricated		X
	Color not as specified		X
Hardware, general	Any part broken, cracked, chipped, distorted, twisted or out of shape	X	
	Any dirt or flash		X
	Any deep scratch or gouge		X
	Gates not trimmed		X
	Surface not smooth		X
	Any pit, void, crazing, air pocket, blister or imbedded foreign matter that will affect serviceability	X	
	Evidence of spray or jetting marks	X	
	Not size or type specified	X	
Buckles	Mating components not from same manufacturer	X	
	Male and female parts do not mate	X	
	Webbing incorrectly threaded through male buckle	X	
	Male buckle upside down	X	
	NOTE: Plastic buckles shall be latched and unlatched three times to determine whether they operate smoothly and provide a secure closure.		
Snap fasteners	Any fastener not functioning properly, i.e., fails to snap closed, provide a secure closure, or open freely	X	
	NOTE: The fasteners shall be snapped and unsnapped twice to determine whether parts of fastener separate freely and also effect a secure closure.		

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TABLE IV. End item visual defects (continued)

Examine	Defect	Classification	
		Major	Minor
Snap fasteners (continued)	Clinched excessively tight, cutting adjacent material	X	
	Clinched loosely, permitting any component to rotate freely but not to the degree that any component can be expected to become detached during use		X
	Clinched loosely to the degree that components can be expected to become detached during use	X	
	NOTE: Incomplete roll of end of button or eyelet barrel is evidence of improper and insecure clinching.		
	Incorrect style	X	
	More than three splits in eyelet or button barrels		X
	Hole for barrel not prepunched		X
Cutting	Any component part not cut in accordance with patterns, directional lines on patterns, or in accordance with specification requirements	X	
Pads	Any unspecified stitching, tacking, or fastening	X	
Seams and stitching:			
Open seam	Up to and including 1/2 inch		X
	More than 1/2 inch	X	
	NOTE: A seam shall be classified as an open seam when one or more stitches joining a seam are broken or when two or more continuous skipped stitches or run-offs occur. On double stitched seams, a seam shall be considered open when either one or both sides of the seam are open.		
Raw edge (on edge required to be finished)	More than 1/2 inch when securely caught in stitching		X
	NOTE: Raw edges not securely caught in stitching shall be classified as open seams.		
Run-off (see open seam)			
Seams and stitch type (cont)	Seam or stitch type not as specified	X	

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TABLE IV. End item visual defects (continued)

Examine	Defect	Classification	
		Major	Minor
Bartacks	Any bartack omitted	X	
	Any bartack not as specified or not in specified location		X
	Loose stitching, incomplete, or broken		X
Stitch tension	Loose, resulting in a loose top or bobbin thread		X
	Excessively tight, resulting in puckering of material		X
	NOTE: Defects to be scored only when the condition exists for 4 inches or more or in several areas with an accumulated distance of 8 inches or more. Applicable to individual seams.		
Stitches per inch	Up to two stitches less than minimum specified		X
	Three or more stitches less than the minimum specified	X	
	Two or more stitches in excess of the minimum specified		X
	NOTE: Variation in the number of stitches per inch caused by the operator speeding up the machine and pulling the cloth in order to sew over heavy seams or in turning corners, shall be classified as follows: (a) Within the minor defect classification - no defect (b) Within the major defect classification - minor defect		
Stitching margin (not otherwise classified herein)	Exceeds specified tolerance, up to 1/16 inch		X
	Exceeds specified tolerance, over 1/16 inch	X	
	NOTE: Defects to be scored only when the condition exists for 4 inches or more or in several areas with an accumulated distance of 8 inches or more. Applicable to individual seams.		
Stitching ends	Not secured as specified (except where ends are held down by other stitching or turned under in a hem)		X
Thread breaks, skipped stitches, or runoffs (unless otherwise classified herein)	Not overstitched as specified	X	
	NOTE: Thread breaks or two or more consecutive skipped stitches or run-offs not overstitched shall be classified as open seams.		

(cont)

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TABLE IV. End item visual defects (continued)

Examine	Defect	Classification	
		Major	Minor
Rows of stitching	Any row missing except on box stitching	X	
	On box stitching:		
	- One row of stitching omitted		X
	- Two or more rows of stitching omitted	X	
Stitching patterns	One row of stitching omitted		X
	Two or more rows of stitching omitted	X	
	Stitch pattern not as specified	X	
Automatic stitching patterns	Stitching ends not backstitched as specified, i.e., less than three tying, overlapping, or backstitches		X
Components and assembly	Any component part omitted or not as specified or any operation omitted or not as specified (unless otherwise classified herein)	X	
	Needle chews	X	
	Any mend, darn, patch, splice, or other unauthorized repair	X	
	Any material pleated or caught in stitch liner where not specified		X
Piecing	Any piecing or splicing	X	
Cleanness	Grease, oil, dirt, or ink stains clearly noticeable		X
	Thread ends not trimmed to 1/4 inch or less		X
Identification and cleaning label	Wrong type or class	X	
	Incorrect type size or information	X	
	Not in location specified	X	
	Incorrect label margins		X
Location markings	Drill mark exceeding size specified		X
	Drill mark not covered on finished item		X
	Printed marking more than 1/32 inch in width or not covered by component part		X
Marking ("FSS", size numerals, and year and month of)	Omitted, incorrect, illegible, misplaced or size of characters not as specified	X	
	Cloth color visible under black marking medium		X
	Wrong type or class	X	

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4.3.4.2 End item dimensional examination. End items shall be examined for the defects listed in table V on a lot by lot basis. Only those dimensions that can be evaluated without damaging or disassembling the end items shall be examined. The inspection level shall be S-3. An AQL, expressed in terms of defects per hundred units, shall be 6.5 major defects and 15.0 for combined major and minor defects.

TABLE V. End item dimensional defects

Examine	Defect	Classification	
		Major	Minor
Dimensions (overall)	Smaller than nominal dimensions less applicable minus tolerance indicated on drawings, but not smaller than nominal dimensions less twice the applicable minus tolerances		X
	Smaller than nominal dimensions less twice the applicable minus tolerance	X	
	Larger than nominal dimensions and applicable plus tolerance		X
Component and location dimensions (not otherwise classified herein)	Not within specified tolerance		X
Box-x stitching	Dimensions not as specified		X
Stitch margin and gauge	Not within specified tolerance		X

4.4 Packaging inspection. An examination shall be made to determine that packing and marking comply with the section 5 requirements. Defects shall be scored in accordance with the list below. The sample unit shall be one shipping container fully packaged except that it need not be closed. Defects of closure listed below shall be examined on shipping containers fully packaged. The lot size shall be the number of shipping containers in the end item inspection lot. The inspection level shall be S-2, and the AQL, expressed in defects per hundred units, shall be 2.5 defects.

<u>Examine</u>	<u>Defect</u>
Markings	Omitted; incorrect; illegible; of improper size, location, sequence, or method of application.
Materials	Any component missing or not as specified. Any component damaged, affecting serviceability.
Workmanship	Inadequate application of components, such as: incomplete closure of container flaps, improper taping, loose strapping, inadequate stapling. Bulged or distorted container.
Contents	Number per container is more or less than required.

4.5 Tests.

4.5.1 Aramid cloth tests. The methods of testing specified in FED-STD-191, wherever applicable and as specified in table VI shall be followed. The physical and chemical values specified in section 3 apply to the results of the determinations made on a sample unit for test purposes as specified in the applicable test method. The breaking strength requirements are applicable to the average of the determinations made on all sample units (lot average). The sample unit shall be 1-1/2 continuous yards, full width of the finished cloth. The lot size shall be expressed in units of 1 yard. The lot shall be unacceptable if one or more sample units fail to meet any test requirement specified or if the breaking strength based on the average of all determinations (lot average) fails to meet the specified requirement. All test reports shall contain the individual values utilized in expressing the final result. The needed aramid felt sample size (number of sample units) shall be one sample per 100 yards. The woven cloth sample size (number of sample units) shall be in accordance with the following:

Lot size in yards	Sample size (units)
800 or less	2
801 through 22,000	3
22,001 and over	5

Table VI. Test methods

Characteristics	Requirements Paragraphs
Woven Cloth Needed Felt	FED-STD-191
Test Method	
Fiber identification	3.2.1.1 3.2.2 <u>1/</u>
Yarn denier	3.2.1.2 3.2.2 4021
Yarn length	— 3.2.2 <u>1/</u>
Yarn tenacity	
Warp	3.2.1.1 — 4100 <u>1/</u>
Fill	3.2.1.1 — 4100 <u>1/</u>
Color	3.2.1.3 3.2.2 <u>1/</u>
Weight	3.2.1.4 3.2.2 5040 <u>2/</u>
Yarns per inch	
Warp	3.2.1.4 — 5050
Fill	3.2.1.4 — 5050
Breaking strength	
Warp	3.2.1.4 — 5104
Fill	3.2.1.4 — 5104
Thickness	3.2.1.4 3.2.2 5030
Weave	3.2.1.5 — Visual <u>1/</u>
Finish (scoured or unscoured)	3.2.1.6 — <u>1/</u>
Breaking strength	
Warp	— 3.2.2 5100 <u>4/</u>
Fill	— 3.2.2 5100 <u>4/</u>
Bursting Strength <u>5/</u>	
Diaphragm	— 3.2.2 ASTM D 3786
Ball <u>5/</u>	— 3.2.2 ASTM D 3787

(continued)

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Table VI. Test methods (continued)

- 1/ Unless otherwise specified, a certificate of compliance shall be submitted for the stated requirement.
- 2/ Roll method.
- 3/ One determination shall be made from each sample unit and the result reported as "pass" or "fail."
- 4/ Breaking strength shall be determined in accordance with Method 5100 except that 2 by 6 inch specimens shall be cut with a die from each sample unit, five parallel to the lengthwise direction of the cloth and five parallel to the width of the cloth. All single determinations for each direction from all sample units shall be averaged and the averages reported as to the breaking strength of the width and length as applicable.
- 5/ Either test method may be used.

5. PACKAGING

5.1 Preservation. Preservation shall be in accordance with ASTM D 3951 and as specified in the contract or purchase order.

5.1.1 Folding. With leg straps buckled and chaps lying face down, the right leg shall be folded over onto left, so "FSS" is visible. Belt shall be folded around end of chaps. Then chaps shall be folded into thirds by folding top third of chaps down over middle third and bottom third over top third.

5.2. Packaging. One pair of chaps prepared in accordance with 5.1 and folded in accordance with 5.1.1 shall be inserted into a snug-fitting clear polyethylene film bag. Bag closure shall be effected by heat-sealing, with the seal made as close as possible to the open end and excess air within the bag being expelled during the final heat-sealing closure operation. Before sealing the plastic bag, a copy of the pamphlet "Inspecting and Repairing Your Chainsaw Chaps" shall be inserted with the pair of chaps. These pamphlets shall be obtained from the preparing activity (6.8).

5.3 Packing. Ten pairs of chaps of the same size packaged as specified shall be packed in a close-fitting fiberboard box, minimum burst strength 275 psi (minimum edge crush test 44 pounds per inch width). Boxes shall be type CF (variety SW) or type SF, class domestic, variety SW, style OSC meeting the requirements of the latest version of ASTM D 5118. Boxes shall be in compliance with the National Motor Freight Classification. Each box shall be closed in accordance with the latest version of ASTM D 1974, except that the inspection shall be in accordance with 4.4. In lieu of supplying boxes that are not full, at the option of the contractor, boxes of mixed content may be supplied and shall be marked as such (see 5.4.1).

5.4 Marking. In addition to any special marking (see 5.4.1) required by the contract or purchase order, shipping and unit containers shall be marked in accordance with FED-STD-123 except that the NFES number shall be included between the NSN and nomenclature. The marking for the packaged chaps shall be imprinted directly on the polyethylene bag, printed on an adhesive label firmly attached to the polyethylene bag, or printed on a piece of plain white paper and inserted into the polyethylene bag in such a way so it is readable without opening the bag. Bar coding is required.

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5.4.1 Special marking. Each shipping container packed with mixed sizes shall have two white paper labels plainly marked or stamped with the words "MIXED SIZES" in block letters at least 1 inch high. The correct quantity of each size with its corresponding NFES number in 1/2 inch letters shall be located directly under the "MIXED SIZES" lettering. All lettering shall be clearly legible. A label shall be securely affixed to one side of the container and a second label to one end of the container.

6. NOTES

6.1 Intended use. The chainsaw chaps are intended for use by workers operating chainsaws. The chaps are cut resistant and provide protection for the legs and lower torso.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Size.
- (c) When first article samples are not required. (see 3.1, 4.3, and 6.3).
- (d) When lot by lot testing is required in lieu of certificates of compliance (see 4.3.2).
- (e) Packaging, packing, and marking required in addition to specification requirements (see section 5).

6.3 First article. When first articles are required, they shall be inspected and approved under the appropriate provisions of Federal Acquisition Regulation 52.209. The first articles shall consist of one sample in each size to be produced under the contract or purchase order. These samples shall be preproduction samples. The contracting officer should include specific instructions regarding arrangements for selection, inspection, and approval of the first articles.

6.4 Types of cloth. The woven aramid cloth described herein was produced from Kevlar® 49. The needled aramid felt cloth described herein was produced from style 970 Kevlar® 29. Kevlar® 49 and Kevlar® 29 are manufactured by the E.I. Du Pont De Nemours and Co., Wilmington, DE 19898.

6.5 Suggested sources of supply. These sources are provided for convenience and may not be all sources of this material.

Woven Aramid Cloth

BGF Industries
3802 Robert Porcher Way
Greensboro, NC 27410

Gentex Corp.
P.O. Box 315
Carbondale, PA 18407

Clark-Schwebel, Inc.
2200 S. Murray Ave.
Anderson, SC 29622

Hexcel Corp.
5794 W. Las Positas Blvd.
Pleasanton, CA 94588-8781

Fiber Materials, Inc.
5 Morin St.
Biddeford Industrial Park
Biddeford, ME 04005-4497

Warwick Mills
301 Turnpike Rd.
New Ipswich, NH 03071

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Acetal Plastic Buckles

American Cord & Webbing, Inc.
1 Carrington St.
Lincoln, RI 02865

National Molding Corp.
5 Dubon Court
Farmingdale, NY 11735-1065

ITW Waterbury
952 South Main St.
Waterbury, CT 06721

6.6 User brochure. A camera-ready copy of the user brochure (3.2.14) will be supplied by the preparing activity (6.9) upon request by the contractor.

6.7 Standard shade sample. Color shade samples for the olive green inner and outer shell cloth may be obtained from the preparing activity (6.9) upon request by the contractor.

6.8 Notice. When Government drawings, specifications, or other data are used for any other purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever.

6.9 Preparing activity. USDA Forest Service, Missoula Technology and Development Center, Building 1, Fort Missoula, Missoula, MT 59804-7294.

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