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ENAC
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Nº12/LE025
Nº12/LE427

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

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Att. Samit V. Chaudhari

REPORT ISSUED BY THE RESEARCH ASSOCIATION OF THE TEXTILE INDUSTRY, AITEX

Nº 2020ID0092

The test was carried out at Polígono Industrial Fuente del Jarro. C/ Ciudad de Gibraltar, 5; 46988 – Paterna (Valencia); which property is shared at 50% between research institutes AITEX and ITE.

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ITE
INSTITUTO TECNOLÓGICO DE LA ENERGÍA

APPLICANT

HONEYWELL TECHNOLOGY SOLUTIONS LAB PVT LTD

Date of reception 03/11/2020

Date Test Starting: 03/11/2020
Ending: 23/11/2020

IDENTIFICATION AND DESCRIPTION OF SAMPLES

REFERENCES
Pant INACP12RB Serie

TESTS CARRIED OUT

- MASS PER UNIT AREA.
- PRE-TREATMENT FOR DOMESTIC WASHING AND DRYING PROCEDURES FOR TEXTILE TESTING.
- STANDARD PRACTICE FOR DETERMINING RESPONSE CHARACTERISTICS AND DESIGN INTEGRITY OF ARC RATED FINISHED PRODUCTS IN AN ELECTRIC ARC EXPOSURE.

DESCRIPCIÓN DE MUESTRAS / *DESCRIPTION OF SAMPLES*

PHOTOGRAPHY

Reference (1)

Pant INACP12RB Serie

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RESULTS/RESULTADOS

MASS PER UNIT AREA

Standard
ASTM D3776/3776M-09a (R2017) Option C

Conditioning date	03/11/2020	**Test date**	10/11/2020

Atmosphere for conditioning testing

Temperature	(21±1) ºC	**Relative humidity**	(65±2) %

Type of fabric
Woven fabric
State of the specimens
Original
Previous treatment
Null
Reference
Pant INACP12RB Serie

Mass per unit area (oz/yd^2)	Mass per unit area (g/m^2)	Mass per unit area (oz/yd)	Mass per unit area (g/m)
9,87	334,55	2,16	66,91

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RESULTS/RESULTADOS

PRE-TREATMENT FOR DOMESTIC WASHING AND DRYING PROCEDURES FOR TEXTILE TESTING

Standard
AATCC 135:2018
Standard deviation

Reference
Sample 1 Pant INACP12RB Serie
Washing machine
13373I12
Washing cycles
3
Washing procedure
IV
Dryer machine
Whirlpool 13098I12
Drying procedure
Aiii
Washing powder
AATCC 1993 WOB
Start and finish date
04/11/2020 - 04/11/2020

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RESULTS/RESULTADOS

MASS PER UNIT AREA

Standard
ASTM D3776/3776M-09a (R2017) Option C

Conditioning date 04/11/2020 **Test date** 10/11/2020

Atmosphere for conditioning testing
Temperature (21±1) ºC **Relative humidity** (65±2) %

Type of fabric
Woven fabric

State of the specimens
Washed

Previous treatment
3 washing cycles, according to standard AATCC 135:2018, washed procedure 3/IV/Aiii

Reference
Pant INACP12RB Serie

Mass per unit area (oz/yd^2)	Mass per unit area (g/m^2)	Mass per unit area (oz/yd)	Mass per unit area (g/m)
10,37	351,49	2,27	70,30

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RESULTS/RESULTADOS

STANDARD PRACTICE FOR DETERMINING RESPONSE CHARACTERISTICS AND DESIGN INTEGRITY OF ARC RATED FINISHED PRODUCTS IN AN ELECTRIC ARC EXPOSURE

Test description

One garment was exposed to an arc incident energy level at least el equal or above to Arc Rating of the fabric or fabric system used in garment construction. Following the arc exposure, the garment is examined. Areas of particular interest are seems, integrity of the closure systems, overlap of important areas, reflective trim or other accessories. The front area is examined for evidence of arc energy that may enter and expose the under-layers. A lightweight undergarment may be used to provide a heat sensitive indicator which is used to help in the evaluation of thermal energy through the closures or interface.

The following test data was recorded for each trial:

Arc exposure electrical conditions: arc trial number, RMS arc current, peak.

Temperature rise response from two monitor sensors for each Mannequin in each trial, plot of average responses from two monitor sensors

Photographs before and after electric arc exposure

Video

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STANDARD PRACTICE FOR DETERMINING RESPONSE CHARACTERISTICS AND DESIGN INTEGRITY OF ARC RATED FINISHED PRODUCTS IN AN ELECTRIC ARC EXPOSURE

Standard
ASTM F2621-2019
Reference
Pant INACP12RB Serie

Test conditions	
Data test	20/11/2020
Stainless steel electrodes, gap of the electrodes	(300 ± 5) mm.
Distance between the electrodes and sample	(300 ± 5) mm.
Arc current	(8 ± 1) kA
Fuse wire	0.5 mm.
Number of samples tested	1
Starting and ending pre-treatment date	04/11/2020 - 04/11/2020

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STANDARD PRACTICE FOR DETERMINING RESPONSE CHARACTERISTICS AND DESIGN INTEGRITY OF ARC RATED FINISHED PRODUCTS IN AN ELECTRIC ARC EXPOSURE

Sample tested	Mannequin A
Reference	Pant INACP12RB Serie
Arc Rating	ATPV = 13 cal/cm^2 1208P49 - Arcwear
Pre-treatment	3 washing cycles at 49ºC, according to standard AATCC TM135-2018, method 3IV and type Aiii drying
Garment layers and components According to the information supplied by the manufacturer	
Layer 1	Navy Blue woven fabric style 100C-320FR MaDEIRA-320, 100% Cotton, 320 g/m², manufacturer XM Textiles.
Closure Type(s)	Button and covered zipper.
Pockets	Two cargo pockets with flap closed by buttons.
Reflective trim	One around sleeves.
Others	Belt loops.
Indicator fabric	
Used in evaluation (yes/no)	Yes
Indicator fabric type	140 g/m^{2}100% Cotton

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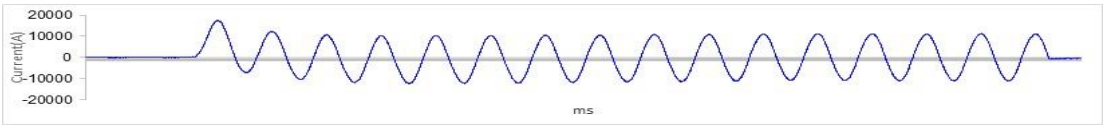
STANDARD PRACTICE FOR DETERMINING RESPONSE CHARACTERISTICS AND DESIGN INTEGRITY OF ARC RATED FINISHED PRODUCTS IN AN ELECTRIC ARC EXPOSURE

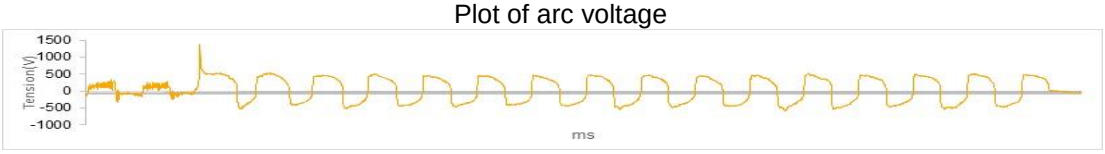
Electrical current and response sensor plot:

Mannequin A Pant INACP12RB Serie

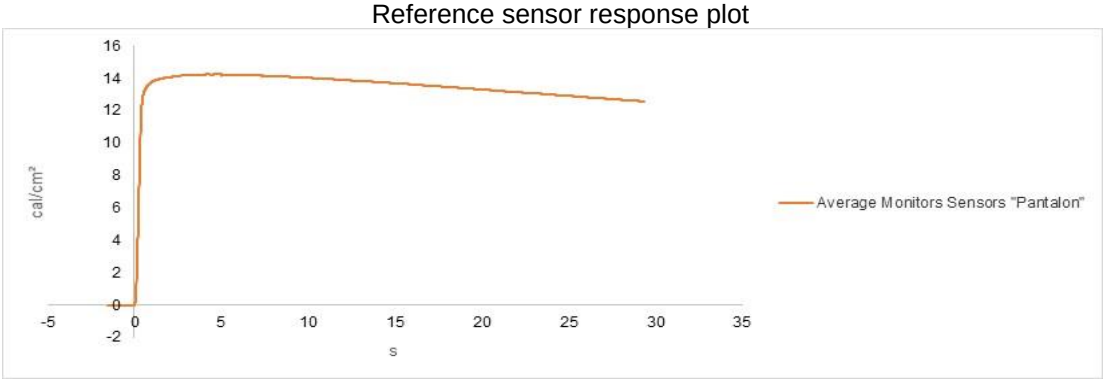
Plot of arc current



Plot of arc voltage



Reference sensor response plot



Current Total RMS (kA)	8,0	**Current Peak (kA)**	17,6	**Arc Voltage (V)**	1389,0
Duration (cycles nº)	15,7	**Duration (ms)**	313,8	**Arc Energy (kJ)**	903,4

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STANDARD PRACTICE FOR DETERMINING RESPONSE CHARACTERISTICS AND DESIGN INTEGRITY OF ARC RATED FINISHED PRODUCTS IN AN ELECTRIC ARC EXPOSURE

Results

Mannequin A Pant INACP12RB Serie

Property	Mannequin A	Remark
Exposure level	14,23 cal/cm^2	
Burn	---	
After-flame	0 s.	
Break Open	No	
Ablation	No	
Melting or Dripping	No	
Charring	Yes	
Embrittlement	Yes	
Shrinkage	No	
Functioning of garment closures	Correct	
Indicator fabric evaluation	Without combustion	

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STANDARD PRACTICE FOR DETERMINING RESPONSE CHARACTERISTICS AND DESIGN INTEGRITY OF ARC RATED FINISHED PRODUCTS IN AN ELECTRIC ARC EXPOSURE

Pictures
Mannequin A Pant INACP12RB Serie

Mannequin A
Original material

Tested material

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Summary of results

GARMENT TESTED ACCORDING TO THE STANDARD ASTM F2621-2019 ATPV = 13 cal/cm^2 To cover hazard/risk category 2 according to NFPA 70E

Arc Flash PPE category according to standard NFPA70E Edition 2018 Table 130.7 (C) (16) - Personal Protective Equipment (PPE)

PPE category	Minumum Arc Rating (cal/cm^2)
1	4
2	8
3	25
4	40

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Lucia Martinez

Head of PPE and Ballistics department

Digitally signed by MIGUEL ANGEL PEREZ ESLAVA - NIF:33567494Y
Date: 2020.11.23 16:15:10 +01:00
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Location: Alcoy

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