

TEST REPORT

2024US0093

DATE OF RECEPTION

Date Format: dd/MM/yyyy 18/12/2023

DATE TESTS

Starting: 20/12/2023

Ending: 20/02/2024

APPLICANT

Flamesafe Workwear USA Ltd
1820 Avenue M, Suite 1086
US-11230 NEW YORK
United States

Att. Peter Bloom

IDENTIFICATION AND DESCRIPTION OF SAMPLES

Reference by AITEX	Reference by customer	AITEX sample description
2023US0355-S02	Coverall made of HODMA HVBK fabric	Coverall
2023US0355-S01	FLBMA350	Hoodie

TESTS CARRIED OUT

- PRE-TREATMENT FOR NFPA 2112 WASHING AND DRYING PROCEDURE.
- PRE-TREATMENT FOR DOMESTIC WASHING AND DRYING PROCEDURES FOR TEXTILE TESTING.
- HEAT TRANSFER EVALUATION OF FLAME RESISTANT MATERIALS.
- LIMITED FLAME SPREAD.
- PROTECTIVE CLOTHING AGAINST HEAT AND FLAME – TEST METHOD FOR COMPLETE GARMENTS – PREDICTION FOR BURN INJURY USING AN INSTRUMENTED MANIKIN.
- MASS PER UNIT AREA.
- SEAM TENSILE RESISTANCE.
- DETERMINATION OF DIMENSIONAL CHANGE IN DOMESTIC WASHING AND DRYING.
- DETERMINATION OF TEMPERATURE OF MELTING.

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





DESCRIPTION OF SAMPLES



Reference by AITEX: 2023US0355-S01

Reference by customer:

FLBMA350

AITEX sample description:

Garment made of knitted fabric.

Information supplied by the customer

Type of garment: Hoodie

External layer:

Style HODMA HVBK

Colour HV BLack

Fabricant Cotton/ Spandex

Fabric structure 3 thread fleece

Weight 350 g/m2

Composition provided by the customer:

Cotton/spandex 95/5



Reference by AITEX: 2023US0355-S02

Reference by customer:

Coverall made of HODMA HVBK fabric

AITEX sample description:

Coverall made by customer for flash fire manikin test.

AITEX Subsamples		Subsample Description
2023US0355-S01.1		Fabric HODMA HVBK
2023US0355-S01.1.1		Yellow fabric
2023US0355-S01.1.1_P1		Yellow fabric - AFTER WASH 3 cycles NFPA 2112
2023US0355-S01.1.1_P2		Yellow fabric - AFTER WASH 100 cycles NFPA 2112
2023US0355-S01.1.1_P3		Yellow fabric - AFTER WASH 5 cycles AATCC 135
2023US0355-S01.1.2		Black fabric
2023US0355-S01.1.2_P1		Black fabric - AFTER WASH 3 cycles NFPA 2112
2023US0355-S01.1.2_P2		Black fabric - AFTER WASH 100 cycles NFPA 2112
2023US0355-S01.1.2_P3		Black fabric - AFTER WASH 5 cycles AATCC 135
2023US0355-S01.4		Thread
2023US0355-S01.5		Seam
2023US0355-S02_P1		Coverall - AFTER WASH 1 cycle NFPA 2112



EXECUTIVE SUMMARY

NFPA 2112:2023	Reference	Test/Standard	Result
	2023US0355-S01.1.1 + S01.1.2 + 2023US0355-S01.1.1_P1 + S01.1.2_P1	HEAT TRANSFER EVALUATION (TPP/HTP) ASTM F 2700:2020	PASS
	2023US0355-S01.1.1 + S01.1.2 + 2023US0355-S01.1.1_P2 + S01.1.2_P2	LIMITED FLAME SPREAD ASTM D 6413/D 6413M:2022	PASS
	2023US0355-S01.1.1_P3 + S01.1.2_P3	DETERMINATION OF DIMENSIONAL CHANGE IN DOMESTIC WASHING AND DRYING AATCC TM 135:2018T	PASS
	2023US0355-S01.5	SEAM TENSILE RESISTANCE ASTM D 1683/D1683M:22	TESTED
	2023US0355-S02_P1	PROTECTIVE CLOTHING AGAINST HEAT AND FLAME – TEST METHOD FOR COMPLETE GARMENTS – PREDICTION FOR BURN INJURY USING AN INSTRUMENTED MANIKIN - THERMO TEX TEST ASTM F 1930-23	PASS



REQUIREMENT SUMMARY

HEAT TRANSFER EVALUATION (TPP/HTP)

Requirements to be met according to NFPA 2112:2023 sec.7.1.1

The spaced HTP rating shall be not less than 25 J/cm² (6,0 cal/cm²) and a contact HTP rating shall not be less than 12.6 J/cm²; (3,0 cal/cm²)

LIMITED FLAME SPREAD

REQUIREMENT ACCORDING NFPA 2112:2023

- No specimen shall give flaming or molten debris.
- The mean value of after flame time shall be ≤ 2 s.
- The average of the char length values shall be ≤ 100 mm.

PROTECTIVE CLOTHING AGAINST HEAT AND FLAME – TEST METHOD FOR COMPLETE GARMENTS – PREDICTION FOR BURN INJURY USING AN INSTRUMENTED MANIKIN - THERMO TEX TEST

REQUISITE ACCORDING TO STANDARD NFPA 2112-23

The average predicted body burn of not more than 50% based on the total surface are covered by sensors, excluding hands and feet.

No single simple with a predicted body burn equal to or greater than 55% based on the total surface are covered by sensors, excluding hands and feet.

Not break open greater than 2.5 cm (1.0 in) in any direction.



RESULTS

PRE-TREATMENT FOR NFPA 2112 WASHING AND DRYING PROCEDURE

Standard

NFPA 2112:2023 pto.8.1.3

Test date**Start date**

20/12/2023

End date

20/12/2023

Washing procedure

Normal

Washing temperature

Tecnitramo

Washing cycles

1

Dryer type

Tecnitramo

Drying procedure

Tumble dryer

Drying temperature

68°C

Washing powder

Tergitol 15-S-9 13157N12 + Sodium Metasilicate 13158N12 + Sodium Tripolyphosphate 13206N12 + Sodium Silicofluoride 13245N12

Reference

2023US0355-S02

Units	Dry mass of the samples(Kg)	Counterweight mass Kg Kg	Counterweight type	Equipment
1	2.9	6.1	Type II / Type II	PILLERIN MILNOR WASHING MACHINE

Reference	Description
2023US0355-S02	Coveral made of HODMA HVBK fabric



RESULTS

PRE-TREATMENT FOR NFPA 2112 WASHING AND DRYING PROCEDURE

Standard

NFPA 2112:2023 pto.8.1.3

Test date**Start date**

30/01/2024

End date

31/01/2024

Washing procedure

Normal

Washing temperature

66°C

Washing cycles

3

Dryer type

Tecnitramo

Drying procedure

Tumble dryer

Drying temperature

68°C

Washing powder

Tergitol 15-S-9 13157N12 + Sodium Metasilicate 13158N12 + Sodium Tripolyphosphate 13206N12 + Sodium Silicofluoride 13245N12

Reference

2023US0355-S01

Units	Dry mass of the samples(Kg)	Counterweight mass(Kg)	Counterweight type	Equipment
1	0.21	8.8	Type II	TECNITRAMO

The test was carried out at laboratory located at Carretera Banyeres s/n - 03802 Alcoi, Alicante

Reference	Description
2023US0355-S01	FLBMA350



RESULTS

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

Standard

AATCC TM 135:2018T

Test date**Start date**

31/01/2024

End date

01/02/2024

Washing procedure

IV

Washing temperature

49°C

Washing cycles

5

Dryer type

Whirlpool

Drying procedure

(Aiii) Tumble Dry Permanent Press

Drying temperature

68°C

Washing powder

AATTC 1993 WOB

Reference

2023US0355-S01.1.1 + S01.1.2

Equipment

LABTEX

The test was carried out at laboratory located at Carretera Banyeres s/n - 03802 Alcoi, Alicante

Reference	Description
2023US0355-S01.1.1 + S01.1.2	Yellow fabric + Black fabric



RESULTS

PRE-TREATMENT FOR NFPA 2112 WASHING AND DRYING PROCEDURE

Standard

NFPA 2112:2023 pto.8.1.3

Test date**Start date**

30/01/2024

End date

16/02/2024

Washing procedure

Normal

Washing cycles

100

Drying procedure

Tumble dryer

Washing powder

Tergitol 15-S-9 13157N12 + Sodium Metasilicate 13158N12 + Sodium Tripolyphosphate 13206N12 + Sodium Silicofluoride 13245N12

Reference

2023US0355-S01

Units	Dry mass of the samples(Kg)	Counterweight mass(Kg)	Counterweight type	Equipment
1	1.8	7.2	Type III	TECNITRAMO

The test was carried out at laboratory located at Carretera Banyeres s/n - 03802 Alcoi, Alicante

Reference	Description
2023US0355-S01	FLBMA350



RESULTS

HEAT TRANSFER EVALUATION OF FLAME RESISTANT MATERIALS

Standard

ASTM F2700-2020; NFPA 2112:2023 sec.8.2

Apparatus

Thermal Protective Performance Tester

Conditioning date	30/01/2024	Test date	20/02/2024
--------------------------	------------	------------------	------------

Conditioned

24h in indoor ambient conditions at (21 ± 2) °C and (65 ± 5) % RH

Sample layers

1

Sample description

Yellow or navy blue knitted fabric

Pre-Treatment

As received

Radiant incident heat flux

83,38 kW/m²

Total incident heat flux

84,31 kW/m²

Specimen mounting

Relaxed

Weight of material as tested

414 g/m²

**Reference**

2023US0355-S01.1.1 + S01.1.2

Position of the sensor to the specimen

Contact

Specimen	HTP (J/cm ²)	TPP (cal/cm ²)
1	59,79	14,28
2	60,69	14,50
3	58,88	14,06
Average	59,79	14,28

Visual examination and evaluation

Property	1	2	3
Melting	No.	No.	No.
Dripping	No.	No.	No.
Break open	No.	No.	No.
Charring	Significant char and embrittlement.	Significant char and embrittlement.	Significant char and embrittlement.
Embrittlement	Significant, specimen completely embrittles.	Significant, specimen completely embrittles.	Significant, specimen completely embrittles.
Ignition	Significant, thick blackish smoke.	Significant, thick blackish smoke.	Significant, thick blackish smoke.
Shrinkage	No.	No.	No.
Sticking	No.	No.	No.



Reference

Position of the sensor to the specimen

Spaced

Specimen	HTP (J/cm ²)	TPP (cal/cm ²)
1	>60	18,52
2	>60	16,68
3	>60	17,23
Average	>60	17,48

Visual examination and evaluation

Property	1	2	3
Melting	No.	No.	No.
Dripping	No.	No.	No.
Break open	No.	No.	No.
Charring	Significant char and embrittlement.	Significant char and embrittlement.	Significant char and embrittlement.
Embrittlement	Significant, specimen completely embrittles.	Significant, specimen completely embrittles.	Significant, specimen completely embrittles.
Ignition	Heavy, thick blackish smoke or flames, or both.	Significant, thick blackish smoke.	Heavy, thick blackish smoke or flames, or both.
Shrinkage	No.	No.	No.
Sticking	No.	No.	No.

Remark

The uncertainty of the assay of Thermal Protective Performance is $\pm 8,3\%$ of the value measured, for a coverage factor of $K=2$ [95%].

**Remark**

These results have been obtained by means of a test method intended solely to classify the set of materials and materials not necessarily applicable to the actual conditions of fire or inflammation.

The test was carried out at laboratory located at Carretera Banyeres s/n - 03802 Alcoi, Alicante

Reference	Description
2023US0355-S01.1.1 + S01.1.2	Yellow fabric + Black fabric



RESULTS

HEAT TRANSFER EVALUATION OF FLAME RESISTANT MATERIALS

Standard

ASTM F2700-2020; NFPA 2112:2023 sec.8.2

Apparatus

Thermal Protective Performance Tester

Conditioning date

31/01/2024

Test date

20/02/2024

Conditioned

24h in indoor ambient conditions at $(21 \pm 2) ^\circ\text{C}$ and $(65 \pm 5) \% \text{RH}$

Sample layers

1

Sample description

Yellow or navy blue knitted fabric

Pre-Treatment

3 washing cycles at 66°C , according to NFPA 2112:2023 point 8.1.3, and tumble drying at 68°C .

Radiant incident heat flux

83,38 kW/m²

Total incident heat flux

84,31 kW/m²

Specimen mounting

Relaxed

Weight of material as tested

414 g/m²



Reference

2023US0355-S01.1.1_P1 + S01.1.2_P1

Position of the sensor to the specimen

Contact

Specimen	HTP (J/cm ²)	TPP (cal/cm ²)
1	>60	15,39
2	>60	15,53
3	>60	16,69
Average	>60	15,87

Visual examination and evaluation

Property	1	2	3
Melting	No.	No.	No.
Dripping	No.	No.	No.
Break open	No.	No.	No.
Charring	Significant char and embrittlement.	Significant char and embrittlement.	Significant char and embrittlement.
Embrittlement	Significant, specimen completely embrittles.	Significant, specimen completely embrittles.	Significant, specimen completely embrittles.
Ignition	Significant, thick blackish smoke.	Significant, thick blackish smoke.	Significant, thick blackish smoke.
Shrinkage	No.	No.	No.
Sticking	No.	No.	No.



Reference

Position of the sensor to the specimen

Spaced

Specimen	HTP (J/cm ²)	TPP (cal/cm ²)
1	>60	17,93
2	>60	17,33
3	>60	16,67
Average	>60	17,31

Visual examination and evaluation

Property	1	2	3
Melting	No.	No.	No.
Dripping	No.	No.	No.
Break open	No.	No.	No.
Charring	Significant char and embrittlement.	Significant char and embrittlement.	Significant char and embrittlement.
Embrittlement	Significant, specimen completely embrittles.	Significant, specimen completely embrittles.	Significant, specimen completely embrittles.
Ignition	Heavy, thick blackish smoke or flames, or both.	Significant, thick blackish smoke.	Heavy, thick blackish smoke or flames, or both.
Shrinkage	No.	No.	No.
Sticking	No.	No.	No.

Remark

The uncertainty of the assay of Thermal Protective Performance is $\pm 8,3\%$ of the value measured, for a coverage factor of $K=2$ [95%].

**Remark**

These results have been obtained by means of a test method intended solely to classify the set of materials and materials not necessarily applicable to the actual conditions of fire or inflammation.

The test was carried out at laboratory located at Carretera Banyeres s/n - 03802 Alcoi, Alicante

Reference	Description
2023US0355-S01.1.1_P1 + S01.1.2_P1	Yellow fabric - AFTER WASH 3 cycles NFPA 2112 + Black fabric - AFTER WASH 3 cycles NFPA 2112



RESULTS

LIMITED FLAME SPREAD

Standard

ASTM D 6413/D 6413M:2022

Test date**Start date**

30/01/2024

End date

06/02/2024

Ambient test conditions**Face exposed to the flame**

Edge

Specimen size

76 mm x 300 mm

Flame contact time

12 s

Reference

2023US0355-S01.1.1 + S01.1.2

Test date**Start date**

30/01/2024

End date

06/02/2024

Atmosphere for testing**Temperature**

22,1 °C

Relative Humidity

61,0 %

Specimen	After flame time(s)	Afterglow time (s)	Melting and Dripping	Char lenght
1	0	21.3	NO	70
2	0	23.3	NO	82
3	0	12.8	NO	86
4	0	13.1	NO	89
5	0	16	NO	83
Average	0	17.30	NO	82

Orientation of the specimen : Weft

Specimen	After flame time (s)	Afterglow time (s)	Melting and Dripping	Char lenght
1	0	21.9	NO	85
2	0	29.6	NO	79
3	0	13.4	NO	81
4	0	13.5	NO	80
5	0	16.3	NO	92
Average	0	18.94	NO	83.4

UncertaintyThe uncertainty of the assay of flame resistance of textiles (vertical test) is $\pm 2\%$ of the value measured

The test was carried out at laboratory located at Carretera Banyeres s/n - 03802 Alcoi, Alicante

Reference	Description
2023US0355-S01.1.1 + S01.1.2	Yellow fabric + Black fabric



RESULTS

LIMITED FLAME SPREAD

Standard

ASTM D 6413/D 6413M:2022

Test date**Start date**

16/02/2024

End date

20/02/2024

Ambient test conditions**Face exposed to the flame**

Edge

Specimen size

76 mm x 300 mm

Flame contact time

12 s

Reference

2023US0355-S01.1.1_P2 + S01.1.2_P2

Test date**Start date**

16/02/2024

End date

20/02/2024

Atmosphere for testing**Temperature**

22,1 °C

Relative Humidity

46,1 %

Specimen	After flame time(s)	Afterglow time (s)	Melting and Dripping	Char lenght
1	0	21.32	NO	102
2	0	26.3	NO	96
3	0	20.8	NO	96
4	0	24.5	NO	92
5	0	27.3	NO	93
Average	0	24.04	NO	95.8

Orientation of the specimen : Weft

Specimen	After flame time (s)	Afterglow time (s)	Melting and Dripping	Char lenght
1	0	23.1	NO	98
2	0	28.3	NO	99
3	0	26.3	NO	101
4	0	34.3	NO	100
5	0	28.2	NO	91
Average	0	28.04	NO	97.8

UncertaintyThe uncertainty of the assay of flame resistance of textiles (vertical test) is $\pm 2\%$ of the value measured

The test was carried out at laboratory located at Carretera Banyeres s/n - 03802 Alcoi, Alicante



Reference	Description
2023US0355-S01.1.1_P2 + S01.1.2_P2	Yellow fabric - AFTER WASH 100 cycles NFPA 2112 + Black fabric - AFTER WASH 100 cycles NFPA 2112



RESULTS

SAMPLE DESCRIPTION

REFERENCE:

2023US0355-S02

SAMPLE TYPE:

Coverall

BODY PARTS COVERED BY THE GARMENT:

Torso, neck, and the upper and lower extremities, apart from the hands and feet.

SIZE:

GARMENT LAYERS:

Layer 1	Yellow fleece fabric, 95% Cotton, 5% Spandex, 350 g/m ² , according to the information supplied by the customer.
---------	---

PARTS OF THE GARMENT:

Collar	Fabric layer 1.
Front	Four pieces of fabric layer 1.
Back	Three pieces of fabric layer 1.
Sleeves	Long sleeves.
Closure system	Zipper covered with flap
Collar closure system	No.
Cuff closure system	Hem stitched inwards.
Reflective trim	No.
Pockets	No.
Belt loops	No.
Legs	Longs.
Waistband adjustment system	No.
Bottom	Hem stitched inwards.
Others	---



RESULTS

PROTECTIVE CLOTHING AGAINST HEAT AND FLAME – TEST METHOD FOR COMPLETE GARMENTS – PREDICTION FOR BURN INJURY USING AN INSTRUMENTED MANIKIN

THERMO TEX TEST

Standard

NFPA 2112:2023 point 8.5.

Test type

Materials of garment construction evaluation

Testing date

09/01/2024 - 09/01/2024

Reference

2023US0355-S02_P1

Underwear and accessories

Shirt underwear	Short sleeves shirt 100% cotton, 155 g/m ²
Trousers underwear	Briefs 100% cotton, 170 g/m ²

Holes and/or cuts

Top back of the T-shirt undergarment

Apparatus

Instrumented Manikin

Test uncertainty

± 7% of the measurand's value, for a coverage value of K=2 (95%)

Conditioning

24h, in indoor ambient conditions at 21 ± 2 °C and 65 ± 5 %HR

Pre-treatment

1 washing cycle at 66°C, according to NFPA 2112:2023 point 8.1.3 and dryer drying at 68°C

Pre-treatment starting date

20/12/2023

Pre-treatment ending date

20/12/2023

Observation or deviation of the standard

The garment has deviations from the design specified in point 8.5.2.2 of Standard NFPA 2112:2023



Exposure conditions:

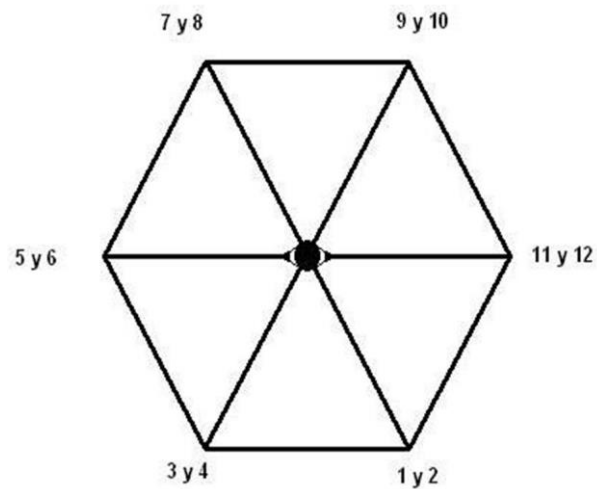
Total number of burners: 12 in two tiers of six surrounding the manikin. The lower set of six burners are pointed at the legs and lower body of the manikin whilst the upper set of six burners are pointed at the upper body and head

• Nominal exposure level of heat flux density	84kW/m ² ± 5%
• Duration of the exposure	3 s
• Duration of the data acquisition	60 s

Level of the exposure	Before the test	After the test
Average of heat flux density	81.92 kW/m ²	81.61 kW/m ²
Standard deviation of the average of heat flux density	18.89 kW/m ²	18.65 kW/m ²

Distribution of burners surrounding the mannequin:

Number of burners: 12



**Sample n° 1**

Ref.- 2023US0355-S02_P1

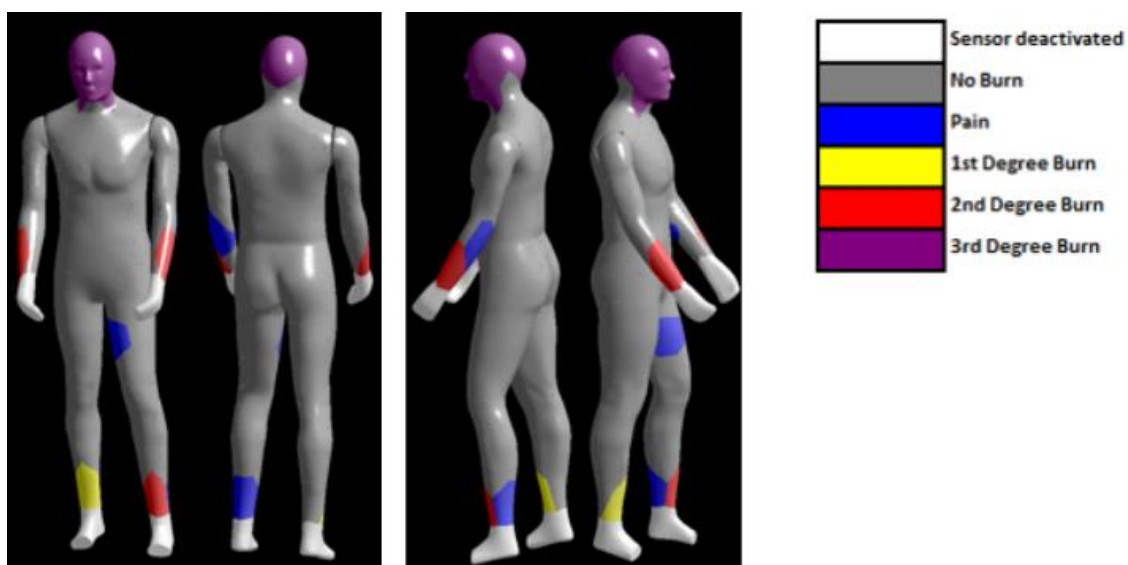
• Duration of the exposure	3 s
• Duration of the data acquisition	120 s
• Temperature of the exposure chamber before the test	20,1 °C

Total Surface Area	1,80 m ²
Total Clothed Surface Area	1,68 m ²
Total transferred energy	110,32 kJ

Predicted total burn injury of the manikin

For this test, therefore, hands and feet are not included in the calculations.

First-degree burn injury area (%)	2nd degree burn injury area (%)	3rd-degree burn injury area (%)	Predicted total area of burn injury (2nd and 3rd degree) (%)
1,1	2,8	6,7	9,5



**Sample n° 1**

Ref.- 2023US0355-S02_P1

Property	Measurement	Sample 1	Remark
Afterflame time	Video	0,0 s	---
Hole formation	Visual	No	---
Melting	Visual	No	---
Embrittlement	Visual	No	---
Smoke	Visual	Yes	---
Dripping	Visual	No	---
Shrinkage	Visual	No	---
Functioning of garment accessories	Visual	Correct	---

**Sample n° 1**

Ref.- 2023US0355-S02_P1

Burns

Body area	Clothed 1st Deg Burn Area (%)	Clothed 2nd Deg Burn Area (%)	Clothed 3rd Deg Burn Area (%)
Arms	0,0	11,5	0,0
Shanks	5,6	4,1	0,0
Thighs	0,0	0,0	0,0
Trunk	0,0	0,0	0,0
WHOLE MANIKIN	1,1	3,0	0,0

Remark

These percentages are for the total area of the manikin covered by the test specimen



Sample before test n° 1 Ref.- 2023US0355-S02_P1

PHOTOS

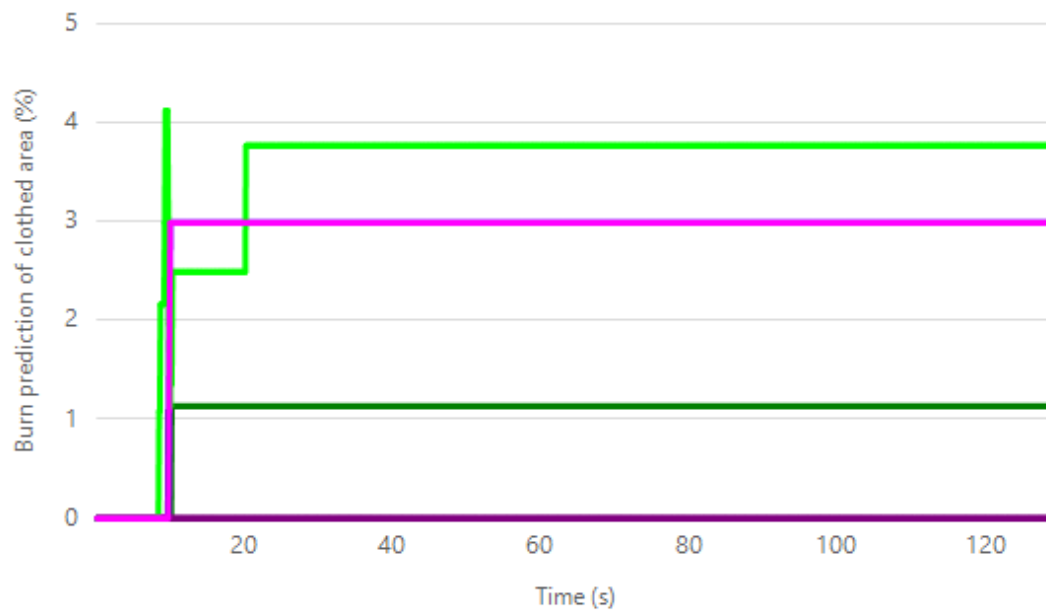


**Sample n° 1**

Ref.- 2023US0355-S02_P1

Clothed Burn Injury Over Time

— Clothed 1st Deg Burn Area — Clothed 3rd Deg Burn Area — Total Clothed Burn Injury Area
— Clothed 2nd Deg Burn Area — Clothed Pain Area





Sample after test n° 1 Ref.- 2023US0355-S02_P1

PHOTOS





Sample n° 2

Ref.- 2023US0355-S02_P1

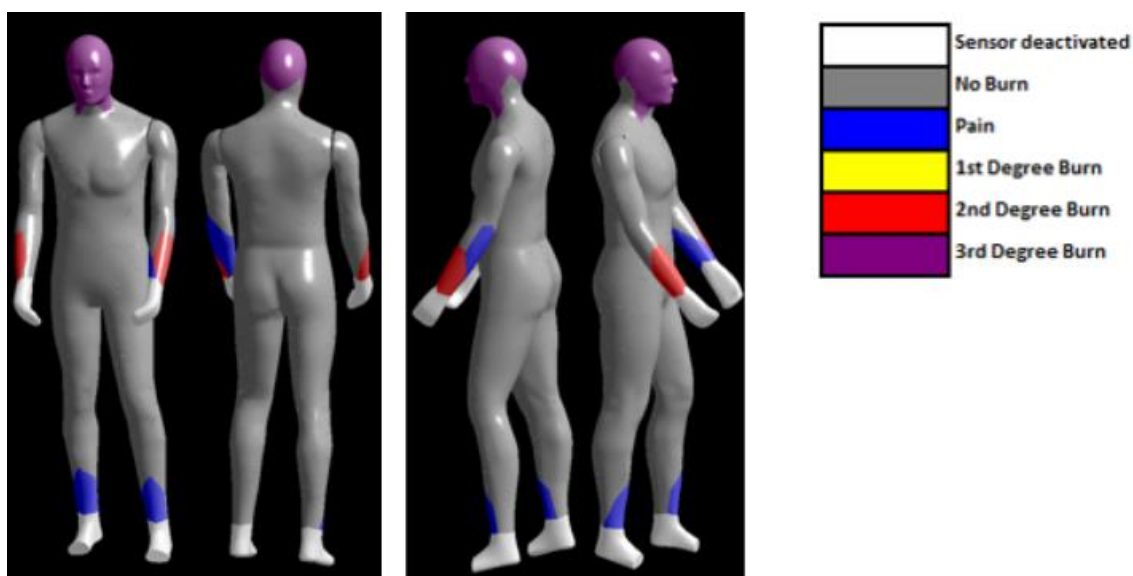
• Duration of the exposure	3 s
• Duration of the data acquisition	120 s
• Temperature of the exposure chamber before the test	20,0 °C

Total Surface Area	1,80 m ²
Total Clothed Surface Area	1,68 m ²
Total transferred energy	104,81 kJ

Predicted total burn injury of the manikin

For this test, therefore, hands and feet are not included in the calculations.

First-degree burn injury area (%)	2nd degree burn injury area (%)	3rd-degree burn injury area (%)	Predicted total area of burn injury (2nd and 3rd degree) (%)
0,0	2,0	6,7	8,7



**Sample n° 2**

Ref.- 2023US0355-S02_P1

Property	Measurement	Sample 2	Remark
Afterflame time	Video	0,0 s	---
Hole formation	Visual	No	---
Melting	Visual	No	---
Embrittlement	Visual	No	---
Smoke	Visual	Yes	---
Dripping	Visual	No	---
Shrinkage	Visual	No	---
Functioning of garment accessories	Visual	Correct	---

**Sample n° 2**

Ref.- 2023US0355-S02_P1

Burns

Body area	Clothed 1st Deg Burn Area (%)	Clothed 2nd Deg Burn Area (%)	Clothed 3rd Deg Burn Area (%)
Arms	0,0	11,5	0,0
Shanks	0,0	0,0	0,0
Thighs	0,0	0,0	0,0
Trunk	0,0	0,0	0,0
WHOLE MANIKIN	0,0	2,2	0,0

Remark

These percentages are for the total area of the manikin covered by the test specimen



Sample before test n° 2 Ref.- 2023US0355-S02_P1

PHOTOS

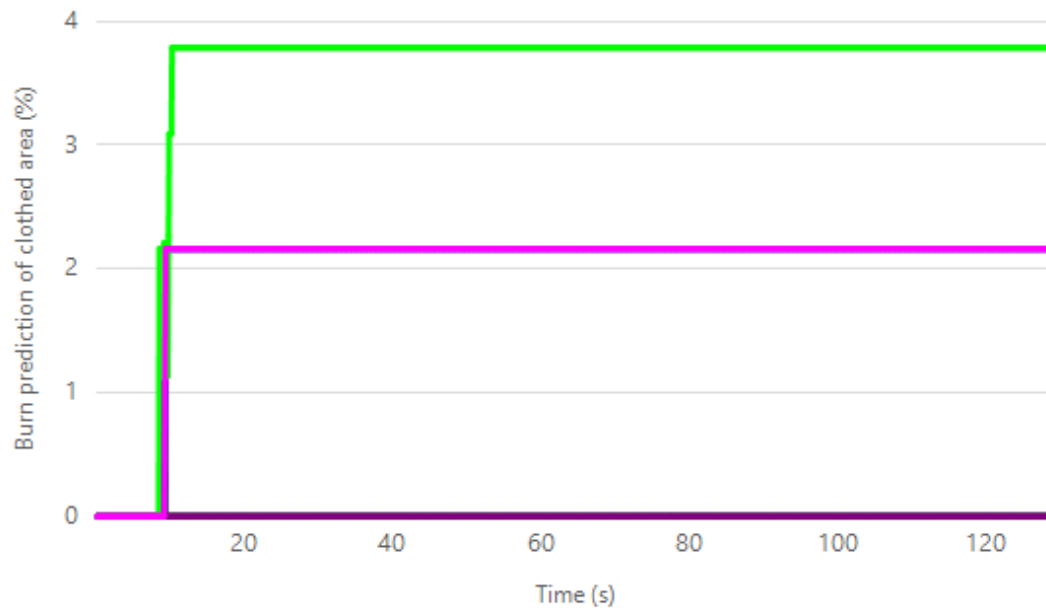


**Sample n° 2**

Ref.- 2023US0355-S02_P1

Clothed Burn Injury Over Time

— Clothed 1st Deg Burn Area — Clothed 3rd Deg Burn Area — Total Clothed Burn Injury Area
— Clothed 2nd Deg Burn Area — Clothed Pain Area





Sample after test n° 2 Ref.- 2023US0355-S02_P1

PHOTOS



**Sample n° 3**

Ref.- 2023US0355-S02_P1

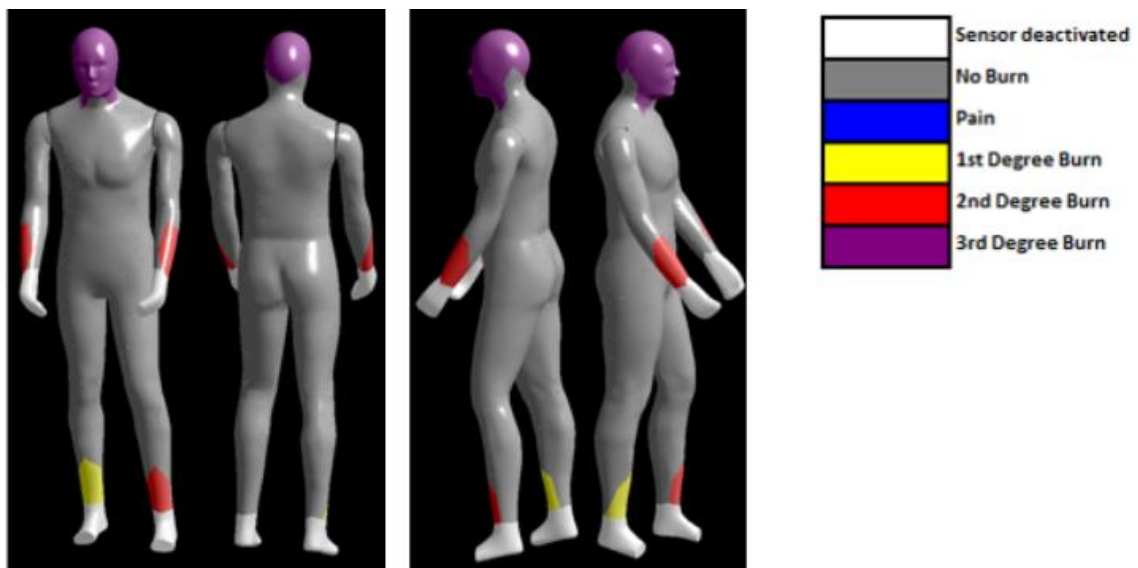
• Duration of the exposure	3 s
• Duration of the data acquisition	120 s
• Temperature of the exposure chamber before the test	20,1 °C

Total Surface Area	1,80 m ²
Total Clothed Surface Area	1,68 m ²
Total transferred energy	106,32 kJ

Predicted total burn injury of the manikin

For this test, therefore, hands and feet are not included in the calculations.

First-degree burn injury area (%)	2nd degree burn injury area (%)	3rd-degree burn injury area (%)	Predicted total area of burn injury (2nd and 3rd degree) (%)
1,1	2,8	6,7	9,5



**Sample n° 3**

Ref.- 2023US0355-S02_P1

Property	Measurement	Sample 3	Remark
Afterflame time	Video	0,0 s	---
Hole formation	Visual	No	---
Melting	Visual	No	---
Embrittlement	Visual	No	---
Smoke	Visual	Yes	---
Dripping	Visual	No	---
Shrinkage	Visual	No	---
Functioning of garment accessories	Visual	Correct	---

**Sample n° 3**

Ref.- 2023US0355-S02_P1

Burns

Body area	Clothed 1st Deg Burn Area (%)	Clothed 2nd Deg Burn Area (%)	Clothed 3rd Deg Burn Area (%)
Arms	0,0	11,5	0,0
Shanks	5,6	4,1	0,0
Thighs	0,0	0,0	0,0
Trunk	0,0	0,0	0,0
WHOLE MANIKIN	1,1	3,0	0,0

Remark

These percentages are for the total area of the manikin covered by the test specimen



Sample before test n° 3 Ref.- 2023US0355-S02_P1

PHOTOS

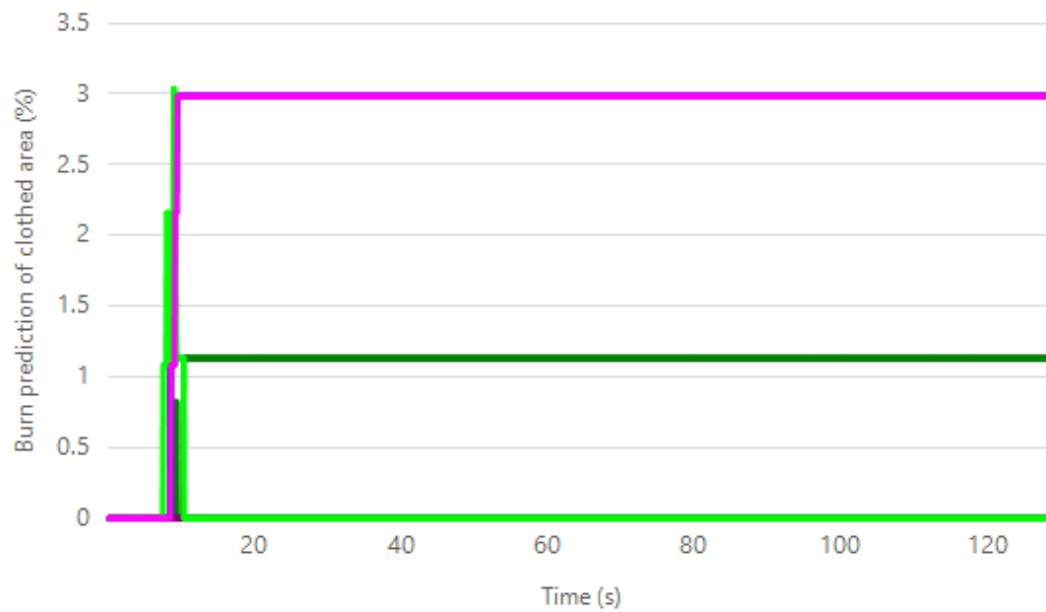


**Sample n° 3**

Ref.- 2023US0355-S02_P1

Clothed Burn Injury Over Time

— Clothed 1st Deg Burn Area — Clothed 3rd Deg Burn Area — Total Clothed Burn Injury Area
— Clothed 2nd Deg Burn Area — Clothed Pain Area





Sample after test n° 3 Ref.- 2023US0355-S02_P1

PHOTOS





Sample Ref.- 2023US0355-S02_P1

Predicted burn injury on the total area of the manikin covered by the test specimen.

Exposure	2nd degree burn injury area	3rd-degree burn injury area	Predicted total area of burn injury (2nd and 3rd degree)	Average	Standard deviation
1	3,0	0,0	3,0	2,7	0,5
2	2,2	0,0	2,2		
3	3,0	0,0	3,0		

Predicted burn injury on the total area of the manikin, except hands and feet.

Exposure	2nd degree burn injury area	3rd-degree burn injury area	Predicted total area of burn injury (2nd and 3rd degree)	Average	Standard deviation
1	2,8	6,7	9,5	9,2	0,5
2	2,0	6,7	8,7		
3	2,8	6,7	9,5		

Reference	Description
2023US0355-S02_P1	Coverall - AFTER WASH 1 cycle NFPA 2112



RESULTS

MASS PER UNIT AREA

Standard

ASTM D3776/3776M-20 (R2020) Option C

Conditioning date 30/01/2024**Test date** 05/02/2024**Atmosphere for conditioning testing****Temperature** (21±1) °C **Relative humidity** (65±2) %**Number of specimens**

1

Dimensions of specimens500 cm²**Reference**

2023US0355-S01.1.1 + S01.1.2

Mass per unit area (oz/yd ²)	Mass per unit area (g/m ²)
23,3	790

Remark

The test was carried out at laboratory located at Carretera Banyeres s/n - 03802 Alcoi, Alicante

Reference	Description
2023US0355-S01.1.1 + S01.1.2	Yellow fabric + Black fabric



RESULTS

MASS PER UNIT AREA

Standard

ASTM D3776/3776M-20 (R2020) Option C

Conditioning date 16/02/2024 **Test date** 19/02/2024**Atmosphere for conditioning testing****Temperature** (21±1) °C **Relative humidity** (65±2) %**Number of specimens**

1

Dimensions of specimens500 cm²**Reference**

2023US0355-S01.1.1_P2 + S01.1.2_P2

Mass per unit area (oz/yd ²)	Mass per unit area (g/m ²)
11,9	404

The test was carried out at laboratory located at Carretera Banyeres s/n - 03802 Alcoi, Alicante

Reference	Description
2023US0355-S01.1.1_P2 + S01.1.2_P2	Yellow fabric - AFTER WASH 100 cycles NFPA 2112 + Black fabric - AFTER WASH 100 cycles NFPA 2112



RESULTS

SEAM TENSILE RESISTANCE

Standard

ASTM D 1683/D1683M:22

Number of test specimens per material to be tested

Tested 5

Rejected 0

Gauge length

Warp:100 mm

Weft:100 mm

The break of the seam is produced for:

Reference

2023US0355-S01.5

Test date

Start date 30/01/2024

End date 02/02/2024

Atmosphere for testing

Temperature (20,0± 2) °C

Relative Humidity (65,0 ± 4) %

Specimen	Seam strength (N)
1	338.13
2	152.97
3	398.36
4	269.64
5	221.07
Average	276,03
C.V.	34,85

Uncertainty

± 6% assay value of the measured

The test was carried out at laboratory located at Carretera Banyeres s/n - 03802 Alcoi, Alicante

Reference	Description
2023US0355-S01.5	Seam



RESULTS

DETERMINATION OF DIMENSIONAL CHANGE IN DOMESTIC WASHING AND DRYING

Standard

AATCC 135:2018

Starting test date

20/12/2023

Ending test date

01/02/2024

Size of specimens and benchmarks

Option 1 - Samples of 380 x 380 mm and benchmarks of 250 mm.

Number of washing cycles

5

Uncertainty of test (% of the measured value)

$\pm 0.4 \%$

Original samples had no wrinkles, were not distorted, not used, ironing or restored in any way.



Reference	Number of specimens	Direction	Dimensional change (%)
2023US0355-S01.1.1_P3 + S01.1.2_P3	3	Warp	-1,9 %
		Weft	-0,8 %

Remark

Negative dimensional change indicates shrinkage

Positive dimensional change indicates lengthening

The test was carried out at laboratory located at Carretera Banyeres s/n - 03802 Alcoi, Alicante

Reference	Description
2023US0355-S01.1.1_P3 + S01.1.2_P3	Yellow fabric - AFTER WASH 5 cycles AATCC 135 + Black fabric - AFTER WASH 5 cycles AATCC 135



RESULTS

DETERMINATION OF TEMPERATURE OF MELTING

Standard

ASTM D7138-16

Equipment

Differential scanning calorimeter DSC 3+/METTLER of heat flow rate with aluminum crucible 40μl

Test date**Start date**

05/02/2024

End date

06/02/2024

Number of test specimens per material to be tested**Tested**

5

Temperature program

First heating cycle from 20 to 300°C at 10°C/min

Isotherm at 300°C, 5 minutes

Cooling cycle at 20°C/min until 20°C

Second heating cycle from 20 to 300°C at 20°C/min

Reference

2023US0355-S01.4

Melting point (°C)

NO MELT

The test was carried out at laboratory located at Carretera Banyeres s/n - 03802 Alcoi, Alicante

Reference	Description
2023US0355-S01.4	Thread



Lucia Martinez
Head of PPE and Ballistics department



Date: 20/03/2024 11:37:21

Digitally Signed by: ISABEL LLOPIS LUMBRERAS -

NIF: 21678551Q

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. AITEX laboratories do not carry out sampling.
- 3.- The Offer and / or Order to which the applicant gives approval through signature and seal, constitutes the Legally Executable Agreement in which AITEX is responsible for safeguarding and guaranteeing the absolute confidentiality of the management of all the information obtained or created during the performance of the contracted activities.
- 4.- 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.
- 5.- AITEX will provide at the request of the person concerned, the treatment of complaints procedure. In the event that you want to make it, direct it to: calidad@aitex.es.
- 6.- AITEX is not responsible for the information provided by customers, which is reflected in the Report, and may affect the validity of the results.
- 7.- AITEX is not responsible for an inadequate state of the sample received that could compromise the validity of the results, expressing such circumstance, in the test reports.
- 8.- AITEX may include in its reports, analyses, results, etc., any other evaluation which it considers necessary, even when it has not been specifically requested.
- 9.- When a Declaration of Conformity is requested, if not indicated otherwise, the decision rule according to ILAC-G8: 2009 will be applied with a security zone of 1U and a Probability of False Acceptance <2.5%.
- 10.- The uncertainties of tests, which are made explicit in the Results Report, have been estimated for a $k = 2$ (95% probability of coverage). If not informed, they are available to the client in AITEX.
- 11.- The original materials and rests of samples, not subject to test, will be retained in AITEX during the twelve months following the issuance of the report, so that any check or claim which, in his case, wanted to make the applicant, should be exercised within the period indicated.
- 12.- This report may only be sent or delivered by hand to the applicant or to a person duly authorised by the same.
- 13.- 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.
- 14.- The client must attend at all times, to the dates of the realization of the tests.
- 15.- According to Resolution EA (33) 31, the test reports must include the unique identification of the sample, and any brand or label of the manufacturer may be added. It is not allowed to re-issue test reports of untested sample names (references), they can only be re-issued for error correction or inclusion of omitted data that were already available at the time of the test. The laboratory can not assume responsibility for declaring that the product with the new trade name / trademark is strictly identical to the one originally tested; This responsibility belongs to the client.
- 16.- This report may not be partially reproduced without the written approval of the issuing laboratory.
- 17.- The tests have been carried out at the Alcoy plant with the address described on the first page of the report, unless another location is indicated in the results sheet of the specific test.