5100-91K Amendment 1 April 10, 2025

U.S. DEPARTMENT OF AGRICULTURE

FOREST SERVICE

SPECIFICATION FOR

SHIRT, FLAME RESISTANT ARAMID

This amendment forms part of Forest Service Specification 5100-91K dated April 28, 2020.

Distribution Statement A: Approved for public release; distribution is unlimited.

Delete:

2.2 -

1977 - Protective Clothing and Equipment for Wildland Fire Fighting

Replace with:

1950 - Standard on Personal Protective Equipment for Technical Rescue Incidents, Emergency Medical Operations, and Wildland and Urban Interface Firefighting, revision in effect.

Delete:

3.1.1. NFPA 1977.

The shirts shall be third party certified as being in compliance with National Fire Protection Association (NFPA) Standard 1977, Protective Clothing and Equipment for Wildland Fire Fighting. Proof of this certification shall be presented at the time of First Article submission.

Replace with:

3.1.1. NFPA.

The shirts shall be third party certified as being in compliance with National Fire Protection Association (NFPA) Standard 1950 (1977) – Standard on Personal Protective Equipment for Technical Rescue Incidents, Emergency Medical Operations, and Wildland and Urban Interface Firefighting. Proof of this certification shall be presented at the time of First Article submission.

Delete and Replace with:

3.2.2.2. Aramid blend.

The collar interlining shall be a blend of 93 percent meta-aramid and 5 percent para-aramid, 2 percent conductive fiber. The interlining shall be 4.2 to 5.8 ounces per square yard, plain weave. The color shall be natural or yellow. The interlining shall conform to textile fabric requirements specified in NFPA 1950 (1977) for protective clothing. The number of fabric nonconformities shall not exceed 200 points per hundred yards when tested in accordance with yard-by-yard inspection

for basic material (see 3.2.1).

Delete and Replace with:

3.2.8. Labels.

Each shirt shall have two labels, one being the combination identification/instruction/care label and the other being a size label. The labels may be woven or non-woven and shall meet the requirements of NFPA 1950 (1977).

Delete and replace with:

3.2.8.1. Combination label.

The combination identification/instruction/care label shall be placed on the inside of the front left facing, 1 to 1 $\frac{1}{2}$ inches above the bottom hem, and sewn on all four sides with a single row of stitching 1/16 to 1/8 inch from edge. Stitching shall not be through the printing. The label shall be written as follows:

(information in brackets "[]" is for reference):

[The header shall be printed with letters at least 2.5 mm (3/32 in.) high. The body shall be printed with letters at least 1.6 mm (1/16 in.) high.]

THIS WILDLAND FIREFIGHTING AND URBAN INTERFACE FIREFIGHTING PROTECTIVE GARMET MEETS THE REQUIREMENTS OF NFPA 1950 (1977), 2025 EDITION (<u>1</u>/)

DO NOT REMOVE THIS LABEL! (3/)

[Manufacturer's name, identification or designation] (2/)

[Manufacturer's address] (2/)

[Country of manufacture] (2/)

[Manufacturer's garment identification number, lot number, or serial number] (2/)

DATE OF MANUFACTURE: [mm/yy] (2/)

USDA FOREST SERVICE SPECIFICATION 5100-91K

CONTRACT NUMBER: (2/)

NSN: (2/)

MATERIALS CONTENT: (2/)

[Authorized mark of certifying organization] (2/)

DATE OF CERTIFICATION [mm/yy (as a minimum)] (2/)

a. Machine wash hot. NO BLEACH.

- b. Wash separately from flammable, lint-producing fabrics.
- c. Rinse thoroughly. Soap or detergent residues will burn.
- d. DO NOT STARCH. Starch will burn.
- e. Tumble dry medium. Remove garment promptly.
- 1/ Or more current revision as applicable.
- 2/ The manufacturer shall insert the applicable information.
- 3/ When a split label is used, this legend shall appear as the bottom line on both labels.

Delete and replace with:

3.9. Workmanship.

The finished shirts shall conform to the quality of product established by this specification. The occurrence of nonconformities shall not exceed the applicable acceptable point values. The finished shirts shall conform to NFPA 1950 (1977) requirements for protective clothing.

Delete and replace with:

4.1.1. Responsibility for certification.

An approved Certification Organization shall certify that the shirts meet the requirements of NFPA 1950 (1977). The contractor shall provide all required materials, garments, and information to the Certification Organization to permit such certification.

Delete and replace with:

4.3.2.3. NFPA.

As a part of first article submission, the contractor shall provide copies of the third-party certification to NFPA 1950 (1977).

5100-91K April 28, 2020 Supersedes 5100-91J February 24, 2011

U.S. DEPARTMENT OF AGRICULTURE FOREST SERVICE

SPECIFICATION FOR

SHIRT, FLAME RESISTANT ARAMID

Beneficial comments (recommendations, additions, deletions) and any pertinent data that may be used in improving this document should be addressed: via electronic mail <<u>wo mtdc webmaster@fs.fed.us</u>> or U.S. mail to the U.S. Department of Agriculture, Forest Service, National Technology and Development Program, 5785 Highway 10 West, MT 59808.

Distribution Statement A: Approved for public release; distribution is unlimited.

FSC 8415

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1. SCOPE AND CLASSIFICATION

1.1. Scope. This specification covers the requirements for flame resistant aramid shirts.

1.2. Classification. The shirt shall be of one type in the following sizes (see 6.2):

Schedule of sizes Extra Small (X-SMALL) Small (SMALL) Small-Long (SMALL LONG) Medium (MEDIUM) Medium-Long (MEDIUM LONG) Large (LARGE) Large-Long (LARGE LONG) Extra Large (X-LARGE) Extra Large-Long (X-LARGE LONG) Extra Extra Large (XX-LARGE) Extra Extra Large-Long (XX-LARGE LONG) Extra Extra Extra Large (XXX-LARGE) Extra Extra Extra Large Long (XXX-LARGE LONG)

1.3. Interpretations and Definitions.

1.3.1. Interpretation.

To carry out the provisions of this document, the word "shall" is understood to be mandatory.

1.3.2. Definitions.

Nonconformity: A departure of a quality characteristic from its intended level or state that occurs with severity sufficient to cause an associated product or service not to meet a specification requirement (per ANSI/ASQ Z1.4).

2. APPLICABLE DOCUMENTS

2.1. Government documents.

2.1.1. Specifications, standards, and handbooks. The following specifications, standards, and handbooks 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 (see 6.2).

FEDERAL

A-A-50198 – Thread, Gimp, Cotton, Buttonhole
A-A-55126 – Fastener Tapes, Hook and Loop, Synthetic
A-A-55217 – Thread, Aramid, Spun Staple
V-B-871 – Button, Sewing Hole, and Button, Staple, (Plastic)
FED-STD-123 – Marking for Shipment (Civil Agencies)
FED-STD-376 – Preferred Metric Units for Use by the Federal Government

MILITARY

MIL-STD-129 - Marking for Shipment

USDA FOREST SERVICE

5100-87 – Cloth, Shirting, Aramid

Unless otherwise indicated, copies of federal and military specifications and standards are available online at https://assist.daps.dla.mil/quicksearch/ or in hard copy from the Standardization Documents Order Desk, Building 4D, 700 Robbins Ave., Philadelphia, PA 19111-5094. Copies of USDA Forest Service specifications are available from the preparing activity, 6.6.

2.1.2. Other Government documents, drawings, and publications.

The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those in effect on the date of the invitation for bids or request for proposals (see 6.2).

USDA FOREST SERVICE DRAWINGS

MTDC-1067 – Patterns, Shirt, Flame Resistant, Aramid, M-2011

Copies of Forest Service Drawings are available from the preparing activity, 6.6.

2.2. Non-Government publications.

The following documents form a part of this specification 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 (see 6.2).

AMERICAN SOCIETY FOR QUALITY (ASQ)

Z1.4 – Sampling Procedures and Tables for Inspection by Attributes

Copies are available from the American Society for Quality, PO Box 3005, Milwaukee, WI 53201-3005, <u>www.asq.org</u>.

ASTM

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 International, 100 Barr Harbor Dr., West Conshohocken, PA 19428-2959, <u>www.astm.org</u>.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

1977 - Protective Clothing and Equipment for Wildland Fire Fighting

Address requests for copies to National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101, <u>www.nfpa.org</u>.

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC., AGENT

National Motor Freight Classification

Address requests for copies to the American Trucking Association, Inc., Traffic Department, 1616 P St. NW, Washington, DC 20036.

UNIFORM CLASSIFICATION COMMITTEE, AGENT

Uniform Freight Classification

Copies are available from the Uniform Freight Classification Committee, Room 1106, 222 S. Riverside Plaza, Chicago, IL 60606.

Non-Government standards and other publications normally are available from the organizations that prepare or 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 a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1. First article.

Unless otherwise specified (see 6.2), First Article Samples of two each of extra small, medium long and extra extra large sizes shall be subjected to first article inspection (see 6.3) in accordance with 4.3. During the term of the contract the contractor shall be required to notify the contracting officer in writing when a component, or the component supplier, changes in any way; when a major manufacturing process changes in any way; and when a manufacturing location changes. The contracting officer may at any time require the contractor to submit a new first article sample when substantive changes occur during the term of the contract.

- 3.1.1. NFPA 1977.
- 4. The shirts shall be third party certified as being in compliance with National Fire Protection Association (NFPA) Standard 1977, Protective Clothing and Equipment for Wildland Fire Fighting. Proof of this certification shall be presented at the time of First Article submission.
- 4.1. Materials and components.

Materials and components shall be as specified herein and in the applicable drawing, MTDC-1067.

4.1.1. Basic material.

The basic material shall in accordance with the requirements specified in Forest Service specification 5100-87, the fabric shall have a soft hand.

4.1.2. Collar interlining.

It shall be optional to the contractor to use any of the three materials specified in 3.2.2.1, 3.2.2.2, and 3.2.2.3 for the collar interlining.

4.1.2.1. Basic material.

The collar interlining shall be basic material (see 3.2.1).

4.1.2.2. Aramid blend.

The collar interlining shall be a blend of 93 percent meta-aramid and 5 percent para-aramid, 2 percent conductive fiber. The interlining shall be 4.2 to 5.8 ounces per square yard, plain weave. The color shall be natural or yellow. The interlining shall conform to textile fabric requirements specified in NFPA 1977 for protective clothing. The number of fabric nonconformities shall not exceed 200 points per hundred yards when tested in accordance with yard-by-yard inspection for basic material (see 3.2.1).

4.1.2.3. Nonwoven aramid.

The collar interlining shall be meta-aramid weighing 1.0 to 1.6 ounces per square yard.

4.1.3. Thread.

The aramid thread shall conform to Type I, Tex size 35-40 and Tex size 50-60, or Type II, Tex size 27 and Tex size 45, A-A-55217. Thread color shall be a good approximation of the basic material (see 3.2.1). The larger thread size can be substituted for the smaller, but not vice versa.

4.1.4. Gimp.

The cotton gimp for reinforcing buttonholes shall conform to Soft Finish Tex 210, or Glazed Finish Tex 180 of A-A-50198. The color shall be a good approximation of the basic material (see 3.2.1).

4.1.5. Buttons.

The buttons shall conform to type II, class D, style 26, size 30-line of V-B-871. The color shall be a good approximation of the color of the basic material (see 3.2.1) and shall have a glossy finish.

4.1.6. Fastener tape, hook and pile.

The hook and pile fastener tape shall conform to 1inch width, type II, class 1 of A-A-55126. The color of the tape shall be a good approximation of the color of the basic material (see 3.2.1).

4.1.7. Retroreflective Striping.

The striping shall be 3M Scotchlite Reflective Material - Comfort Trim style #5535, segmented, 7/8 inch width. Reflective trim shall be applied using a heat press set at 350-375 degrees Fahrenheit for 10-20 seconds with 30-40 pounds per square inch. Striping is applied to elbow patches and pocket flaps in accordance to MTDC-1067 before attaching pieces onto the shirt. Striping adherence shall be tested according to 4.3.4.3.

4.1.8. Labels.

Each shirt shall have two labels, one being the combination identification/instruction/care label and the other being a size label. The labels may be woven or non-woven and shall meet the requirements of NFPA 1977.

4.1.8.1. Combination label.

The combination identification/instruction/care label shall be placed on the inside of the front left facing, 1 to 1 1/2 inches above the bottom hem, and sewn on all four sides with a single row of stitching 1/16 to 1/8 inch from the edge. Stitching shall not be through the printing. The label shall be written as follows: (information in brackets "[]" is for reference):

[The following information shall be printed in letters at least 3/32 inch in height]

THIS WILDLAND FIRE FIGHTING PROTECTIVE GARMENT MEETS THE REQUIREMENTS OF NFPA 1977, STANDARD ON PROTECTIVE CLOTHING AND EQUIPMENT FOR WILDLAND FIRE FIGHTING, 2016 EDITION.[1/]

[The following information shall be printed with letters at least 1/16 inch in height.]

[Authorized mark of certifying organization 2/]

DATE OF CERTIFICATION [mm/yy (as a minimum) 2/]

SHIRT, FLAME RESISTANT, ARAMID

NSN: [2/]

US FOREST SERVICE SPECIFICATION 5100-91K

MATERIALS CONTENT: 93 % META-ARAMID, 5% PARA-ARAMID, 2% ANTISTATIC

SIZE: [3.2.8.2 2/]

[Manufacturer's name 2/]

[Manufacturer's address 2/]

[Country of origin 2/]

Contract Number: [2/]

[Manufacturer's garment identification number, lot number, or serial number 2/]

DATE OF MANUFACTURE: [mm/yy 2/]

CARE INSTRUCTIONS

- a. Machine wash hot. NO BLEACH.
- b. Wash separately from flammable, lint-producing fabrics.
- c. Rinse thoroughly. Soap or detergent residues will burn.
- d. DO NOT STARCH. Starch will burn.
- e. Tumble dry medium. Remove garment promptly.

DO NOT REMOVE THIS LABEL [3/]

<u>1</u>/ Or more current revision as applicable.

<u>2</u>/ The manufacturer shall insert the applicable information.

 $\underline{3}$ / When a split label is used, this legend shall appear as the bottom line on both labels.

3.2.8.1.1. Split combination label.

It shall be optional to split the combination label information onto two separate labels providing both labels have 'DO NOT REMOVE THIS LABEL' as the bottom line. When the label is split, the second label shall be sewn to the inside of the front right facing in a location and construction corresponding to the front left facing label.

4.1.8.2. Size label.

The size label shall be sewn on the inside center back approximately 1/4 inch below the neckline. Sew label on all four sides with a single row of stitching 1/16 to 1/8 inch from edges. The printing shall be clearly visible. The size label shall finish 1 by 1-1/2 inch. The label shall be white, the lettering shall be black. The letters shall be a minimum of 3/16 inch high 1/8 inch wide. The size label shall be written as follows (information in brackets "[]" is for reference):

X-SMALL NFES [XXXX]	SMALL NFES [XXXX]	SMALL LONG NFES [XXXX]	MEDUIM NFES [XXXX]	MEDUIM LONG NFES [XXXX]
LARGE NFES [XXXX]	LARGE LONG NFES [XXXX]	X-LARGE NFES [XXXX]	X-LARGE LONG NFES [XXXX]	XX-LARGE NFES [XXXX]
XX-LARGE LONG NFES [XXXX]	XXX-LARGE NFES [XXXX]	XXX-LARGE LONG NFES [XXXX]		

4.1.9. User instructions.

Figure 4 illustrates the user instructions that shall be inserted into each packaged shirt before closure of the package (5.1.1). User instructions shall be printed on 5-1/2 by 8-1/2-inch minimum size sheets of white, 60 pound offset paper stock. Printing shall be with black ink.

4.2. Design.

The shirt shall be a long-sleeved single-breasted design button through front. (see Figures 1 & 2).

4.2.1. Collar.

The stand-up collar design shall have a hook and loop fastener tape closure. The interlining shall be quilted to the under collar with two lines of stitching, 1-inch gage.

4.2.2. Chest pockets.

There shall be two chest patch pockets with flaps (see MTDC-1067 for placement). The left pocket only shall have a sewn pencil division. 1-inch fastener tape closures are used on the pocket flaps. For all sizes the chest pockets shall finish 6-1/4 X 6-1/4 inches (\pm 1/4) and the openings shall measure 6 inches (\pm 1/8) between bartacks. The flaps shall finish 6-1/2 X 2-5/8 inches (\pm 1/4).

4.2.3. Back.

The back possesses a bi-swing bellows design (see Figure 2).

4.2.4. Elbow patch.

There shall be an elbow patch on each sleeve (see MTDC-1067 for placement).

4.2.5. Pencil pocket.

The left sleeve shall have a two-channel pencil pocket. The hem of the pencil pocket shall be 3/4-inch wide, double turned clean finished. The pencil pocket shall finish 5-1/4 X 2-3/4 inches (\pm 1/4) for all sizes (see MTDC-1067 for placement). The flap shall finish 2-5/8 X 3 inches (\pm 1/4).

4.2.6. Cuffs.

Each sleeve cuff opening shall be adjustable and have a pointed tab with a hook and loop fastener tape closure.

4.3. Patterns.

Standard full-size patterns (MTDC-1067) will be furnished by the Government. The standard patterns shall not be altered in any way and shall be used only as a guide for cutting the contractor's working patterns. The contractor's working patterns shall be identical to the standard patterns. The standard patterns provide a seam allowance of 1/2-inch for side seams, shoulder seams, collar and sleeve seams; and 3/8-inch allowance for all other seams, except where otherwise specified. Pockets, pocket flaps, pencil pocket, elbow patches, and hook and loop fastener tape shall be located in accordance with marks on patterns. The pattern list in Table 1 is provided to ensure that the pattern set provided is complete. The working patterns will be identical to the Government patterns except that additional notching to facilitate manufacture is permissible. Also, minor modifications are permitted where necessary to accommodate manufacturer's processes and using automatic equipment. These modifications shall not alter the serviceability or appearance requirements. NOTE: When the 5-thread safety stitch is used for the shoulder and armhole seams, contractor must adjust patterns for 3/8-inch gage in lieu of 1/2-inch double needle seams.

4.3.1. List of pattern parts.

The components of the shirt shall be cut from materials as specified in accordance with Table 1:

Material	Pattern nomenclature	Cut parts
Basic material	Front	2
	Back	1
	Side back	2
	Top sleeve	2
	Under sleeve	2
	Top collar	1
	Under collar	1
	Pocket	2
	Pocket flap	2
	Cuff	2
	Cuff tab	2

Table 1. List of pattern parts.

	Pocket (Lt side)	1
	Pencil pocket flap	1
	Elbow patch	2
Basic material or optional aramids	Collar interlining	1

4.4. Construction.

4.4.1. Stitches, seams, and stitching.

Stitch, seam, and stitching types, as specified in table 2, shall conform to ASTM D 6193. When two or more seam or stitch types are given for the same part of an operation, any one of them may be used. Where stitch type 401 is used, the chain, or underside of the stitch, shall be on the inside of the shirt. Seam allowances shall be maintained with seams sewn so that no raw edges, runoffs, twists, pleats, puckers or open seams will result. All seams shall start and finish evenly. Thread tension shall be maintained so that there is no tight or loose stitching. All material edges shall be clean finished, either turned-in, turned-under, or serged. Overedge or pre-hemming shall be 6-10 stitches per inch. Unless otherwise indicated by patterns, bartacks shall be set 1/8-inch from edge. All pocket flaps shall be serged prior to setting. The openings above bi-swing bartacks shall be closed by superimposing stitching on topstitching.

4.4.1.1. Safety and overedge stitching.

The gage of safety stitching shall be 5/16 to 3/8-inch. The gage of overedge stitching and the overedge portion of safety stitching shall be 3/16 to 1/4-inch. The guides and knives for the safety stitch and overedge machines shall be set to trim only the raveled edges of the fabric.

4.4.1.2. Thread breaks and ends of seams.

Ends of all seams and stitching produced with 301 stitch type, when not caught in other seams or stitching, shall be backtacked not less than 1/2-inch. Thread breaks (all stitch types) shall be secured by stitching back of the break not less than 1/2-inch. Skipped stitches and thread breaks for 401 stitch type may be repaired using 301 stitch type. The ends of a continuous line of stitching (except labels and automatic stitching) shall be overlapped not less than 1/2-inch. The ends of labels and automatic stitching shall be overlapped not less than 1/2-inch.

4.4.1.3. Stitches per inch.

The minimum and maximum number of stitches per inch shall be as specified in Table 2.

Seam Placement	Seam type	Gage	Stitch type	Stitches per inch	Thread
Side/front seams, arm seams, set in sleeves, shoulder seams OR	LSc-2	3/16 to 1/4-inch gage (double lap seam)	301 or 401	10-13	50-60
Alternate safety stitch for shoulder and armhole	SSa-2	3/8 to 1/2-inch gage	516, 519	8-10	50-60 chainstitch 35- 40 overedge

Table 2. Seam and Stitching Types

Safety stitch side to back	SSa-2	3/8 to 1/2-inch gage	516, 519	8-10	50-60 chainstitch 35- 40 overedge
Top stitch side/back, shoulder &armhole (if safety stitched)	SSa-2	3/16 to 1/4-inch gage	301 or 401	10-13	35-40
Front facings	EFa-1	1/16 to 1/8-inch from edge	301	10-13	35-40
Top stitching of pocket flaps, front edge	OSf-1	1/16 to 1/8-inch from edge	301	10-13	35-40
Attachment of pockets When using automatic pocket setting equipment topstitching shall be 1/6 or 1/8 gauge	LSd-1	1/16 to 1/8-inch from edge	301	10-13	50-60
Left chest pocket pencil channel	SSv-1	1-1/2-inch ± 1/8 from right edge, sewn top to bottom edge of pocket	301	10-13	35-40
Attachment of pocket flaps	LSd-1	1/16 to 1/8-inch from edge	301	10-13	50-60
Attachment of elbow patches	LSd-1	1/16 to 1/8-inch from edge	301	10-13	35-40
Bottom hemming	EFb-1	1/16 to $1/8$ -from edge $3/8 \pm 1/8$ - inch wide hem, double turned clean finished	301	10-13	35-40
Sleeve hemming	EFb-1	1/16 to 1/8-inch from the edge 1 1/2 ± 1/8-inch wide hem	301	10-13	35-40
Attach cuff tab to cuff	SSe-2	1/16 to 1/8-inch from the edge	301	10-13	35-40
Setting cuffs	LSd-1	1/16 to 1/8-inch from the edge	301	10-13	35-40
Attach collar interlining to under collar	SSv-4	Four rows 1/2- inch apart (top and bottom rows match marks on under collar pattern)	301 or 401	10-13	35-40
Attach under collar to top collar	SSe-2	1/16 to 1/8-inch from the edge	301	10-13	35-40
Setting collar	SSa-1 LSb-1	1/16 to 1/8-inch from the edge	301	10-13	50-60

Hook/Loop	LSbj-1	1/8 inch ±1/32 from the edge on all 4 sides	301	7-12	50-60
Top stitch pleat of bi-	Efa-2	Two rows 3/16 to	301	10-13	35-40
swing	LSbm-4	1/4-inch gage			
		apart			
Attachment of	-	-	301	14-22 per	50-60
buttons				button	
Attachment of labels	LSbj-1	1/16 to1/8-inch from the edge on all 4 sides	301	7-12	50-60

4.4.2. Puckering.

In the course of the sampling examination, seams suspected of being puckered shall be examined at a distance of 3 feet, any seam that is puckered for 2 or more inches so that it causes visible distortion of the garment, shall be scored as a puckered seam.

4.4.3. Buttonholes.

The buttonholes shall be the cut-after eyelet end taper bar type, worked over gimp with the end tacked with not less than four stitches not counting the cross-over stitch. The stitching shall be caught in the fabric with the purling on the outside. The finished cut length of the buttonholes shall be 3/4 to 7/8-inch. There shall be 50-60 stitches per buttonhole using Type I, Tex size 35 thread.

4.4.4. Bartacks.

Unless otherwise specified, bartacks shall be meet the requirements of Table 3. Bartacking shall be free from thread breaks and loose stitching. Bartack placement shall be as specified in Table 4 (see Figures 1 and 2).

Length	Length Width Tolerance Stitches		Stitches			
_		Length	Width	per Bartack	Thread	
1/2-inch	1/8-inch	\pm 1/16-inch	±1/32-inch	28	35-40	

Table 3. Bartacks

Table 4. Bartack Placement

Bartack Placement	Number of Bartacks
All pocket flaps on ends of topstitching	2
Each lower sleeve tab	2
Each lower sleeve seam	1
Each front chest pocket opening	2
Top of pencil pocket, superimposed on stitchlines	3
Top of left chest pocket pencil channel, superimposed on stitchline	1
Bi-swing, upper and lower locations as indicated on patterns (place upper bartack for all sizes 2 inches from the top edge of the back pattern piece)	2

4.5. Manufacturing operations.

The shirt shall be made in accordance with the manufacturing requirements specified in Table 2.

4.5.1. Figures.

Figures 1, 2, and 3 are furnished for information purposes only. In the event of inconsistencies between the specification and the figures, the specification shall govern.

4.5.2. Shade and size marking.

The cut components of the shirt shall be marked or bundled to ensure a uniform shade and size throughout the garment. Any method of marking may be used except:

- a. Corrosive metal fastening devices.
- b. Sew-on type tickets.
- c. Adhesive type tickets that discolor the material or leave traces of paper or adhesive on material after ticket removal.

4.6. Finished measurements.

Finished measurements of shirts shall be as specified in Table 5.

Table 5. Finished measurements (inches, ± 1/2-inch)

Size	1/2 chest	Back length	Sleeve length
	(A)	(B)	(C)
Extra Small	20-1/2	30-5/8	21-7/16
Small	22-1/2	31-5/8	21-3/4
Small-Long	22-1/2	33-1/8	22-3/4
Medium	24-1/2	32-5/8	22-1/16
Medium-Long	24-1/2	34-1/8	23-1/16
Large	26-1/2	33-5/8	22-3/8
Large-Long	26-1/2	35-1/8	23-3/8
Extra Large	28-1/2	34-5/8	22-11/16
Extra Large-Long	28-1/2	36-1/8	23-11/16
Extra Extra Large	30-1/2	35-5/8	23
Extra Extra Large-Long	30-1/2	37-1/8	24
Extra Extra Extra Large	32-1/2	36-5/8	23-5/16
Extra Extra Extra Large-Long	32-1/2	38-1/8	24-5/16

NOTE: A, B, and C measurements shall be taken with the shirt buttoned and laid flat and smooth.

A. Chest measurement shall be taken with shirt buttoned, at a point in line with pit of armhole, from folded edge to folded edge.

B. Back length shall be taken along center of back from undercollar seam to bottom edge of shirt.

C. Sleeve length shall be taken with the sleeve folded along the underarm seam; measure from the arm pit seam to bottom of sleeve (including cuff).

4.7. Deviations and waivers.

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

4.8. Workmanship.

The finished shirts shall conform to the quality of product established by this specification. The occurrence of nonconformities shall not exceed the applicable acceptable point values. The finished shirts shall conform to NFPA 1977 requirements for protective clothing.

4.9. 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.

4.10. Recovered materials.

The contractor is encouraged to use recovered material in accordance with Federal Acquisition Regulation 23.4 to the maximum extent practical.

5. QUALITY ASSURANCE PROVISIONS

5.1. Responsibility for inspection.

Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and 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 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 the specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

5.1.1. Responsibility for certification.

An approved Certification Organization shall certify that the shirts meet the requirements of NFPA 1977. The contractor shall provide all required materials, garments, and information to the Certification Organization to permit such certification.

5.1.2. 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 the 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 nonconforming material, either indicated or actual, nor does it commit the Government to acceptance of nonconforming material.

5.1.3. 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.

5.1.4. 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). Where certificates of compliance are submitted, the Government reserves the right to check test such items to determine the validity of the certification.

5.2. Sampling for inspections and tests.

Sampling for inspections and tests shall be made in accordance with ASQ Z1.4. The inspection level and acceptable quality level (AQL) shall be as specified.

5.3. Quality conformance inspection.

Each end item lot shall be sampled and inspected as specified in 4.3.4.1 and 4.3.4.2. As part of quality conformance inspections, test results shall be submitted to determine compliance of the basic cloth with the requirements of Forest Service specification 5100-87. The packaging shall be sampled as specified in 5.4. Packaging is not required when first articles are presented. 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. The presence of any nonconformity or failure to pass any test shall be cause for nonacceptance of a first article sample.

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.

4.3.2. Certification.

As a part of the first article submission the contractor shall provide certificates of compliance (COC) for the materials of the shirts. COCs shall be provided for the following components:

Basic material (3.2.1) Collar interlining (3.2.2) Thread (3.2.3) Gimp (3.2.4) Buttons (3.2.5) Hook and Loop fastener tape (3.2.6) Retroreflective Striping (3.2.7) Labels (3.2.8)

4.3.2.1. 4.3.2.1 COC Contents.

The COC shall include the following:

Specification with type, class, etc. Quantity purchased Purchase source, address, and telephone number Purchase date 4.3.2.2. Test Reports.

The COCs shall be supported by test reports for the following components, test reports of tests performed by the contractor or the manufacturer are acceptable.

Basic material (3.2.1) Thread (3.2.2)

4.3.2.3. NFPA 1977.

As a part of first article submission, the contractor shall provide copies of the third-party certification to NFPA 1977.

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 and finished lengths, cut parts, marking for location of components, and location of assembled component parts are in accordance with specified requirements and the drawings. Whenever nonconformance is noted, corrections shall be made to the parts and lot affected in-process. Parts that cannot be corrected shall be removed from production.

4.3.4. Examination of the end item.

Examination of the end items shall be in accordance with 4.3.4.1 and 4.3.4.2.

4.3.4.1. Visual examination.

Each sample shirt selected from lots presented for delivery shall be examined for nonconformities in color, design, material, construction, workmanship and marking and the nonconformities classified in accordance with Table 6 as follows:

TABLE 6. End item classification of visual nonconformities		
Attribute	Nonconformity Point value value	
Material Nonconformities and Workmanship Damages	d Any hole, cut, tear, mend, burn, needle chew, exposed drill holes, or open place:	
	1. Up to and including 1/4-inch	2
	2. More than 1/4-inch	3
	Knot larger than 1/32-inch on any part of the shirt.	1
	NOTE: Material nonconformities and workmanship damages classified as indicated above only when the condition is of definitely weakens the structure of the garment, or when conspicuously located as to be clearly noticeable. Nonwe conditions which are inconspicuous shall not be classified nonconformities.	ges are to be one which it is so eakening d as
Shaded Parts	Shaded parts (excluding sleeve tab, breast pocket flap liner, and collar interlining).	2
	Any shade bar above the bottom buttonhole on the finished shirt.	1
	Shade of sleeve tab or breast pocket flap liner not good approximation of the shade of the garment.	1
Cleanness	Any spot or stain on outside.	1
	Five or more thread ends not trimmed to 1/2-inch or less.	1

	Two or more shade or size tickets not removed.	1
	One or more shade or size markings visible on outside.	1
Cutting	Any component part not cut in accordance with	3
<u> </u>	specified pattern or directional lines as indicated on	
	patterns or not in accordance with specification	
	requirements.	
Components and Assembly	Any component part or required operation emitted	2
Components and Assembly	Any component part of required operation officed	3
	(unless otherwise classified field).	1
	Any operation not performed as specified (unless	I
	Any component not as specified (type, size, color, etc.)	2
	The edge of any component part required to be forced	3
	aut baying folds more than 1/9 inch (unloss otherwise	I
	out, naving loids more than 1/o-inch (unless otherwise	
	Any component part twisted, distorted, pleated,	2
	misshaped, tight, or full (unless otherwise classified	
	herein).	
Coore and Stitching	Conoroli	
Seams and Stitching	General.	4
	1. Seam irregular, twisted, or wavy (unless otherwise	Ĩ
	Classified herein).	4
	2. Seam puckered (score only on major portion of	1
	Sealin) (see 3.5.2).	0
	3. Any part of shift caught in an unrelated operation of	Z
	Succing.	4
	4. End of stitching when not caught in other seams of	Ĩ
	for attaching lobals and automatic attaching	
	for attaching labels and automatic stitching).	
	5. Thread break (all stitch types) stitched less than 1/2-	1
	Inch beyond each end of break.	
	6. Ends of a continuous line of stitching not overlapped	1
	as specified.	4
	7. Inread color not as specified.	1
	8. Stitching for attaching labels or automatic stitching	1
	not finished as specified.	
	Gage of stitching and seam allowance:	4
	1. Gage irregular or not within range specified.	1
	2. Edge or raised stitching sewn too close to edge,	2
	resulting in damage of cloth.	
	3. Seam allowance more than 1/16-inch more or less	1
	than specified.	
	Open seams:	
	1. On all seams except bottom nem and label stitching:	4
	(a) Up to 1/2-inch (inclusive).	1
	(b) More than 1/2-inch up to 3/4-inch (inclusive)	2
	(c) wore than 3/4-inch	3
	2. On bottom nem more than 1/2-inch.	1
	3. On label stitching.	1
	NOTE: One or more broken, skipped, or runoff stitches or	n a joining
	seam constitutes an open seam.	
	KUNOTTS:	4
	1. Un joining seam score as open seam.	1
	2. Edge or raised stitching (when not resulting in an open	seam);
	(a) Up to 1/2-inch (inclusive)	1

	(b) More than 1/2-inch	2
	Raw edges:	
	NOTE: Raw edge not caught in stitching shall be classifie	d as an open
	Seam and stitch type:	
	1 Seam or stitch type not as specified	2
	2. Looper thread on outside.	3
	3. Any required line of stitching omitted.	3
	4 Any line of stitching not beginning or ending where	1
	specified (unless otherwise classified herein).	
	5. Any seam not lapped or finished as specified.	1
	Broken, missing, or skipped stitches on edge or raised	1
	stitching (when seam is seamed, turned, and stitched)	
	more than 1/4-inch.	
	Stitch tension:	
	1 Loose tension, resulting in a loose seam	3
	2 Loose tension on edge or raised stitching resulting	1
	in exposed loose thread	I
	3 Tight tension (stitches break when strain is applied in	3
	direction of seam or stitching).	C C
	NOTE: Puckering is evidence of tight tension. When puck	kering is
	evident, seam shall be tested by exerting pull in lengthwis	e direction of
	seam or stitching. If broken stitching results from the pull,	score as
	specified above.	
	Stitches per inch:	
	1. Stitches per inch to be scored only when the condition	exists on
	more than half the length of seam or stitching:	
	(a) Less than the minimum specified.	2
D. Westerland	(b) More than maximum specified.	1
Buttonnoles	finished as specified.	3
	Gimp omitted, uncut buttonhole.	1
	Ragged edge, incomplete stitching, stitching not	2
	securely caught in fabric.	
	One or more broken stitches or two or more skipped	1
	stitches in one or more buttonholes.	
	Buttonhole stitching extending beyond bartack; stitches	1
	per buttonhole less than minimum specified.	
	NOTE: Stitches per buttonhole shall be determined by co	ounting the
	number of needle perforations containing stitch floats to the	he outside of
	the buttonhole gimp.	
	Finished cut length not as specified.	1
	Gimp color not a good approximation of the color of the	1
	basic material.	
	End of buttonhole tacked with less than four stitches.	1
Buttons (applying to all	Missing, broken, defective, misplaced, not positioned,	2
buttons)	or attached as specified, or insecurely sewn.	
	NOIE: A button shall be considered nonconforming wher	n it has sharp,
	rough, cracked, or split edge; has scratch, dent, blemish,	Deppedant 10
	all bubble(s) or loreign matter; or is badly snaded.	
	Wrong type, size, or color.	3
	Badly shaded.	1

	Stitching on one or more not locked at end of cycle (tug at the loose end of the thread when accessible to determine if it will ravel).	1
Fastener Tapes	Hook and loop tapes not positioned as specified, exceeding 1/8-inch tolerance.	1
	Length and width not as specified.	1
	Incorrect color.	1
Bartacks	One missing, loose, or misplaced; not specified size or	1
	not serving intended purpose.	
	Two missing, loose, or misplaced; not specified size or not serving intended purpose.	2
	Three or more missing, loose, or misplaced; not	3
	Loose stitch tension	1
Labels	Size label:	1
Labels	1 Label missing incorrect or illegible	3
	2 Label not located below collar seam as specified	1
	3 Label off center by more than 1/2-inch	1
	4. Stitching through the printing of label.	1
	5. Label not sewn on all 4 sides	1
	Combination label:	·
	1. Missing, incorrect, or illegible.	3
	2. Stitching exposed on outside of shirt.	1
	3. Not positioned as specified.	1
	4. Stitching through the printing.	1
Collar	Not uniform in size or shape - any point varying more	3
	than 3/8-inch with corresponding point or matching part.	
	Collar points uneven in length by 3/8-inch or more.	2
	Twisted, not smooth, too full, short, or tight, causing	2
	Collar points not properly forced out	2
	Off center by 1/2-inch or more	1
	NOTE: Center of collar is determined by aligning the two	shoulder
	seams at junction of collar.	
	neckline (see 3.5.2).	1
	Edge of collar not properly forced out, i.e., having a fold of more than 1/8-inch.	1
	Stitching of top collar joining seam more than 1/8-inch	1
	above or below stitching of undercollar joining seam for a distance of more than 2 inches.	
	Parallel rows of stitching on undercellar omitted	2
	Stitch gage of percellel rows of stitching verying from the	3
	gage specified by more than 1/8-inch.	1
Fronts	Spacing between two or more buttonholes unequal by 1/4-inch or more.	1
	Buttonhole position:	
	1. Buttonhole less than 3/8-inch or more than 5/8-inch	1
	from edge.	
	2. Two or more buttonholes out of horizontal alignment	1
	by more than 1/4-inch.	

	3. Lapel buttonhole not parallel with top edge of lapel.	1
	Front tight or short, or front facing tight or twisted	1
	causing noticeable bulge or twist when shirt is	
	buttoned.	
	Front edge not folded straight with warp line (i.e.,	1
	forming curve).	
	Length of fronts:	•
	1. Uneven by 1/2-inch or more at bottom, when	1
	buttoned.	
	2. Uneven by 1/2-inch or more at neck, when buttoned.	1
Front Facing	Facing not caught as specified.	1
	Back edge of facing not finished as specified.	1
	Width of facing not as specified.	1
	Facing not smooth and flat, shows evidence of	1
	puckering.	-
Pocket or Flap	Not uniform in size or shape - any measurement varying	from pocket
	to pocket or flap to flap by:	
	1. More than 3/8-inch.	3
	2. 1/4-inch up to and including 3/8-inch.	2
	Out of alignment at any point from pocket to pocket or flap	p to flap by
	(Determination may be made by a straight edge):	
	1. More than 1/2-inch.	3
	2. More than 3/8-inch up to and including 1/2-inch.	1
Pocket	Pocket edge(s) not parallel to front edge of shirt by:	
	1. More than 3/8-inch.	3
	2. More than 1/4-inch up to and including 3/8-inch.	2
	3. 3/16-inch up to and including 1/4-inch.	1
	Edge of pocket pleated or twisted.	1
	Pocket corner not secured as specified.	1
	Width of pocket hem not as specified.	1
	Pocket hem not overedged.	1
	Pocket opening gapped.	1
Flap	Distance between sides of pocket and underside of	2
	opened flap vary by more than 1/8-inch.	
	Pocket exposed beyond end of flap by 1/8-inch or	1
	more.	
	Not properly forced out.	1
	Underside of flap not finished as specified.	1
	Edge of under flap exposed beyond edge of top flap	1
	1/16-inch or more for a distance of 1-inch or more.	4
	Side edge(s) of flap extending beyond side edge(s) of	1
	Pocket by more than 1/4-inch.	1
Sleeves	Sleeves reversed	2
0166763	Slooves plasted or excessive fullness at armholo	2
	affecting appearance (see 3.5.2)	۷
	Sleeve tight at armhole seam causing puckers on front	2
	or back, affecting appearance (see 3.5.2).	
	Sleeve hem (bottom of sleeve) finishing less than 1	1
	3/8-inch or more than 1 5/8-inch wide.	
	Sleeve hem irregular in width by 1/4 inch or more.	1
	Sleeve tab not finished flat and smooth.	1
	Tab not positioned as specified or attached crookedly.	1

	Tab width less than 1 3/8-inch or more than 1 5/8-inch.	1
Bottom Hem	Less than 1/4-inch or more than 1/2-inch wide.	1
	Irregular in width by 1/4-inch or more.	1
	Hem end extending more than 1/8-inch beyond front edge of shirt.	1
	Hem twisted, pleated, or puckered (see 3.5.2).	1

4.3.4.1.1. Acceptable point values.

The sample size based on lot size and the acceptance values for 3- and 2-point nonconformities and total (3, 2, and 1-point) nonconformities listed in 4.3.4.1 shall be as specified in table 7. The sample unit shall be one shirt and the lot shall be unacceptable if either or both of the following occur:

- a. The point value for 3- and 2-point nonconformities exceeds the applicable maximum acceptable point value.
- b. The point value for total (3, 2, and 1-point) nonconformities exceeds the applicable maximum acceptable point value.

Table 7. Sampling provisions for visual examination

		Maximum accept	able point values
l ot size	Samnla siza	3- & 2-point	3, 2, & 1-point
	Sample Size	nonconformities	nonconformities
		(1/)	
Up to 500	50	18 points	25 points
501 to 1,200	80	25 points	36 points
1,201 to 3,200	125	32 points	50 points
3,201 to 10,000	200	45 points	73 points
10,001 and over	315	68 points	110 points
Up to 500	50	13 points	20 points
501 to 1.200	80	20 points	30 points
1,201 to 3,200	125	32 points	40 points
3,201 to 10,000	200	45 points	58 points
10,001 and over	315	68 points	88 points
Up to 1,200	32	13-20 points	25 points
1,201 to 3,200	50	16-25 points	32 points
3,201 to 10,000	80	23-32 points	43 points
10,001 and over	125	32-41 points	54 points
	Lot size Up to 500 501 to 1,200 1,201 to 3,200 3,201 to 10,000 10,001 and over Up to 500 501 to 1,200 1,201 to 3,200 3,201 to 10,000 10,001 and over Up to 1,200 1,201 to 3,200 3,201 to 10,000 10,001 and over	Lot sizeSample sizeUp to 50050501 to 1,200801,201 to 3,2001253,201 to 10,00020010,001 and over315Up to 50050501 to 1,200801,201 to 3,2001253,201 to 10,00020010,001 and over315Up to 1,200321,201 to 3,200503,201 to 10,000321,201 to 3,200503,201 to 10,0008010,001 and over125	Lot sizeSample sizeMaximum accept $3-\& 2$ -point nonconformities (1/)Up to 5005018 points501 to 1,2008025 points1,201 to 3,20012532 points3,201 to 10,00020045 points10,001 and over31568 pointsUp to 5005013 points501 to 1,2008020 points1,201 to 3,20012532 points3,201 to 10,00020045 points1,201 to 3,20012532 points3,201 to 10,00020045 points10,001 and over31568 pointsUp to 1,2003213-20 points1,201 to 3,2005016-25 points3,201 to 10,0008023-32 points3,201 to 10,0008023-32 points10,001 and over12532-41 points

1/ For reduced inspection, when the first value is exceeded but not the second value, the lot shall be accepted, but normal inspection shall be reinstated (see 4.3.4.1.4.4). The second value is the maximum acceptable point value.

4.3.4.1.2. Initiation of inspection.

Normal inspection shall be used at the start of inspection unless otherwise directed by the responsible procurement quality assurance element administering the contract.

4.3.4.1.3. Continuation of inspection.

Normal, tightened, or reduced inspection shall continue unchanged on successive lots except where switching procedures in 4.3.4.1.4 require change.

4.3.4.1.3.1. Switching procedures

4.3.4.1.3.1.1. Normal to tightened.

When normal inspection is in effect, tightened inspection shall be instituted when two out of five consecutive lots have not been accepted on original inspection (i.e., ignoring resubmitted lots for this procedure).

4.3.4.1.3.1.2. 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.

4.3.4.1.3.1.3. Normal to reduced.

When normal inspection is in effect, reduced inspection shall be instituted, providing that all of the following conditions are satisfied:

- a. The preceding 10 lots have been on normal inspection and none have not been accepted on original inspection; and
- b. The total number of points for 3- and 2-point nonconformities in the samples from the preceding 10 lots is equal to or less than 60 percent of the total maximum acceptable point values for 3 and 2 point nonconformities from the preceding 10 lots; and
- c. The total number of points for 3, 2 and 1-point nonconformities in the sample from the preceding 10 lots is equal to or less than 75 percent of the total maximum acceptable point values for 3, 2 and 1-point nonconformities from the preceding 10 lots; and
- d. Production is at a steady rate; and
- e. Reduced inspection is considered desirable by the procurement quality assurance element administering the contract.

4.3.4.1.3.1.4. 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 not accepted; or
- b. A lot is considered acceptable but exceeds the applicable first value (see 4.3.4.1.1); or
- c. Production becomes irregular or delayed; or
- d. Other conditions warrant that normal inspection be instituted.
- 4.3.4.2. Dimensional examination.

The appropriate number of shirts, determined from table 8, shall be examined for conformance to the dimensional requirements cited in table 4. When a measurement deviates from a dimension and tolerance specified, the shirt shall be penalized 1 point. Each shirt shall also be penalized 1 point when the sleeves are uneven in length by 1/2 inch or more. The lot shall be unacceptable if the total point value resulting from this examination exceeds the maximum acceptable point value. Each size of shirt present in the lot should be represented in the sample selected for this examination.

Table 8. Sampling provisions for dimensional examination

Lot size	Sample Size	Maximum acceptable point values
Up through 500	8	0
50 - 3,200	13	1
3,201 - 35,000	20	2

35,001 and up	32	3
---------------	----	---

4.3.4.3. Retroeflective striping adherence.

To ensure proper striping adherence, first article submission shall include 2 complete shirts that have endured 5 home-style (either top or front load) laundry cycles - wash (hot water, 115 - 135 F) and dry (high, 115 - 135 F). No signs of peeling, curling or cracking allowed.

4.4. Packaging inspection.

An examination shall be made to determine that packing and marking comply with the section 5 requirements. Nonconformities shall be scored in accordance with Table 8. The sample unit shall be one shipping container fully packaged except that it shall not be palletized and it need not be closed. Shipping containers fully packaged that have not been palletized shall be examined for nonconformities in closure. 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 shall be 2.5 nonconformities per hundred units.

Table 8 —Packaging inspection		
Component	Nonconformity	
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, or inadequate stapling.	
	Bulged or distorted container.	
Contents	Number of items per container is more or less than required.	

6. PACKAGING

6.1. Preservation.

Preservation shall be in accordance with ASTM D 3951 and as specified in the contract or purchase order (see 6.2).

6.1.1. Packaging.

Each fully buttoned shirt shall be neatly folded to measure approximately 14 1/2-inches by 10 1/2-inches. The folded shirt shall be secured with stainless steel pins, aluminum clips, or plastic fasteners. Each shirt shall be inserted in a snug-fitting flat style clear polyethylene film bag of 0.00125-inch thickness (\pm 25 percent tolerance). The polyethylene bag shall be formed with heat-sealed seams that are straight, continuous, and parallel to each other and the formed edges of the bag. Before closure, a copy of the User instructions (3.2.9) shall be inserted into the bag with the shirt. The final closure of the bag shall be

heat sealed with the heat seal made as close as possible to the open end. The bag may be fabricated from polyethylene film tubing or sheeting. A 1/4-inch diameter hole shall be made at one corner of each polyethylene bag to allow excess air to escape. As an alternate, the polyethylene bag may be of the tuckin or reverse flap type in which case a heat seal closure and corner vent hole are not required.

6.2. Packing.

Unless otherwise specified (see 6.2), packing shall be in accordance with the requirements specified herein.

6.2.1. Packing.

Thirty (30) shirts of one size, packaged in accordance with 5.1.1 shall be packed into a Type CF, Class Weather Resistant, Style RSC, Variety SW, Grade 350 (55 ECT) of ASTM D 5118; size shall be 24 x 16 x 16 (-3/4, +1) inches, the closure shall be in accordance with method IV of the appendix. The box shall comply with the Uniform Freight Classification and the National Motor Freight Classification.

6.3. Marking.

In addition to any special marking required by the contract or purchase order, shipping containers shall be marked in accordance with FED-STD-123 for civilian purchases and MIL-STD-129 for Defense Logistics Agency purchases.

6.3.1. Special marking.

The corresponding National Fire Equipment System (NFES) number of each box shall be marked on the shipping container below the NSN. The NFES number shall be preceded by "NFES".

6.3.2. Polyethylene bag.

Each polyethylene bag (see 5.1.1) shall have the stock number, nomenclature, and size legibly printed or stamped in black on the center face of the bag, or a label printed black on white with the required information shall be inserted in the bag so that it can be easily read through the polyethylene.

7. NOTES

7.1. Intended use.

The shirts are intended to be worn with flame resistant jeans for fighting wildland fires and for conducting controlled burning operations.

7.2. Acquisition requirements.

Acquisition documents must specify:

- a. Title, number, and date of this specification.
- b. Sizes of shirts and quantities of each (see 1.2).
- c. When required, the specific issue of individual document referenced (see 2.1 and 2.2).
- d. When first article samples are not required (see 3.1, 4.3, and 6.3).
- e. When lot by lot testing is required in lieu of certificates of compliance (see 4.3.2).
- f. Packaging requirements if other than specified (see 5.1 and 5.2).

7.3. First article.

When first articles are required, they shall be inspected and approved under the appropriate provisions of FAR 52.209. First articles shall be preproduction samples. The contracting officer should include specific instructions in all acquisition documents regarding arrangements for selection, inspection, and approval of the first articles.

7.4. Bidder information.

For bidding purposes, 11" X 17" drawings, or electronic drawings in *.dwf format, will be furnished upon request. They will contain sufficient information regarding size, shape, and quantity of material for bidding purposes. It is the bidder's responsibility to determine yield and waste from the provided 11" X 17" drawings or electronic drawings and no further direction or clarification will be provided by the government. Color shade samples, full-size drawings and full-size patterns will be furnished only to successful bidders upon contract award.

7.5. 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.

7.6. Preparing Activity.

U.S. Department of Agriculture, Forest Service, National Technology and Development Program, 5785 Highway 10 West, MT 59808, <<u>wo_mtdc_webmaster@fs.fed.us</u>>.













User Instructions

(Remove only by end user)

Shirt, Flame resistant. US Forest Service Specification - 5100-91K

1. Pre-Use Information

a) Safety Considerations. Use this garment in conjunction with all other required PPE, including hard hat, gloves, fire resistant pants, leather boots and fire shelter. This garment should be used only by personnel who have completed the required formal training courses for wildland fire fighting operations and fully understand the limitations and use of this garment.

b) This shirt provides limited thermal and physical protection from the hazards associated with wildland fire fighting.

c) This garment should not be marked.

d) The protective properties of this garment cannot be tested by users in the field.

e) The contractor warranties this garment to be free from defects in workmanship and materials for one year after date of purchase. The warranty assumes that the garment is used by trained personnel following accepted wildland fire fighting procedures.

2 Preparation for Use, Donning/Doffing

a) Sizing/Adjustment: Shirt should be loose fitting. Shirts are available in 13 sizes which include regular or long sleeve and body length options.

b) Interface Issues: This shirt is an outer garment, undergarments should be made of 100% cotton, wool, silk, aramid or other flame resistant materials. Ensure there is proper coverage at wrist and waist.

c) Recommended storage: Clean and dry this shirt properly before storage. Store in a dry place - out of direct sunlight and extreme temperatures.

3. Inspection Frequency and Details

Inspect garment upon receipt and after each cleaning. Inspect for holes, tears and proper operation of fasteners.

4. Maintenance and Cleaning

a) Do not use this garment if it is not thoroughly cleaned and dried.

b) Machine wash in hot water, NO BLEACH. Wash separately from flammable, lint producing fabrics. Rinse thoroughly, soap and detergent residues will burn. Do not starch. Tumble dry medium and remove promptly.

5. Decontamination Procedures

a) Decontamination is dependent upon what the protective clothing has been exposed to; however, chlorine bleach cannot be used under any circumstances.

b) For extreme contamination with products of combustion or fire debris, remove the contaminants by flushing with water as soon as possible, followed by appropriate cleaning.

6. Retirement/Disposal Criteria

It is recommended that individual units establish their own criteria for routine inspection and subsequent repair or retirement of this garment.

7. Proper use should be consistent with NFPA 1500, Standard on Fire Department Occupational Safety and Health Program, and 29 CFR 1910.132, "Personal Protective Equipment."

Figure 4

User Instructions