

NOTICE



This documentation has been reviewed by the technical authority and does not contain controlled goods. Disclosure notices and handling instructions originally received with the document shall continue to apply.

AVIS

Cette documentation a été révisée par l'autorité technique et ne contient pas de marchandises contrôlées. Les avis de divulgation et les instructions de manutention reçues originalement doivent continuer de s'appliquer.

## **CLOTH, PLAIN WEAVE, FLAME RESISTANT, ARAMID, 185 g/m<sup>2</sup>**

### 1.1 Scope

This Specification covers the technical requirements for 185 g/m<sup>2</sup>, plain weave, aramid, flame resistant fabrics with comfort properties.

***Note: The GL-PD 10-13 A2CU Cloth (Class 10) distributed by 1947 LLC ([www.1947llc.com](http://www.1947llc.com)) fully meets the requirements within this specification.***

### 1.2 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-54.1-M Part 2 - Textiles - Seam Types - Classification and Terminology
- CAN/CGSB-155.20 Workwear for Protection Against Hydrocarbon Flash Fire

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

- 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 pH of the Water-Extract from Wet Processed Textiles
- AATCC Test Method 112 Formaldehyde Release from Fabric

American Society for the Testing of Materials (www.astm.org)

- ASTM D2165 Standard Test Method for pH of Wood and Similar Animal Fibers

Association of the Non-Woven Fabrics Industry (www.inda.org)

- INDA Standard Test Method 10.1 Absorption - Liquid Absorption Time, Capacity and Wicking Rate

## **2.0 REQUIREMENTS**

### **2.1 Fabric**

The cloth must be 1x1 plain weave. When tested in accordance with the specified test methods, the finished fabric must comply with the performance requirements of Table 1. The finished fabric must be free from oil stains and spots of any kind, all residue of any processing textile chemical auxiliaries must be removed. The finished fabric must have a full flexible hand.

### **2.2 Workmanship**

The material covered by the Specification must be free of imperfections or blemishes such as may adversely affect its appearance or serviceability. For inspection purposes, imperfections and blemishes will be considered defects when clearly visible at a normal inspection distance of approximately 1 meter (3.3 ft) under good, preferably North light, lighting conditions.

### **2.3 Yarns and Fibre Content**

Yarns in both warp and weft must be aramid, 2-ply spun yarn with a balanced twist. Fibre content must be minimum 92% meta-aramid. A maximum of five percent para-aramid may be added as necessary to meet the specified performance requirements (Table 1). Up to three percent carbon fibre must be added to meet the static dissipation performance requirements. *Fibre content must be reported, however, laboratory results are not required.*

### **2.4 Dyeing and Printing**

The finished fabric must be printed with the certified MULTICAM® camouflage pattern. The fabric colour may be obtained by using solution dyed or dope dyed aramid fibres. The fabric may also be dyed using an appropriate class of dyes that will give the required degree of colour fastness and a uniform, good penetration of colour in the fibres and fabric. Dyed fabric that does not visibly meet the colour penetration requirements will be rejected.

2.5 Finish

A durable finish to provide enhanced wicking performance and moisture control must be applied to the fabric for wearer comfort purposes. Since additives may adversely affect the burning behaviour, care must be taken in finishing to ensure that add-ons are sufficient to provide comfort enhancement and shape retention, but are kept to the minimum necessary.

**Table 1: Finished Cloth**

<b>Property</b>	<b>Test Method</b>	<b>Specified Requirement</b>	<b>Minimum Acceptable</b>	<b>Maximum Acceptable</b>
Fibre Content		93 % meta-aramid 5 % para-aramid 2 % carbon	92 % meta-aramid  1 % carbon	99 % meta-aramid 5 % para-aramid 3 % carbon
Mass (g/m <sup>2</sup> )	CAN/CGSB-4.2 Test 5.1	185	180	215
Resistance to Pilling	CAN/CGSB-4.2 Test 51.1		3.5	
Breaking Strength (N) (grab)	CAN/CGSB-4.2 Test 9.2		Warp: 800 Weft: 450	
Tearing Strength (N) (trapezoid)	CAN/CGSB-4.2 Test 12.2		Warp: 100 Weft: 65	
Air permeability (cm <sup>3</sup> /cm <sup>2</sup> /s)	CAN/CGSB-4.2 Test 36		30	100
Dimensional Stability (after 3 wash-dry cycles)	CAN/CGSB-4.2 Test 58 (III.E3) (permanant press dry cycle)			Warp: 3.0% Weft: 3.0%
Colourfastness to Laundering	CAN/CGSB-4.2 Test 19.1 (#2)			Colour change and staining: Grey Scale 4
Colourfastness to Light - Xenon	AATCC Test Method 16 Option 3		Grey Scale 4 after 20 AATCC Fading Units.	

Property	Test Method	Specified Requirement	Minimum Acceptable	Maximum Acceptable
Colourfastness to Crocking	CAN/CGSB-4.2 Test 22 (6.1 & 6.2)			Colour change and staining: Dry: Grey Scale 4 Wet: Grey Scale 3
Wicking - As received and - After 25 washes	INDA 10.1-92 Para 10  CAN/CGSB-4.2 Test 58 (III.E3) (permananet press dry cycle)			60 seconds
Formaldehyde release	AATCC Test Method 112			100 ppm
pH of Aqueous Extract	AATCC Test Method 81 or ASTM D2165		6.5	7.5
Flame Resistance (edge ignition) - As received and - After 10 washes <sup>1</sup>	CAN/CGSB-4.2 Test 27.10  CAN/CGSB-4.2 Test 58 (III.E3) (permananet press dry cycle)			Average damaged length: Warp: 100mm Weft: 100mm Average afterflame: 2.0 seconds
Thermal Protective Performance (TPP) with spacer	CAN/CGSB-4.2 Test 78.1 Spacer test		10	
Thermal Shrinkage Resistance (at 260°C for 5 minutes)	CAN/CGSB-155.20 Section 7.3.1			3%
Static Decay - As received (new) - After 10 washes <sup>1</sup>	FED-STD 191A Method 5931 Test at 20°C & 20% RH; Test warp and weft; Charge to +5000V and -5000V; Report results for each direction.	Fabric must charge to at least $\pm 4000V$ ; Less than 0.5 second overall average time to decay, no single measurement greater than 0.5 seconds.		

Property	Test Method	Specified Requirement	Minimum Acceptable	Maximum Acceptable
Seam Efficiency	FED-STD 191A Method 5110 and Note 1		80%	

Note 1: Seam Efficiency - The fabric must be tested for seam efficiency according to Federal Test Methods Standard 191A Method 5110. The thread used must be flame resistant (eg. Kevlar, Nomex or Kermel). The size must be that which is specified in the applicable garment specification or that which best suits the sewing operation involved and the equipment used for the operation. The seam used must be seam type 2.04.03 as specified in CAN/CGSB 54.1. There must be 10 to 12 stitches per inch (2.5 cm) in the seams. Seam efficiency is a function of both the fabric construction/stability and the seam construction. Because seam construction is critical to the results for this test, it is recommended that the seams be constructed and this testing coordinated by the garment manufacturer rather than the fabric producer.