



File MH26117
Projects 11RT03117, 12RT02252 and SR9104410

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REPORT

on

COMPONENT - PROTECTIVE **ENSEMBLES** FOR STRUCTURAL FIRE FIGHTING
(QGVG2)

Safety Components Fabric Technologies Inc.
Greenville, SC

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DESCRIPTION

PRODUCT COVERED

Outer shell fabrics for use in protective clothing for structural fire fighting.

Style	Weight (oz./yd. ²)	Composition	Weave	Finish
PBI Matrix	7.25	60% Para-Aramid/40% PBI	Ripstop	DWR
Fusion 5050	7.0	50% Para-Aramid/50% Meta-Aramid	Ripstop	DWR
Fusion 6040	7.0	60% Para-Aramid/40% Meta-Aramid	Ripstop	DWR
Armor 7.0	7.1	75% Para-Aramid/25% Meta-Aramid	Twill	DWR
Armor AP	7.1	65% Para-Aramid/35% Meta-Aramid	Twill	DWR
PBI MAX 7.0	7.0	Consisting of 70% Spun Yards (52% PBI/48% Para-Aramid Spun Yards)/30% Para-Aramid Filament Yarns	Twill	DWR
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*				

The outer shell fabrics listed above may be supplied in any color.

REQUIRED MARKINGS

Company name, Style designation and Component Recognition Mark on material and/or on tag or ticket attached to each roll, box or bag of material.

TECHNICAL CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE)

Use - For use only in products where the acceptability of the combination is determined by UL LLC. These outer shell fabrics have been found to meet the performance requirements of NFPA 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, **2018** Edition.

Conditions of Acceptability - For use only in the construction of protective clothing for structural fire fighting. The acceptability of these outer shell fabrics for use in any type of clothing other than protective clothing for structural fire fighting has not been investigated.

TEST RECORD NO. 9

GENERAL

Materials submitted by the manufacturer were subjected to the performance tests for outer shell fabrics in accordance with NFPA 1971, Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting, 2018 Edition (2017-08-21). Results of all testing were in compliance with the requirements.

Test Results relate only to the items tested.

SAMPLES

The Outer Shell Fabrics submitted are as follows:

Style	Weight (oz/yd ²)	Composition	Weave	Finish
PBI Matrix	7.25	60% Para-Aramid/40% PBI	Ripstop	DWR
Fusion 5050	7.00	50% Para-Aramid/50% Meta-Aramid	Ripstop	DWR
Fusion 6040	7.00	60% Para-Aramid/40% Meta-Aramid	Ripstop	DWR
Armor 7.0	7.10	75% Para-Aramid/25% Meta-Aramid	Twill	DWR
Armor AP	6.50	65% Para-Aramid/35% Meta-Aramid	Twill	DWR
PBI MAX 7.0	7.00	Consisting of 70% Spun Yards (52% PBI/48% Para- Aramid Spun Yards)/30% Para-Aramid Filament Yarns	Twill	DWR

TESTS PER NFPA 1971

Tear Resistance
 Flame Resistance Test One
 Heat and Thermal Shrinkage Resistance
 Cleaning Shrinkage Resistance
 Breaking Strength
 Water Absorption Resistance

NOTES

All testing was conducted per NFPA 1971-2018 Edition (2017-08-21) under UL Project number 4787744425.

The weight measurements noted in the above table are representative of the nominal values previously described in the Report. Actual weight measurements were measured under the Weight test and those values were used for the Flame Resistance Test One.

BREAKING STRENGTH TEST	NFPA 1971-2018, SECTION 8.50
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Item Type	Garment Materials	
Description	Armor AP, 6.5 osy, 65% Para-Aramid/35% Meta-Aramid, Twill	
Color	Gold with Matrix Pattern	
DO SPECIMENS COMPLY WITH THE REQUIREMENTS OF THE STANDARD [YES/NO]		YES

Conditioning	Specimen	Breaking Strength (N)	
		Warp	Fill
After 10 Launderings	1	1169.9	1333.7
	2	1363.0	1506.3
	3	1260.8	1385.9
	4	1320.2	1468.6
	5	1299.2	1499.4
	Average	1283	1439
Requirement		≥ 623	

CLEANING SHRINKAGE RESISTANCE TEST (CONT'D)	NFPA 1971-2018, SECTION 8.24
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Item Type	Garment Materials Other than Wristlets	
Description	Armor AP, 6.5 osy, 65% Para-Aramid/35% Meta-Aramid, Twill	
Color	Gold with Matrix Pattern	
DO SPECIMENS COMPLY WITH THE REQUIREMENTS OF THE STANDARD [YES/NO]	YES	

Conditioning	Direction	Specimen	Percent Shrinkage			
			1	2	3	Specimen Average
After 5 Launderings	Warp (Wales)	1	-3.0	-3.0	-3.0	-3.0
		2	-3.0	-3.0	-3.0	-3.0
		3	-3.0	-3.0	-3.0	-3.0
Average of all 3 Specimens					-3	
After 5 Launderings	Fill (Courses)	1	-2.0	-2.0	-2.0	-2.0
		2	-2.0	-2.0	-2.0	-2.0
		3	-2.0	-2.0	-2.0	-2.0
Average of all 3 Specimens					-2	
Requirement					≥ -5	

FLAME RESISTANCE TEST 1 (CONT'D)	NFPA 1971-2018, SECTION 8.2
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Item Type	Garment Fabric Materials
Description	Armor AP, 6.5 osy, 65% Para-Aramid/35% Meta-Aramid, Twill
Color	Gold with Matrix Pattern
Weight	6.4
DO SPECIMENS COMPLY WITH THE REQUIREMENTS OF THE STANDARD [YES/NO]	
YES	

Conditioning	Specimen	Warp (Wales)			Fill (Courses)		
		Afterflame (s)	Char Length (mm)	Melt [Y/N]	Afterflame (s)	Char Length (mm)	Melt [Y/N]
As Received	1	0.00	20	N	0.00	17	N
	2	0.00	17	N	0.00	15	N
	3	0.00	19	N	0.00	18	N
	4	0.00	16	N	0.00	20	N
	5	0.00	18	N	0.00	16	N
	Average	0.0	18		0.0	17	
After 5 Launderings	1	0.00	13	N	0.00	13	N
	2	0.00	14	N	0.00	11	N
	3	0.00	15	N	0.00	9	N
	4	0.00	16	N	0.00	13	N
	5	0.00	18	N	0.00	12	N
	Average	0.0	15		0.0	12	
Requirement		≤ 2.0	≤ 100	N	≤ 2.0	≤ 100	N

HEAT AND THERMAL SHRINKAGE RESISTANCE TEST (CONT'D)	NFPA 1971-2018, SECTION 8.6
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Item Type	Garment Outer Shell Fabrics	
Description	Armor AP, 6.5 osy, 65% Para-Aramid/35% Meta-Aramid, Twill	
Color	Gold with Matrix Pattern	
DO SPECIMENS COMPLY WITH THE REQUIREMENTS OF THE STANDARD [YES/NO]	YES	

Conditioning	Specimen	Warp Percent Shrinkage			Average Percent Shrinkage	Fill Percent Shrinkage			Average Percent Shrinkage
		1	2	3		1	2	3	
As Received	1	-0.5	-0.5	-0.5	-0.5	0.0	0.0	0.0	0.0
	2	-0.5	-0.5	-0.5	-0.5	0.0	0.0	0.0	0.0
	3	-1.0	-0.5	-0.5	-0.7	0.0	0.0	0.0	0.0
Average					-1	Average			0
After 5 Launderings	1	-0.5	0.0	-0.5	-0.3	0.0	0.0	0.0	0.0
	2	-0.5	-0.5	0.0	-0.3	0.0	0.0	-0.5	-0.2
	3	-0.5	-0.5	-0.5	-0.5	0.0	0.0	0.0	0.0
Average					0	Average			0
Requirement					≥ -10	Requirement			≥ -10
Conditioning	As Received				After 5 Launderings				
Observation [Y/N]	Specimen	1	2	3	Specimen	1	2	3	
	Drip	N	N	N	Drip	N	N	N	
	Separate	N	N	N	Separate	N	N	N	
	Ignite	N	N	N	Ignite	N	N	N	
	Char	N	N	N	Char	N	N	N	
Requirement		N	N	N		N	N	N	

TEAR RESISTANCE TEST (CONT'D)	NFPA 1971-2018, SECTION 8.12
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Item Type	Garment Outer Shell/Collar Lining Materials	
Description	Armor AP, 6.5 osy, 65% Para-Aramid/35% Meta-Aramid, Twill	
DO SPECIMENS COMPLY WITH THE REQUIREMENTS OF THE STANDARD [YES/NO]	Yes	

Specimen	Tear Resistance Strength (N)			
	As Received		After 5 Launderings	
	Warp Average	Fill Average	Warp Average	Fill Average
1	378.5	540.1	278.4	322.6
2	443.1	518.0	266.4	337.1
3	401.2	581.9	264.0	373.7
4	373.0	635.2	272.2	297.2
5	421.1	632.4	264.6	307.5
Average	403	582	269	328
Requirement	100	100	100	100

WATER ABSORPTION RESISTANCE TEST (CONT'D)	NFPA 1971-2018, SECTION 8.25
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Item Type	Garment Outer Shell Materials
Description	Armor AP, 6.5 osy, 65% Para-Aramid/35% Meta-Aramid, Twill
DO SPECIMENS COMPLY WITH THE REQUIREMENTS OF THE STANDARD [YES/NO]	YES

Conditioning	Specimen	Wet Weight (g)	Dry Weight (g)	Percent Absorption
After 5 Launderings	1	2.44	2.34	4
	2	2.45	2.32	6
	3	2.37	2.27	4
Average				5
Requirement				≤ 15