



Laboratory: physic-chemical

File N°: 1902665 -1

Receipt date: 04/04/2019

Sample N°/ Your Reference:

1902665.01: Knitted Fabric EBR020-S220: %60 Modacrylic %38 Cotton %2 Carbon (220 g/m²)

Requested tests:

-NF EN ISO 9151: NF EN ISO 11612	Convective heat transmission
-NF EN ISO 6942: NF EN ISO 11612	Heat transfer - Radiance
- NF ISO 17493: NF EN ISO 11612	Convective heat resistance
-NF EN ISO 15025: NF EN ISO 11612	Limited flame spread
-NFEN ISO 13938-1: NF EN ISO 11612	Determination of bursting strength and bursting distension
-NF EN 1149-3	Determination of Induction Decay

Moknine : 12-04-2019

The Manager



Note :

The results of this report relate only to the samples submitted to the lab TTS and cannot in any case be extrapolated to other samples even if they are of the same lot. Any partial reproduction of this report is prohibited unless it is subject to written approval by the laboratory of TTS.
Notices, interpretations and declarations of conformity are not covered by accreditation

Test method : Convection heat transmission (Codification letter B)
 Test date : 10-04-2019
 Our reference : 1902665 .01
 Your reference : Knitted Fabric EBR020-S220: %60 Modacrylic %38 Cotton %2 Carbon (220 g/m²)

Standard used : NF EN ISO 9151: 2017
Product standard : NF EN ISO 11612 § 7.2: 2015
 Standard deviation : No
 Pretreatment : 05 washing cycles at 60°C (6N/F) according to ISO 6330 + tumbler dry + ironing
 Conditioning : 24h à 20°C /65%HR
 test atmosphere : 23 °C / 40 % HR
 Face tested : In front
 Heat Flow Density : 80 kW/m²
 Gas used : Propane
 Type of calorimeter used : Method A

Results:

	t ₁₂ (s)	t ₂₄ (s)
Specimen 1	3.8	5.4
Specimen 2	3.9	5.5
Specimen 3	4	5.6
Average	3.9	5.5
Heat transfer index HTI₂₄ (s)		5

Requirements according to ISO 11612 § 7.2	level B1 : 4 s ≤ HTI ₂₄ < 10 s level B2 : 10 s ≤ HTI ₂₄ < 20 s level B3 : 20 s ≤ HTI ₂₄
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Classification according to ISO 11612 § 7.2	Level B1
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Test carried out under accreditation



Test method : Heat transfer - Radiance (Codification letter C)
Test date : 11-04-2019
Our reference : 1902666 .01
Your reference : Knitted Fabric EBR020-S220: %60 Modacrylic %38 Cotton %2 Carbon (220 g/m²)

Standard used : NF EN ISO 6942: 2002 /METHOD B
Product standard : NF EN ISO 11612 § 7.3: 2015
Standard deviation : No
Pretreatment : After 05 washing cycles at 60°C (6N/F) according to ISO 6330 + tumbler dry +ironing
Conditioning: : 20°C /65%HR
Test atmosphere : 26 °C/ 45 % HR
Density of heat flow : 20 kW/m²
Number of specimens : 3

Results:

Specimen N° :	Heat flow density Q _c (kW/m ²)	Heat transfer factor TF (20)
1	14.678	0.736
2	15.361	0.770
3	15.012	0.753

	t ₂₄ (s)	t ₂₄ (s) – t ₁₂ (s)
Specimen 1	9.7	4.5
Specimen 2	9.4	4.3
Specimen 3	9.6	4.4

Heat transfer index RHTI₂₄ (20) (s)	9
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Requirements according to ISO 11612 § 7.3	Level C1 : 7 s ≤ RHTI ₂₄ < 20 s
	Level C2 : 20 s ≤ RHTI ₂₄ < 50 s
	Level C3 : 50 s ≤ RHTI ₂₄ < 95 s
	Level C4 : 95 s ≤ RHTI ₂₄

Classification according to ISO 11612 § 7.3	Level C1
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Test carried out under accreditation



Test method : Convective heat resistance (180 ± 5) °C
Test date : 11-04-2019
Our reference : 1902666 .01
Your reference : Knitted Fabric EBR020-S220: %60 Modacrylic %38 Cotton %2 Carbon (220 g/m²)

Standard used : NF ISO 17493: 2017
Product standard : NF EN ISO 11612 § 6.2.1: 2015
Standard deviation : No
Pretreatment : 05 washing cycles at 60°C (6N/F) according to ISO 6330 + tumbler dry +Ironing
Conditioning : 20°C /65%HR
Test temperature : 180°C
Exposure duration : 5 min

Results

		Specimen 1	Specimen 2	Specimen 3	Moyenne
(%) Dimensional variation	length direction	0.12	-0.48	-1.21	-0.5
(%) Dimensional variation	Width direction	-1.21	-2.3	-1.94	-2.0

Observations :

Inflammation: No
Melting: No
Charring: No
Embrittlement: No
Hole formation: No
Separation: No
Other: No

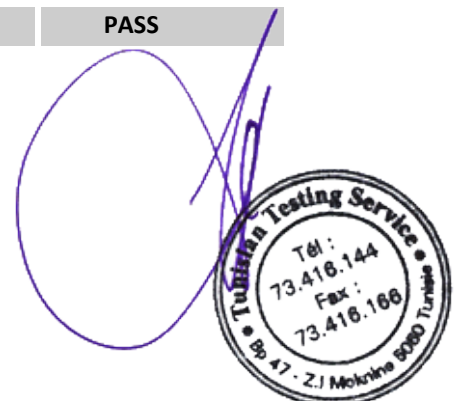
Requirements according to ISO 11612 § 6.2.1

shrinkage ≤ 5 %
Inflammation: No
Melting : No

Conformity assessment according to ISO 11612 § 6.2.1

PASS

Test carried out under accreditation



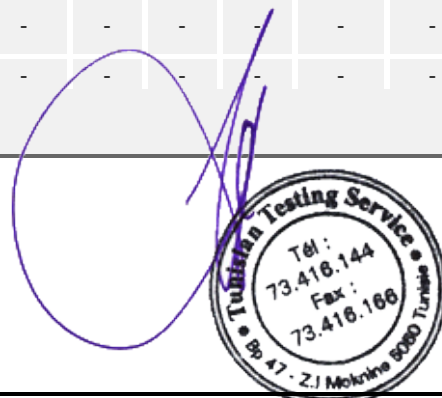
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Test method : Limited flame spread (Codification letter A1)
Test date : 08-04-2019
Our reference : 1902666 .01
Your reference : Knitted Fabric EBR020-S220: %60 Modacrylic %38 Cotton %2 Carbon (220 g/m²)

Standard used : NF EN ISO 15025: 2017 / METHOD A
Product standard : NF EN ISO 11612 § 6.3.2: 2015
Standard deviation : No
Pretreatment : Without
Conditioning : 20 °C /65 %HR
Test atmosphere : 19°C / 46 % HR
Ignition time : 10 s
Type of gas used : Propane

Results

➤ Surface ignition												
Sample	Length direction						Width direction					
	1	2	3	4	5	6	1	2	3	4	5	6
Layer exposed to flame	Outer	Outer	Outer	back	back	back	Outer	Outer	Outer	back	back	back
Ignition of specimens (yes/no)	No	No	No	No	No	No	No	No	No	No	No	No
Upper border reached (yes/no)	No	No	No	No	No	No	No	No	No	No	No	No
Duration of flame persistence (s)	-	-	-	-	-	-	-	-	-	-	-	-
Incandescence (yes / no)	No	No	No	No	No	No	No	No	No	No	No	No
Residual incandescence time(s)	-	-	-	-	-	-	-	-	-	-	-	-
Production of debris (yes / no)	No	No	No	No	No	No	No	No	No	No	No	No
Debris having ignited the filter paper	No	No	No	No	No	No	No	No	No	No	No	No
Merger (yes / no)	No	No	No	No	No	No	No	No	No	No	No	No
Hole formation (yes / no)	No	No	No	No	No	No	No	No	No	No	No	No
Number of holes	-	-	-	-	-	-	-	-	-	-	-	-
Dimensions of the largest hole	-	-	-	-	-	-	-	-	-	-	-	-
Length damaged / charred	-	-	-	-	-	-	-	-	-	-	-	-



Test method : Limited flame spread (Codification letter A1)
Test date : 08-04-2019
Our reference : 1902666 .01
Your reference : Knitted Fabric EBR020-S220: %60 Modacrylic %38 Cotton %2 Carbon (220 g/m²)

Standard used : NF EN ISO 15025: 2017 / METHOD A
Product standard : NF EN ISO 11612 § 6.3.2: 2015
Standard deviation : No
Pretreatment : 05 washing cycles at 60°C (6N/F) according to ISO 6330 + tumbler dry +ironing
Conditioning : 20 °C /65 %HR
Test atmosphere : 19°C / 46 % HR
Ignition time : 10 s
Type of gas used : Propane

Results

➤ Surface ignition												
	Length direction						Width direction					
Sample	1	2	3	4	5	6	1	2	3	4	5	6
Layer exposed to flame	Outer	Outer	Outer	back	back	back	Outer	Outer	Outer	back	back	back
Ignition of specimens (yes/no)	No	No	No	No	No	No	No	No	No	No	No	No
Upper border reached (yes/no)	No	No	No	No	No	No	No	No	No	No	No	No
Duration of flame persistence (s)	-	-	-	-	-	-	-	-	-	-	-	-
Incandescence (yes / no)	No	No	No	No	No	No	No	No	No	No	No	No
Residual incandescence time(s)	-	-	-	-	-	-	-	-	-	-	-	-
Production of debris (yes / no)	No	No	No	No	No	No	No	No	No	No	No	No
Debris having ignited the filter paper	No	No	No	No	No	No	No	No	No	No	No	No
Merger (yes / no)	No	No	No	No	No	No	No	No	No	No	No	No
Hole formation (yes / no)	No	No	No	No	No	No	No	No	No	No	No	No
Number of holes	-	-	-	-	-	-	-	-	-	-	-	-
Dimensions of the largest hole	-	-	-	-	-	-	-	-	-	-	-	-
Length damaged / charred	-	-	-	-	-	-	-	-	-	-	-	-

Requirement according to ISO 11612 § 6.3.2

Inflammation: No
 Flaming debris: No
 Hole > 5mm: No
 Residual glow time < 2s
 Flame persistence time < 2s

Conformity according to ISO 11612 § 6.3.2

PASS Level A1

Test carried out under accreditation

Test method : Limited flame spread (Codification letter A2)
Test date : 09-04-2019
Our reference : 1902666 .01
Your reference : Knitted Fabric EBR020-S220: %60 Modacrylic %38 Cotton %2 Carbon (220 g/m²)

Standard used : NF EN ISO 15025: 2016 / METHOD B
Product standard : ISO 11612 § 6.3.3: 2015
Standard deviation : No
Pretreatment : Without
Conditioning : 20 °C /65 %HR
Test atmosphere : 21°C / 49 % HR
Ignition time : 10 s
Type of gaz used : Propane

Result

➤ Edge ignition												
Sample	Length direction						Width direction					
	1	2	3	4	5	6	1	2	3	4	5	6
Layer exposed to flame	Outer	Outer	Outer				Outer	Outer	Outer			
Ignition of specimens (yes/no)	No	No	No				No	No	No			
Upper border reached (yes/no)	No	No	No				No	No	No			
Duration of flame persistence (s)	-	-	-				-	-	-			
Incandescence (yes / no)	No	No	No				No	No	No			
Residual incandescence time(s)	-	-	-				-	-	-			
Production of debris (yes / no)	No	No	No				No	No	No			
Debris having ignited the filter paper	No	No	No				No	No	No			
Merger (yes / no)	No	No	No				No	No	No			
Hole formation (yes / no)	No	No	No				No	No	No			
Number of holes	-	-	-				-	-	-			
Dimensions of the largest hole	-	-	-				-	-	-			
Length damaged / charred	125	140	127				110	95	115			



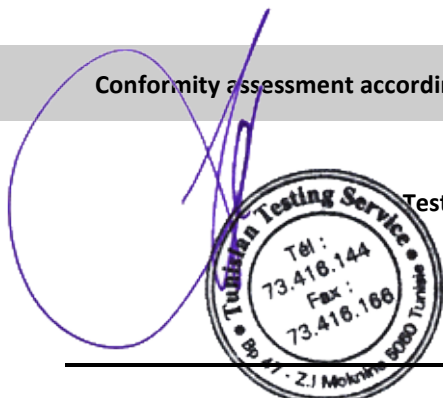
Test method : Limited flame spread (Codification letter A2)
Test date : 09-04-2019
Our reference : 1902665 .01
Your reference : Knitted Fabric EBR020-S220: %60 Modacrylic %38 Cotton %2 Carbon (220 g/m²)

Standard used : NF EN ISO 15025: 2016 / METHOD B
Product standard : ISO 11612 § 6.3.3: 2015
Standard deviation : No
Pretreatment : 05 washing cycles at 60°C (6N/F) according to ISO 6330 + tumbler dry +ironing
Conditioning : 20 °C /65 %HR
Test atmosphere : 21°C / 49 % HR
Ignition time : 10 s
Type of gaz used : Propane

Result

➤ Edge ignition												
Sample	Length direction						Width direction					
	1	2	3	4	5	6	1	2	3	4	5	6
Layer exposed to flame	Outer	Outer	Outer				Outer	Outer	Outer			
Ignition of specimens (yes/no)	No	No	No				No	No	No			
Upper border reached (yes/no)	No	No	No				No	No	No			
Duration of flame persistence (s)	-	-	-				-	-	-			
Incandescence (yes / no)	No	No	No				No	No	No			
Residual incandescence time(s)	-	-	-				-	-	-			
Production of debris (yes / no)	No	No	No				No	No	No			
Debris having ignited the filter paper	No	No	No				No	No	No			
Merger (yes / no)	No	No	No				No	No	No			
Hole formation (yes / no)	No	No	No				No	No	No			
Number of holes	-	-	-				-	-	-			
Dimensions of the largest hole	-	-	-				-	-	-			
Length damaged / charred	115	130	85				100	95	60			

Conformity assessment according to ISO 11612 § 6.3.3 PASS Level A2



Test carried out under accreditation

Test method : Determination of bursting strength and bursting distension
Test date : 08-04-2019
Our reference : 1902665 .01
Your reference : Knitted Fabric EBR020-S220: %60 Modacrylic %38 Cotton %2 Carbon (220 g/m²)

Standard used : NF EN ISO 13938-1: 1999
Product standard : NF EN ISO 11612 § 6.5.3: 2015
Deviation : No
Pretreatment : 05 washing cycles at 60°C (6N/F) according to ISO 6330 + tumbler dry +ironing
Conditioning : 20°C /65%HR
Equipment : Eclatometer M229 SDL ATLAS
Number of specimens : 5
Test area : 7.3 cm²
Speed : 52.9 cm³/min

Results:

	Specimen 1	Specimen 2	Specimen 3	Specimen 4	Specimen 5	Average
bursting strength (kPa)	824	735	767	819	785	786
Height (mm)	7.4	7.5	7.4	7.8	7.7	7.6
Observations :						

Requirement according to ISO 11612 § 6.5.3

For 50 cm² : ≥ 100 kPa
 For 7,3 cm² : ≥ 200 kPa

Conformity assessment according to ISO 11612 § 6.5.3

PASS

Test carried out under accreditation



Test method : Electrostatic properties: Test methods for measurement of charge decay
Test date : 10-04-2019
Our reference : 1902666 .01
Your reference : Knitted Fabric EBR020-S220: %60 Modacrylic %38 Cotton %2 Carbon (220 g/m²)

Standard used : NF EN 1149-3: 2004 / Method 2
Standard deviation : No
Pretreatment : 05 washing cycles at 60°C (6N/F) according to ISO 6330 + tumbler dry + ironing
Conditioning : 24h à (23°C / 25% HR)
Atmosphere of test : 23°C / 25% HR
Number of specimen : 3
Specimen size : 350 mm x 350 mm

Results

	Half decay time t50 (s)	Shielding Factor S
Specimen 1	< 0.01	0.45
Specimen 2	< 0.01	0.41
Specimen 3	< 0.01	0.46
Average	< 0.01	0.44

Test under accreditation



End of report