TEST REPORT

2018EC0064

DATE OF RECEPTION
10/10/2018

DATE TESTS
Starting: 30/10/2018
Ending: 11/12/2018

APPLICANT

Honeywell Salisbury
PO Box 70729
US-29415 NORTH Charleston
South Carolina

Att. Bill Williams

Asociación de Investigación de la Industria Textil – C.I.F.: G03182870

IDENTIFICATION AND DESCRIPTION OF SAMPLES

REFERENCES
CHARLESTON ELECTRIFLEX MODIFIED FORMULA CLASS 1 (BLACK)

A new sample has been added to the order: GLOVES CLASS 1 (BLACK)

TESTS CARRIED OUT

- DIMENSIONs OF THE INSULATING EQUIPMENT.
- THICKNESS OF INSULATING EQUIPMENT.
- PUNCTURE RESISTANCE.
- DETERMINATION OF BREAKING STRENGTH AND ELONGATION.
- DETERMINATION OF RESIDUAL ELONGATION.
- DIELECTRIC TESTS.
- FLAME RETARDANCY TEST.
- DETERMINATION OF pH VALUE.
- EXTRACTABLE PROTEINS.

Tests marked with * are not included within the scope of the ENAC accreditation

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RESULTS

DIMENSIONS OF THE INSULATING EQUIPMENT

Standard
EN 60903:2003 (point 8.2.2)

Apparatus
Rules

Test date
16/11/2018

Test room conditions for testing
Initial

Temperature: 21.4 °C, Relative humidity of 52.4 %.

Final

Temperature: 20.9 °C, Relative humidity of 51.5 %.

Sample pre-conditioning
2 h at a temperature of 21.4 ° C and relative humidity 51.1%.

Observation or deviation of the standard

Description of the sample
Insulating glove black class 1 and category RC.

Reference
GLOVE REF. CHARLESTON ELECTRIFLEX MODIFIED FORMULA CLASS 1 (BLACK)

Test uncertainty
The expanded uncertainty is ± 1.5 mm of the value of the measured for a probability of coverage of 95%.

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RESULTS

SAMPLES Nª	1	2	3
Length (mm)	400	412	405

Requirements for the dimensional evaluation of insulation gloves according to EN 60903:2003 (point 5.1.3).

- **Dimensions:** for preformed gloves the difference between max. And min. shall be (50 ± 6) mm, except for long composite gloves that will be (100 ± 12) mm. Standard lengths vary by class:

CLASS	Standard Lengths (mm)				
variation	± 15				± 20[a]
00	280	360	-	-	-
0	280	360	410	460	-
1	-	360	410	460	800[a]
2	-	360	410	460	800[a]
3	-	360	410	460	800[a]
4	-	360	410	460	-

[a] Compound Long Gloves

For a glove of 410 mm length.

PASS

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The test was carried out at APPE Laboratory located at Polígono Industrial Santiago Payá C/Filá Benimerines, 25 B – 03801 Alcoy (Alicante).

RESULTS

THICKNESS OF INSULATING EQUIPMENT

Standard
EN 60903:2003 (point 8.2.3)

Apparatus
Thickness gauge.

Test date
16/11/2018

Test room conditions for testing
Initial
Temperature: 21.4 °C, Relative humidity of 52.4 %.
Final
Temperature: 20.9 °C, Relative humidity of 51.5 %.

Sample pre-conditioning
2 h at a temperature of 21.4 ° C and relative humidity 51.1%.

Observation or deviation of the standard

Description of the sample
Insulating glove black class 1 and category RC.

Test uncertainty.
The expanded uncertainty is ± 0.1 mm of the value of the measured for a probability of coverage of 95%.

Reference
GLOVE REF. CHARLESTON ELECTRIFLEX MODIFIED FORMULA CLASS 1 (BLACK)

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RESULTS

SAMPLE Nº	MAXIMUM THICKNESS (mm)	SAMPLE Nº	MAXIMUM THICKNESS (mm)	SAMPLE Nº	MAXIMUM THICKNESS (mm)
1	1.04	**11**	1.23	**17**	1.19
2	1.08	**12**	1.21	**18**	1.14
3	1.07	**13**	1.18	**19**	1.17
8	1.11	**14**	1.07	**20**	1.20
9	1.19	**15**	1.23	**21**	1.13
10	1.31	**16**	1.07	**---**	---

Requirements for the thickness evaluation of insulation gloves according to EN 60903: 2003 (point 5.1.4).

- **Thickness**: The maximum thickness on the smooth face of a glove shall be:

CLASS	Thickness (mm)		
	Insulating gloves	Composite Gloves	Compound Long Gloves
00	0.50	1.8	-
0	1.00	2.3	-
1	1.50	-	3.1
2	2.30	-	4.2
3	2.90	-	4.2
4	3.60	-	-
Category A, H, Z and R gloves may require an additional thickness not to exceed 0.6 mm.			

PASS

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The test was carried out at APPE Laboratory located at Polígono Industrial Santiago Payá C/Filá Benimerines, 25 B - 03801 Alcoy (Alicante).

RESULTS

PUNCTURE RESISTANCE

Standard
EN 60903:2003 point 8.3.2

Apparatus
INSTRON Dynamometer

Gauge length
(500±50) mm/min

Atmosphere for conditioning
Temperature (23±2) ºC **Relative humidity** (50±5) %

Nº of specimens
2

Conditioning date
20/11/2018

Test date
26/11/2018

Reference	GLOVE REF. CHARLESTON ELECTRIFLEX MODIFIED FORMULA CLASS 1 (BLACK)
Specimens	**Maximum force (N)**
1	70.23
2	50.29

Remark
The expanded uncertainty of maximum force is ±10% of the value of the measured for a probability of coverage of 95%.

REQUISITE ACCORDING TO STANDARD EN 60903:2003 POINT 6.1.
Mechanical puncture resistance should correspond to a higher than 18N/mm for insulating gloves and must be greater than 60N for composed gloves.

PASS

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RESULTS

DETERMINATION OF RESIDUAL ELONGATION

Standard
EN 60903:2003 point 8.3.3

Apparatus
INSTRON Dynamometer

Gauge length
50 mm

Mounting Laxo

Atmosphere for conditioning and testing

Temperature (23±2) ºC **Relative humidity** (50±5) %

Nº of specimens
3

Conditioning date
20/11/2018 - 03/12/2018

Test date
03/12/2018

Reference	Residual Elongation (%)	C.V. (%)
GLOVE REF. CHARLESTON ELECTRIFLEX MODIFIED FORMULA CLASS 1 (BLACK) Original	0%	0.0
GLOVE REF. CHARLESTON ELECTRIFLEX MODIFIED FORMULA CLASS 1 (BLACK) After thermal aging (168h to 70º±2C)	0%	0.0

REQUISITE ACCORDING TO STANDARD EN 60903:2003 POINT 5.2.2.
The residual elongation should not exceed 15%.

PASS

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RESULTS

DIELECTRIC TESTS

Standard
EN 60903:2003 (point 8.4)

Apparatus
Equipment testing of dielectric equipment.

Test date
16/11/2018 - 30/11/2018

Test room conditions for testing

Initial (30-11-2018)
Samples 6, 7: Temperature: 22.1 °C, Relative humidity of 48.5 %.
Final
Samples 6, 7: Temperature: 22.3 °C, Relative humidity of 48.3 %.

Initial (20-11-2018)
Samples 8, 9 and 10: Temperature: 22.4 °C, Relative humidity of 55.9 %.
Final
Samples 8, 9 and 10: Temperature: 25.8 °C, Relative humidity of 50.1 %.

Initial (28-11-2018)
Samples 12, 13: Temperature: 21.4 °C, Relative humidity of 46.1 %
Final
Samples 12, 13: Temperature: 21.4 °C, Relative humidity of 45.4 %

Initial (28-11-2018)
Sample 15, 16: Temperature: 20.9 °C, Relative humidity of 47.2 %.
Final
Sample 15, 16: Temperature: 20.9 °C, Relative humidity of 47.2 %.

Initial (30-11-2018)
Samples 17, 18: Temperature: 22.9 °C, Relative humidity of 48.5 %.
Final
Samples 17, 18: Temperature: 23.0 °C, Relative humidity of 47.3 %.

Initial (20-11-2018)
Samples 19, 20 and 21: Temperature: 23.5 °C, Relative humidity of 54.9 %.
Final
Samples 19, 20 and 21: Temperature: 23.3 °C, Relative humidity of 56.7 %.

Sample pre-conditioning

16-11-2018
2 h at a temperature of 21.4 ° C and relative humidity 51.1%.

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RESULTS

Observation or deviation of the standard

Description of the sample
Insulating glove black class 1 and category RC.

Test uncertainty
The expanded uncertainty is ± 7% of the value of the measured for a probability of coverage of 95%.

Reference
GLOVE REF. CHARLESTON ELECTRIFLEX MODIFIED FORMULA CLASS 1 (BLACK)

Pre-Treatment Conditioning to moisture absorption: (16 ± 0.5) h by immersion in water.

SAMPLE Nº	8	9	10
Proof test voltage (kV)	10.1	10.1	10.1
Maximum proof test current (mA)	8.1	8.4	8.2
Test Time (s)	180	180	180
Proof test voltage result	Pass	Pass	Pass
Withstand test voltage (kV)	20.2	20.2	20.2
Withstand test voltage result	Pass	Pass	Pass
Overcoming Dielectric Tests	YES	YES	YES

Pre-Treatment Exposure to aging: 168 h at a temperature of (70 ± 2) ° C and relative humidity less than (20) %. Cool min. 24 h.

SAMPLE Nº	6	7
Proof test voltage (kV)	10.0	10.0
Maximum proof test current (mA)	7.1	7.0
Test Time (s)	180	180
Overcoming Dielectric Tests	YES	YES

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RESULTS

Pre-treatment

Exposure to very low temperature of Category C: (24 ± 0.5) h at (-40 ± 3) ° C, 1 min. Then fold over the wrist and subject to a force of 100 N for 30s.

SAMPLE Nº	19	20	21
Proof test voltage (kV)	10.0	10.0	10.0
Maximum proof test current (mA)	7.3	7.3	7.4
Test Time (s)	180	180	180
Overcoming Dielectric Tests	YES	YES	YES

Pre-Treatment

Exposure to Category A contamination: (8 ± 0.5) h. Submerged in H2SO4 of 32ºB, at (23 ± 2) ºC. Then wash the samples with water and dry for (2 ± 0.5) h at 70 ° C approx.

SAMPLE Nº	12	13
Proof test voltage (kV)	10.1	10.1
Maximum proof test current (mA)	7.5	7.1
Test Time (s)	180	180
Overcoming Dielectric Tests	YES	YES

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RESULTS

Pre-Treatment Exposure to contamination category H: (24 ± 0.5) h. Immersed in liquid 102 at (70 ± 2) ° C and then dried with a cloth.

SAMPLE Nº	15	16
Proof test voltage (kV)	10.1	10.1
Maximum proof test current (mA)	7.1	7.8
Test Time (s)	180	180
Overcoming Dielectric Tests	YES	YES

Pre-Treatment Exposure to contamination category Z: conditioned in an oven for (3 ± 0.5) h. At 40 ± 2 ° C and an ozone concentration of (1 ± 0.01) mg / m3 at atmospheric pressure of 1013 mbar, and stored at (23 ± 2) ° C and (50 ± 5) RH for 48 ± 0.5) H.

SAMPLE Nº	17	18
Proof test voltage (kV)	10.0	10.0
Maximum proof test current (mA)	7.1	7.1
Test Time (s)	180	180
Overcoming Dielectric Tests	YES	YES

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RESULTS

Requirement for evaluation of dielectric test according to EN 60903: 2003 (point 5.3).

Class	Alternating current test					
	Proof test voltage (kV)	Maximum proof test current (mA)				Withstand test voltage (kV)
		Length of glove (mm)				
		280	360	410	≥ 460	
00	2.5	12	14	N.A.	N.A.	5
0	5	12	14	16	18	10
1	10	N.A.	16	18	20	20
2	20	N.A.	18	20	22	30
3	30	N.A.	20	22	24	40
4	40	N.A.	N.A.	24	26	50

N.A.:Not applicable.

PASS

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The test was carried out at APPE Laboratory located at Polígono Industrial Santiago Payá C/Filá Benimerines, 25 B – 03801 Alcoy (Alicante).

RESULTS

DETERMINATION OF BREAKING STRENGTH AND ELONGATION

Standard
EN 60903:2003 point 8.3.1
Apparatus
INSTRON Dynamometer
Gauge length
50 mm
Gauge length
(500±50) mm/min
Mounting Laxo
Atmosphere for conditioning and testing
Temperature (23±2) ºC **Relative humidity** (50±5) %
Nº of specimens
4
Conditioning date
03/12/2018
Test date
10/12/2018

Reference	Maximum average Load (MPa)		C.V. (%)	Average Elongation at break (%)		C.V. (%)
GLOVE REF. CHARLESTON ELECTRIFLEX MODIFIED FORMULA CLASS 1 (BLACK)	26.97	**26.99**	7.6	649.31	**637.40**	1.91
	28.69			641.47		
	28.19			620.54		
After thermal aging (168h to 70º±2C)	24.12			638.28		

Remark
The expanded uncertainty of maximum force is ±5% of the value of the measured for a probability of coverage of 95%.

REQUISITE ACCORDING TO STANDARD EN 60903:2003 POINT 8.3.1.
The average tensile strength and elongation at break should not be less than 80% of the values obtained by gloves that have not been exposed to oil. The residual elongation should not exceed 15%

PASS

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RESULTS

FLAME RETARDANCY TEST

Standard
EN 60903:2003 (point 8.6.2)

Apparatus
Equipment testing of dielectric equipment.

Test date
16/11/2018 - 04/12/2018

Test room conditions for testing

Initial (04-12-2018)
Sample 3: Temperature: 22.5 °C, Relative humidity of 45.7 %.
Final
Sample 3: Temperature: 22.5 °C, Relative humidity of 46.1 %.

Sample pre-conditioning
2 h at a temperature of 21.4 ° C and relative humidity 51.1%.

Observation or deviation of the standard

Description of the sample
Insulating glove black class 1 and category RC.

Reference
GLOVE REF. CHARLESTON ELECTRIFLEX MODIFIED FORMULA CLASS 1 (BLACK)

SAMPLE Nº	The flame reaches the reference lines during the observation period.
3	NO

Requirement for evaluation of flame resistance for insulating gloves according to standard to EN 60903: 2003 (point 5.5.2).

Test piece obtained from gloves shall withstand the propagation of the flame: The reference line on the specimen shall not reach 55 mm from its end within 55 s after flame removal.

PASS

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The test was carried out at APPE Laboratory located at Polígono Industrial Santiago Payá C/Filá Benimerines, 25 B – 03801 Alcoy (Alicante).

RESULTS

DETERMINATION OF BREAKING STRENGTH AND ELONGATION

Standard
EN 60903:2003 point 8.3.1
Apparatus
INSTRON Dynamometer
Gauge length
50 mm
Gauge length
(500±50) mm/min
Mounting Laxo
Atmosphere for conditioning and testing
Temperature (23±2) ºC **Relative humidity** (50±5) %
Nº of specimens
4
Conditioning date
29/11/2018
Test date
03/12/2018

Reference	Maximum average Load (MPa)		C.V. (%)	Average Elongation at break (%)		C.V. (%)
GLOVE REF. CHARLESTON ELECTRIFLEX MODIFIED FORMULA CLASS 1 (BLACK)	23.63	**23.53**	0.6	603.97	**607.44**	0.81
After acid	23.44			610.92		

Remark
The expanded uncertainty of maximum force is ±5% of the value of the measured for a probability of coverage of 95%.

REQUISITE ACCORDING TO STANDARD EN 60903:2003 POINT 5.6.1
The average tensile strength and elongation at break should not be less than 75% of the values obtained by gloves that have not been exposed to acid.

PASS

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RESULTS

DETERMINATION OF BREAKING STRENGTH AND ELONGATION

Standard
EN 60903:2003 point 8.3.1
Apparatus
INSTRON Dynamometer
Gauge length
50 mm
Gauge length
(500±50) mm/min
Mounting Laxo
Atmosphere for conditioning and testing
Temperature (23±2) ºC **Relative humidity** (50±5) %
Nº of specimens
4
Conditioning date
29/11/2018
Test date
03/12/2018

Reference	Maximum average Load (MPa)		C.V. (%)	Average Elongation at break (%)		C.V. (%)
GLOVE REF. CHARLESTON ELECTRIFLEX MODIFIED FORMULA CLASS 1 (BLACK)	12.54	**14.48**	18.9	508.69	**507.13**	0.44
	16.41			505.57		
After oil						

Remark
The expanded uncertainty of maximum force is ±5% of the value of the measured for a probability of coverage of 95%.

REQUISITE ACCORDING TO STANDARD EN 60903:2003 POINT 5.6.2
The average tensile strength and elongation at break should not be less than 50% of the values obtained by gloves that have not been exposed to oil.

PASS

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RESULTS

DETERMINATION OF PH VALUE

Standard
EN ISO 3071:2006

Determination date
11/12/2018

Extractor solution
A - H_2O

pH Extractor solution
7,38

Temperature
21.3 ºC

Reference	pH	Uncertainty
GLOVE REF. CHARLESTON ELECTRIFLEX MODIFIED FORMULA CLASS 1 (BLACK)	7.30	± 5 %

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RESULTS

EXTRACTABLE PROTEINS

Standard: EN 455-3:2015

Test method : Modified Lowry´s method

Test date: 31.10.18 – 08.11.18

Sample reference: GLOVE REF. CHARLESTON ELECTRIFLEX MODIFIED FORMULA CLASS 1 (BLACK)

Batch number [(1)]: ---

Size: --

Results:

Result µg/g	Uncertainly %
44.6	52

Remarks:

- [(1)] Data provided by the Customer.
- According to the standard EN 455-3:2015, if the gloves are labelled indicating a protein content, is not allowed to declare in the label an inferior protein content to 50 µg/g.
- Test covered by accreditation number Nº. 0248, emitted by UKAS

Raquel Muñoz
Chief of Innovation Area

Digitally signed by RAQUEL MUNOZ GONZALEZ - NIF:05895159Y
Date: 2018.12.12 17:00:10 +01:00
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