

Hugh Hoagland Consulting, Inc.

ArcWear.com

Electric Arc Exposure Tests

For XM Textiles

Material System

10 oz/yd² 350 g/m² Satin 4/1, 100% Cotton

Style: 100C-350FR-S

Color: Navy

Actual Areal Density (AAD): 10.4 oz/yd² 352 g/m²

Report Number: 1204P01, Revision: 00

April, 2012

Tests Conducted by Kinectrics High Current Laboratory
Toronto, Ontario, Canada

Electric Arc Exposure Report

ASTM F 1959/F 1959M-06 a^{ε1} Standard Test Method for Determining the Arc Rating of Materials for Clothing

General

At the request of Wu Cong Jun electric arc exposure tests were conducted on textile systems for XM Textiles. Wu Cong Jun arranged with ArcWear.com to facilitate testing by the High Current Laboratory of Kinectrics in Toronto and to review test data.

The tests documented in this report were conducted in accordance with ASTM International Standard F 1959/F 1959M-06 a^{ε1} Standard Test Method for Determining the Arc Rating of Materials for Clothing.

Test samples

The test material was received on March 26, 2012. The test material was washed 3 times and dried by ArcWear.com in accordance with requirements of the above standard. This is specified in the standard to allow for minimal shrinkage while removing contaminants from the material manufacturing process. Following the washing procedure, material was cut into panel test specimens.

Test results

The test program includes minimum of twenty individual panel arc trials. The following test data was recorded for each trial:

- arc exposure electrical conditions: arc trial number, RMS arc current, peak arc current, arc voltage, arc duration, energy dissipated in arc, plots of arc current and arc voltage
- temperature rise response from two monitor and two panel sensors for each panel in each trial, plot of average responses from two panel and two monitor sensors, plot of Incident energy distribution E_i from bare shot analysis
- photographs of exposed material panels
- video

Above mentioned test data is part of report and is available for download from ArcWearOnline.com arc testing website. Test data is accessible only to and protected with XM Textiles unique password.

Report # K-418406-1204P01

Test Report

Kinectrics Inc., 800 Kipling Avenue, Unit 2
Toronto, Ontario, Canada
Tel: 416-207-6000, www.kinectrics.com



KINECTRICS
ISO 9001-2008

Samples Received:
MARCH 26, 2012

Samples Tested:
April 24, 2012

Tested for

Hugh Hoagland
ArcWear.com
502-333-0510
arctesting@arcwear.com

Contact information for item tested:

Wu Cong Jun
XM Textiles
+86 21 52362201
vit@xinmeng.com.br

Test item description

XM Textiles, Style 100C-350FR-S, 10 oz/yd² 350 g/m² Satin 4/1, 100% Cotton, Navy, AAD 10.4 oz/yd² 352 g/m², ArcWear# 1204P01

Reference Standard

ASTM F1959/F1959M-06ae1
Standard Test Method for Determining Arc Thermal Performance of Textile Materials for Clothing by Electric Arc Exposure Method

Test Parameters:

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

Number of samples analysed: 21
Incident Energy Range: 12 to 19 cal/cm²

Arc Rating, ATPV = 16 Cal/cm²
Heat Attenuation Factor, HAF = 83%

Summary

The Arc Rating of this material is intended for use as part of a flame resistant garment for workers exposed to electric arcs. The material was tested by Kinectrics as received. The test result is applicable only to the Test Item, other material or color may have different protection level. Actual performance of the complete garment may vary depending on the final design and assembly of the garment. 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.

As of August 1, 2010, the arc testing performed to the above mentioned Standard is accredited by the Standards Council of Canada to conform to the requirements of CAN-P-4E (ISO/IEC 17025:2005) by QMI, a division of SAI Global and North America's leading QMS registrar. Adherence to this standard provides one of the strongest assurances of service quality available. As a minimum, since July 1998 all work at Kinectrics is performed to meet the requirements of ISO 9001.

Kinectrics Inc takes reasonable steps to ensure that all work performed shall meet the industry standards as set out in Kinectrics Inc.'s Quality Manual, and that all reports shall be reasonably free of errors, inaccuracies or omissions. KINECTRICS INC. DOES NOT MAKE ANY WARRANTY OR REPRESENTATION WHATSOEVER, EXPRESS OR IMPLIED, WITH RESPECT TO THE MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OF ANY INFORMATION CONTAINED IN THIS REPORT OR THE RESPECTIVE WORKS OR SERVICES SUPPLIED OR PERFORMED BY KINECTRICS INC. Kinectrics Inc. does not accept any liability for any damages, either directly, consequentially or otherwise resulting from the use of this report.

Note

- The test performed does not apply to electrical contact or electrical shock hazard.
- An unsigned copy of this report is an unofficial reporting of information. Report must be signed to validate test data and conform to quality standards.

Performed by:

Daniel Ferguson
Station Operator
High Current Laboratory
Ph: 416-207-6000

Approved by:

Claude Maurice,
Lab Manager
High Current Laboratory
hcl@kinectrics.com

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Date:
April 24, 2012

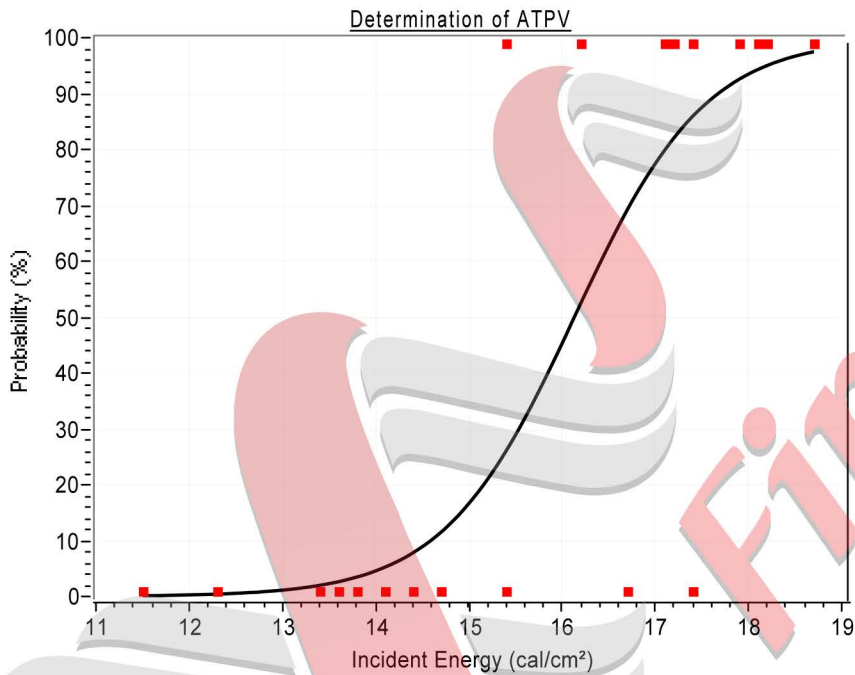
Report #
K-418406-1204P01

Determination of ATPV by performing logistic regression on panel burn
response as indicated in Summary Table

Test Performed in accordance with : ASTM F1959/F1959M-06ae1



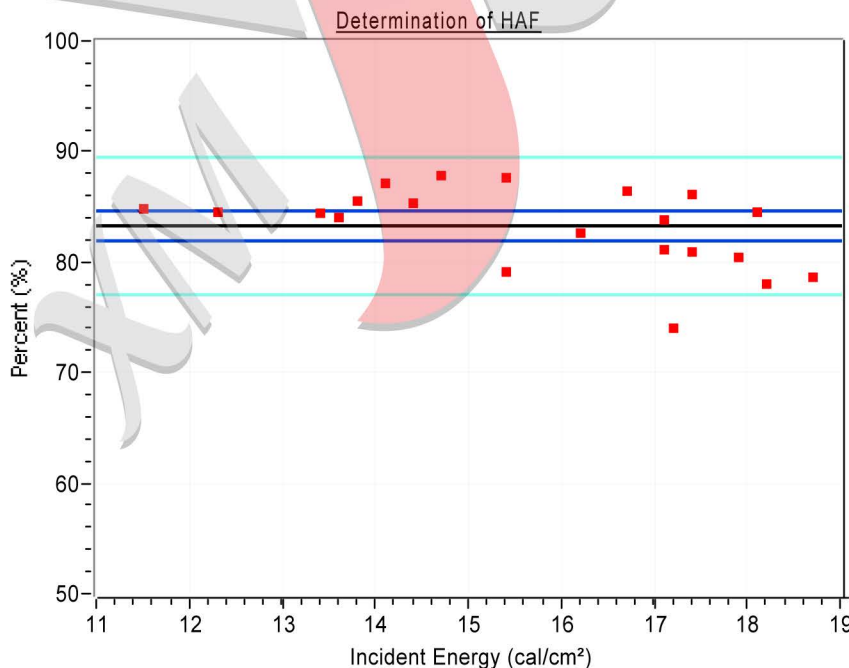
Fabric XM Textiles, Style 100C-350FR-S, 10 oz/yd² 350 g/m² Satin 4/1, 100% Cotton, Navy, AAD 10.4 oz/yd² 352 g/m², ArcWear# 1204P01







ATPV = 16 cal/cm²

Probability	Ei
5%	14.1
10%	14.6
20%	15.2
30%	15.5
40%	15.8
50%	16.1
60%	16.4
70%	16.7
80%	17.1
90%	17.7

Pts = 21
Pts above Stoll = 10
Pts Break-Open = 0
Pts always >STOLL = 5
Pts always <STOLL = 8
Pts within 20% = 19
Pts in mix zone = 7



HAF = 83 %
Confidence Intervals
95% CI = 81.6 , 84.4

Data pts 
Best Fit 
95% CI 
95% CI pts 

Date:
April 24, 2012

Report #
K-418406-1204P01

Summary Table

Test Performed in accordance with : ASTM F1959/F1959M-06ae1



Fabric Description: XM Textiles, Style 100C-350FR-S, 10 oz/yd² 350 g/m² Satin 4/1, 100% Cotton, Navy, AAD 10.4 oz/yd² 352 g/m², ArcWear# 1204P01

Summary of measured energy and observations

	Test #	Panel	Test Current A	Cycles of 60Hz	Ei Cal/cm ²	SCD Cal/cm ²	HAF %	Burn Y/N	Break Open Y/N	Ablation Y/N	After Flame sec.	Omit Y/N	Comment
1	K-418406-2930	A	8306	16.2	14.7	-0.44	87.9	No	-	-	-	No	
2	K-418406-2930	B	8306	16.2	11.5	-0.4	84.9	No	-	-	-	No	
3	K-418406-2930	C	8306	16.2	14.1	-0.5	87.2	No	-	-	-	No	
4	K-418406-2931	A	8234	22.2	18.2	1.84	78.1	Yes	-	-	-	No	
5	K-418406-2931	B	8234	22.2	18.7	1.9	78.7	Yes	-	-	-	No	
6	K-418406-2931	C	8234	22.2	17.2	2.4	74.1	Yes	-	-	-	No	
7	K-418406-2932	A	8252	20.2	17.1	0.40	83.9	Yes	-	-	-	No	
8	K-418406-2932	B	8252	20.2	15.4	0.9	79.2	Yes	-	-	-	No	
9	K-418406-2932	C	8252	20.2	18.1	0.4	84.6	Yes	-	-	-	No	
10	K-418406-2933	A	8247	18.2	15.4	-0.42	87.7	No	-	-	-	No	
11	K-418406-2933	B	8247	18.2	13.8	-0.5	85.6	No	-	-	-	No	
12	K-418406-2933	C	8247	18.2	17.4	1.1	81.0	Yes	-	-	-	No	
13	K-418406-2934	A	8340	17.2	13.4	-0.24	84.5	No	-	-	-	No	
14	K-418406-2934	B	8340	17.2	14.4	-0.4	85.4	No	-	-	-	No	
15	K-418406-2934	C	8340	17.2	12.3	-0.4	84.6	No	-	-	-	No	
16	K-418406-2935	A	8288	21.2	16.7	-0.27	86.5	No	-	-	-	No	
17	K-418406-2935	B	8288	21.2	16.2	0.3	82.7	Yes	-	-	-	No	
18	K-418406-2935	C	8288	21.2	17.1	0.9	81.2	Yes	-	-	-	No	
19	K-418406-2936	A	8265	19.2	17.9	1.18	80.5	Yes	-	-	2	No	
20	K-418406-2936	B	8265	19.2	13.6	-0.3	84.1	No	-	-	-	No	
21	K-418406-2936	C	8265	19.2	17.4	-0.1	86.2	No	-	-	-	No	
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