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Fire test of a full scale mattress – preliminary results

Product

According to Järven Plast & Smide the mattress consist of polyether (35 kg/m³) with a cover of a composite material based on armid (1000 g/m²).

Purpose

The test is for informatory purpose.

The heat release and smoke production was measured according to fire test method NT FIRE 032 (modified). The testing was a part of SP project BRm6038 and was performed 2000-07-24.

NOTE: As a result of project BRm6038 a new Nordtest method was formed, NT FIRE 055, which is specifically designed for testing of mattresses. NT FIRE 055 is based on the same testing principle as NT FIRE 032. The test results described in this document show that the tested mattress also fulfil the criteria of NT FIRE 055, Annex G.

Testing

The mattress was tested according to NT FIRE 032, "Upholstered Furniture: Burning Behaviour – Full Scale Test". As an ignitions source a gas burner was used. This was specifically developed for ignition of upholstered furniture, the so called CBUF burner.

The test object is placed on a scale and is ignited on the top surface by the gas burner. After two minutes the gas burner is removed. The smoke formed during the test is collected by a hood placed above the test object. The heat release rate is calculated using oxygen consumption during the test.

The development of smoke is measured with a lamp (white light) and a photocell which are mounted in the duct leading from the hood. Mass loss is registered continuously during the test with the scale.

Test results

(min:s)

0:00 Ignition – burner is applied in the centre of the top surface of the mattress with a distance of 25 mm.

0:15 The cover is ignited where the burner is applied.

1:00 There is limited heat release from the mattress. No holes in the mattress. limited smoke production.

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2:00 The burner is removed.

2:15 Flames in the mattress self-extinguished.

Observations after fire test

The top cover was burnt where the burner was applied (approximately 0.2 m²), but there were no holes in the cover, the fabric structure was intact. Under the burnt part of top cover the polyether had melted to a depth of 5 cm. Mass loss was approximately 0.1 kg.

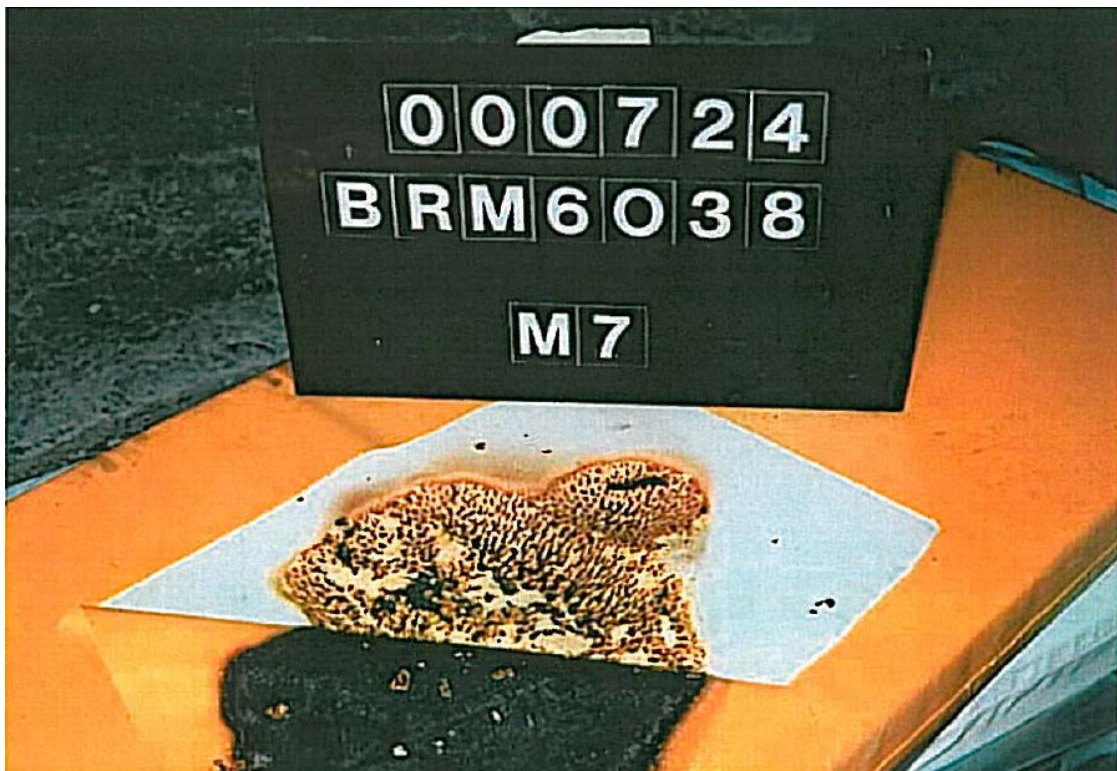


Figure 1 Damage in mattress after fire test (top cover is cut out). The polyether has melted where the burner was applied. The top cover is burnt, but there are no holes in the fabric.

Graphs of heat release rate and smoke production

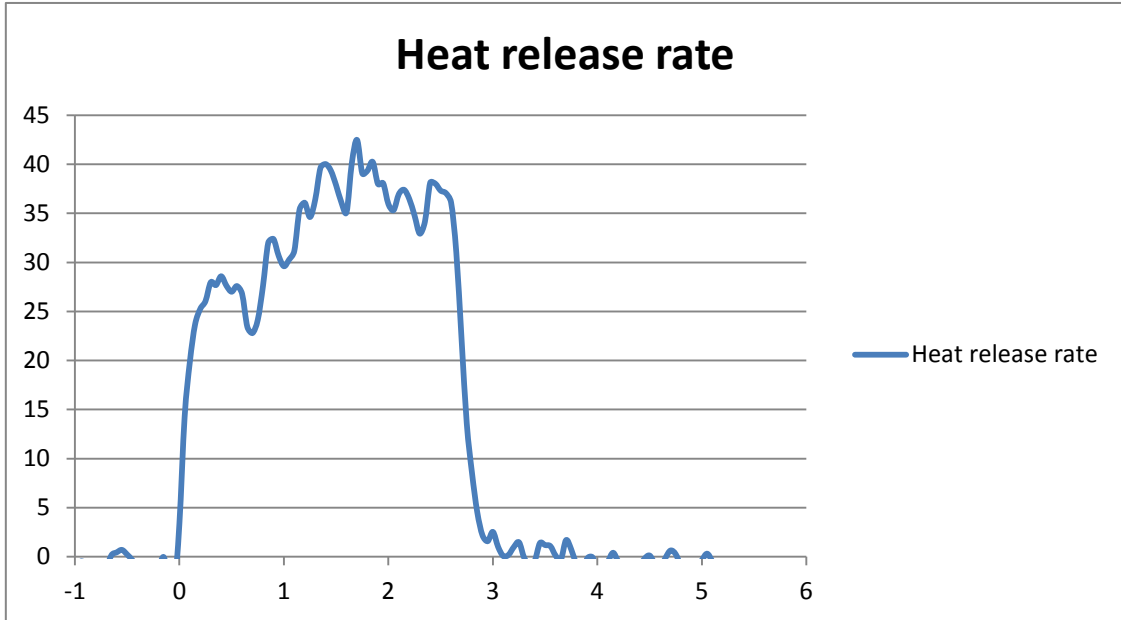


Figure 2 Heat release rate (including burner, 30kW) from the mattress during test. When the burner was removed the flames extinguished.

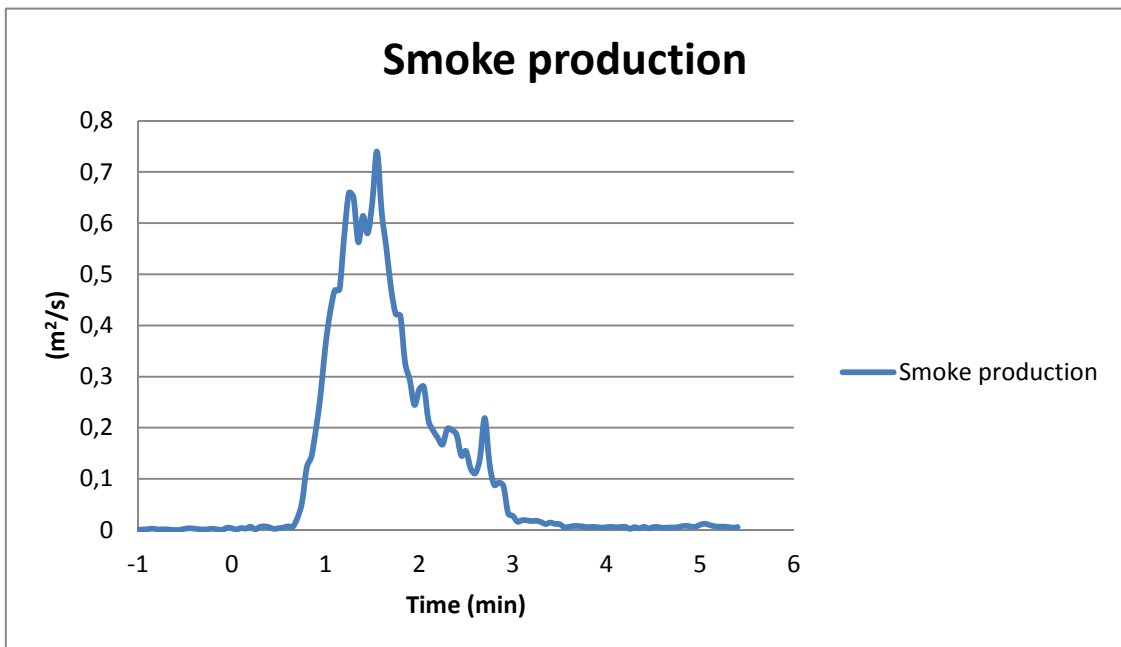


Figure 3 Smoke production from the mattress during test. Due to the small burnt area the smoke production was very limited.