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

(1 appendix)

Introduction

SP has by request of Lammhults Möbel AB performed a fire test according to EN 1021-1 and EN 1021-2. The purpose of the test is basis for technical fire classification.

Product

According to the client:

Chair called "Campus Air" consisting of glass fibre reinforced polyamide. The seat is reinforced to 15% and the back to 30%.

Manufacturer

Lammhults Möbel AB, Lammhult, Sweden.

Sampling

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

The sample was received on January 20, 2011 at SP Fire Technology.

Test results

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

The seat and back was dismantled and put in contact with each other in the test rig.

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.

No progressive smouldering and/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.

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Criteria

Section 3 in EN 1021-1, 2006 and EN 1021-2, 2006 describing "Criteria of ignition" with regards to "Progressive smouldering ignition" (3.1) and "Flaming ignition" (3.2).

Deviation from standard

The tested product consist of homogeneous plastic material. It is not a combination of cover and upholstery as given in the standard.

Assessment

The tested plastic chair "Campus Air" meets the technical fire requirements according to EN 1021-1 and EN 1021-2.

**SP Technical Research Institute of Sweden
Fire Technology - Fire Dynamics**

Kerstin Borgerud
Technical Officer



Per Thureson
Technical Manager

Appendix

1 Test results

Test results - EN 1021-1, 2006 and EN 1021-2, 2006

Product

According to the client:

Chair called "Campus Air" consisting of glass fibre reinforced polyamide. The seat is reinforced to 15% and the back to 30%.

Observations, EN 1021-1, ignition source cigarette

Table 1. Observations during the cigarette tests.

| Test no | 1 | 2 |
|---|-------|-------|
| The cigarette was applied in a position along the junction between seat and back, min:s | 00:00 | 00:00 |
| Cover melted, min:s | - | - |
| The filling uncovers, min:s | - | - |
| Cover ignited, min:s | -* | -* |
| Filling ignited, min:s | -* | -* |
| The cigarette died out, min:s | ** | ** |
| Flames in the cover died out, min:s | - | - |
| Flames in the filling died out, min:s | - | - |
| The glow/flames was/were extinguished, min:s | - | - |
| The test was finished, min:s | 60:00 | 60:00 |

* Ignition of the materials was not observed.

** The cigarette self extinguished after 6 min. Approximately.

Table 2. Test criteria and assessment, cigarette test.

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

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 melted, min:s | - | - | - |
| The filling uncovers, min:s | - | - | - |
| Cover ignited, min:s | _* | _* | _* |
| Filling ignited, min:s | _* | _* | _* |
| The ignition source was removed, min:s | 00:15 | 00:15 | 00:15 |
| Flames in the cover died out, min:s | - | - | - |
| Flames in the filling died out, min:s | - | - | - |
| The glow/flames was/were extinguished, min:s | - | - | - |
| The test was finished, min:s | 60:00 | 60:00 | 60:00 |

* 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, 4.7 mm approximately.

Area weight, 6.0 kg/m² approximately.

Pre treatment

According to the client, the cover material has not been chemically treated to reduce ignitability. The cover material has therefore not been subjected to the water soaking and drying procedure described in Annex D before testing.

Conditioning

The tested product was conditioned for a minimum of 24 h at a temperature of (23 ± 2) °C and a relative humidity of (50 ± 5) %.

Date of test

January 21, 2011.