Report # K-352124-05-R00	Test Report
Samples Received: Dec-11-18 / Samples Tested: Dec-13-18	Kinectrics Inc., 800 Kipling Avenue, Unit 2 Toronto, Ontario, Canada Tel: 416-207-6000, www.kinectrics.com

Tested for

Norfab Corp.
1032 Stanbridge Street
Norristown, PA 19401
USA

Contact information for item tested:

Harish Lilani
1032 Stanbridge Street
Norristown, PA 19401
(Ph) (610) 805-6100

Test item description

3 Layer System, Ensemble 5;
Total Wt. Outer Shell Fabric 5PT339 – OG or CG + Thermal Liner 6NMB1MA1 or PB1, 11.2 z/yd²;
(L1) Norfab Corp., Style NFA OS #5PT339 – OG or CG, 5.1 oz/yd² Plain Weave,
40% Para-Aramid, 30% Novoloid, 30% O-Pan, Dark Olive Green, Pre-wash Weight: 5.1 oz/yd², Weight as Tested: 5.2 oz/yd²;
(L2) Norafin, Style NF TL #6NMB1MA1 or PB1, 2.7 oz/yd² Non-Woven Spunlace,
50% Melamine, 25% Meta-Aramid, 25% Para-Aramid, Yellow,
(L3) Style MA1 or PB1, 3.2 oz/yd² Plain Weave,
93% Meta-Aramid, 5% Para-Aramid, 2% Antistat, Light Blue; Pre-wash Weight: 6.1 oz/yd², Weight as Tested: 6.5 oz/yd²;

Reference Standard

IEC 61482-1-1:2009 Method A, ASTM F1959/F1959M-14e1
Complying with both IEC and ASTM Standard Test Method for Determining the Arc Rating of Materials for Clothing

Test Parameters:

Test current: 8 kA
Arc Gap: 30 cm
Distance to Fabric: 30 cm

Number of samples analysed: 24

Incident Energy Range: 36 to 58 cal/cm²

Arc Rating, ATPV = 46 Cal/cm²
Material Break-Open, Ebt = 51 Cal/cm²
Heat Attenuation Factor, HAF = 95%

Material break-open threshold energy (Ebt) above ATPV determined as requested by client.
No variations to standard method noted.
Samples tested as received, samples not laundered.

Test Summary

The Arc Rating of this material is intended for use as part of a flame resistant garment or system for workers exposed to electric arcs. The test result is applicable only to the test item as described; other fiber blends, weaves, finishing or dye may have different protection level. The test articles are tested as received; no test is done to validate the fiber content or composition. The Arc Rating was calculated based on the data obtained and analysed in accordance with the latest version of the applicable standards. The individual test sheets, graphs, photographs of the samples and video of every test are provided in digital format to the Client for review.

The arc testing performed to the above mentioned Standard is accredited by the Standards Council of Canada (SCC) to conform to the requirements of CAN-P-4E (ISO/IEC 17025:2005). Accreditation by the Standards Council of Canada (SCC) is a mark of competence and reliability recognized throughout the world.

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Note: The test performed does not apply to electrical contact or electrical shock hazard.

Prepared by:

Yosbani Guerra
2019.03.19
08:59:06 -04'00'

Yosbani Guerra
HCL Technologist
Kinectrics Inc.

Approved by:

Andrew Haines
2019.03.20
18:54:44 -04'00'

Andrew Haines
HCL Supervising Technologist
Kinectrics Inc.

Note: For verification about results in this report, please forward copy of the report or inquiry to hcl@kinectrics.com

Date: Dec-13-18	Determination of ATPV by performing logistic regression on the panel burn response as indicated in Summary Table
Report # K-352124-05-R00	Test Performed in accordance with: IEC 61482-1-1:2009 Method A, ASTM F1959/F1959M-14e1

KINECTRICS

Fabric Description:

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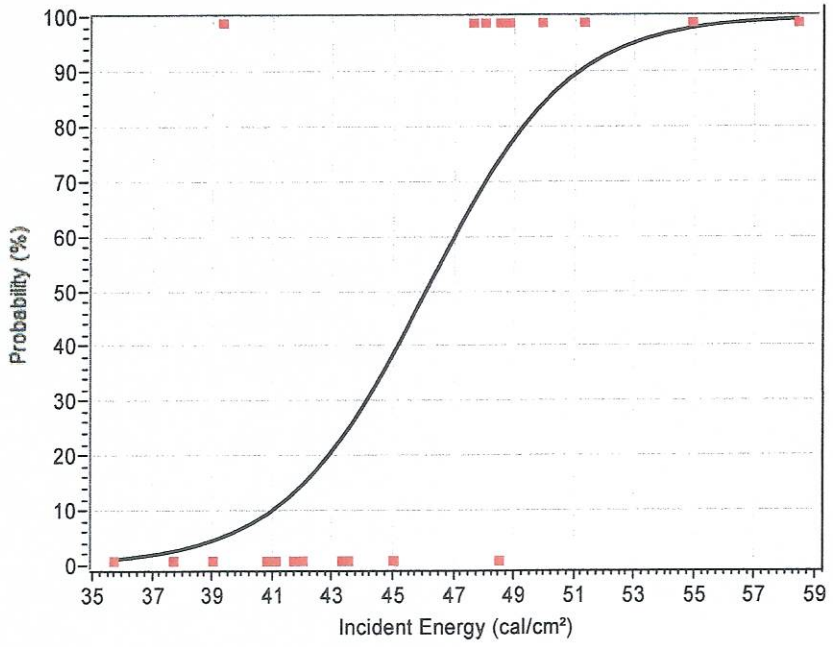
(L3) Style MA1 or PB1, 3.2 oz/yd² Plain Weave,
93% Meta-Aramid, 5% Para-Aramid, 2% Antistat, Light Blue; Pre-wash Weight: 6.1 oz/yd², Weight as Tested: 6.5 oz/yd²;

Determination of ATPV



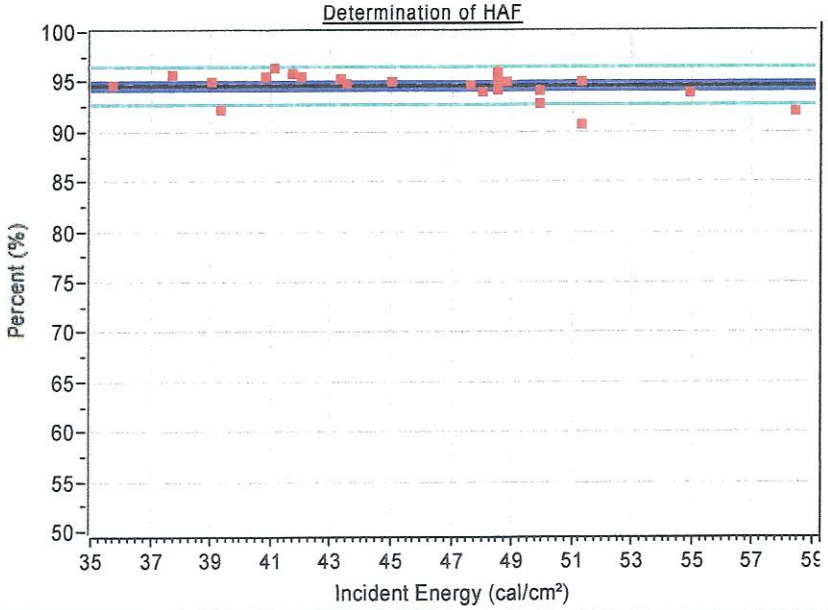
ATPV = 46 cal/cm²

Probability	Ei
5%	39.3
10%	41.0
20%	42.9
30%	44.1
40%	45.1
50%	46.1
60%	47.0
70%	48.1
80%	49.3
90%	51.2

(Note: ATPV is reported to nearest integer for ratings above 10 cal/cm²)

Total points analyzed = 24
Points above Stoll = 12
Points above mix zone = 9
Points below mix zone = 3
 # Pts within 20% = 22
 # Pts in mix zone = 10

Determination of HAF



HAF = 95 %

Confidence Intervals
95% CI = 94.6 , 95.4

Data pts
Best Fit
95% CI
95% CI pts

Date: Dec-13-18	Determination of Ebt by performing logistic regression on the panel break-open response as indicated in Summary Table
Report # K-352124-05-R00	Test Performed in accordance with: IEC 61482-1-1:2009 Method A, ASTM F1959/F1959M-14e1

KINECTRICS

Fabric Description:

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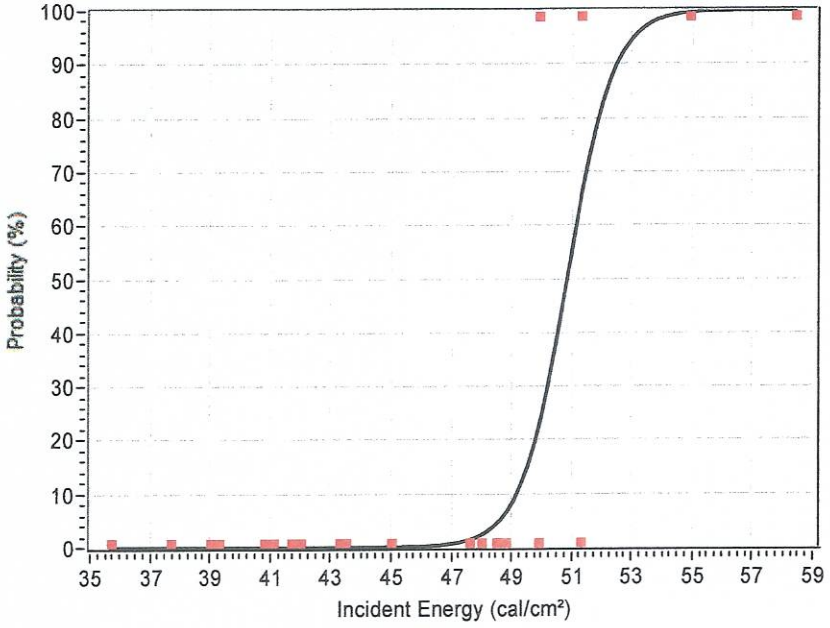
93% Meta-Aramid, 5% Para-Aramid, 2% Antistat, Light Blue; Pre-wash Weight: 6.1 oz/yd², Weight as Tested: 6.5 oz/yd²;

Determination of Ebt, 50% of Probability of Breakopen



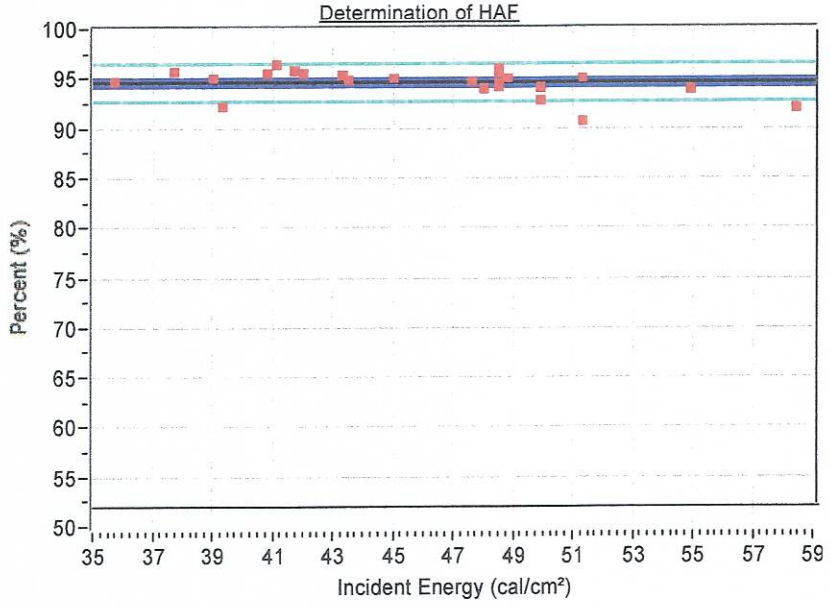
Ebt = 51 cal/cm²

Probability	Ei
5%	48.6
10%	49.2
20%	49.8
30%	50.2
40%	50.5
50%	50.8
60%	51.2
70%	51.5
80%	51.9
90%	52.5

(Note: Ebt is reported to nearest integer for ratings above 10 cal/cm²)

Total points analyzed = 24
Points Break-Open = 4
Points above mix zone = 3
Points below mix zone = 18
 # Pts within 20% = 20
 # Pts in mix zone = 2

Determination of HAF



HAF = 95 %

Confidence Intervals
95% CI = 94.6 , 95.4

Data pts
Best Fit
95% CI
95% CI pts

Date: Dec-13-18	Summary of Measured Energy and Observations
Report # K-352124-05-R00	Test Performed in accordance with : IEC 61482-1-1:2009 Method A, ASTM F1959/F1959M-14e1

Fabric Description: 3 Layer System, Ensemble 5;
Total Wt. Outer Shell Fabric 5PT339 – OG or CG + Thermal Liner 6NMB1MA1 or PB1, 11.2 z/yd²;
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93% Meta-Aramid, 5% Para-Aramid, 2% Antistat, Light Blue; Pre-wash Weight: 6.1 oz/yd², Weight as Tested: 6.5 oz/yd²;

	Test #	Panel	Test Current A	Cycles of 60Hz	Ei Cal/cm²	SCD Cal/cm²	HAF %	>Stoll Y/N	Break Open Y/N	Ablation Y/N	After Flame sec.	Omit Y/N	Comment
1	K-352124-7420	A	8121	52.2	48.0	0.4	94.1	Yes	N	Y	2.5	No	
2	K-352124-7420	B	8121	52.2	39.0	-0.6	95.1	No	N	N	2.5	No	
3	K-352124-7420	C	8121	52.2	48.5	0.2	94.6	Yes	N	Y	2.5	No	
4	K-352124-7421	A	8137	55.2	48.5	0.4	94.3	Yes	N	Y	2	No	
5	K-352124-7421	B	8137	55.2	43.5	-0.2	94.9	No	N	N	3	No	
6	K-352124-7421	C	8137	55.2	47.6	0.1	94.8	Yes	N	Y	3.5	No	
7	K-352124-7422	A	8103	60.3	58.4	2.5	92.1	Yes	Y	Y	4.5	No	
8	K-352124-7422	B	8103	60.3	48.5	-0.2	95.6	No	N	Y	2	No	
9	K-352124-7422	C	8103	60.3	48.5	-0.4	96.1	No	N	Y	1.5	No	
10	K-352124-7423	A	8123	48.2	41.7	-0.6	95.9	No	N	N	2	No	
11	K-352124-7423	B	8123	48.2	42.0	-0.5	95.6	No	N	N	2	No	
12	K-352124-7423	C	8123	48.2	41.1	-0.7	96.5	No	N	N	1.5	No	
13	K-352124-7424	A	8123	56.2	49.9	1.2	92.9	Yes	Y	Y	2.5	No	
14	K-352124-7424	B	8123	56.2	49.9	0.6	94.2	Yes	N	Y	2	No	
15	K-352124-7424	C	8123	56.2	45.0	-0.2	95.1	No	N	Y	3	No	
16	K-352124-7425	A	8127	65.3	54.9	0.8	94.0	Yes	Y	Y	1.5	No	
17	K-352124-7425	B	8127	65.3	51.3	2.7	90.8	Yes	Y	Y	1.5	No	
18	K-352124-7425	C	8127	65.3	51.3	0.1	95.1	Yes	N	Y	3	No	
19	K-352124-7426	A	8115	54.2	48.8	0.0	95.1	Yes	N	Y	1.5	No	
20	K-352124-7426	B	8115	54.2	43.3	-0.3	95.4	No	N	Y	2.5	No	
21	K-352124-7426	C	8115	54.2	39.3	0.6	92.3	Yes	N	Y	3.5	No	
22	K-352124-7427	A	8129	45.2	40.8	-0.5	95.6	No	N	N	1.5	No	
23	K-352124-7427	B	8129	45.2	37.7	-0.5	95.8	No	N	N	2	No	
24	K-352124-7427	C	8129	45.2	35.7	-0.5	94.8	No	N	N	5	No	
25													
26													
27													
28													
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24 samples exhibited afterflame during testing for an average duration of 2.5 seconds.