

Hugh Hoagland Consulting, Inc.

ArcWear.com

Electric Arc Exposure Tests

For Salisbury by Honeywell

Hood

Salisbury by Honeywell Hood Model Number FH11BL

Report Number: 1205F02, Revision: 00

May 30, 2012

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

Electric Arc Exposure Report

ASTM F2178-08 Standard Test Method for Determining the Arc Rating and Standard Specification for Eye or Face Protective Products

General

At the request of Patrick Smith electric arc exposure tests were conducted on hoods for Salisbury by Honeywell. Patrick Smith 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 F2178-08 Standard Test Method for Determining the Arc Rating and Standard Specification for Face Protective Products

Test Samples

Hood test samples (were) received on May 18, 2012.

Samples were tested as received. No washing or any other preparation is required by the standard.

Test Results

The test program includes minimum of ten two-mannequin arc trials. The test data set is evaluated using logistic regression method.

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 four face sensors for each instrumented mannequin head in each trial, 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 Salisbury by Honeywell unique password.

Essential test data and test results are presented in the table below and on the attached data pages as follows:

- arc rating ATPV or EBT or both and plots of the burn injury probability (ATPV) or breakopen probability (EBT) or both versus E_i
- test specimen description and order of layers for fabric system and faceshield
- distance from an arc center line to the panel surface

- subjective evaluation
- heat attenuation factor (HAF) and plot of HAF on E_i
- ignition probability value (if determined during testing)

Rating

Rating resulted from Hood arc testing is **ATPV = 15.0 cal/cm²**

Rating resulted from Hood Fabric System previous testing is **ATPV = 12.4 cal/cm²**

Hood system specified in the Table 1 below received final arc rating as:

ATPV = 12.4 cal/cm²

Table 1

Customer	Salisbury by Honeywell
Manufacturer, Part/Model Number General Design	Salisbury by Honeywell Hood Model Number FH11BL
Hood fabric system	
Layer 1	Milliken Style 155590, 9 oz/yd ² Twill, 88% Cotton 12% Nylon, Navy Blue
Hood faceshield system	
Manufacturer, Design	Paulson Style ARC PC12 NCP
Layer 1 Material, Color, Thickness	Green, Thickness 1.5 mm
Hard Hat	
Manufacturer, Part/Model Number	North Hardhat Model SA79R038

The order of layering is numbered starting from the outer layer listed first.


Requested by: Patrick Smith



Approved by Hugh Hoagland
Arcwear.com

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Report # K-418406-1205F02		Test Report		 KINETRICS ISO 9001-2008
Samples Received: May 18, 2012	Samples Tested: May 30, 2012	Kinectrics Inc., 800 Kipling Avenue, Unit 2 Toronto, Ontario, Canada Tel: 416-207-6000, www.kinectrics.com		
Tested for		Contact information for item tested:		
Hugh Hoagland ArcWear.com 502-333-0510 arcctestng@arcwear.com		David Sklodowski Salisbury by Honeywell 630-343-3856 david.sklodowski@honeywell.com		
Test item description				
Salisbury by Honeywell, Hood Model Number FH11BL, Hardhat SA79R038, Faceshield: Paulson, Style ARC PC12 NCP, Thickness 1.5mm, Fabric: Milliken, Style S/155590, 9 oz/yd ² Twill, 88% Cotton 12% Nylon, Navy Blue, ArcWear# 1205F02				
FABRIC RATING ATPV 12.4 cal/cm ²				
Reference Standard				
ASTM F2178-08 Standard Test Method for Determining the Arc Rating and Standard Specification for Eye and Face Protective Products				
Test Parameters:				
Test current: 8 kA		Number of samples analysed: 20		
Distance to Fabric: 30 cm		Incident Energy Range: 12 to 18 cal/cm ²		
Arc Gap: 30 cm				
Arc Rating, ATPV = 15 Cal/cm² Heat Attenuation Factor, HAF = 87% FABRIC LIMIT ATPV 12.4 cal/cm²				
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. KINETRICS 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 KINETRICS 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:		Approved by:		
Joe Ogrodowczyk Station Operator High Current Laboratory Ph: 416-207-6000		Claude Maurice, Lab Manager High Current Laboratory hcl@kinectrics.com		

Date:
May 30, 2012

Report #
K-418406-1205F02

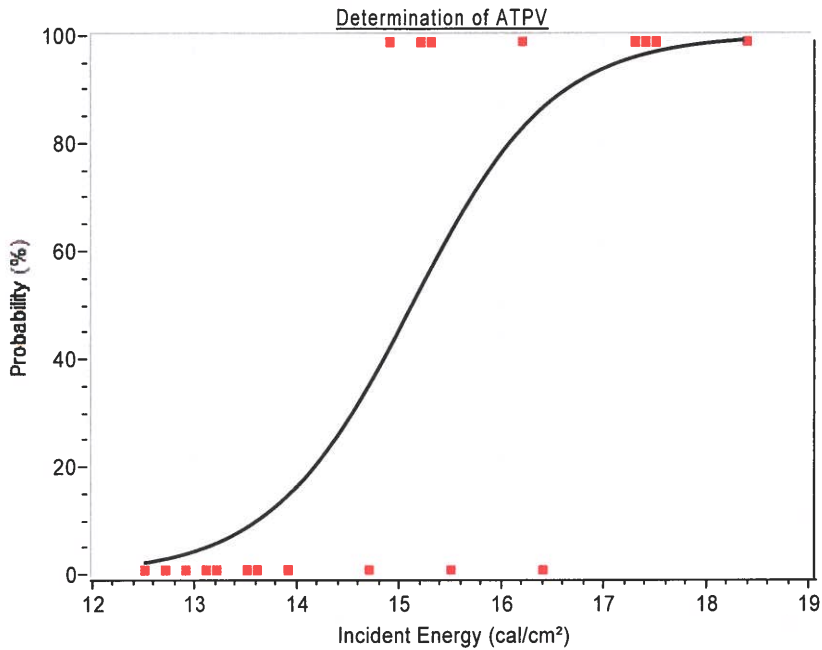
Determination of ATPV by performing logistic regression on panel burn response as indicated in Summary Table

Test Performed in accordance with : ASTM F2178-08



Fabric: Salisbury by Honeywell, Hood Model Number FH11BL, Hardhat SA79R038, Faceshield: Paulson, Style
Description: ARC PC12 NCP, Thickness 1.5mm, Fabric: Milliken, Style S/155590, 9 oz/yd² Twill, 88% Cotton 12% Nylon, Navy Blue, ArcWear# 1205F02

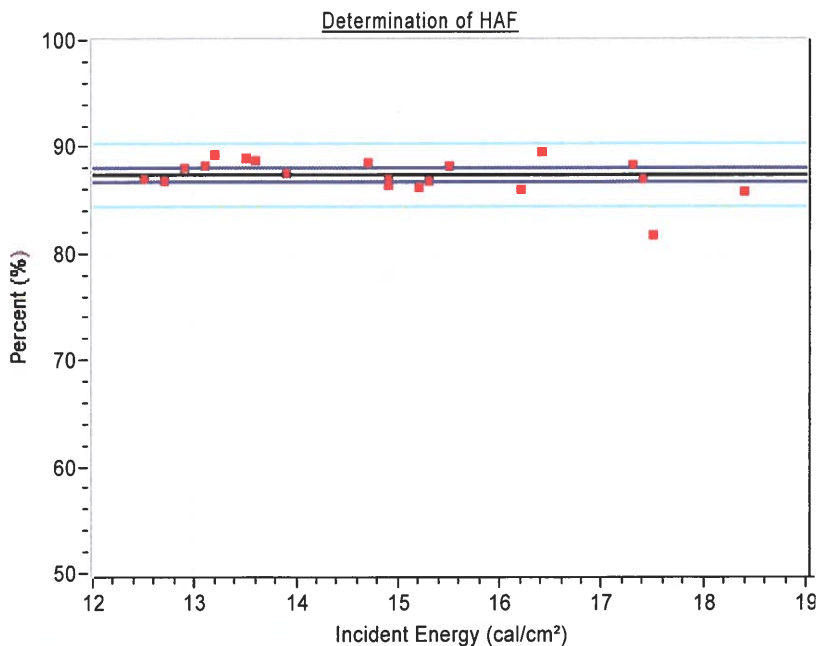
FABRIC RATING ATPV 12.4 cal/cm²



ATPV = 15 cal/cm²





Probability	Ei
5%	13.1
10%	13.6
20%	14.2
30%	14.5
40%	14.8
50%	15.1
60%	15.4
70%	15.7
80%	16.1
90%	16.6

Pts = 20
Pts above Stoll = 9
Pts Break-Open = 0
Pts always >STOLL = 4
Pts always <STOLL = 9
Pts within 20% = 19
Pts in mix zone = 7



HAF = 87 %

Confidence Intervals
95% CI = 86.3 , 87.7

Data pts 
Best Fit 
95% CI 
95% CI pts 



Summary Table

Test Performed in accordance with : ASTM F2178-08

Date: May 30, 2012

Report # K-418406-1205F02

Fabric Description: Salisbury by Honeywell, Hood Model Number FH11BL, Hardhat SA79R038, Faceshield: Paulson, Style ARC PC12 NCP, Thickness 1.5mm, Fabric: Milliken, Style S/155590, 9 oz/yd² Twill, 88% Cotton 12% Nylon, Navy Blue, ArcWear# 1205F02

FABRIC RATING ATPV 12.4 cal/cm²

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-418406-3909	A	8167	23.2	17.3	0.00	88.4	Yes	-	1.5	No	
2	K-418406-3909	B	8167	23.2	18.4	0.6	85.9	Yes	-	2.5	No	
3	K-418406-3910	A	8250	15.2	12.5	0.04	87.1	No	-	0	No	CHANGED TO NO BURN, NOISE
4	K-418406-3910	B	8250	15.2	12.9	-0.0	88.1	No	-	0	No	
5	K-418406-3908	A	8164	20.2	13.2	-0.28	88.3	No	-	0	No	
6	K-418406-3908	B	8164	20.2	17.4	0.4	87.1	Yes	-	1.5	No	
7	K-418406-3911	A	8225	17.2	13.9	-0.04	87.6	No	-	0	No	
8	K-418406-3911	B	8225	17.2	13.5	-0.2	89.0	No	-	3.5	No	
9	K-418406-3912	A	8192	21.2	15.2	0.17	86.3	Yes	-	2	No	
10	K-418406-3912	B	8192	21.2	17.5	1.1	81.8	Yes	-	2	No	
11	K-418406-3913	A	8249	19.2	15.3	0.18	86.9	Yes	-	0	No	
12	K-418406-3913	B	8249	19.2	13.6	-0.2	86.8	No	-	2	No	
13	K-418406-3914	A	8246	18.2	14.7	-0.04	86.6	No	-	0	No	
14	K-418406-3914	B	8246	18.2	16.2	0.5	86.1	Yes	-	0	No	
15	K-418406-3915	A	8254	17.7	12.7	-0.14	86.9	No	-	0	No	
16	K-418406-3915	B	8254	17.7	15.5	-0.1	86.3	No	-	0	No	
17	K-418406-3916	A	8270	17.7	14.9	0.07	87.1	Yes	-	0	No	
18	K-418406-3916	B	8270	17.7	16.4	-0.1	86.6	No	-	0	No	
19	K-418406-3917	A	8257	18.7	13.1	-0.32	86.3	No	-	1.5	No	
20	K-418406-3917	B	8257	18.7	14.9	0.1	86.5	Yes	-	1	No	
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