

## NOTICE



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# **SPECIFICATION FOR CLOTH, RIPSTOP, ARAMID/FR RAYON, MULTICAM®, OIL AND WATER REPELLENT TREATED**

## **1.0 SCOPE**

### **1.1 Scope**

This specification covers the requirements for cloth, ripstop, aramid/fire resistant (FR) rayon with an oil and water repellent treatment in the MULTICAM® camouflage pattern.

***Note: It is known that the 6.5 oz Defender M Ripstop material with a durable water repellent treatment in MULTICAM® distributed by 1947 LLC (www.1947llc.com) fully meets the requirements within this specification.***

### **1.2 Classification**

The fabric must be classified as follows: Cloth, Ripstop, Aramid/FR Rayon, MULTICAM®, Oil and Water Repellent Treated.

### **1.3 Applicable Documents**

The following documents form part of this specification to the extent specified, and are supportive of this specification when referenced; all other document references are to be considered supplemental information only. In the event of a conflict between the documents referenced and the contents of this specification, then the contents of this specification must take precedence:

CAN/CGSB Standards (email: [ncr.cgsb-ongc@pwgsc.gc.ca](mailto:ncr.cgsb-ongc@pwgsc.gc.ca))

- CAN/CGSB-4.2-M Textile Test Methods
- CAN/CGSB-155.20 Workwear for Protection Against Hydrocarbon Flash Fire

FED Standards (Download Documents: <http://assist.daps.dla.mil/quicksearch/>)

- FED-STD-191A Federal Standard for Textile Test Methods

American Association of Textile Chemists and Colorists Standards ([www.aatcc.org](http://www.aatcc.org))

- AATCC Test Method 16 Colourfastness to Light

- AATCC Test Method 81 Test Method for the pH of the Water-Extract from Wet Processed Textiles
- AATCC Test Method 116 Colorfastness to Crocking: Rotary Vertical Crockmeter Method
- AATCC Test Method 118 Oil Repellency: Hydrocarbon Resistance Test
- AATCC 143 Test Method for the Appearance of Apparel and Other Textile End Products after Home Laundering

American Society for the Testing of Materials (ASTM) ([www.astm.org](http://www.astm.org))

- D1424 Standard Test Method for Tearing Strength of Fabrics by the Falling Pendulum-Type (Elmendorf) Apparatus

#### 1.4 Order of Precedence

In the event of any inconsistency in contract documents such as contract, specification and sealed patterns, the order of precedence must be contract, specification, and sealed pattern. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification must take precedence. For any inconsistency in technical details between languages, the language of the original document, which in this case is English, must take precedence. Nothing in this document supersedes applicable laws and regulations, unless a specific exemption has been obtained.

### 2.0 **REQUIREMENTS**

#### 2.1 Fabric Structure

The weave must be a plain weave with reinforcement ribs in both the warp and filling directions forming a uniform pattern. The ribs must be formed by having every twenty-fourth warp end contain two ends weaving as one and every thirteenth filling contain two picks weaving as one. Warp and weft yarns must be prepared from an intimate blend of aramid and FR rayon fibers. The addition of nylon fibers to the intimate blend may be required to impart the required strength and abrasion resistance. The printed cloth must be given a durable water repellent treatment. When tested in accordance with the applicable test methods, the finished fabric must comply with the requirements specified in Table 1.

#### 2.2 Workmanship

The materials covered by this specification must be free of imperfections or blemishes such as may adversely affect its appearance or serviceability. For inspection purposes, imperfections and blemishes must be considered defects when clearly visible at a normal inspection distance of approximately 1 m (3.3 ft) under good, preferably Northern Light, lighting conditions.

#### 2.3 Dyeing and Printing

The cloth(s) must be dyed to a ground shade either matching or approximating Cream 524 and then overprinted with the MULTICAM® camouflage pattern by roller or screen printing in a manner that gives the required degree of colour fastness and a uniform, good penetration of colour in the fibres and fabric as follows:

- (a) When the ground shade is dyed to match Cream 524, the remaining colors are obtained by subsequent printing using six rollers or screens, as appropriate for the Tan 525, Pale Green 526, Olive 527, Dark Green 528, Brown 529 and Dark Brown 530 areas of the pattern;
- (b) When the ground shade is dyed to approximate Cream 524 all seven colors of the camouflage pattern are obtained by subsequent printing using seven rollers or screens to match all seven colors; and

- (c) Resin bonded pigments are not be used.

#### 2.4 Finish

The fabric must be given a durable water repellent treatment that meets the requirements specified in **Error! Reference source not found..**

#### 2.5 Spectral Reflectance

Spectral reflectance data must be obtained from 600 to 860 nanometers (nm) at 20 nm intervals on a spectrophotometer relative to the barium sulfate standard, the preferred white standard. Other white reference materials may be used provided they are calibrated to absolute white, e.g. magnesium oxide or vitrolite tiles. The spectral band width must be less than 26 nm at 860 nm. Reflectance measurements must be made by either the monochromatic or polychromatic mode of operation. When the polychromatic mode of operation is used, the spectrophotometer must operate with the specimen diffusely illuminated with the full emission of a continuous source that simulates either CIE Source A or CIE Source D65. Measurements must be taken on a minimum of two (2) different areas and the data averaged. The measured areas should be at least 15 cm (6 in) away from the selvage. The specimen must be viewed at an angle no greater than 10 degrees from normal, with the specular component included. Specimens must be oriented in different directions during testing. When possible, the specimens tested must not contain the same warp or filling yarns when presented to the sample port. Photometric accuracy of the spectrophotometer must be within 1 percent and wavelength accuracy within 2 nanometers. The diameter for standard aperture size used in the color measurement device must be 9.4869 mm (0.3725 in) or larger. Any color having spectral reflectance values falling outside the limits at four or more of the wavelengths specified must be considered a test failure.

Wavelength, Nanometers (nm)	Cream 524 and Tan 525		Pale Green 526, Olive 527 and Brown 529		Dark Green 528 and Dark Brown 530	
	Min.	Max.	Min.	Max.	Min.	Max.
600	22	44	12	30	3	11
620	24	45	12	30	3	11
640	24	45	12	32	4	12
660	25	45	12	32	4	12
680	28	45	14	34	4	13
700	28	46	14	34	6	16
720	30	48	16	36	6	20
740	32	50	18	36	10	25
760	36	50	20	40	14	30
780	38	52	22	40	18	35
800	40	54	22	42	22	40
820	44	56	24	44	24	42
840	46	57	26	44	27	43
860	48	58	28	46	29	45

Table 1: Finished Cloth Requirements

Property	Test Method	Minimum Acceptable	Maximum Acceptable
Mass (g/m <sup>2</sup> )	CAN/CGSB 4.2 Test Method 5.1	200	240
Fiber Content	CAN/CGSB 4.2 Test Method 14		65% aramid 65% FR viscose 10% nylon
Woven Fabric Count (yarns per cm)		Warp: 23 Weft: 19	
pH	AATCC 81	5.0	8.5
Dimensional Stability after 5 wash-dry cycles	CAN/CGSB 4.2 Test Method 58 (III.E3)  or  CAN/CGSB 4.2 Test Method 24 (3.E.III)		Warp: 3.5% Weft: 3.5%
Tensile Strength (N)	CAN/CGSB 4.2 Test Method 12.1	Warp: 400 Weft: 400	
Flame Resistance (edge ignition) As received and after 25 wash-dry cycles	CAN/CGSB 4.2 Test Method 27.10		Average damaged length: Warp: 115 mm Weft: 115 mm  Average Afterflame: 2.0 sec  Average Afterglow 15.0 sec
Tearing Strength (Elmendorf) (N)	ASTM D1424	Warp: 44 Weft: 35	
Air Permeability (cm <sup>3</sup> /cm <sup>2</sup> /s)	CAN/CGSB 4.2 Test Method 36	12	
Water Resistance	CAN/CGSB 4.2	80	

(as received)	Test Method 26.2		
Appearance Rating As received	AATCC 143	5	
Appearance Rating After 15 wash-dry cycles	AATCC 143	3	
Colourfastness to Laundering After 1 wash-dry cycle (each color)	CAN/CGSB 4.2 Test Method 19.1		Colour Change: 2-3 Staining: 2-3
Colourfastness to Light (Grey Scale after 40 AATCC Fading Units)	AATCC Test Method 16 Option 3		Cream: 3 Brown: 3-4 Dark Green: 3-4 Olive: 3 Tan: 3 Pale Green: 3 Dark Brown: 3-4
Colourfastness to Crocking (all colours)	CAN/CGSB 4.2 Test Method 116		Dry: Grey Scale 3.5 Wet: Grey Scale 2
Colorfastness to Perspiration (all colors)	CAN/CGSB 4.2 Test Method 23		No appreciable change in color and no appreciable staining: Grey Scale 3-4
Water Resistance (Absorption) - As received AND - After 15 launderings	FED-STD-191A Method 5500.1  Laundering: CAN/CGSB-4.2 Test 24.2 or CAN/CGSB-4.2 Test 58 (III.E3)		Max average 25%  Max for any single determination 30%