

## Technical Bulletin 4.6

### Fire Classifications and Ratings

The present Technical Bulletin provides detailed information on how to read and understand the fire classifications and ratings for Mactac Digital products.

#### Introduction

Fire safety and health requirements are regulated in the building regulations included in the European Construction Products Regulations (CPR).

These standardized regulations classify the use of construction materials of which a building has been made as well as all the materials that are used to cover walls, ceilings or floors, both for internal and external use.

The ultimate goal of the CPR legislation is to secure the health and safety of users in a building.

Over the past years, the EU has set standardized regulations to protect users against injuries at workplaces, public spaces and buildings.

Additionally, it has promoted high levels of protection in safety and health policies, also in third countries.

#### Fire Classifications in the EU

In the European countries, there have been a large number of different tests used for assessing the reaction of products to fire. These variations across individual member states mean that comparison of the performances of a product when assessed by different methods can be extremely complicated. This not only leads to barriers in the acceptance of classifications but it also creates confusion.

The Construction Products Regulations, effective since April 2011, has been implemented to replace the Construction Products Directive 89/106/EEC.

The harmonized classification regarding reaction to fire is set out in EN 13501-1 : 2018 and the end result is supposed to be that all national classification systems should be replaced by harmonised European standards. This procedure has been finalised and each European country will be required to incorporate CPR in national building regulations.

#### EN 13501-1: European Standard

European Standard EN13501-1 provides the reaction to fire classification for all products and building elements.

According to this standard, reaction to fire is the response of a product in contributing by its own decomposition to a fire to which it is exposed, under specified conditions.

All construction products are classified according to this harmonized test method.

In total, 7 Euroclasses are established: A1, A2, B, C, D, E and F.

- A1 and A2 classes are non-combustible products (glass, stone, concrete, etc.).
- B to F are combustible products, classified in an ascending order.

Flooring materials are classified to the same classes as mentioned above followed by the abbreviation "fl" - flooring. These materials do not fill the requirements related to the production of flaming droplets/particles and usually have a twofold classification (e.g., Bfl - **s1**, Bfl - **s2**).

Products which are to be rated in a given class are recognised to satisfy all the requirements of any lower class.

## Fire Classification DIN EN 13501-1

The tables presented below summarise the classification order and definition of the norm.

### Fire Resistance:

<b>A1</b>	Non-combustible materials	Highest level
<b>A2</b>	Non-combustible materials with limited combustible components	
<b>B - C</b>	Combustible materials	Difficult to ignite
<b>D - E</b>		Normal combustibility
<b>F</b>		Easily ignited

### Smoke Level:

<b>S</b>	<b>1</b>	No/hardly any smoke
	<b>2</b>	Limited smoke production
	<b>3</b>	Unlimited smoke production

### Drips/flaming droplets:

<b>D</b>	<b>0</b>	No drips/flaming droplets
	<b>1</b>	Limited drips/flaming droplets
	<b>2</b>	Unlimited drips/flaming droplets

## Testing

There are two aspects of fire tests which need to be determined;

- Resistance to fire; measurement of the capability of a product or material to resist fire.
- Reaction to fire properties; measurement of behaviour and contribution of the material to the progress of fire and to the further spread of it.

To obtain classification of reaction to fire performance in accordance with EN 13501-1, two tests have to be conducted:

- Determination of the ignitability properties of the product by direct small flame impingement according to EN-ISO 11925-2:2013
- Determination of the reaction to fire properties of the product when exposed to the thermal attack by a Single Burning Item according EN 13823:2015

To obtain classification of reaction to fire performance of floorings in accordance with EN 13501-1, an additional test to EN-ISO 11925-2:2013 is required:

- Determination of the reaction to fire properties of the product when exposed to the thermal attack by a radiant panel according to EN ISO 9239-1:2002

All the tests mentioned above provide very complete information about the behavior of our products when it comes to fire resistance. For this reason Mactac established EN 13501-1:+A1:2013 as the standard test method.

## Possible EU Classifications

The table presented below is intended as a guide only.

UK norm BS 476-6/7	French norm NF P92-507	German norm DIN EN 4102-1	European norm DIN EN 13501-1 Wall Covering			European norm DIN EN 13501-1 Floor Covering		
Non combustible	Non combustible	A1	A1			A <sub>fl</sub>		
Limited combustible	M0	A2	A2 - s1, d0			A <sub>fl</sub> - s1	A <sub>fl</sub> - s2	
	M1	B1	A2 - s1, d1	A2 - s1, d2				
			A2 - s2, d0	A2 - s2, d1	A2 - s2, d2			
			A2 - s3, d0	A2 - s3, d1	A2 - s3, d2			
	Class 0		B - s1, d0	B - s1, d1	B - s1, d2		B <sub>fl</sub> - s1	B <sub>fl</sub> - s2
			B - s2, d0	B - s2, d1	B - s2, d2			
B - s3, d0			B - s3, d1	B - s3, d2				
Class 1 & 2	M2	C - s1, d0	C - s1, d1	C - s1, d2		C <sub>fl</sub> - s1	C <sub>fl</sub> - s2	
		C - s2, d0	C - s2, d1	C - s2, d2				
		C - s3, d0	C - s3, d1	C - s3, d2				
Class 3	M3	B2	D - s1, d0	D - s1, d1	D - s1, d2		D <sub>fl</sub> - s1	D <sub>fl</sub> - s2
	M4 (no droplets)		D - s2, d0	D - s2, d1	D - s2, d2			
			D - s3, d0	D - s3, d1	D - s3, d2			
Class 4	M4	/	E	E - d1		E <sub>fl</sub>		
	/		E - d2					
/	/	B3	F			F <sub>fl</sub>		

**DIN EN 13501-1 is the preferred fire testing method because the results provide ratings for smoke production and flaming droplets/particles which is not the case of other norms.**

**Production of flaming droplets/particles ratings is important data when films are applied onto walls and ceilings but not applicable for films applied onto floors.**

### General Remarks:

- When a product is issued, it is always ensured to cover the requirements for its specific application.
- The classification document is only applicable for the products which are mentioned on the corresponding document.
- With regards to self-adhesive films; they may be applied onto a dedicated substrate or overlaminated on top of another self-adhesive film.
- Combinations of self-adhesive films should be tested, if required, as one product to determine the classification. When mounted together, two materials classified in a given rating do not automatically result in an end product with the same classification.
- In order to ensure anti-slip properties of specified self-adhesive films, surfaces must remain clean and dry throughout the usage period. Dirt, liquids and any other contaminants will increase the risk of slip and therefore injury will most likely occur.

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Classification: Avery Dennison - Public

In the table below, classification ratings and details of Mactac Digital range products are reported.

Inkjet Printing Media			
Product	Classification	Testing Institute	Expiring Date
JT 10700 WG-BFG-XR	B-s1, d0	Efectis NL	Unlimited
JT 10700 WG-BFG	B-s1, d0	LNE	Unlimited
JT 10500 WG-BFG	B-s1, d0	LNE	Unlimited
JT 9700 Series	B-s1, d0	LNE	Unlimited
JT 9500 Series	B-s1, d0	LNE	Unlimited
JT 9300 Series	B-s2, d0	LNE	Unlimited
JT 8700 Series	B-s2, d0	LNE	Unlimited
JT 8500 Series	B-s1, d0	Efectis NL	Unlimited
JT 8300 Dot Series	B-s2, d0	LNE	03/2023
JT 8300 Dot Floors	Bfl-s1	LNE	Unlimited
JT 7500 WG-PB 40	B-s2, d0	LNE	Unlimited
JT 7300 WG-PB 40	B-s2, d0	LNE	Unlimited
WW 100 Pro	B-s1, d0	Efectis NL	Unlimited
WW 300 Series	B-s1, d0	LNE	Unlimited
WW Leather, Canvas, Veneziano	B-s2, d0	Efectis FR	Unlimited
WW Linen/Country Paper	B-s1, d0	LNE	Unlimited
WW Smooth Paper	B-s1, d0	LNE	Unlimited
WW Smooth Textile	C-s1, d0	Efectis NL	Unlimited
JT 5409 RUV	B-s1, d0	LNE	Unlimited

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Classification: Avery Dennison - Public

Laminating Films			
Product	Classification	Testing Institute	Expiring Date
LF 10700 Series	B-s1, d0	Efectis NL	Unlimited
LF 10500 CG	B-s1, d0	LNE	Unlimited
LF 9700 Series	B-s1, d0	LNE	Unlimited
LF 9500 Series	B-s1, d0	LNE	Unlimited
LF 9300 Series	B-s1, d0	LNE	Unlimited
LF 8700 Series	B-s1, d0	LNE	Unlimited
LF 8500 Series	B-s1, d0	Efectis NL	Unlimited
LAG 100	B-s1, d0	LNE	Unlimited
LUV 7036	B-s1, d0	LNE	Unlimited
PG 7075	B-s1, d0	LNE	Unlimited
PermaFun Brushed Metal	B-s1, d0	LNE	Unlimited
PermaFun Coarse Wood	C-s1, d0	LNE	Unlimited
PermaFun Carbon Fibers	C-s1, d0	LNE	Unlimited
Floorgraphics			
LUV 6300	Bfl-s1	LNE	Unlimited
LUV 6301	Bfl-s1	Efectis NL	Unlimited
LUV 6400	Bfl-s1	LNE	Unlimited
LF 6302 Floorgraphics	Bfl-s1	Efectis NL	Unlimited
StreetRap + FloorGrip	Bfl-s1	Efectis NL	Unlimited
StreetRap + StreetLam	Bfl-s1	Efectis NL	Unlimited

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