

Zesty Interiör AB
Kamrergatan 28
211 56 MALMÖ

Ignitability of upholstered furniture according to EN 1021-1 and EN 1021-2

(1 appendix)

Introduction

SP has by request of Zesty Interiör AB performed fire tests according to EN 1021-1 and EN 1021-2. The purpose of the tests is to form a basis for technical fire classification.

Products

According to the client: Furniture called “Gradient”. The furniture is hollow and the shell consists of polyethylene material called “EVOLVE N-461” and pigments. The shell has a nominal density of 0.935 g/cm³ and a nominal thickness of 2.5 – 8 mm.

The following furniture collections are also made from the material described above, some of them are not for seating purpose. See photographs of furniture in appendix 2.

- | | |
|------------------------------------|----------------------------|
| - Drago/Dragheto (not for seating) | - Lapsus (not for seating) |
| - Fura Family | - Ohla Family |
| - Godot (not for seating) | - Sat |
| - Gumball Family | - Simple Family |
| - Gumball Junior | - Talea |
| - Jetlag | |

Manufacturer

Euro3plast S.p.A, Italy.

Sampling

The sample was delivered by the client. It is not known to SP Fire Research if the product received is representative of the mean production characteristics.

The sample was received on July 6, 2016 at SP Fire Research.

Test results

The product was tested with cigarette (EN 1021-1) and match flame equivalent (EN 1021-2) as ignition sources.

The ignition sources were applied in a position along the junction between seat and back. Special care was taken to note any progressive smouldering and/or flaming combustion in the combination.

SP Technical Research Institute of Sweden

Postal address
SP
Box 857
SE-501 15 BORÅS
Sweden

Office location
Brinellgatan 4
SE-504 62 BORÅS

Phone / Fax / E-mail
+46 10 516 50 00
+46 33 13 55 02
info@sp.se

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No progressive smouldering or flaming occurred within the 60 minute test time (non-ignition). The test results are given in appendix 1.

The test results relate only to the ignitability of the combination of upholstery composites under the particular conditions of the test; they are not intended as a means of assessing the potential fire hazard of the materials or products in use.

Criteria

Section 3 in EN 1021-1, 2014 and EN 1021-2, 2014 describing "Criteria of ignition" with regards to "Progressive smouldering ignition" (3.1) and "Flaming ignition" (3.2).

Deviation from standard

The product tested is not within the scope of the standard. It is not an upholstered furniture but a furniture made in hard plastic material with no filling, it is also not a seating furniture. However this furniture was chosen to make test specimens from due to its shape.

The test rig described by the standard was not used due to deviation of specimen size. Two specimens were put together to form the joint between seat and back according to standard, see photo in appendix 2.

Assessment

The furniture called "Gradient" meets the technical fire requirements according to EN 1021-1 and EN 1021-2.

The following products are hence also deemed to meet the fire requirements according to EN 1021-1 and EN 1021-2.

- | | |
|-------------------------------------|----------------------------|
| - Drago/Draghetto (not for seating) | - Lapsus (not for seating) |
| - Fura Family | - Ohla Family |
| - Godot (not for seating) | - Sat |
| - Gumball Family | - Simple Family |
| - Gumball Junior | - Talea |
| - Jetlag | |

SP Technical Research Institute of Sweden Safety - Fire Research, Fire Dynamics

Performed by



Anna Bergstrand

Examined by



Michael Försth

Appendix

1. Test results
2. Photographs

Appendix 2

Test results - EN 1021-1, 2014 and EN 1021-2, 2014

According to the client: Furniture called “Gradient”. The furniture is hollow and the shell consists of polyethylene material called “EVOLVE N-461” and pigments. The shell has a nominal density of 0.935 g/cm³ and a nominal thickness of 2.5 – 8 mm.

Observations, EN 1021-1, ignition source cigarette

Table 1. Observations during the cigarette tests.

Test no	1	2	3
The cigarette was applied in a position along the junction between seat and back, min:s	00:00	00:00	00:00
Cover ignited, min:s	_*	_*	_*
Filling ignited, min:s	_*	_*	_*
The cigarette died out, min:s	02:20**	02:32**	02:15**
The test was finished, min:s	60:00	60:00	60:00

* Ignition/Flaming ignition of the materials was not observed.

** The cigarette died out before burning its complete length.

Table 2. Test criteria and assessment, cigarette test.

	Test no		
	1	2	3
<i>Smouldering criteria</i>	Yes/No		
Unsafe escalating combustion (3.1 a)	No	No	No
Test assembly consumed (3.1 b)	No	No	No
Smoulders to extremities (3.1 c)	No	No	No
Smoulders through thickness (3.1 c)	No	No	No
Smoulders more than 1 h (3.1 d)	No	No	No
In final examination, presence of progressive smouldering (3.1 e)	No	No	No
<i>Flaming criteria</i>			
Occurrence of flames (3.2)	No	No	No

Appendix 2

Observations, EN 1021-2, ignition source small flame
Table 3. Observations during the match flame tests.

Test no	1	2	3
The ignition source was applied in a position along the junction between seat and back, min:s	00:00	00:00	00:00
Cover ignited, min:s	_*	_*	_*
Filling ignited, min:s	_*	_*	_*
The ignition source was removed, min:s	00:15	00:15	00:15
The test was finished, min:s	60:00	60:00	60:00

* Ignition/Flaming ignition of the materials was not observed.

Table 4. Test criteria and assessment, match flame test.

	Match flame equivalent		
	1	2	3
<i>"Smouldering criteria"</i>			
	Yes/No		
Unsafe escalating combustion (3.1 a)	No	No	No
Test assembly consumed (3.1 b)	No	No	No
Smoulders to extremities (3.1 c)	No	No	No
Smoulders through thickness (3.1 c)	No	No	No
Smoulders more than 1 h (3.1 d)	No	No	No
In the final examination, presence of active smouldering (3.1 e)	No	No	No
<i>"Flaming criteria"</i>			
Unsafe escalating combustion (3.2 a)	No	No	No
Test assembly consumed (3.2 b)	No	No	No
Flames to extremities (3.2 c)	No	No	No
Flames through thickness (3.1 c)	No	No	No
Flames longer than 120 s (3.2 d)	No	No	No

Measured data of tested product

Thickness of furniture shell 4.2 – 4.9 mm.

Thickness of furniture 45 mm approx.

Density of plastic 900 – 1100 kg/m³ approx.

Appendix 2

Conditioning

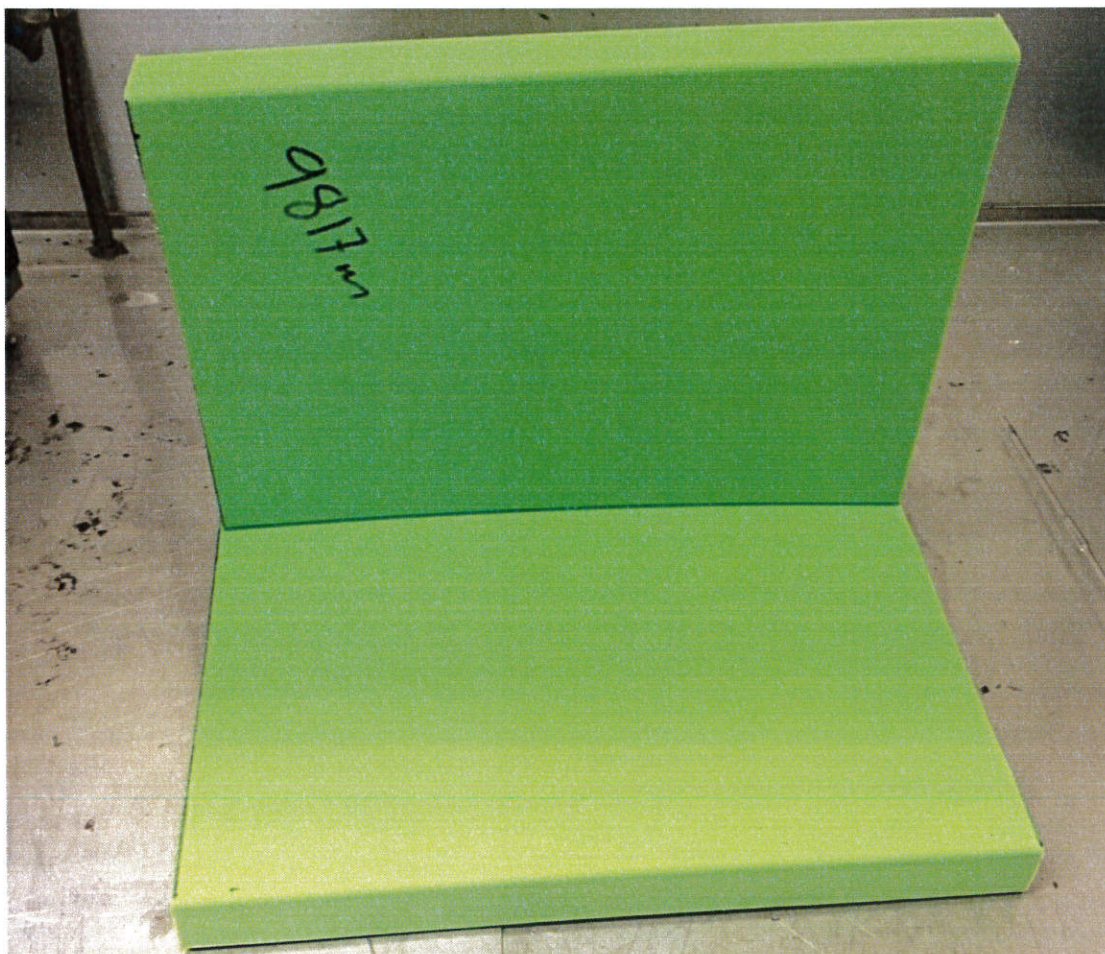
The tested product was conditioned for a minimum of 24 h at a temperature of $(23 \pm 2) ^\circ\text{C}$ and a relative humidity of $(50 \pm 5) \%$.

Date of test

July 13, 2016.

Appendix 2

Photographs



Test set-up.

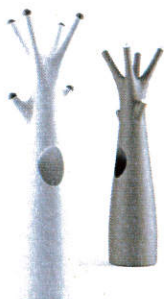


Drago/Draghetto

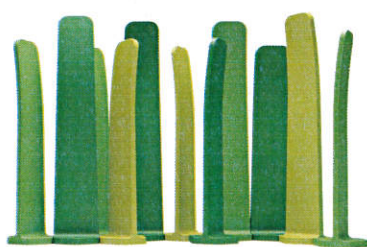


Fura

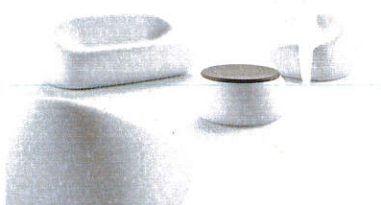
Appendix 2



Godot



Gradient – tested product

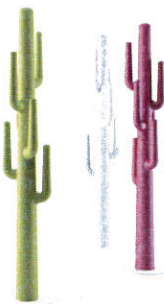


Gumball



Jetlag

Appendix 2



Lapsus



Ohla



Sat



Simple



Talea