REPORT

Issued by an Accredited Testing Laboratory

Contact person
Lukas Andersson
Division Built Environment
+46 10 722 32 75
lukas.andersson@ri.se

Date	Reference	Page
2023-05-17	1194506A	1 (1)

Järven Plast & Smide AB
Bromsvägen 3
891 60 ÖRNSKÖLDSVIK
SWEDEN

Testing of hospital beds according to SS 8760011:2001

(3 appendices)

Customer:	Järven Plast & Smide AB
Test object:	Hospital Mattress: Magma Plus
Test method:	SS 8760011:2001 Health care textiles – Hospital beds – Determination of resilience and durability SS 8760020:2017 Healthcare textiles – Mattresses – Specifications and requirements
Scope:	Complete test according to SS 8760011. The results are compared with the requirements in SS 876 00 20
Date of test:	2023-05-12 – 2023-05-17
Test result:	The tested object passed the test
Reservation:	The test results in this report apply solely to the specimen tested
Test environment:	23 ± 2ºC and 50 ± 5% relative humidity
Measurement uncertainty:	Decision rule according to EN ISO IEC 17025:2018 clause 3.7 No account is taken of measurement uncertainty when reporting numerical results

RISE Research Institutes of Sweden AB
Department Building and Real Estate - Technical Wood Assessment

Performed by	Examined by
Lukas Andersson	Bengt-Åke Andersson

Appendices

1. Test result (1 page)
2. Test object (1 page)
3. Pictures (1 page)

Appendix 1

Test result

The change in height loss after durability (130 000 cycles/500 N) according to SS 876 00 11:2001 are reported in table 1

Table 1 Results

Load (N)	Position 100 cycles (mm)	Position 130 000 cycles (mm)	Height loss after 130 000 cycles (mm)	Height loss after 130 000 cycles (%)
4 N	119.4	117.4	2.0	4
40 N	107.9	103.9	4.0	7
200 N	63.2	58.0	5.2	9
250 N	53.0	48.0	5.0	9

Requirement: Height loss ≤ 25 mm or less than 25% of the suspension depth

Suspension depth is the difference in position of the loading pad in vertical direction at the force of 4 N and 200 N

Conclusion

At the end of the test, the tested piece did not exhibit any faults, fractures or other damage judged to affect its functions.

Height loss after durability tests 130 000 cycles are less than 25 mm in all positions

Appendix 2

Test object

Test object:	Hospital Mattress: Magma Plus

Dimensions [1]

Width:	800 mm
Length:	2000 mm
Height:	120 mm
Mass:	7.8 kg

Mattress

Core:	Flexible foam
Surface layer:	Hygiene

Sampling:	The test object was selected by the customer
Date of arrival at RISE test laboratory:	2023-05-05
Observed defects before testing:	No defects

[1] The dimensions are only intended to unambiguously identify the test object and do not claim to be metrologically accurate

Appendix 3

Pictures

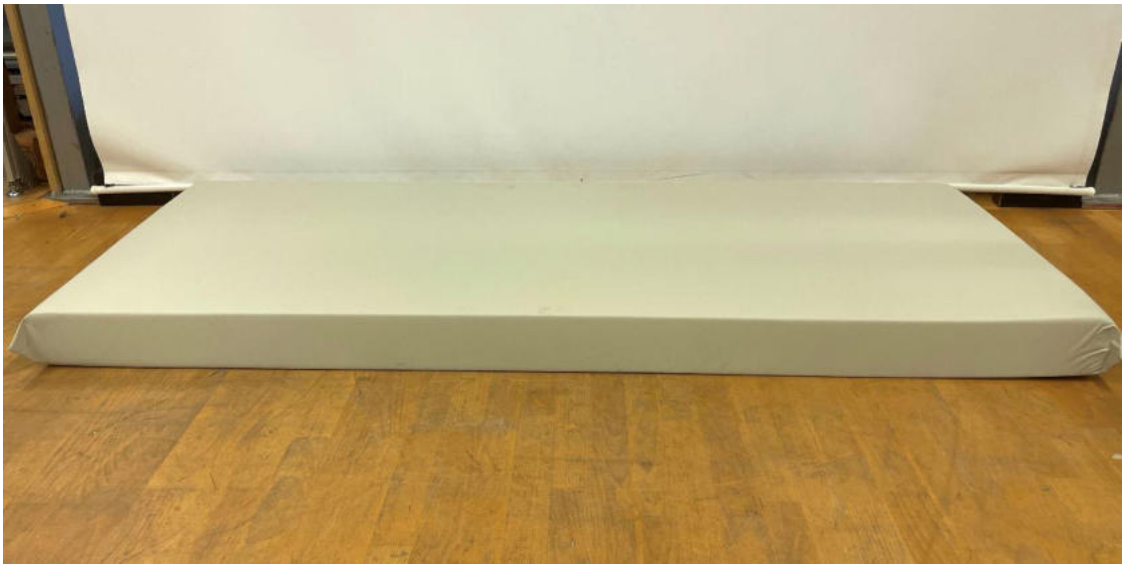


Figure 1

Figure 2

Verification

Transaction 09222115557492952921

Document

1194365A Järven Magma Plus SS8760020
Main document
4 pages
Initiated on 2023-05-17 16:04:04 CEST (+0200) by Bengt-Åke Andersson (BA)
Finalised on 2023-05-17 16:05:08 CEST (+0200)

Signing parties

Bengt-Åke Andersson (BA)
RISE Research Institutes of Sweden AB
Company reg. no. 556464-6874
bengt-ake.andersson@ri.se

Signed 2023-05-17 16:04:20 CEST (+0200)

Lukas Andersson (LA)
Research Institutes of Sweden AB
Company reg. no. 556464-6874
lukas.andersson@ri.se

Signed 2023-05-17 16:05:08 CEST (+0200)

REPORT

Issued by an Accredited Testing Laboratory

Contact person
Richard Johansson
Division Safety and Transport
+46 10 516 56 75
richard.johansson@ri.se

Date
2023-05-12

Reference
O100745-1192162

Järven Plast & Smide AB
Bromsvägen 3
891 60 ÖRNSKÖLDSVIK
Sweden

Fire test of mattress according to NT FIRE 055 – Measurement of heat release rate and smoke production

(3 appendices)

Introduction

RISE has at the request of Järven Plast & Smide AB performed a fire test according to NT FIRE 055 with criteria according to SS 8760010:2016 – Healthcare textiles – Nursing beds – Burning requirements for mattresses to be used in high risk environment. The purpose of the test is to form a basis for technical fire classification according to SS 8760010.

Product

According to the client:

Mattress called “Magma Plus”, consisting of the following components:

Component	Material content	Nominal data
Cover fabric	PU 100%	230 g/m^2
Inter liner	Spunlace 70% PYR 20% mAr 10%	Color Black 1 - 2 mm
Foam filling	RG38140	38 kg/m^3

Manufacturer

End-use product: Järven Plast & Smide AB, Örnsköldsvik, Sweden.

Sampling

The sample was delivered by the client. It is not known to RISE, Fire and Safety if the product received is representative of the mean production characteristics.

The sample was received on May 8, 2023 at RISE, Fire and Safety.

Test procedure

The mattress was tested according to NT FIRE 055, ”Mattresses: Burning Behaviour - Full Scale Test”. The ignition source used was a square gas burner developed especially for upholstered furniture, see California TB 133 furniture test. The effect of the burner was 30 kW.

The test specimen was located on a mock-up bed frame and the gas burner was positioned centrically on top of the specimen. The gas burner was positioned on the test specimen for two minutes and then removed. The smoke gases produced during testing were collected by a hood and exhaust system from where gas samples were taken for gas analysis. The heat release rate and the smoke production rate were calculated from oxygen consumption measurements. The fire test was documented with photos and video. The smoke production was measured with a lamp (white light) and a photo cell mounted inside the exhaust duct, downstream the hood.

According to SS 8760010:2016 the mattress cover should be vandalized prior to testing to simulate arson. Two cuts, each 30 cm in length, are placed in the centre of the mattress and perpendicular to each other with their centres crossed. The flaps are folded in under the cover fabric to keep them in place during the test. The gas burner is placed above the vandalized area so that the filling is directly exposed to the flames during the test.

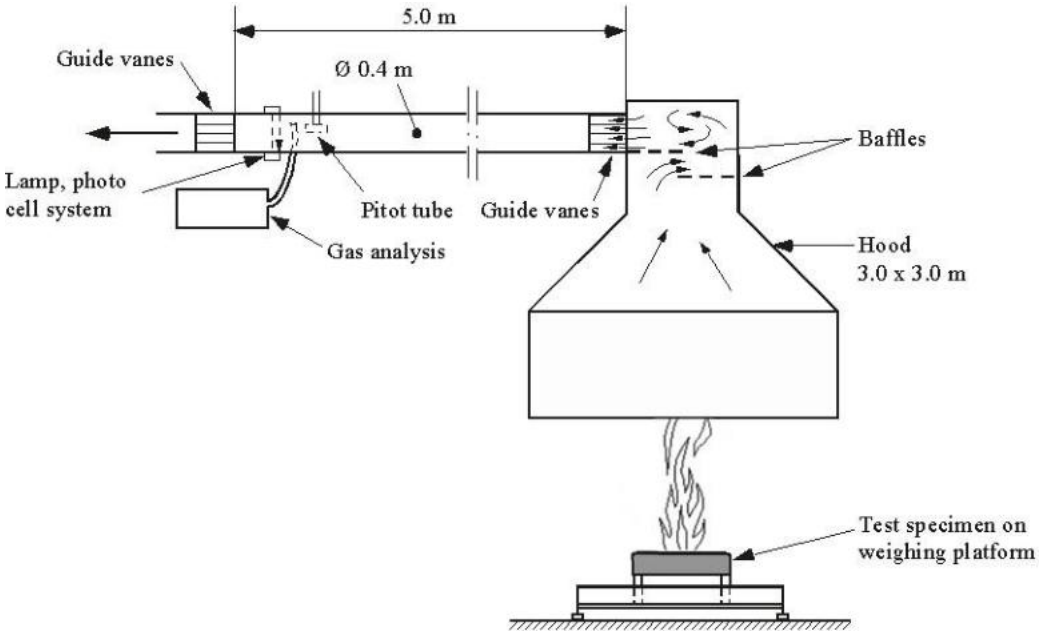


Figure 1 Schematic drawing of the test set-up according to NT FIRE 055

Test results

A summary of the test results is given in the table below. Detailed tests results concerning heat and smoke production are given in appendix 1. Photographs are shown in appendix 2. A test parameter explanation is given in appendix 3.

Table 1. Summary of measured data (burner heat output is included in the heat release data)

Test	$HRR_{\text{smooth (peak)}}$ Heat release rate, maximum of 30 s sliding average (kW)	TSP_{10} Total smoke production during the first 10 minutes of the test (m^2)	After burn time Time of combustion after removal of the burner (min:s)
1	41	17	02:57

Criteria

According to SS 8760010:2016 – Healthcare textiles – Nursing beds – Burning requirements for mattresses to be used in high risk environment one mattress/upholstered furniture shall be tested according to NT FIRE 055 and fulfil the following requirements:

- The total smoke production (TSP_{10}) shall not exceed 50 m^2.
- The maximum heat release rate ($HRR_{\text{smooth (peak)}}$) shall not exceed 55 kW (85 kW including the burner heat output).
- The after burn time or afterglow time may not exceed 3 minutes.

Assessment

The tested mattress meets the technical fire requirements according to SS 8760010.

Note

The accreditation referred to is valid for NT FIRE 055.

Deviation from standard NT FIRE 055

Information regarding paragraph 7 and 9.2 is not reported since no requirements are stated for these parameters in SS 8760010.

SS 8760010:2016 states that the core of the mattress shall be exposed when the cuts for the vandalization is made. The cuts must be made without damaging the core of the mattress. This mattress has an inter liner glued to the core that cannot be removed without damaging the mattress core. The vandalization that was made for this test therefore only includes the product's cover fabric.

RISE Research Institutes of Sweden AB
Fire and safety - Reaction to Fire Medium Scale Lab

Performed by

Richard Johansson

Examined by

Per Thureson

Appendices

1 Test results – NT FIRE 055:2006
2 Photographs from test
3 Test parameter explanation

Appendix 1

Test results – NT FIRE 055:2006

Product

According to the client:

Mattress called “Magma Plus”, consisting of the following components:

Component	Material content	Nominal data
Cover fabric	PU 100%	230 g/m^2
Inter liner	Spunlace 70% PYR 20% mAr 10%	Color Black 1 - 2 mm
Foam filling	RG38140	38 kg/m^3

Test conditions during test

Temperature 22 °C.

Relative humidity 27 %.

Observations during test

Table 1 Observations during test. See photos in appendix 2.

Time, min:s	Observations during test
00:00	The gas burner is applied. Burner heat output 30 kW. See photo 2.
00:12	The mattress ignites.
02:00	The burner is removed. See photo 3.
02:16	The mattress continue to burn at the edges of the burnt mattress cover. See photo 4.
04:57	The fire self-extinguishes.
10:00	End of test. The amount of damage in the mattress can be seen in photo 6 – 7.

Observations after fire test

Damage corresponding to a circle with a diameter of approximately 40 cm can be seen in photo no 6.

Appendix 1

Measured results

Table 2 Summary of measured data (burner heat output is included in the heat release data).

Test	$HRR_{smooth\ (peak)}$ Heat release rate, maximum of 30 s sliding average (kW)	THR_{10} Total heat release during the first 10 minutes of the test (MJ)	SPR_{peak} Smoke production rate, maximum (m^2/s)	TSP_{10} Total smoke production during the first 10 minutes of the test (m^2)	After burn time Time of combustion after removal of the burner (min:s)
1	41	5.2	0.2	17	02:57

Graphs for heat release rate and smoke production rate

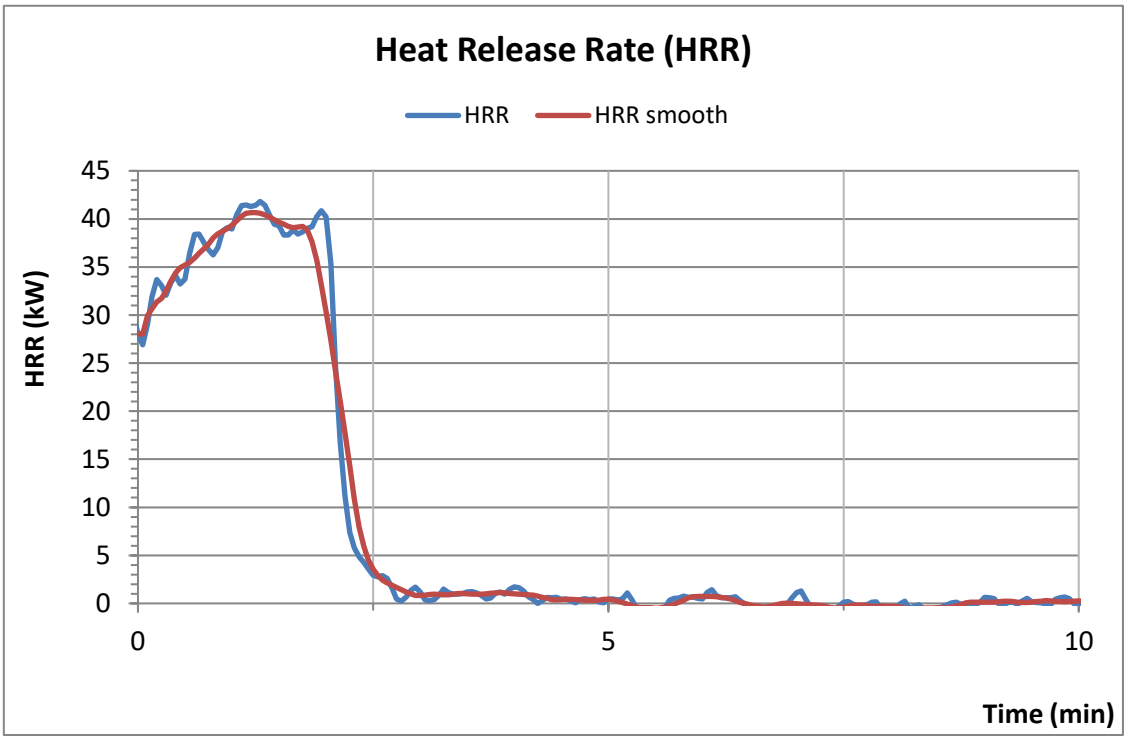


Figure 1 Heat release rate (HRR) and 30 s sliding average heat release rate (HRR_{smooth}) from the product during test (including burner).

Appendix 1

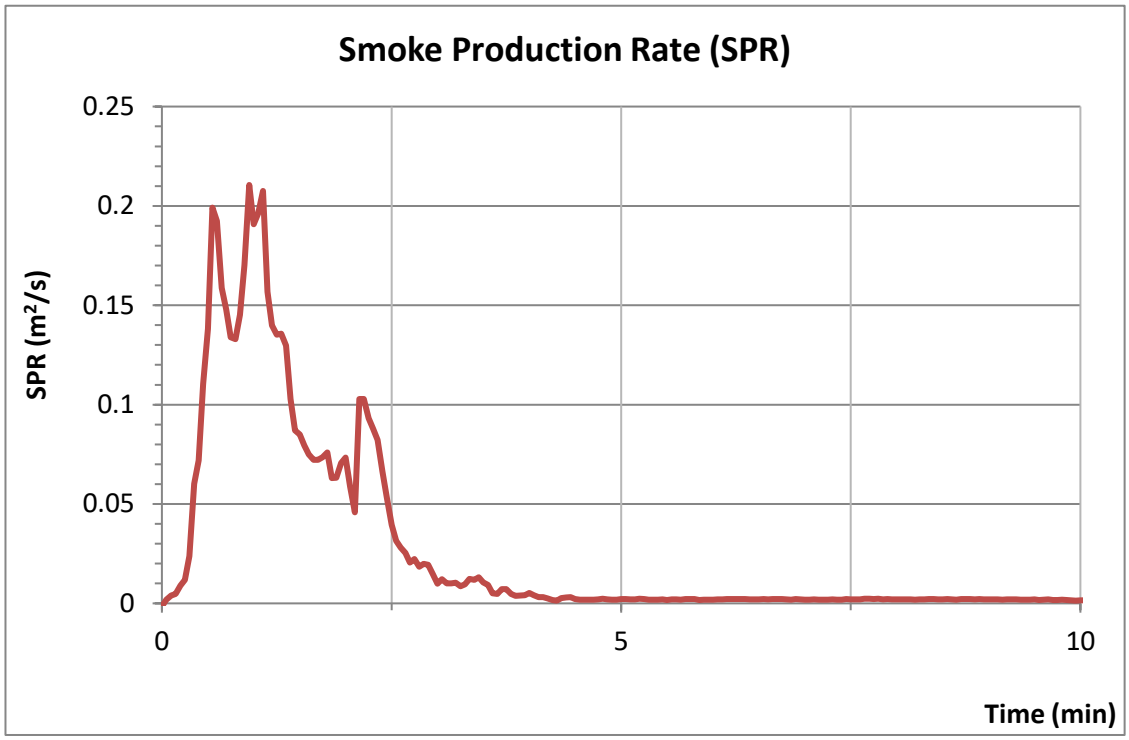


Figure 2 Smoke production rate from the product during test.

Conditioning

The test specimen was conditioned to equilibrium before testing meaning <0.1 % difference in mass between two measurements.

Mass 1: 8549 g.

Mass 2: 8549 g.

Interval: 24 h.

Date of test

May 12, 2023.

Appendix 2

Photographs from test

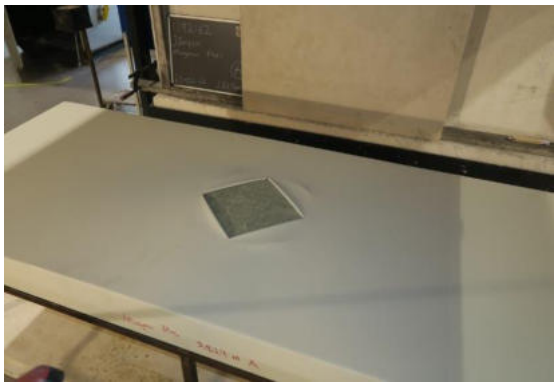


Photo 1 - Prior to test.

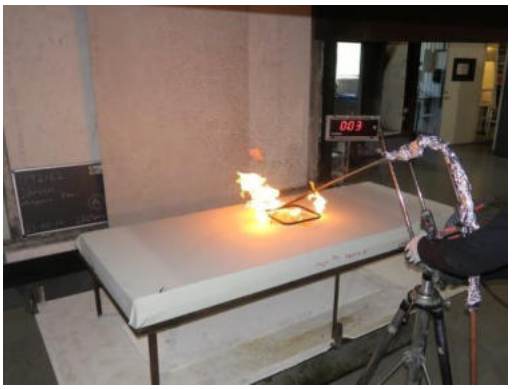


Photo 2 - Time 00:03. The burner has been applied.

Photo 3 – Time 01:59. The burner is about to be removed.

Photo 4 - Time 02:14. The mattress continue to burn at the edges of the burnt mattress cover.

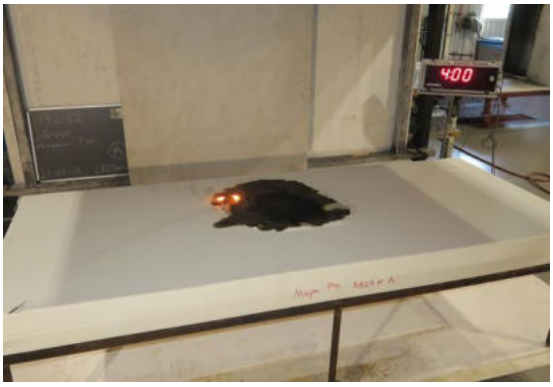


Photo 5 - Time 04:00. Most of the flames in the mattress has self-extinguished.

Photo 6 – Damage in the mattress after test.

Appendix 2

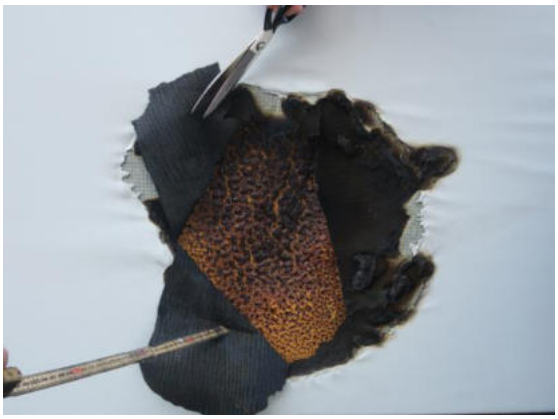


Photo 7 – Damage in the mattress after test.

Appendix 3

Test parameter explanation

Parameter	Explanation
Test start	The specimen is exposed to the ignition source.
End of test	Two minutes after all visible flaming has ceased or 60 minutes has elapsed since the start of the burner exposure (NT Fire 055). For the purpose of SS 876 00 10 only 10 minutes test time is necessary for evaluation of results.
After burn time, s	The time that the material glows or burns with or without a flame, after the ignition source has been removed.
HRR, kW	Heat Release Rate between test start and end of test, included contribution from ignition source.
HRR_{smooth}, kW	30 second sliding average of Heat Release Rate during the test.
THR_{10}, MJ	Total Heat Release during the first 10 minutes of the test.
TSP_{10}, m^2	Total smoke production during the first 10 minutes of the test.
SPR, m^2/s	The smoke production rate is calculated according to the following equation: $$SPR = \frac{1}{L} \cdot \ln\left(\frac{I_0}{I}\right) \cdot \dot{V}$$ Where L is the optical path length in the duct (m) I_0 is the initial intensity of a light beam I is the intensity of the light beam after traversing a smoky environment $\dot{V}$ is the volumetric flow in the exhaust duct (m^3/s).

Verifikat

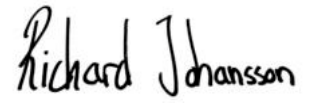
Transaktion 09222115557493128617

Dokument

O100745-1192162 Järven Plast & Smide AB NT Fire 055
Huvuddokument
9 sidor
Startades 2023-05-22 08:48:04 CEST (+0200) av Richard Johansson (RJ)
Färdigställt 2023-05-22 13:54:38 CEST (+0200)

Signerande parter

Richard Johansson (RJ)
RISE Research Institutes of Sweden AB
Org. nr 556464-6874
richard.johansson@ri.se



Signerade 2023-05-22 08:50:23 CEST (+0200)

Per Thureson (PT)
RISE Research Institutes of Sweden AB
per.thureson@ri.se

Signerade 2023-05-22 13:54:38 CEST (+0200)