aitex
textile research institute

TEST CERTIFICATE

Test Certificate nº 2013CN0183

AITEX declares that the articles:

FABRIC MOD180
According to the information supplied by the custumer:
Modacrylic/cotton/antistatic Fabric, approx. 180g/m²

Given by the company:

XINKE SPECIAL TEXTILE CO. LTD
FLOOR 10, INTERNATIONAL TRADE BUILDING C,
NEW 2STREET
CN-453003 XINXIANG
HENAN

Complies with the requirements of the standard/s:

UNE-EN ISO 11612:2010. Protective clothing. Clothing to protect against heat and flame
Wash and dry: 5 washing cycles at 40ºC, according to standard ISO 6330:2012, method 4N and A drying
6.2 Heat resistance (180)ºC. – Pass
6.3 Limited flame spread. Method A.- A1
6.4 Dimensional change.- Pass
6.5.1 Tensile strength and rupture elongation. - Pass
6.5.2 Tear strength.- Pass
6.9.2. pH value.- Pass
7.2 Convective heat .- B1
7.3 Radiant heat .- C1

UNE-EN 1149-5:2008. Protective clothing. Electrostatic properties
Wash and dry: 5 washing cycles at 40ºC, according to standard ISO 6330:2012, method 4N and A drying
- Test method according to UNE-EN 1149-3:2004 pt. 4.2: Charge decay.- Pass

The test results above indicated, are shown in the testing report/s:

2013CN0183

Issue by AITEX

This document is of application for the tested sample, according to the tests that have been done in the previously mentioned dates in the reports above shown.
This does not implies any monitoring or control activity on this product done by AITEX:

Signed by Raquel Muñoz González
Manager Innovation Area
04/12/2013

Xinxiang Xinke Protective Technology Co., Ltd.
De Ye Street, High-tech Zone, Xinxiang City - 453003, Henan, China
Tel: 86-373-3535038 Fax: 86-373-5859036

Test Report In Xinke Laboratory

Item	MOD180- 60%Modacrylic38%Cotton2%Anti-static	
Description	60%Modacrylic38%Cotton2%Anti-static	**EN Standard**
Color	Navy blue	
Width	150CM	
Weight	180gsm+/-5%	
Tensile Strength (T/W)	650/350N	EN ISO 13937-2
Tear Strength (T/W)	13/14N	EN ISO 13934-1
Shrinkage rate (T/W)	-1.3/-0.2	ISO 5077: 2007 (One time washing at 40 degree)
Initial Carbon Long (T/W)	128/133	
After flame time	0s	ISO 15025: 2000
After grow time	0s	ISO 15025: 2000
melt or drip	No	ISO 15025: 2000
Colorfastness to rubbing	Dry:3-4, Wet:3	ISO 105 X12

aitex
textile research institute

ilac-MRA ENAC
ENSAYOS
Nº 12 / LE025
Nº 12 / LE045
Nº 12 / LE427
Nº 12 / LE813
*Tests marked with * are not included within the scope of the accreditation*

TEST REPORT

Nº 2013CN0183

DATE OF RECEPTION: 14/11/2013

DATE TEST: Starting: 15/11/2013
Ending: 04/12/2013

APPLICANT

XINKE SPECIAL TEXTILE CO. LTD
FLOOR 10, INTERNATIONAL TRADE
BUILDING C, NEW 2STREET
CN-453003 XINXIANG
HENAN

DESCRIPTION AND IDENTIFICATION OF SAMPLES

SAMPLES REFERENCED:

-"FABRIC MOD180".

According to the information supplied by the costumer:
Modacrylic/cotton/antistatic Fabric, approx. 180g/m².

TESTS CARRIED OUT

- HEAT RESISTANCE
- LIMITED FLAME SPREAD
- DETERMINATION OF DIMENSIONAL CHANGE IN DOMESTIC WASHING AND DRYING
- FABRIC TENSILE STRENGTH AND RUPTURE ELONGATION
- DETERMINATION OF TEAR RESISTANCE
- DETERMINATION OF pH VALUE
- METHOD OF DETERMINING HEAT TRANSMISSION ON EXPOSURE TO FLAME
- RADIANT HEAT

ATTACHED --- SAMPLE(S) SEALED

Central: Plaza Emilio Sala, 1
E-03801 ALCOY (Alicante) SPAIN
Tel.:+34 96 554 22 00
Fax: +34 96 554 34 94

Technical Units: Paterna: Tel. 96 131 81 93 Fax: 96 131 81 83
Alcoy: Calle Sant Jordi,13 Tel.:+34 96 554 22 00

www.aitex.es
www.observatoriotextil.com
info@aitex.es

RESULTS

HEAT RESISTANCE

Standard
ISO 17493:2000

Apparatus
Air stove

Temperature
(180 ± 5) ºC

Deviation from the Standard

Test uncertainty
± 0,6 %

Pre-treatment
5 washing cycles at 40ºC, according to the standard ISO 6330:2012, method 4N and A drying

Material tested
Main fabric

Reference		FABRIC MOD180	
Flame	**Melting**	**Shrink**	
No	No	Warp Weft	-2,8 % -2,0 %
No	No	Warp Weft	-2,9 % -1,9 %
No	No	Warp Weft	-2,7 % -1,8 %

PERFORMANCE LEVEL ACCORDING TO UNE-EN ISO 11612:2010	PASS

Requisites to meet according to UNE-EN ISO 11612:2010

a) No layer can ignite.
b) No layer can melt.
c) No layer shrinks more than 5%.

RESULTS

LIMITED FLAME SPREAD

Standard

UNE-EN ISO 15025:2003 (Method A)

Apparatus

Equipment for determination of limited flame spread 13008IE12

Original and pre-treatment test date

20/11/2013-20/11/2013

Conditioned

24h. in indoor ambient conditions at 20 ± 2 ºC and 65 ± 5 % HR

Original and pre-treatment ambient conditions test

23,9ºC and 25,5% HR-24,2ºC and 25,5% HR

Gas used

Propane

Deviation from the standard

Face exposed to the flame

Outer surface

Material tested

Principal fabric

Test uncertainty

± 0,29 s

>>>

RESULTS

Reference **FABRIC MOD180**

Pre-Treatment Original fabric

Specimen	1	2	3	4	5	6
Direction		Warp			Weft	
Flaming to top or either side edge	No	No	No	No	No	No
Post- After flame (s)	0,00	0,00	0,00	0,00	0,00	0,00
Post- Afterglow (s)	0,00	0,00	0,00	0,00	0,00	0,00
Loose waste	No	No	No	No	No	No
Inflammation of the filter paper detached from waste	No	No	No	No	No	No
Hole formation	No	No	No	No	No	No

Pre-Treatment 5 washing cycles at 40ºC, according to the standard ISO 6330:2012, method 4N and A drying

Specimen	1	2	3	4	5	6
Direction		Warp			Weft	
Flaming to top or either side edge	No	No	No	No	No	No
Post- After flame (s)	0,00	0,00	0,00	0,00	0,00	0,00
Post- Afterglow (s)	0,00	0,00	0,00	0,00	0,00	0,00
Loose waste	No	No	No	No	No	No
Inflammation of the filter paper detached from waste	No	No	No	No	No	No
Hole formation	No	No	No	No	No	No

>>>

RESULTS

PERFORMANCE LEVEL ACCORDING UNE-EN ISO 11612:2010	A1

Requisites to be met according to UNE-EN ISO 11612:2010

a) No specimen shall give flaming to top or either side edge.
b) No specimen shall give hole formation in any layer.
c) No specimen shall give flaming or molten debris.
d) The mean value of after flame time shall be ≤ 2 s.
e) The mean value of afterglow time shall be ≤ 2 s.

_____///

RESULTS

DETERMINATION OF DIMENSIONAL CHANGE IN DOMESTIC WASHING AND DRYING

Standard

UNE-EN ISO 5077:2008 + ERRATUM:2008

Preparation, marking and measuring of fabric specimens according to UNE-EN ISO 3759:2011

Washing procedure

4N (T^a = 40 ± 3ºC; Total dry load test samples and the counterweight 2 ± 0.1 Kg) according to ISO 6330:2012

Used apparatus

Wascator

Used equipment

02172E12

Number of washing cycles

5

Procedure C - Flat dry

Uncertainly of test

± 0.3 %

Reference	Number of specimens	Direction	Dimensional change(%)
FABRIC MOD180	2	Warp Weft	-1,0 -0,5

REMARK

Negative dimensional change indicates shrinkage

REQUISITE

In accordance with the Standard UNE-EN ISO 11612:2010 point (6.4.1), the dimensional change shall not exceed ±3%, both in width (warp) and in length (weft)

PASS

///

RESULTS

FABRIC TENSILE STRENGTH AND RUPTURE ELONGATION

Standard
UNE-EN ISO 13934-1:2013

Apparatus
INSTRON Dynamometer

Gauge length 200 mm **Rate of extension** 100 mm/min

Pretension of
Warp 5 N **Weft** 5 N

Atmosphere for conditioning and testing
Temperature (20±2) ºC **Relative humidity** (65±4) %

Nº of specimens
Tested 5 for each direction **Rejected** 0

Pre-treatment
5 cycles of washing at 40ºC, according UNE-EN ISO 6330:2012, method 4N and A drying

Reference	FABRIC MOA180			
Direction	**Average load (N)**	**CV (%)**	**Elongation to the maximum load (%)**	**CV (%)**
Warp	740	1,0	23,5	2,6
Weft	480	1,0	24,5	2,0

REQUISITE STANDARD UNE-EN ISO 11612:2010
The material must resist a breaking load in both directions ≥ 300 N.

PASS

///

RESULTS

DETERMINATION OF TEAR RESISTANCE

Standard
UNE-EN ISO 13937-2:2001

Apparatus
INSTRON Dynamometer

Atmosphere for conditioning and testing
Temperature (20±2) ºC **Relative humidity** (65±4) %

Number of specimens tested
5 for each direction

State of the specimens
Conditioning

Pre-treatment
5 cycles of washing at 40ºC, according UNE-EN ISO 6330:2012, method 4N and A drying

Reference			
	Tear	**Average load (N)**	**CV (%)**
FABRIC MOA180	Warp	41	5,1
	Weft	44	6,6

Remark
The test was performed with specimens of great width (200x200 mm) in both directions.

REQUISITE ACCORDING TO STANDARD UNE-EN ISO 11612:2010

The material must resist a breaking load in both directions ≥ 15 N.

PASS

_____///>

RESULTS

DETERMINATION OF PH VALUE

Standard
UNE-EN ISO 3071:2006

Determination date
21/11/2013

Extractor solution
A - H_2O

pH Extractor solution
7,27

Temperature
16.4 ºC

Reference	pH	Uncertainty
FABRIC MOD180	6.80	± 0.05

_____///

RESULTS

METHOD OF DETERMINING HEAT TRANSMISSION ON EXPOSURE TO FLAME

Standard
ISO 9151:1995

Apparatus
Convective heat

Heat flux density
79,11 kW/m^2

Pre-Treatment
5 washing cycles at 40ºC, according to the standard ISO 6330:2012, method 4N and A drying

Conditioned
24h. in indoor ambient conditions at 20 ± 2 ºC and 65 ± 5 % HR

Ambient conditions test
23,5 ºC and 21,5 % HR

Deviation from the Standard

Test date
26/11/2013

Material tested
Principal fabric

Test uncertainty
± 0,36 s

RESULTS

Reference	Specimen	Range of HTI[a] 12 values (s)	Range of HTI[a] 24 values (s)
FABRIC MOD180	1	3,5	5,1
	2	3,1	4,5
	3	3,2	4,6
	Result	**3,1**	**4,5**

PERFORMANCE LEVEL ACCORDING TO STANDARD UNE-EN ISO 11612:2010	B1

Results in according with standard UNE-EN ISO 11612:2010

Performance level	Range of HTI[a] 24 values (s)	
	Minimum	Maximum
B1	4,0	< 10,0
B2	10,0	< 20,0
B3	20,0	
	Heat transfer index, as defined in ISO 9151:1995	

Results have been obtained according a test method with pretenders only the classification of the materials, and are not necessary the application of the conditions

RESULTS

RADIANT HEAT

Standard
UNE-EN ISO 6942:2002

Apparatus
Equipment for the determination of radiant heat

Heat flux density
20,10 kW/m^2

Pre-Treatment
5 washing cycles at 40ºC, according to the standard ISO 6330:2012, method 4N and A drying

Conditioned
24h. in indoor ambient conditions at 20 ± 2 ºC and 65 ± 2 % HR

Ambient conditions test
23,5 ºC and 21,5 % HR

Deviation from the Standard

Test date
26/11/2013

Material tested
Principal fabric

Test uncertainty
± 0,34 s

Reference	FABRIC MOD180		
Specimen	RHTI[a] 12 (s)	RHTI[a] 24 (s)	(RHTI[a] 24 - RHTI[a] 12) (s)
1	6,2	11,6	5,4
2	6,1	11,3	5,2
3	6,0	11,1	5,1
RHTI[a] 24	**6,0**	**11,1**	**5,1**

RESULTS

PERFORMANCE LEVEL ACCORDANCE WITH STANDARD UNE-EN ISO 11612:2010	C1

Results in accordance with Standard UNE-EN ISO 11612:2010

Performance level	Range of RHTI[a] 24 values	
	Minimum	Maximum
C1	7,00	< 20,0
C2	20,0	< 50,0
C3	50,0	< 95,0
C4	95,0	

Heat transfer index, as defined in EN ISO 6942:2002

Results have been obtained according a test method with pretenders only the classification of the materials, and are not necessary the application of the conditions

_____///

RESULTS

CHARGE DECAY

Standard

UNE-EN 1149-3:2004 pt. 4.2

Conditioned

24h. in indoor ambient conditions at 23 ± 1 ºC and 25 ± 5 % HR

Ambient conditions test

23,0 ºC and 22,6 % HR

Test method used

Induction charge (Test method 2)

Potential applied

(1200 ± 50) V in 30 µs

Time measurement

30s

Deviation from the Standard

Test date

21/11/2013

Material tested

Principal fabric

Measurement uncertainty

Shielding factor: ± 0,02
t_{50}: ±0,01 s

>>>

RESULTS

Pre-Treatment

5 washing cycles at 40ºC, according to the standard ISO 6330:2012, method 4N and A drying

Reference	FABRIC MOD180	
Specimen	**Shielding factor (units)**	**Decay half time (s)**
1	0,67	< 0,01
2	0,67	< 0,01
3	0,66	< 0,01
Average	**0,66**	**< 0,01**

ACCORDING TO STANDARD UNE-EN 1149-5:2008	**PASS**

ACCEPTANCE CRITERION ACCORDING TO UNE-EN 1149-3:2004 AND UNE-EN 1149-5:2008, METHOD INDUCTION CHARGING

Requisites according to Standard UNE-EN 1149-5:2008 for the induction charge method according to the Standard UNE-EN 1149-3:2004 are:

$$t_{50} < 4s. \text{ or } S > 0,2$$

Where, t_{50}= Decay half time
S = Shielding factor

_____///

Lucia Martinez
Head of PPE´s department

Digitally signed by LUCIA MARTINEZ MOLITO - NIF:21651425F
Date: 2013.12.09 14:30:08 +01:00
Reason: Responsable
Location: Alcoy

LIABILITY CLAUSES

1.- AITEX is liable only for the results of the methods of analysis used, as expressed in the report and referring exclusively to the materials or samples indicated in the same which are in its possession, the professional and legal liability of the Centre being limited to these. Unless otherwise stated, the samples were freely chosen and sent by the applicant.
2.- AITEX shall not be liable in any case of misuse of the test materials nor for undue interpretation or use of this document
3.- The original test report is kept in AITEX. An electronic copy of it is delivered to the costumer which keeps the value from the original one as far as the security properties of the document are not violated. A hard copy of this report with the AITEX logotype sealed in all the pages, keeps the original value.
4.- The results are considered to be the property of the applicant, and AITEX will not communicate them to third parties without prior permission. After one month, AITEX may use the results for statistical or scientific purposes.
5.- None of the indications made in this report may be considered as being a guarantee for the trade marks mentioned herein.
6.- In the eventuality of discrepancies between reports, a check to settle the same will be carried out in the head offices of AITEX. Also, the applicants undertake to notify AITEX of any complaint received by them as a result of the report, exempting this Centre from all liability if such is not done, the periods of conservation of the samples being taken into account.
7.- AITEX may include in its reports, analyses, results, etc., any other evaluation which it considers necessary, even when it has not been specifically requested.
8.- The estimated uncertainties in the tests accredited by ENAC are at the client' s disposal in AITEX.
9.- The tested samples will be stored in AITEX facilities during the next TWELVE MONTHS after the report emission. Any verification or complaint, requested by the client, will be made during the mentioned period.
10.- This report may only be sent or delivered by hand to the applicant or to a person duly authorised by the same.
11.- The results of the tests and the statement of compliance with the specification in this report refer only to the test sample as it has been analyzed / tested and not the sample / item which has taken the test sample.
12.- AITEX laboratories are placed in Alcoy.

UNIVERSIDAD NACIONAL DE LA PLATA
FACULTAD DE INGENIERÍA
LEME Laboratorios de Ensayos y Mediciones Eléctricas
Calle 49 y 116 - (1900) La Plata - Argentina
+54 221 425 0075
leme@ing.unlp.edu.ar

Solicitante: **GEOTEX S.R.L.** Domicilio: Dorrego 535, (1878) Quilmes	**Informe de Ensayo** LEP.19.051.0.I Laboratorio de Ensayos de Potencia Fecha: 17/01/2020	OAA Organismo Argentino de Acreditación Laboratorio de Ensayo LE 239

Realizado por: Ing. Carlos D. Arrojo
Tco. Carlos Alfaro
Tco. Cándido Condori

Supervisado por: Ing. Carlos Arrojo

Participaron: Juliana Latour
(GEOTEX S.R.L.)

Aprobado por: Ing. Ricardo Dias

Tema:

Ensayo de prendas utilizadas ante riesgo de exposición al arco eléctrico

Resumen:

A solicitud de GEOTEX S.R.L., se realizó el ensayo de dos prendas (mamelucos) marca GEOTEX, utilizadas ante riesgo de exposición al arco eléctrico.

La prueba se realizó siguiendo las indicaciones de la norma IRAM 3904/04, para indumentaria Clase 1.

Las muestras fueron presentadas a este Laboratorio por el solicitante.

LEME
Departamento de Electrotecnia
Facultad de Ingeniería
Universidad Nacional de La Plata

Calle 49 y 116 - (1900) La Plata - Argentina
+54 221 425 0075
leme@ing.unlp.edu.ar

1.- Elementos ensayados

Previo a la realización del ensayo, las prendas fueron lavadas cinco veces con el procedimiento indicado en el punto 6.2.2 de la norma de Ref. 1. El lavado se realizó en INTI-Textiles y le corresponde el Informe de Ensayo O.T.Nº: 228-1565-U, cuya copia con la hoja de resultados se adjuntan selladas y firmadas. Las prendas fueron entregadas al Laboratorio por el solicitante, se tomaron dos de las tres muestras presentadas, las mismas fueron identificadas por el Laboratorio con los códigos 19.051-01 y 19.051-02.

Las prendas poseían las siguientes características, obtenidas de etiquetas internas:

- Marca: GEOTEX
- PMPRMDCR1800000A
- ITLAMDCR1800000A
- Talle: L
- 25/10/2019
- O.P.: 2033
- O.C.: 1755
- 180 grs
- 60 % Modacrílico
- 38 % Algodón
- 2 % Antiestático
- Mameluco
- Industria Argentina

En el presente informe se incluyen cuatro (4) Fotos, según el siguiente detalle:

- Foto Nº 1: Prenda 19.051-01, antes del ensayo.
- Foto Nº 2: Prenda 19.051-01, después del ensayo de arco eléctrico.
- Foto Nº 3: Prenda 19.051-02, antes del ensayo.
- Foto Nº 4: Prenda 19.051-02, después del ensayo de arco eléctrico.

Fecha de recepción: 10/12/2019.

2.- Ensayo Realizado

Fecha de realización: 16/01/2019.

LEME
Departamento de Electrotecnia
Facultad de Ingeniería
Universidad Nacional de La Plata

Condiciones ambientales:

- Temperatura [°C]: 24
- Humedad relativa [%]: 34

Elementos utilizados:

Descripción	*Nº*
Propiedad del LEME	
Transformador Tamini	TPCC-02
Derivador	D02
Caja de medición (divisor de tensión	T2-T3
Adquisidor	ADQ05
Temporizadores	RK-02,05,07
Sincronizador	RK-01
Caja de ensayo de arco eléctrico	BP-03
Cronómetro	CR02
Termómetro-Higrómetro	Te10

Las máximas incertidumbres de medida fueron: ±0,1ms, ±1,5% en corriente y ±1% en tensión.

Las pruebas se realizaron siguiendo las indicaciones de la norma IRAM 3904/04 (Ref.1).

Antes de comenzar con las pruebas, se midió la corriente prevista de ensayo.

Los valores medidos fueron:

- Corriente: I_{ef} = 4,00 kA
- Tensión de vacío: U_{ef} = 405 V

Antes de cada prueba se realizó una inspección visual de la prenda a ensayar.

Resultados:

Los valores obtenidos fueron:

- **Prenda: 19.051-01 – Oscilograma: 16012003**
  Video: LEP.19.051.0.I_Videos.mp4
  Duración: 507 ms
  Energía: 184 kJ
  Tiempo de persistencia de la llama: sin llama
  Formación de agujeros: menor a 5 mm
  Función de los elementos de cierre (broches y cierre): funcionamiento adecuado

LEME
Departamento de Electrotecnia
Facultad de Ingeniería
Universidad Nacional de La Plata

En la Foto N° 2 se puede observar el estado de la prenda luego de la exposición al arco eléctrico.

El registro en video correspondiente al ensayo de la prenda 19.051-01, identificado como "LEP.19.051.0.I_Videos.mp4", se hallará disponible en el enlace "https://drive.google.com/open?id=1YkcoMRhAgBXkKsRvdV79noVCSeVFkwr8" por 180 días.

- **Prenda: 19.051-02 – Oscilograma: 16012004**

  Video: LEP.19.051.0.I_Videos.mp4

  Duración: 508 ms

  Energía: 182 kJ

  Tiempo de persistencia de la llama: sin llama

  Formación de agujeros: menor a 5 mm

  Función de los elementos de cierre (broches y cierre): funcionamiento adecuado

  En la Foto N° 4 se puede observar el estado de la prenda luego de la exposición al arco eléctrico.

  El registro en video correspondiente al ensayo de la prenda 19.051-02, identificado como "LEP.19.051.0.I_Videos.mp4", se hallará disponible en el enlace "https://drive.google.com/open?id=1YkcoMRhAgBXkKsRvdV79noVCSeVFkwr8" por 180 días.

3.- Conclusiones

De los resultados obtenidos se concluye que las prendas ensayadas, identificadas por el Laboratorio con los códigos 19.051-01 y 19.051-02, cumplen con los requerimientos de la norma IRAM 3904/04, para indumentaria Clase 1, según se detalla en el punto 2 del presente Informe.

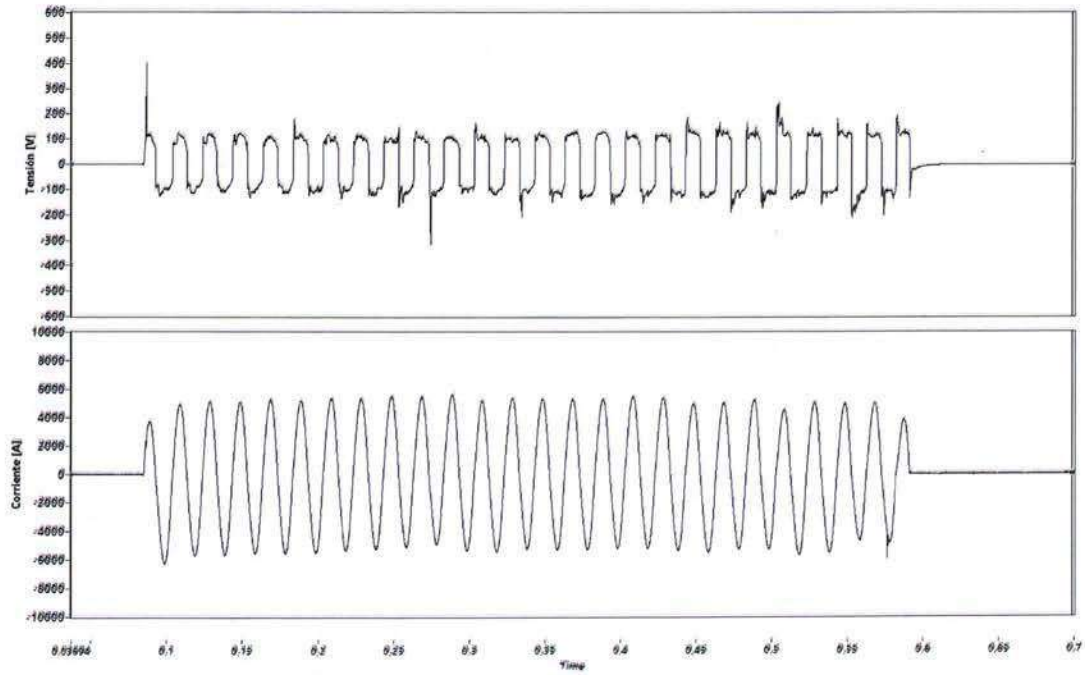
4.- Referencia

Ref. 1.- Norma IRAM 3904/04: "Indumentaria de protección. Requisitos y métodos de ensayo de materiales y prendas utilizados ante riesgo de exposición al arco eléctrico".

LEME
Departamento de Electrotecnia
Facultad de Ingeniería
Universidad Nacional de La Plata

Calle 49 y 116 - (1900) La Plata - Argentina
+54 221 425 0075
leme@ing.unlp.edu.ar

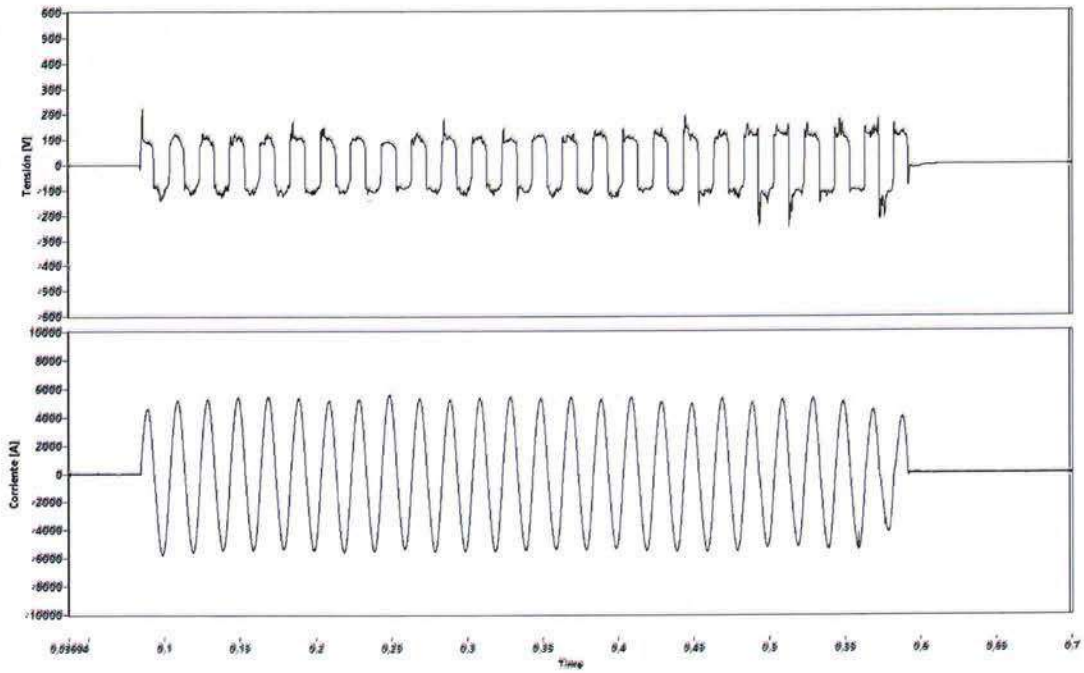
Oscilograma 16012003



LEME
Departamento de Electrotecnia
Facultad de Ingeniería
Universidad Nacional de La Plata

Calle 49 y 116 - (1900) La Plata - Argentina
+54 221 425 0075
leme@ing.unlp.edu.ar

Oscilograma 16012004



LEME
Departamento de Electrotecnia
Facultad de Ingeniería
Universidad Nacional de La Plata

Foto Nº 1: Prenda 19.051-01 antes del ensayo

LEME
Departamento de Electrotecnia
Facultad de Ingeniería
Universidad Nacional de La Plata

Foto Nº 2: Prenda 19.051-01 después del ensayo de arco eléctrico

LEME
Departamento de Electrotecnia
Facultad de Ingeniería
Universidad Nacional de La Plata

Foto Nº 3: Prenda 19.051-02 antes del ensayo

LEME
Departamento de Electrotecnia
Facultad de Ingeniería
Universidad Nacional de La Plata

Foto Nº 4: Prenda 19.051-02 después del ensayo de arco eléctrico

LEME
Departamento de Electrotecnia
Facultad de Ingeniería
Universidad Nacional de La Plata

Laboratorio de ensayo acreditado por el OAA con acreditación Nº LE 007

INFORME DE RESULTADOS

O.T.Nº: 228-1565-U
Fecha: 08/01/2020

Anexos: -

LAVADOS Y SECADOS SUCESIVOS

Se le efectuaron 5 (cinco) ciclos de lavados y secados sucesivos a las muestras M1, M2 y M3.
Inicio de ensayo: 26/12/2019
Fin de ensayo: 08/01/2020

MÉTODO DE ENSAYO:

NORMA: IRAM 7810:1995 IRAM-INTI-CIT G 7811:1998. Procedimiento 2 A.
Lavarropas Wascator FOM 71 MP-LAB de Electrolux. Balasto: Poliéster 100%.
Secado en tumble (Whirlpool) a una temperatura inferior a 60ºC

Fin del Informe

JORGELINA ALBERTI
Técnico de Laboratorio

MAURO FERNANDEZ
Responsable Laboratorio Químico

LEME
Departamento de Electrotecnia
Facultad de Ingeniería
Universidad Nacional de La Plata

Los ensayos señalizados con (*) se encuentran fuera del alcance de la acreditación.
Condiciones ambientales: según normas IRAM 7502, IWTO 52, ASTM D 1776 e ISO 139

Laboratorio de ensayo acreditado por el OAA con acreditación Nº LE 007

Informe de ensayo

O.T.Nº: 228-1565-U
Informe tipo: Unico
Fecha: 08-01-2020

FUND. FAC. DE ING. DE LA PLATA (Nº27440)
Calle 1 Nº 732 E/46 y 47
(1900) La Plata

Elementos entregados: 3 (tres) muestras de prenda identificadas como:

Identificación interna	Identificación del cliente
M1	Mameluco Nº 19.051-01
M2	Mameluco Nº 19.051-02
M3	Mameluco Nº 19.051-03

(Fecha de recepción:(18-12-2019)

Determinaciones requeridas: Lavado y secado

Resultados informados en:
Cant. de pág.: 1
Cant. de anexos: --

LEME
Departamento de Electrotecnia
Facultad de Ingeniería
Universidad Nacional de La Plata

Nota: en las Planillas de resultados las muestras se nombran por la Identificación interna que se detalla en la tabla de Elementos entregados

Los ensayos señalizados con (*) se encuentran fuera del alcance de la acreditación.

Instituto Nacional de Tecnología Industrial
www.inti.gob.ar
consultas@inti.gob.ar
0800 444 4004
Facebook INTIArg
Twitter @INTIargentina
LinkedIn INTI

Sede Parque Tecnológico Miguelete
Avenida General Paz 5445
Casilla de Correo 157
B1650WAB San Martín,
Prov. de Buenos Aires, República Argentina
Teléfono (54 11) 4724 6200 Int. 6560/6561
E-mail textiles@inti.gob.ar

BTTG FIRE TECHNOLOGY SERVICES

Confidential Report

Our Ref: 30/07092/2

BTTG Fire Technology Services
Unit 4B Stag Industrial Estate, Atlantic Street,
Broadheath, Altrincham, Cheshire, WA14 5DW

BTTG FIRE TECHNOLOGY SERVICES

Unit 4B Stag Industrial Estate
Atlantic Street, Broadheath
Altrincham, Cheshire
WA14 5DW, England

Tel: +44 (0)161 929 8056
Fax: +44 (0)161 929 8070
Web: www.bttg.co.uk
Email: info@bttg.co.uk

10 April 2014

Our Ref: 30/07092/2

Client: XINKE Special Textile Co., Ltd

Job Title: RALPH manikin testing of shirt and pants

Clients Order Ref: Email 18 November 2013

Date of Receipt: 19 March 2014

Description of Sample:
Coveralls, referenced:
Coveralls: Style 100, Khaki ArcWear# 1311T03
Fabric: MOD180
60% modacrylic, 38% cotton, 2% antistatic. 180grs/mt²

Work Requested:
Testing to ISO 13506 on BTTG male manikin (RALPH)
3 second flame exposure time
After 1 wash at 60°C

RONALDO ALVES DE OLIVEIRA
4 9 2 8
Tradutor Público

FIRE TECHNOLOGY SERVICES

Unit 4B Stag Industrial Estate
Atlantic Street, Broadheath
Altrincham, Cheshire
WA14 5DW, England

Tel: +44 (0)161 929 8056
Fax: +44 (0)161 929 8070
Web: www.bttg.co.uk
Email: info@bttg.co.uk

10 April 2014

Our Ref: 30/07092/2
XINKE Special Textile Co., Ltd

RONALDO ALVES DE OLIVEIRA 4/9/2014 Tradutor Público

RALPH MANIKIN TESTING OF COVERALLS

REFERENCE : STYLE 100, KHAKI

FABRIC: MOD180

1. Samples

Three sets of coveralls made from MOD180 fabric were submitted for test, referenced:-

Coveralls: Style 100, Khaki ArcWear# 1311T03

The fabric was referenced:-
MOD180 60% modacrylic, 38% cotton, 2% antistatic. 180grs/mt²

The coveralls were sized LG.

The coveralls were considered to be a "good" fit on the manikin.

2. Method of Test

Testing was undertaken on the 2006 version of the "male" heat sensing manikin known as RALPH (Research Aim Longer Protection against Heat) developed at BTTG Fire Technology Services. This version of RALPH together with the associated test facility has been built to comply with ISO 13506.

RALPH has a total of 135 sensors distributed over the head, torso, legs, arms and hands which monitor the temperature on the surface of the manikin during a test. (The feet of the manikin are not sensored.) For this test the sensors in the hands and interface areas were not used leaving 123 sensors being monitored.

From the temperatures recorded predictive percentage burn injury at Pain, 1st, 2nd and 3rd degree levels are calculated using the Takata and Stoll skin model as specified in Annex C of ISO 13506.

During a test the manikin is challenged by a flame engulfment apparatus consisting of 12 burners (in two tiers of six) surrounding the manikin in a hexagonal pattern. The manikin is placed at the centre of the hexagonal pattern. The lower set of six burners are pointed at the legs and lower body of the manikin whilst the upper set of six burners are pointed at the upper body and head.

The test was performed under the following conditions:

Mean heat flux:	84kW/m² ±2.5% (i.e. 81.9kW/m² – 86.1kW/m²)
Flame exposure time:	3 seconds
Data acquisition time:	60 seconds

The test was performed with the manikin dressed only in the coveralls submitted – no other garments were worn.

BTTG FIRE TECHNOLOGY SERVICES

Unit 4B Stag Industrial Estate
Atlantic Street, Broadheath
Altrincham, Cheshire
WA14 5DW, England

Tel: +44 (0)161 929 8056
Fax: +44 (0)161 929 8070
Web: www.bttg.co.uk
Email: info@bttg.co.uk

3. Cleansing Pretreatment

Prior to test the coveralls were washed once at 60°C according to ISO 6330: 2000 (Procedure 2A) followed by tumble drying.

4. Summary of Results

See pages 4 – 11.

Notes Relating to Interpretation of Results

The RALPH manikin test has been developed to provide information on the flammability and heat transfer performance of clothing systems when subjected to flame envelopment such as might only reasonably be expected to occur under "emergency" conditions. It is essentially intended to compare one clothing system with another, it does not purport to provide information in terms of the "survivability" of a given event. The following points should also be borne in mind when assessing the results obtained.

(a) These results were obtained using the specified test conditions and do not necessarily represent the behaviour of the clothing system under other conditions of test or use.

(b) The fit of the garments has an important bearing on the heat transfer results obtained during the test. For this test the coveralls were considered to be a good fit.

(c) It must be stressed that whilst the test conditions used can be considered very severe there may be occasions where the clothing system is subjected to even greater challenge which could results in serious injury to the wearer.

(d) The RALPH manikin together with the associated test facility has been built to comply with ISO 13506. Not all manikin test systems fully comply with ISO 13506 and, therefore, currently results from the various manikins will not necessarily be the same. **It is very important when comparing manikin test results to take into account which "skin model" has been used to calculate the percentage burn injury results. The results in this report have been calculated using the Takata and Stoll skin model as specified in Annex C of ISO 13506.**

(e) The burn injury results are expressed according to clause 9.5.3 of ISO 13506 which calculates the percentage burn injury based on the total area of manikin covered by the garments under test being 100%. For this test, therefore, the head is not included in the calculations.

(f) These results must not be used in advertising or promotional literature without the written permission of BTTG Fire Technology Services.

RONALDO ALVES DE OLIVEIRA
4/9/23
Tradutor Público

FIRE TECHNOLOGY SERVICES

Unit 4B Stag Industrial Estate
Atlantic Street, Broadheath
Altrincham, Cheshire
WA14 5DW, England

Tel: +44 (0)161 929 8056
Fax: +44 (0)161 929 8070
Web: www.bttg.co.uk
Email: info@bttg.co.uk

4. Summary of Results

The observations made during the tests and the examinations after the tests were similar for all three tests.

Observations during the test

There was no ignition of the coveralls and virtually no surface afterflame following the burners being switched off. There was no "break-open" of the coveralls during the test.

After test examination

Coveralls: The exposed areas of the coveralls were charred in places.

Burn Injury Prediction

See pages 5, 7 and 9 for the burn injury prediction diagrams.

See pages 6, 8 and 10 for the burn injury development with time.

See page 11 for a summary of the burn injury results.

RONALDO ALVES DE OLIVEIRA
49/28
Tradutor Público

BTTG FIRE TECHNOLOGY SERVICES

Unit 4B Stag Industrial Estate
Atlantic Street, Broadheath
Altrincham, Cheshire
WA14 5DW, England

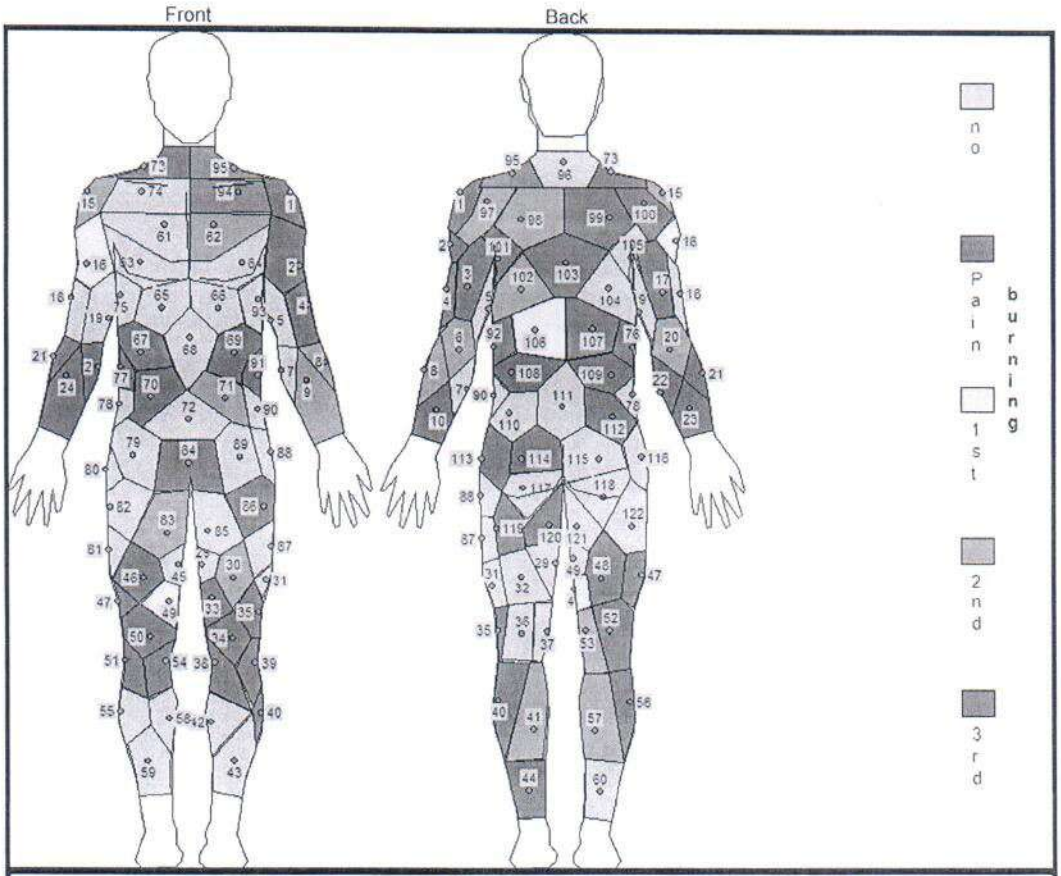
Tel: +44 (0)161 929 8056
Fax: +44 (0)161 929 8070
Web: www.bttg.co.uk
Email: info@bttg.co.uk

Our Ref: 30/07092/2
XINKE Special Textile Co., Ltd

RALPH MANIKIN TEST 1 – BURN INJURY PREDICTION AT 60s

CLOTHING SYSTEM: Coverall, referenced:
Coverall: Style 100, Khaki ArcWear# 1311T03
Fabric: **MOD180 60% modacrylic, 38% cotton, 2% antistatic. 180grs/mt²**

FLAME EXPOSURE TIME: 3 seconds (data acquisition time 60 seconds)



Burn Injury Prediction (according to ISO 13506 clause 9.5.3)				
Pain	1st° Burn	2nd° Burn	3rd° Burn	2nd° + 3rd° Burn
41.6%	2.7%	18.8 %	1.8%	20.6%

RONALDO ALVES DE OLIVEIRA 4/9/2014 Tradutor Público

FIRE TECHNOLOGY SERVICES

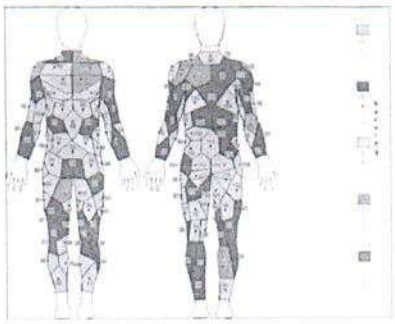
Unit 4B Stag Industrial Estate
Atlantic Street, Broadheath
Altrincham, Cheshire
WA14 5DW, England

Tel: +44 (0)161 929 8056
Fax: +44 (0)161 929 8070
Web: www.bttg.co.uk
Email: info@bttg.co.uk

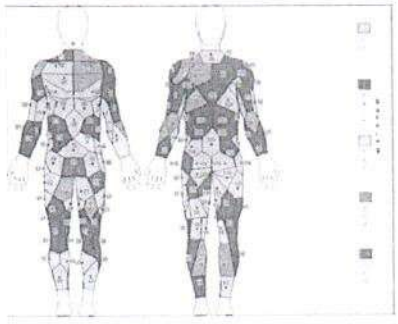
Our Ref: 30/07092/2
XINKE Special Textile Co., Ltd

RALPH MANIKIN TEST 1 – BURN INJURY DEVELOPMENT WITH TIME

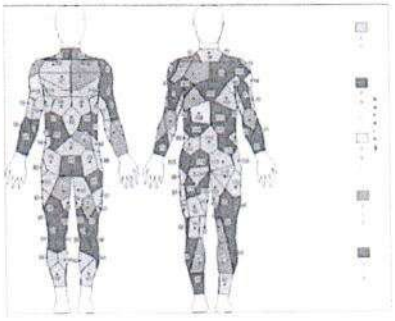
CLOTHING SYSTEM: Coverall, referenced:
Coverall: Style 100, Khaki ArcWear# 1311T03
Fabric: **MOD180 60% modacrylic, 38% cotton, 2% antistatic. 180grs/mt²**



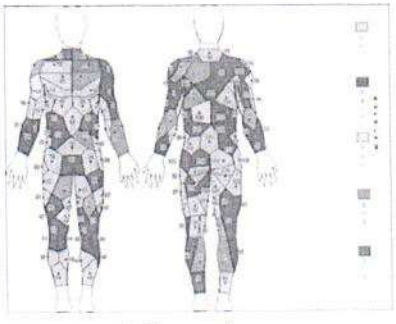
At 15 seconds



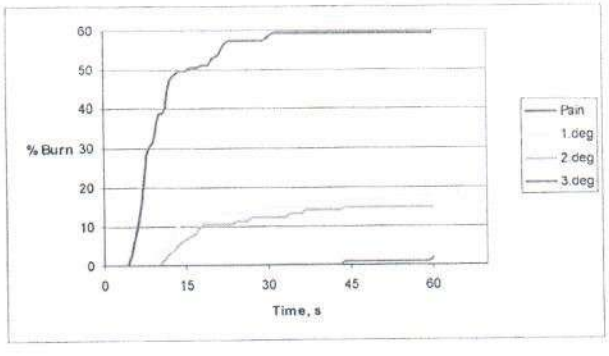
At 30 seconds



At 45 seconds



At 60 seconds



RONALDO ALVES DE OLIVEIRA
Tradutor Público

BTTG FIRE TECHNOLOGY SERVICES

Unit 4B Stag Industrial Estate
Atlantic Street, Broadheath
Altrincham, Cheshire
WA14 5DW, England

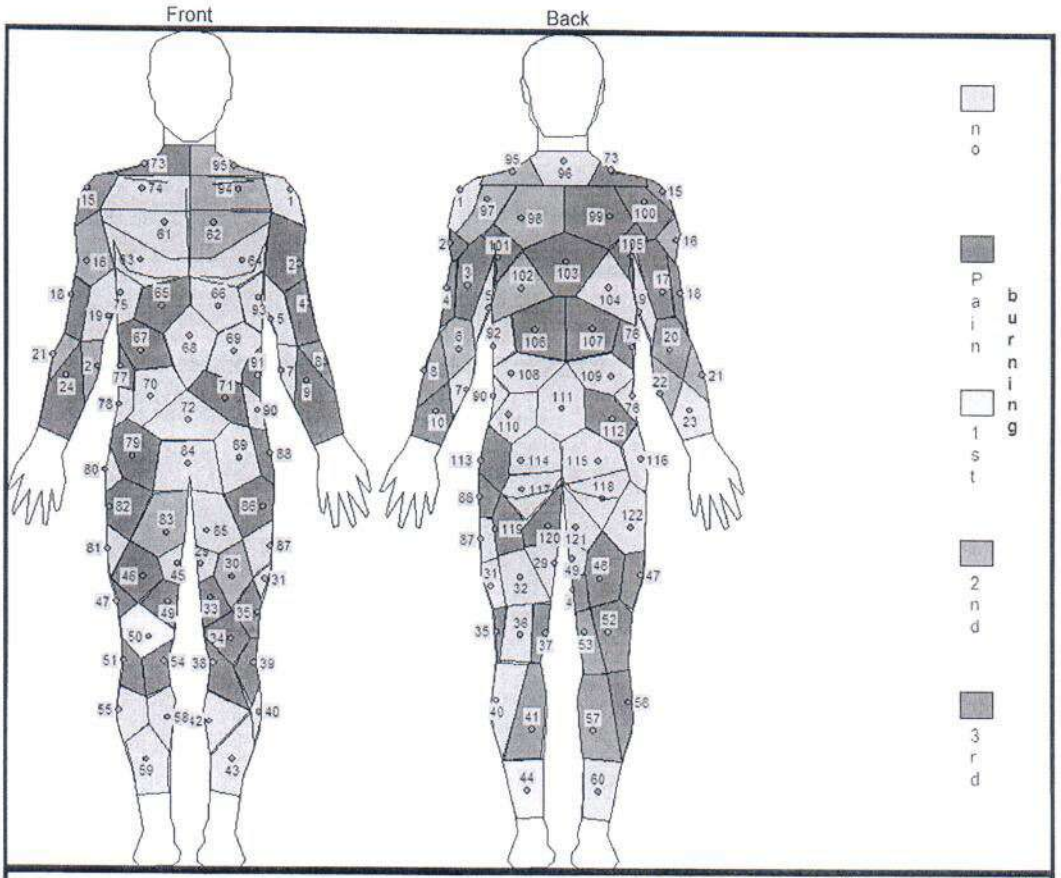
Tel: +44 (0)161 929 8056
Fax: +44 (0)161 929 8070
Web: www.bttg.co.uk
Email: info@bttg.co.uk

Our Ref: 30/07092/2
XINKE Special Textile Co., Ltd

RALPH MANIKIN TEST 2 – BURN INJURY PREDICTION AT 60s

CLOTHING SYSTEM: Coverall, referenced:
Coverall: Style 100, Khaki ArcWear# 1311T03
Fabric: **MOD180 60% modacrylic, 38% cotton, 2% antistatic. 180grs/mt²**

FLAME EXPOSURE TIME: 3 seconds (data acquisition time 60 seconds)



Burn Injury Prediction (according to ISO 13506 clause 9.5.3)				
Pain	1st° Burn	2nd° Burn	3rd° Burn	2nd° + 3rd° Burn
39.3%	1.8%	16.7 %	5.4%	22.1 %

RONALDO ALVES DE OLIVEIRA 49/22 Tradutor Público

BTTG FIRE TECHNOLOGY SERVICES

Unit 4B Stag Industrial Estate
Atlantic Street, Broadheath
Altrincham, Cheshire
WA14 5DW, England

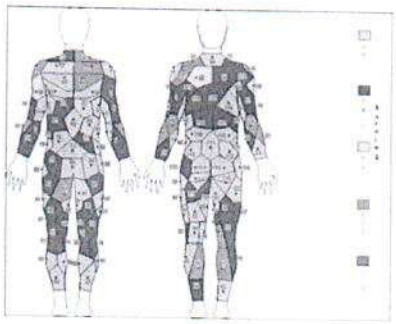
Tel: +44 (0)161 929 8056
Fax: +44 (0)161 929 8070
Web: www.bttg.co.uk
Email: info@bttg.co.uk

10 April 2014

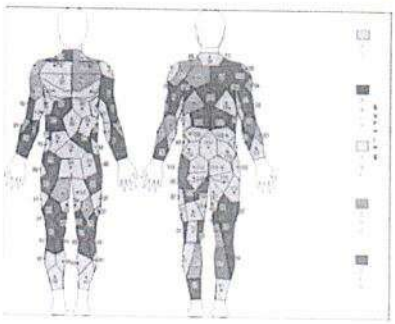
Our Ref: 30/07092/2
XINKE Special Textile Co., Ltd

RALPH MANIKIN TEST 2 – BURN INJURY DEVELOPMENT WITH TIME

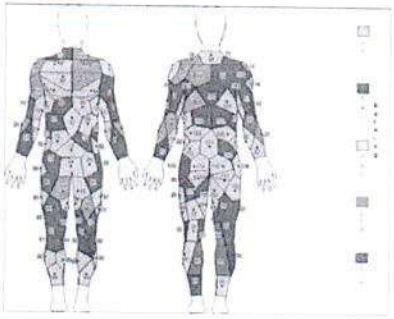
CLOTHING SYSTEM: Coverall, referenced:
Coverall: Style 100, Khaki ArcWear# 1311T03
Fabric: **MOD180 60% modacrylic, 38% cotton, 2% antistatic. 180grs/mt²**



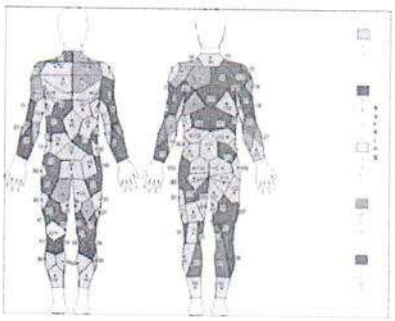
At 15 seconds



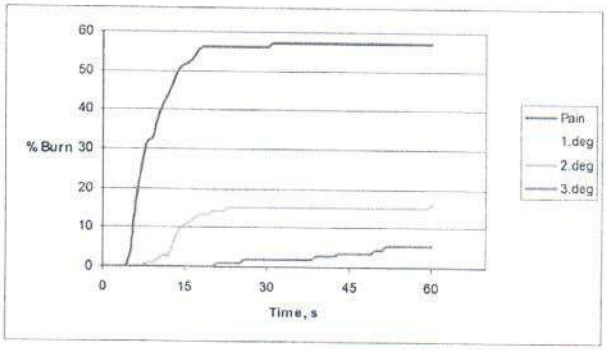
At 30 seconds



At 45 seconds



At 60 seconds



RONALDO ALVES DE OLIVEIRA
49/28
Tradutor Público

BTTG FIRE TECHNOLOGY SERVICES

Unit 4B Stag Industrial Estate
Atlantic Street, Broadheath
Altrincham, Cheshire
WA14 5DW, England

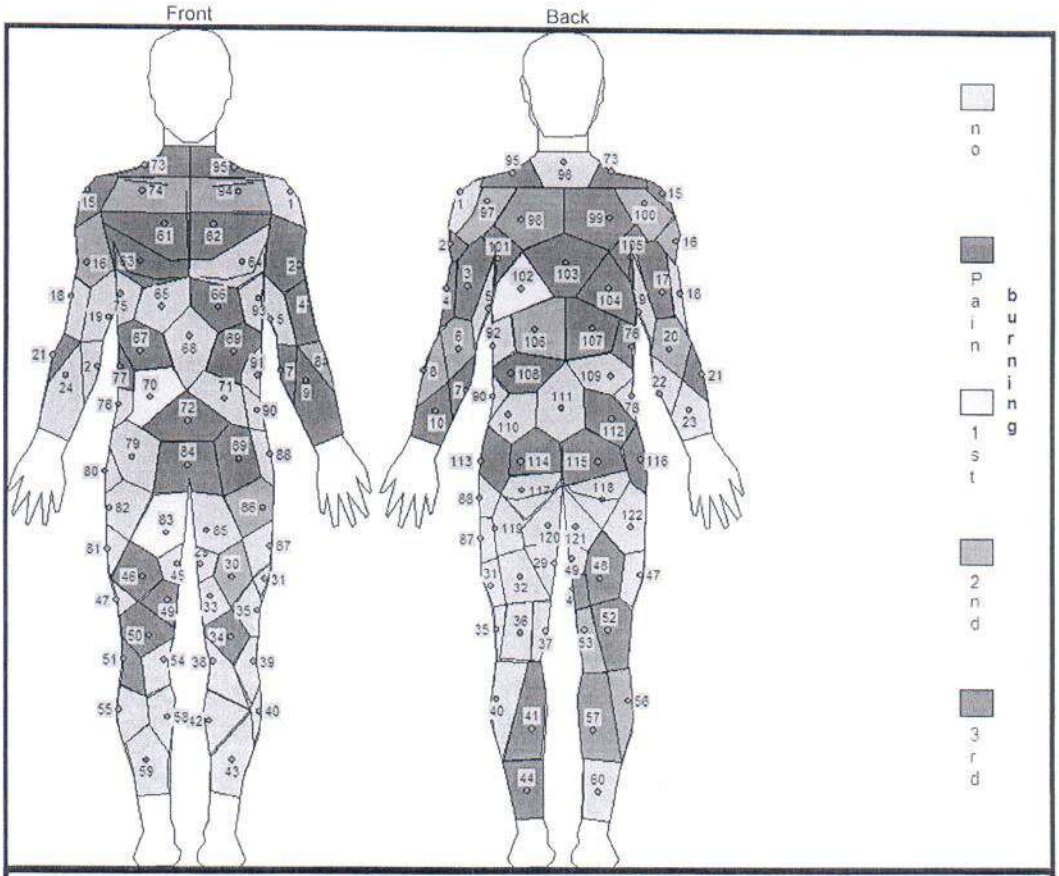
Tel: +44 (0)161 929 8056
Fax: +44 (0)161 929 8070
Web: www.bttg.co.uk
Email: info@bttg.co.uk

Our Ref: 30/07092/2
XINKE Special Textile Co., Ltd

RALPH MANIKIN TEST 3 – BURN INJURY PREDICTION AT 60s

CLOTHING SYSTEM: Coverall, referenced:
Coverall: Style 100, Khaki ArcWear# 1311T03
Fabric: **MOD180 60% modacrylic, 38% cotton, 2% antistatic. 180grs/mt²**

FLAME EXPOSURE TIME: 3 seconds (data acquisition time 60 seconds)



Burn Injury Prediction (according to ISO 13506 clause 9.5.3)				
Pain	1st° Burn	2nd° Burn	3rd° Burn	2nd° + 3rd° Burn
37.7%	2.6%	18.4 %	1.8%	20.2 %

RONALDO ALVES DE OLIVEIRA 49/22 Tradutor Público

BTTG FIRE TECHNOLOGY SERVICES

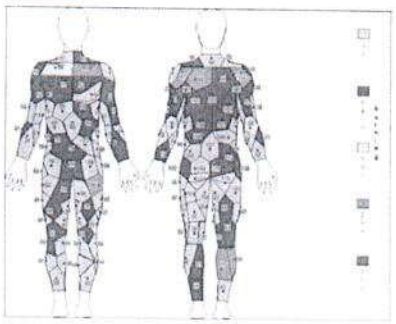
Unit 4B Stag Industrial Estate
Atlantic Street, Broadheath
Altrincham, Cheshire
WA14 5DW, England

Tel: +44 (0)161 929 8056
Fax: +44 (0)161 929 8070
Web: www.bttg.co.uk
Email: info@bttg.co.uk

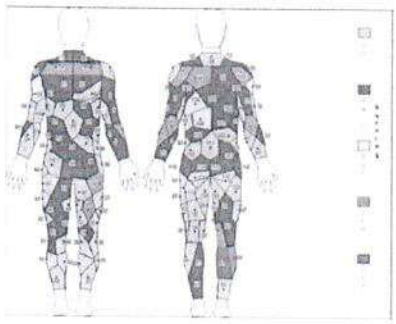
Our Ref: 30/07092/2
XINKE Special Textile Co., Ltd

RALPH MANIKIN TEST 3 – BURN INJURY DEVELOPMENT WITH TIME

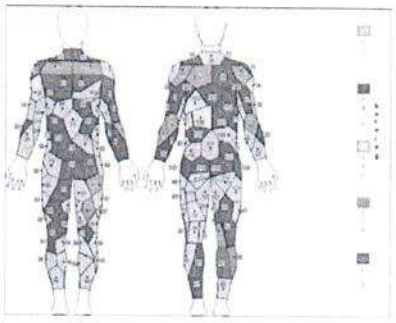
CLOTHING SYSTEM: Coverall, referenced:
Coverall: Style 100, Khaki ArcWear# 1311T03
Fabric: **MOD180 60% modacrylic, 38% cotton, 2% antistatic. 180grs/mt²**



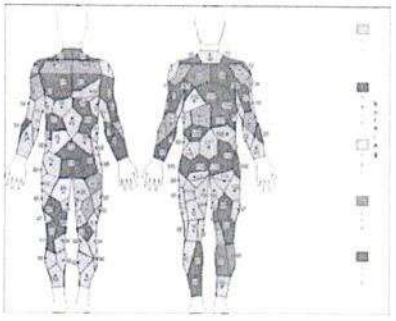
At 15 seconds



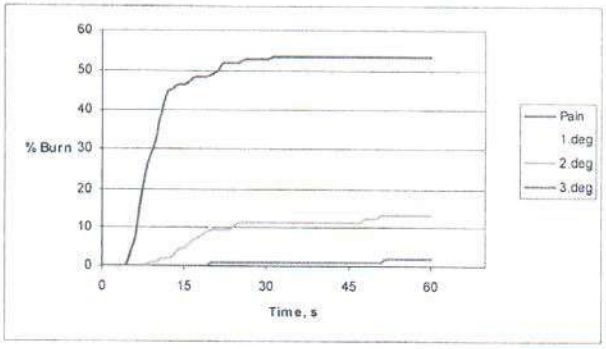
At 30 seconds



At 45 seconds



At 60 seconds



RONALDO ALVES DE OLIVEIRA 49/28 Tradutor Público