EUROLAB Laboratory Services

TEST / INSPECTION REPORT

EUROLAB LABORATUVAR HİZMETLERİ

TÜRCERT TEKNİK KONTROL VE BELGELENDİRME A.Ş.

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Sample ID : **Digital Printing Fabrics**

	TEST	METHOD	RESULT	
*	Fire behaviour of building materials and elements Part 1: Classification of building materials Requirements and testing	DIN 4102-1	PASS	B1
*	Standard Methods of Fire Tests for Flame Propagation of Textiles and Films Test Method 2	NFPA-701	PASS	
*	Safety against fire - Building materials - Reaction to fire tests - Electrical burner test for flexible materials	NF P92-503	PASS	M1
	Safety against fire - Building materials - Reaction to fire tests - Flame retention test and flame spread rate	NF P92-504	PASS	
	Fire Test to Building Material - Dripping test	NF P92-505	PASS	
	Fire Safety - Building - Interior Fitting Materials - Classification According To Their Reaction To Fire	NF P92-507	PASS	

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Environment

The requirements and standards apply to equipment intended for use in,

X	Residential (domestic) environment
X	Commercial and light-industrial environment
X	Industrial environment
X	Medical environment

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DIN 4102-1

Scope

The standard applies to the classification of the fire behavior of building materials to assess the risk as a single building material and in combination with other building materials.

Building Material Classes

The building materials are classified according to their fire behavior into the building material classes according to Table 1:

Building Material Classes	Building Inspectorate Designation
A A1 A2	Non-combustible building materials
B B1 B2 B3	Flammable building materials Flame retardant building materials Normally flammable building materials Easilly flammable building materials

Building material class B1

General requirements :

a) Building materials with the exception of outer wall cladding and floor coverings The test represents a model of the fire of an object in a room (eg waste paper basket in a corner of the room) Under this stress, the fire spread must not extend significantly outside the primary fire area and the heat emission must be limited.
b) Exterior wall cladding The test is a model of the flames emerging from a wall opening. Under this load, the spread of fire must not extend significantly outside the primary fire area.
c) Floor coverings The test represents a model of a fire situation in which flames strike from the door opening to an adjacent room. Under this load, the horizontal flame spread and the smoke development must be harmless.

Requirements for classification

Building materials, with the exception of floor coverings, meet the requirements for classification in building material class B1 if they pass the fire pit test and meet the requirements for building material class B2.

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RESULTS

Digital Printing Fabrics

row-no.	Foil-type:	Results of the Numune test (part 1) measurements test specimen	Digital Printing Fabrics		
1	No. of test specimen arrangement according to DIN 4102, part 15 , table 1		--		
2	Max. flame height above bottom edge cm		0.2		
	Time [1] min : s		0:3		
4	Melt through / burn through Time[1] min : s		x		
5	Observations on the backside of the specimens Flames/smouldering Time [1] min : s		--		
6	Discolouration Time [1] min : s		x		
7	Burning droplets Start [1] min : s		x		
8	Extent sporadic burning droplets		--		
9	continually falling particles		x		
10	Falling particles which burns Start [1] min : s		x		
11	sporadic falling parts		x		
12	continually falling particles		--		
13	Duration of the burning on the screen bottom (max.) min : s		--		
14	Interference of the burner flame by dripping /falling particles Time [1] min : s		--		
15	Early termination of the test End of burning at the specimen [1] min : s		--		
16	Time of early cancellation of the test [1] min : s		--		

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row-no.		Results of the Numune (part 2) measurements test specimen			
			Digital Printing Fabrics		
	Continuous burning after termination of the test				
17	Duration min : s		--		
18	Number of specimens		--		
19	Front side of the specimen		--		
20	Back side of the specimen		--		
21	Flame length cm		--		
	Smouldering after termination of the test				
22	Duration min : s		--		
23	Number of specimens		--		
	Location				
24	Lower half of the specimens		--		
25	Upper half of the specimens		--		
26	Front side of the specimen		--		
27	Backside of the specimen		--		
	Smoke development				
28	? 400 % x min		X		
29	> 400 % x min		--		
30	Diagram in appendix		--		
	Residual lengths		-- --		
31	Single values cm		-- --		
32	Average values cm		X		
33	Photo of the specimen on page		--		
	Smoke temperature				
34	Maximum value of the averaged values ºC		120		
35	Time [1] min : s		X		
36	Diagram in appendix Nr.		--		

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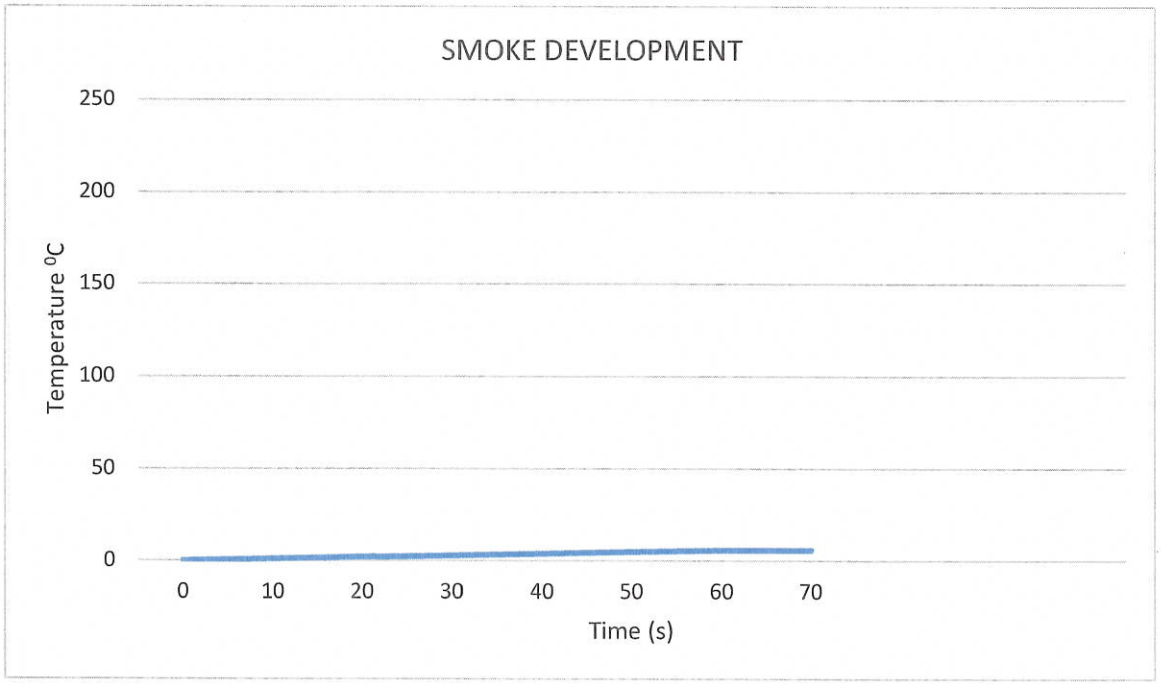
Baustoffklasse B1 (schwerentflammbare Baustoffe)

According to DIN 4102 part 1 (Mai 1998). This assessment is only valid, if the foils are glued on steel. The surface of the self-adhesive foils may be printed, but not be covered with paints, coatings or similar products. The resistance of the fire behaviour against climatic influences in the outside was not proofed. Therefore the product may be used as schwerentflammbar only inside of buildings or in oth- erwise weather protected areas.

- The material does not produce burning droplets / particles.



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NFPA-701: Standard Methods of Fire Tests for Flame Propagation of Textiles and Films Test Method 2

Scope

This standard establishes test methods for evaluating the flame spread of various textiles and films under specific fire test conditions.

Requirements

Test Method 2

Test Method 2 shall expose a 1200 mm long specimen to a 280 mm ± 12 mm igniting fame inside a four-sided test cabinet that is 305 mm ± 5 mm wide on each side and 2.13 m ± 0.01 m high.

Test Conditioning

Time (h)	24
Temperature (^{0}C)	20 ± 5

Purpose

The purpose of Test Methods 2 shall be to assess the propagation of beyond the area exposed to the ignition source.
Test Methods 2 shall not be deemed to indicate whether the material tested resists the propagation of under more severe fre exposure conditions or when the material is used in a manner that differs from the test conditions.

Procedure

NFPA 701 (Small Scale) testing measures the ignition resistance of a fabric after it is exposed to a flame for 12 seconds. The flame, char length, and flaming residue are recorded. The fabric will pass the test if all samples meet the following criteria:

- If a flame for less than 2.0 seconds occurs
- Less than 6.5 "(16.51 cm) character length
- If the specimen does not continue to catch fire after reaching the floor of the test chamber

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RESULTS

Specimen	Char Length (mm)	After Flame (s)	Flaming Residue (s)	Results
# 1	103	0.0 sec	0.0 sec	PASS
# 2	100	1.0 sec	0.0 sec	PASS
# 3	102	0.0 sec	0.0 sec	PASS
# 4	105	0.0 sec	0.0 sec	PASS
# 5	103	0.0 sec	0.0 sec	PASS
# 6	101	1.0 sec	0.0 sec	PASS
# 7	104	0.0 sec	0.0 sec	PASS
# 8	100	0.0 sec	0.0 sec	PASS
# 9	105	1.0 sec	0.0 sec	PASS
# 10	101	0.0 sec	0.0 sec	PASS

Comment: Digital Print Fabrics have been tested and meet the criteria of NFPA 701 testing.

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Procedure

NF-P92-503 to 507 standard- FR fabric test for French contract industry (also known as M1)

NF-P92-503: Safety against fire - Building materials - Reaction to fire tests - Electrical burner test for flexible materials

A fabric sample is placed in a metal frame above an extreme heat source at an angle of 30^0.
A flame is generated from the heat source directly on the surface of the fabric.

The following parameters are observed:

- How long the fabric continues to burn after the flame is removed (after flame)
- Are there burning droplets falling from the burning fabric
- Measure the length and width of the burn damage after the flame is distinguished,

NF-P92-504: Safety against fire - Building materials - Reaction to fire tests - Flame retention test and flame spread rate

This test must be performed if the fabric contracts or melts during the NF-P92-503 test.

A fabric sample is placed vertically in a metal frame. A flame is generated an is run horizontally along the whole surface of the fabric.

The following parameters are observed:

- How long the fabric continues to burn after the flame is removed (after flame)
- Are there burning droplets falling from the burning fabric.

NF-P92-505: Safety against fire - Building materials - Reaction to fire tests - Drip test for thermal melting materials

This test must only be performed if there are burning droplets falling during the NF-P92-503 and NF-P92-504 test.
A fabric sample is placed horizontally under a metal sift. Burning heat is generated on the fabric causing burning droplets to fall from the fabric onto a cotton wool pad directly beneath it.
The following parameter is observed:

- Do the burning droplets ignite the cotton wool.

French standards have also introduced a classification between M1 and M4. According to this,

M1 - Non-flammable
M2 - Low flammability
M3 - Moderately flammable
M4 – Flammable

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Requirements

Following completion of the NF-P92-503 to 505, the fabric can be categorized as NF-P92-507 and classified from M1 to M4. M1 being the highest standard of FR and M4. M1 being the highest standard of FR and M4 being the lowest:

M1:

- NF-P92-503 the after flame is max 5 seconds
- NF-P92-503 the width and length of burn damage is max 250 mm
- NF-P92-504 the after flame is max 2 seconds
- NF-P92-503 to 505 there are no burning droplets

M2:

- NF-P92-504 the after flame is max 5 seconds
- NF-P92-503 the width and length of burn damage is max 350 mm
- NF-P92-503 to 505 there are no burning droplets

M3:

- NF-P92-503 the width and length of burn damage is max 90 mm
- NF-P92-503 to 505 there are no burning droplets

M4:

- If the fabric does not meet the criteria of M1,M2 or M3, it is automatically classified as M4= not flame retardant/resistant

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RESULTS

- The test specimens have not been cleaned nor submitted to an accelerated ageing procedure.

Conditioning

minimum 7 days at (23 ± 2) °C and (50 ± 5) % RH or until constant mass is achieved

ELECTRIC BURNER TEST (NF P92-503)

	Sample 1				Sample 2				Sample 3				Sample 4				
Piercing	No				No				No				No				
Lighting time (s)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
Duration of flaming after pilot flame removal (s)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
Spread of glowing dots beyond the char area	–				–				–				–				
Fall of flaming droplets or debris	No				No				No				No				
Melting behavior, fall of non-flaming molten drips	Yes				Yes				Yes				Yes				
Destroyed or burned lenght (mm)	100				102				105				103				Average lenght 103

Ignition duration ≤ 5s	Yes
Average Lenght < 250 mm	Yes
Inflamed falling drippings	No

* No flames were observed in the sample.

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FLAME SPREAD TEST (NF P92-504)

	Sample 1	Sample 2	Sample 3	Sample 4
Duration of flaming after ISO 6940 burner removal	No	No	No	No
Material's maximum duration of flaming inferior or equal to 2s	Yes			
Material's maximum duration of flaming inferior or equal to 5s	Yes			
Fall of not flaming molten drips	Yes	Yes	Yes	Yes
Fall of flaming molten drips	No	No	No	No

Each test has been carried out with a flame application time of 5s

- The test specimens have not been cleaned nor submitted to an accelerated ageing procedure.

Conditioning

minimum 7 days at (23 ± 2) °C and (50 ± 5) % RH or until constant mass is achieved

	first ignition (s)	non-flaming debris	flaming debris	ignition cotton wool
1	*	yes	no	no
2	*	yes	no	no
3	*	yes	no	no
4	*	yes	no	no

* no ignition

Conclusion : **M1**

Overall Rating : PASS

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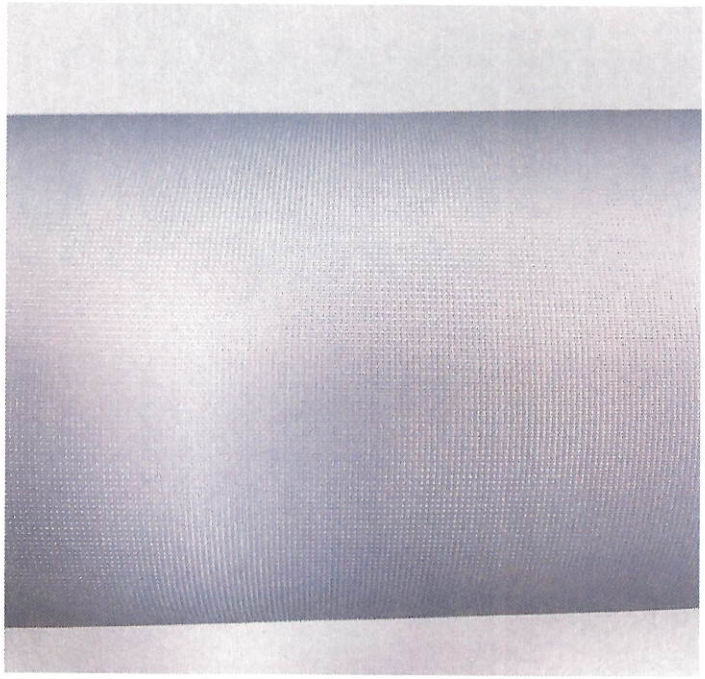
SAMPLE UNDER TEST



*** End of Report***

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