

<b>Prüfbericht-Nr.:</b> <i>Test Report No.:</i>	21225540_001	<b>Auftrags-Nr.:</b> <i>Order No.:</i>	3127232-30	Seite 1 von 13 Page 1 of 13
<b>Kunden-Referenz-Nr.:</b> <i>Client Reference No.:</i>	N/A	<b>Auftragsdatum:</b> <i>Order date:</i>	21 Oct. 2014	
<b>Auftraggeber:</b> <i>Client:</i>	Latexco N.V., Sint-Amandstraat 8 b, 8700 Tielt, Belgium			
<b>Prüfgegenstand:</b> <i>Test item:</i>	Mattress foam			
<b>Bezeichnung / Typ-Nr.:</b> <i>Identification / Type No.:</i>	SP000F/200*90*14 STIFT 100% NATUUR FIRM			
<b>Auftrags-Inhalt:</b> <i>Order content:</i>	Durability test			
<b>Prüfgrundlage:</b> <i>Test specification:</i>	2 PFG-Q 2215: 2013-05 Matratzen im Wohnbereich – Dauerhaltbarkeit nach DIN EN 1957 zur Erlangung des Qualitätszertifikates  Mattresses domestic use – durability (DIN EN 1957) for the Quality certificate			
<b>Wareneingangsdatum:</b> <i>Date of receipt:</i>	27 Oct. 2014			
<b>Prüfmuster-Nr.:</b> <i>Test sample No.:</i>	A000081286-001			
<b>Prüfzeitraum:</b> <i>Testing period:</i>	03 Nov. – 07 Nov. 2014			
<b>Ort der Prüfung:</b> <i>Place of testing:</i>	Goebenstraße 4-10, 32052 Herford, Germany			
<b>Prüflaboratorium:</b> <i>Testing laboratory:</i>	TÜV Rheinland LGA Products GmbH (TRLP)			
<b>Prüfergebnis*:</b> <i>Test result*:</i>	Pass			
<b>geprüft von / tested by:</b>		<b>kontrolliert von / reviewed by:</b>		
07 Nov. 2014 Philipp Schulz / Expert		07 Nov. 2014 Berthold Heinz / Head of laboratory		
<b>Datum</b> <i>Date</i>	<b>Name / Stellung</b> <i>Name / Position</i>	<b>Unterschrift</b> <i>Signature</i>	<b>Datum</b> <i>Date</i>	<b>Name / Stellung</b> <i>Name / Position</i>
				<b>Unterschrift</b> <i>Signature</i>
<b>Sonstiges / Other:</b> The requirements for the Quality Certificate are met with 100 points. Foreseeable use was considered. Currently neither a safeguard clause procedure has been invoked nor is an increase in accidents known for this / these product (s).				
<b>Zustand des Prüfgegenstandes bei Anlieferung:</b> <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>		
* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested				
<b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b> <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				



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**Produktbeschreibung**  
**Product description**

**Product details**

SP000F 100% natural foam core

**Dimensions / Weight**

Height: 142 mm, length: 1990 mm, width: 890 mm  
Weight: 20.0 kg

**Product description:**

The used material is latex foam.  
The ventilation holes have a diameter of 6 mm.  
The distance between the holes is 17 mm.

Fig. 1: Packaging



Fig. 2: Longitudinal view

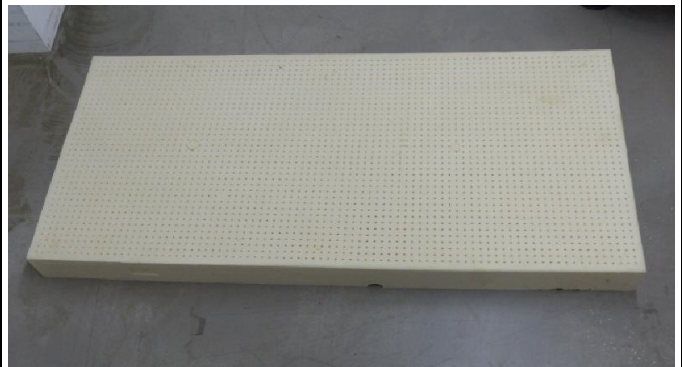
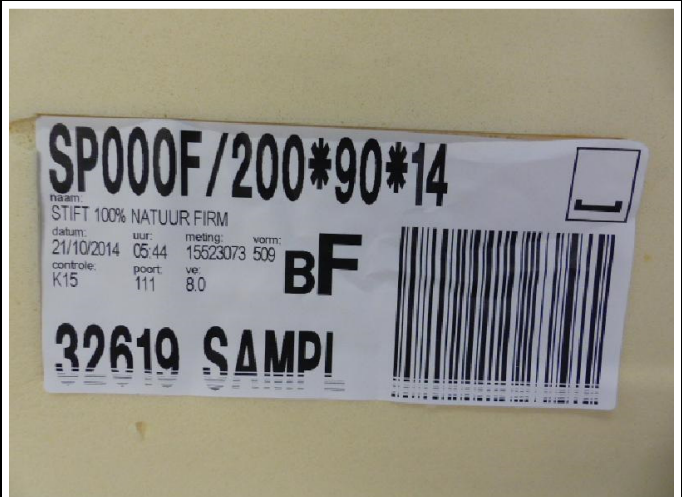


Fig. 3: Transverse view



Fig. 4: Productional marking on the product



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**The content of the test basics was shortened. For details be referred to the original documents.**

**1 Scope of testing**

- Durability test in two stages according LGA-Guidelines 33003.5 and DIN EN 1957: 2013-01
- Determination of resilience characteristics (Force-Displacement-Plot)

**2 Test base**

- |                         |  |
|-------------------------|--|
| - 2 PfG-Q 2215: 2013-05 | Mattresses domestic use – durability (DIN EN 1957) for the Quality certificate |
| - DIN EN 1957: 2013-01  | Beds and mattresses. Test methods for determining the functional properties    |
| - LGA - RL 33003.5      | Mattresses domestic use; durability (DIN EN 1957) for the Quality certificate  |

**3 Scope of the test findings**

The test results refer only to the samples submitted for the test. The digital photos, if there are any, serve for supplementary explanation and do not constitute an own part of the test result.

**4 Accuracy of measurement**

Unless otherwise specified, the accuracy of the linear dimension is defined according to DIN 7168-g for old drawings respectively to DIN ISO 2768 Part 1 "c" for new drawings. All other physical dimensions shall have an accuracy of < 5% of the nominal force. The tests were carried out at an ambient temperature unless otherwise stated.

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<b>5</b>	<b>Test results</b>		
	<p>The test item has been tested in a durability test rig with a roller load of 1400 N in two test stages with a total of 30 000 cycles. In the centre of the area three measurements of the characteristic curves of resilience have been taken:</p> <p>a) after 200 strokes b) after 30 000 strokes c) after 60 000 strokes</p> <p>The characteristic curves of resilience allow an assessment of the resilience and durability characteristics as well as the subjective hardness rating and the hysteresis.</p>		
<b>5.1</b>	<b>Characteristics before the test</b>		
	Hardness index: Hysteresis: Height of system:	5.44 17.88 % 142 mm	
<b>5.2</b>	<b>Characteristics after test</b>		
	Change in height after the test: Change in hardness after 30000 strokes: Change in hardness after the test: Resilience loss factor after the test: (deviating from DIN EN 1957)	2.41 mm 3.72 % 0.55 % 5.25	
<b>5.3</b>	<b>LGA-rating system</b>		
	<p>The data are determined based on the LGA-rating system limited to a maximum of 100 points. Essential for the estimating is the change in height, the change in hardness and the resilience loss factor. For each of this characteristics a maximum of 25 points can be achieved.</p> <p>The requirement for an increased quality level is 80 points.</p> <p>The following pages contain further information about test parameters and geometry of the roller, measurement conditions and design of the loading pad, modalities of assessment and rating system.</p> <p>The results of the test refer solely to the tested sample.</p>	<p>Change in height after the test: 25 points</p> <p>Change in hardness after 30000 strokes: 25 points</p> <p>Change in hardness after the test: 25 points</p> <p>Resilience loss factor after the test: 25 points</p> <p>Total score after the test: 100 points</p>	<p>P <input checked="" type="checkbox"/></p> <p>F <input type="checkbox"/></p> <p>N/A <input type="checkbox"/></p> <p>N/T <input type="checkbox"/></p>

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<b>6</b>	<p><b>Durability Test – Roller Test</b></p> <p>Test Rig:</p> <p>The durability test is carried out by means of an electromotive driven roller test device. A specified roller made of lacquered hard wood rolls over the mattress that is placed on a levelled, rigid, flat base fixed to prevent slipping.</p> <p>Rotation symmetric roller:</p> <ul style="list-style-type: none"> <li>- Length 1.000 mm</li> <li>- Length of the medium section 400 mm, Ø 300 mm</li> <li>- Spherical ends reduced to Ø 250 mm</li> <li>- Outer edges with radius: 30 mm</li> <li>- Roller load 1.400 N</li> </ul> <p>Test parameters:</p> <p>Length of stroke: 500 mm Cycle: 1 cycle consists of one forward and one backward Stroke in sinusoidal motion</p> <p>Rolling strain: Symmetric over the width of the mattress Stage 1 for 30 000 strokes = 15 000 cycles Stage 2 for 30 000 strokes = 15 000 cycles</p> <p style="padding-left: 40px;">Total test for 60 000 strokes = 30 000 cycles</p> <p>Roller drive: Horizontal directed force</p> <p>Test rate: 16 ± 2 cycles per minute</p> <p>Condition in the Test bay: Standard climate, 23/50-2, DIN 50014</p> <p>Visual examination:</p> <p>The mattress has been checked before, during and after the durability test. A necessary interior check is carried out after test and evaluation.</p>
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<b>7</b>	<p><b>Determination of resilience characteristics (Force-Displacement-Plot)</b></p> <p>Measuring set-up and conditions:</p> <p>A loading pad as specified applies and removes a load to the mattress at the area of its centre of gravity with linear speed.</p> <p>The load is measured by means of a piezoelectric load cell at the loading pad, the actual compression by means of an inductive displacement sensor.</p> <p>The fourth characteristic curve after 3 loads applications of 1000 N and removal of the load will be recorded.</p> <p>Measurement uncertainty: <math>\pm 1 \%</math></p> <p>Design of the loading pad:</p> <p>Spherical pad, diameter 355 mm          Curvature radius 800 mm (surface 1000 cm<sup>2</sup>)</p> <p>Travel speed: 90 mm/min</p> <p>The resilience characteristic curves as Force-Displacement-Plots with the axes compression force and depth of impression are taken</p> <p>a) after 200 strokes = 100 cycles          b) after 30 000 strokes = 15 000 cycles          c) after 60 000 strokes = 30 000 cycles</p> <p>with a recuperation time of at least 5 hours each.</p>
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<b>8</b>	<b>Assessment of the Force-Displacement-Plot</b>		
	Change in height and change in hardness as well as resilience loss are dimensions of durability as measurable functional characteristics.		
<b>8.1</b>	<b>Change in height</b>		
	The change in height is determined after testing under a load of 50 N applied by the loading pad. The change in height in mm indicates how intensive the mattress will visibly deform under frequent use.		
<b>8.2</b>	<b>Hardness rating and change in hardness rating</b>		
	The hardness rating is calculated as mean inclination of the Force-Displacement-Plot at a load of 210 N, 275 N and 340 N.		
	$H = \frac{C_1 + C_2 + C_3}{3} \text{ N/mm}^2$		
	C1 Inclination at a load of 210 N C2 Inclination at a load of 275 N C3 Inclination at a load of 340 N		
	The change in hardness rating in percent is calculated from the relations between the hardness rating after test stage 1 and 2 to the hardness rate before the test.		
<b>8.3</b>	<b>Resilience loss factor (deviating to DIN EN 1957: 2013-01)</b>		
	It is calculated from the quotient of the areas between curve a) and c) and the rectangle that is formed by the perpendiculars from the end point of curve c) and the coordinate axes multiplied by the factor 100.		
	Also the resilience loss factor indicates how the resilience and elasticity of the mattress change during the test. It shows especially how the characteristic curve deviates in the curvature after test from the one before testing.		



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**8.4 Determination of subjective hardness rating Hs**

The rating of the subjective hardness is determined by means of hardness value H, that is based on results of empiric studies and indicates the subjective valuation by the user.  
The subjective hardness rating Hs is a figure on a scale from 1 to 10 that indicates the hardness of the resilience.  
Hs = 1 is a hard resilience, Hs = 10 is a soft resilience  
Hs is determined according to the following function:

$$H_s = 10 \left( 1 - e^{-(K \cdot a + b)} \right)^2$$

K is calculated with the following equation from the Force-Displacement-Plot:

$$K = \frac{A}{H}$$

Where:

- A = Area under the curve from 0 to 450 N from the Force-Displacement-Plot
- H = Hardness rating
- a =  $5.92 \times 10^{-4}$
- b = 0.148

**8.5 Determination of the hysteresis**

The per cent hysteresis is calculated from the quotient of the area enclosed by the load and reload curves and the area below the load curve (up to max. depth of indentation at 1000 N) multiplied by a factor of 100.

The hysteresis value is a measure of the ratio of applied force and with drawn force and characterizes how freely the user can move on the mattress (change in sleeping position).

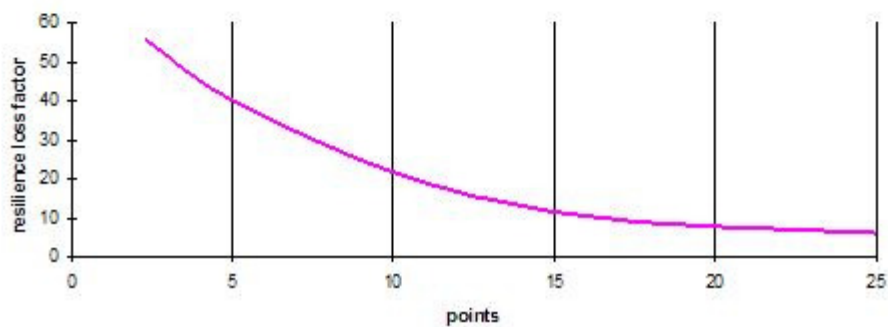
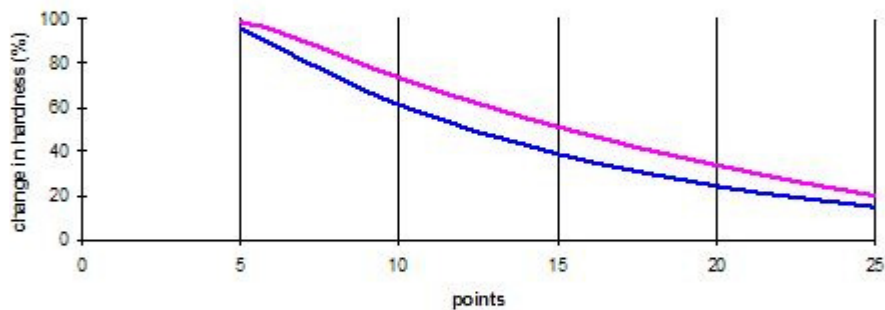
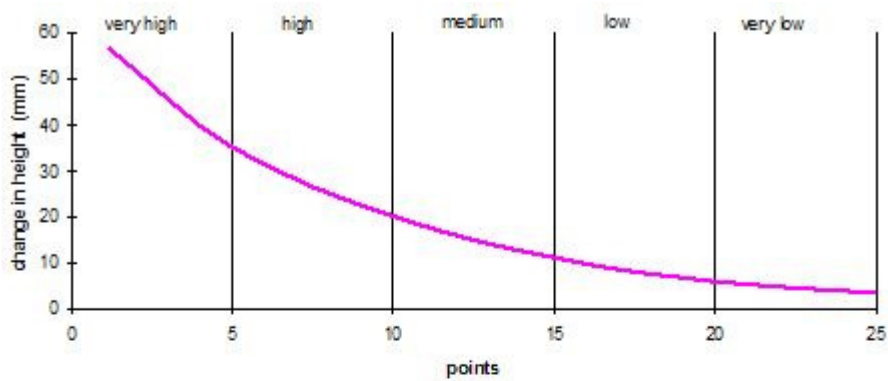
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**9 Results of measurement and assessment**

The following pages contain the Force-Displacement-Plot, results of measurement and assessment as well as rating points according to LGA-rating system.

TÜV Rheinland LGA - Rating System



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<b>10</b>	<b>Additional tests</b>		
<b>10.1</b>	Mechanical properties of the cover: No damage of the cover caused by the durability test (e.g. cracked textiles or joints).	The product is not ready for use. No cover was supplied.	P <input type="checkbox"/> F <input type="checkbox"/> N/A <input checked="" type="checkbox"/> N/T <input type="checkbox"/>
<b>10.2</b>	Handling: Washable cover (evidence for washable cover without shrinkage of the cover when washing with the washing machine and keep to the laundry symbols).	The product is not ready for use. No cover was supplied.	P <input type="checkbox"/> F <input type="checkbox"/> N/A <input checked="" type="checkbox"/> N/T <input type="checkbox"/>
<b>10.3</b>	Strength of the handles: Strength of the handles $\geq 1,5 \times$ mattress weight.	The product is not ready for use. No cover with handles was supplied.	P <input type="checkbox"/> F <input type="checkbox"/> N/A <input checked="" type="checkbox"/> N/T <input type="checkbox"/>
<b>10.4</b>	Handles: Positioning, manipulation, grip / traction etc.	The product is not ready for use. No cover with handles was supplied.	P <input type="checkbox"/> F <input type="checkbox"/> N/A <input checked="" type="checkbox"/> N/T <input type="checkbox"/>
<b>10.5</b>	Declaration: Denomination by manufacturer or trade name.	The product is not ready for use. See figure 4 on page 3 for productional marking on the product	P <input type="checkbox"/> F <input type="checkbox"/> N/A <input checked="" type="checkbox"/> N/T <input type="checkbox"/>
<b>10.6</b>	Product information: The customer should be informed beside about the following facts:	The product is not ready for use.	P <input type="checkbox"/> F <input type="checkbox"/> N/A <input checked="" type="checkbox"/> N/T <input type="checkbox"/>
<b>10.7</b>	Maintenance: e.g. to advance the durability by periodic turning over of the mattress.	The product is not ready for use.	P <input type="checkbox"/> F <input type="checkbox"/> N/A <input checked="" type="checkbox"/> N/T <input type="checkbox"/>
<b>10.8</b>	Cleaning instruction of the cover	The product is not ready for use.	P <input type="checkbox"/> F <input type="checkbox"/> N/A <input checked="" type="checkbox"/> N/T <input type="checkbox"/>
<b>10.9</b>	Aeration: Customers should be informed about mould or stains caused by inadequate aeration and climatical conditions.	The product is not ready for use.	P <input type="checkbox"/> F <input type="checkbox"/> N/A <input checked="" type="checkbox"/> N/T <input type="checkbox"/>



**ZUSATZ-DOKUMENTATION**  
**ADDITIONAL DOCUMENTATION**

**A 4. Mattress resilience characteristics**

