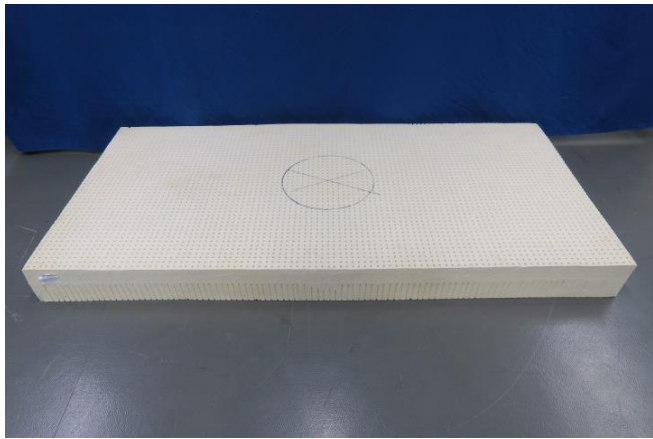




Prüfbericht-Nr.: <i>Test report no.:</i>	DE220V8I 001	Auftrags-Nr.: <i>Order no.:</i>	1128130 10	Seite 1 von 11 Page 1 of 11
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	LGA QZ Latex core	Auftragsdatum: <i>Order date:</i>	2022-05-23	
Auftraggeber: <i>Client:</i>	Richard Pieris Export Ltd., HighLevel Road 310, Nawinna, Maharagama, Sri Lanka			
Prüfgegenstand: <i>Test item:</i>	100% Natural Latex			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	Latex Foam Matresscore			
Auftrags-Inhalt: <i>Order content:</i>	Durability (DIN EN 1957) for the Quality certificate for Mattresses domestic use according to 2 PfG Q 2215			
Prüfgrundlage: <i>Test specification:</i>	2 PfG-Q 2215: 2018-03 Mattresses domestic use – Durability according to DIN EN 1957 for obtaining the quality certificate			
Wareneingangsdatum: <i>Date of sample receipt:</i>	2022-10-21			
Prüfmuster-Nr.: <i>Test sample no.:</i>	A003359135-001 to 001			
Prüfzeitraum: <i>Testing period:</i>	2022-10-21 – 2022-12-07			
Ort der Prüfung: <i>Place of testing:</i>	Furniture Testing Institute Nuremberg			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland LGA Products GmbH			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von: <i>tested by:</i>		genehmigt von: <i>authorized by:</i>		
Datum: <i>Date:</i> 2022-12-07	Signiert von: Karl Swoboda	Ausstellungsdatum: <i>Issue date:</i> 2022-12-07	Signiert von: Felix Scharnagl	
Stellung / Position:	Expert	Stellung / Position:	head of laboratory	
Sonstiges / <i>Other:</i>	Durability / roller test acc. to DIN EN 1957:2013-01 and evaluation of resilience characteristic acc. to TRLP rating. The test item reached a total number of 100 points. Durability / quality requirements according to TÜV Rheinland LGA rating system not fulfilled. A 1. Results and evaluation according to DIN EN 1957; A 2. Assessment of firmness rating (proposal); A 3. Attachment to LGA – Rating scale.			
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>	Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>			
* Legende:	P(ass) = entspricht o.g. Prüfgrundlage(n)	F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
* Legend:	P(ass) = passed a.m. test specification(s)	F(ail) = failed a.m. test specification(s)	N/A = not applicable	N/T = not tested
<p>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. <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></p>				

V05

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Anmerkungen
Remarks

1	<p>The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.</p>
2	<p>As contractually agreed, this document has been signed digitally only. TUV Rheinland has not verified and unable to verify which legal or other pertaining requirements are applicable for this document. Such verification is within the responsibility of the user of this document. Upon request by its client, TUV Rheinland can confirm the validity of the digital signature by a separate document. Such request shall be addressed to our Sales department. An environmental fee for such additional service will be charged.</p>
3	<p>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report. Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</p>
4	<p><i>The decision rule for statements of conformity in this test report is based on the "Zero Guard Band Rule" and "Simple Acceptance" in accordance with ILAC G8:2019 and IEC Guide 115:2021, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report.</i></p>
5	<p>The test results have a degree of measurement uncertainty. If applicable, the uncertainty of measurement complies with the requirements of the standards. If the uncertainty of measurement is not separately specified, the combined standard uncertainty of the overall result is $\leq 5\%$.</p>
6	<p>The content of the standard was packed. For details, be referred to the original document.</p>
7	<p>The following cited documents are required for the application of this document. For dated references, only the referenced edition applies. For undated references, the latest edition of the referenced document (including any amendments) applies.</p> <p>DIN EN 1957: 2013-01 Furniture – Beds and mattresses – Test methods for the determination of functional characteristics and assessment criteria</p>

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Produktbeschreibung
Product description

1	Produktdetails Product details	Latex Foam Matresscore
2	Maße / Gewicht Dimensions / Weight	Length: 2015 mm; Width: 940 mm; Height: 159 mm / Mass: 21.8 kg
3	Produktbeschreibung Product description	Core: Base layer (d = 159 mm) consisting of: Core composed of natural latex foam, layer with openings (Aeration holes) Aeration holes top side and bottom side: Ø = 6 mm openings not continuous, depth = 55 - 90 mm. There is a Marking on the Mattress core for up-side. Cover: no cover Turning handles: No turning handles available
4	Sonstiges Other	Test sample(s), as well sample information, description, product details and intended usage was provided by customer.
5	Prüfmusterbereitstellung: Test sample obtaining:	<input checked="" type="checkbox"/> Sending by customer <input type="checkbox"/> Sampling by TÜV Rheinland Group <input type="checkbox"/> others:

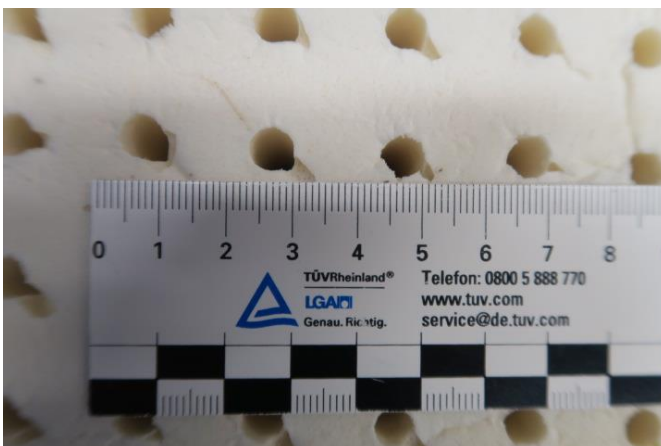
Pic. 1: View from above



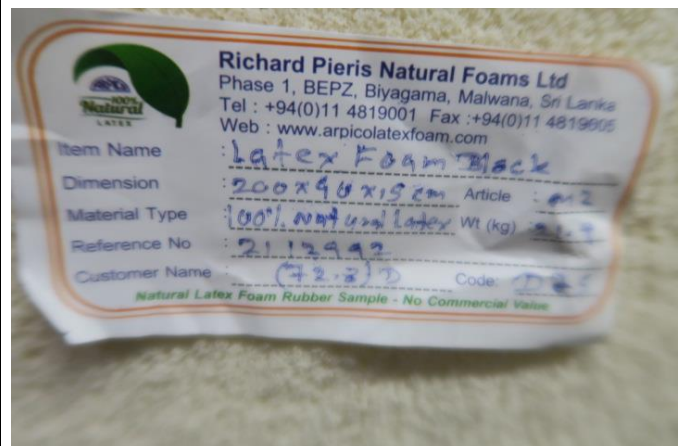
Pic. 2: Bottom view



Pic. 3: Detail view 1



Pic. 4: Marking



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Absatz Clause	Anforderungen - Prüfungen / Requirements – Tests [2 PfG-Q 2215: 2018-03]	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result
1	Summary of test results		
	<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 60000 strokes (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 = 100 cycles b) after 30000 strokes = 15000 cycles c) after 60000 strokes = 30000 cycles</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>		
1.1	Characteristics before the test		
	Hardness index Hs: Hysteresis: Height of system:	5.41 22.17 % 159 mm	
1.2	Characteristics after test		
	Change in height after 30000 cycles: Change in hardness after 15000 cycles: Change in hardness after 30000 cycles: Resilience loss factor after 30000 cycles: (deviating from DIN EN 1957)	1.2 mm 0.6 % 0.7 % 3.0	
1.3	LGA-rating system		
	<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>A total of 100 points were achieved for the test object.</p> <p>Height change after the test: 25 points</p> <p>Hardness change after 30,000 strokes: 25 points</p> <p>Hardness change after the test: 25 points</p> <p>Suspension loss factor: 25 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>
2	General test conditions		

Absatz Clause	Anforderungen - Prüfungen / Requirements – Tests [2 PfG-Q 2215: 2018-03]	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result
	<p>Equipment for the durability test:</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"> - Length 1.000 mm - Length of the medium section 400 mm, Ø 300 mm - Spherical ends reduced to Ø 250 mm - Outer edges with radius: 30 mm - Roller load 1.400 N <p>Test parameters:</p> <p>Length of stroke: 500 mm</p> <p>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: 100px;">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>Pre-conditioning: One week in a standardised climate of (23 ± 2) °C and (50 ± 5) % RH</p> <p>Climate conditions during testing: The tests shall be carried out at indoor ambient conditions, between 15 °C to 25 °C</p>		
3	Determination of resilience characteristics (Force-Displacement-Plot)		

Absatz Clause	Anforderungen - Prüfungen / Requirements – Tests [2 PfG-Q 2215: 2018-03]	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result
	<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 load applications of 1000 N and removal of the load will be recorded.</p> <p>Design of the loading pad:</p> <ul style="list-style-type: none"> - Spherical pad, diameter 355 mm - Front edge radius - Curvature radius 800 mm <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 30000 strokes = 15000 cycles c) after 60000 strokes = 30000 cycles</p> <p>with a recuperation time of at least 5 hours each.</p>		
4	<p>Assessment of the Force-Displacement-Plot Evaluation of characteristic parameters</p>		
	<p>Change in height and change in hardness as well as resilience loss are dimensions of durability as measurable functional characteristics.</p>		
4.1	<p>Determination of height loss</p>		
	<p>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.</p>		
4.2	<p>Determination of resilience loss factor (deviating to DIN EN 1957: 2013-01)</p>		
	<p>The resilience loss factor 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.</p> <p>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.</p>		
4.3	<p>Determination of hardness value H</p>		

Absatz Clause	Anforderungen - Prüfungen / Requirements – Tests [2 PfG-Q 2215: 2018-03]	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result
	<p>The hardness value (H), in N/mm, is the average of the slopes of the load/deflection curves at 210 N, 275 N and 340 N.</p> $H = \frac{C_1 + C_2 + C_3}{3} [N/mm]$ <p>where:</p> <p>C1 = slope at 210 N C2 = slope at 275 N C3 = slope at 340 N</p>		
4.4	Determination of subjective hardness rating Hs and the change in hardness		
	<p>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</p> <p>Hs is determined according to the following function:</p> $H_s = 10 \left(1 - e^{-(K \cdot a + b)} \right)^2$ <p>K is calculated with the following equation from the Force-Displacement-Plot:</p> $K = \frac{A}{H}$ <p>Where:</p> <p>A = Area under the curve from 0 to 450 N from the Force-Displacement-Plot H = Hardness rating a = 5.92 x 10⁻⁴ b = 0.148</p> <p>Change in hardness:</p> <p>The change in hardness rating in percent is calculated from the relations between the hardness rating Hs after 15000 cycles and 30000 cycles to the hardness rating before the test (100 cycles).</p>		
4.5	Determination of the hysteresis		

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Absatz Clause	Anforderungen - Prüfungen / Requirements - Tests [2 PfG-Q 2215: 2018-03]	Messergebnisse - Bemerkungen/ Measuring results - Remarks	Ergebnis Result
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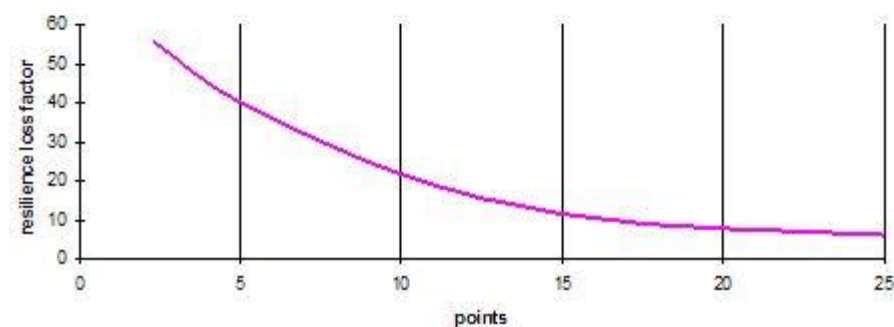
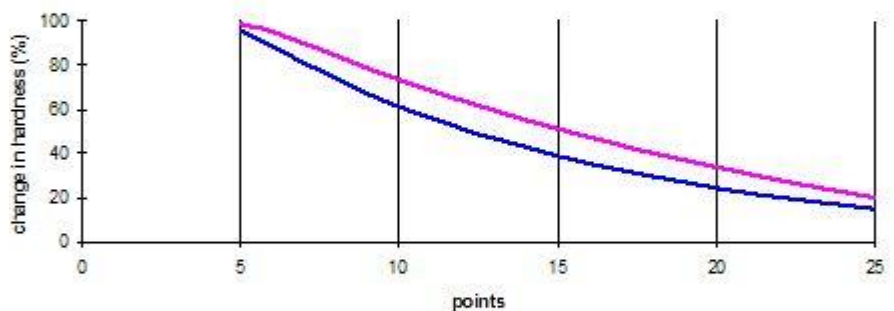
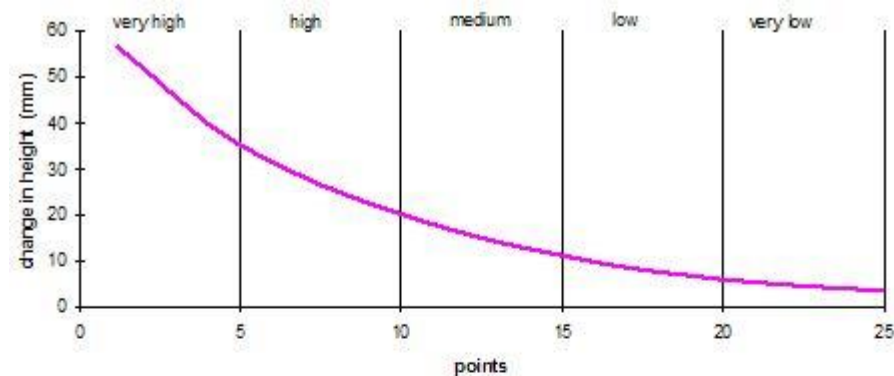
The hysteresis in percent is calculated from the quotient of the area enclosed by the load and reload curves and the area below the load curve (up to max. depth of indentation at 1000 N) multiplied by a factor of 100.

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

5 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



6 Additional tests

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Absatz Clause	Anforderungen - Prüfungen / Requirements – Tests [2 PfG-Q 2215: 2018-03]	Messergebnisse – Bemerkungen/ Measuring results - Remarks	Ergebnis Result
6.1	<p>Visual inspection: The test object is examined before, during and after the durability test to determine the changes caused by the durability test.</p> <p>Requirement: No damage to the cover (such as cracks in the fabric or seams) and the mattress core (e.g., broken or protruding springs). The internal examination takes place at the end of the test after all measurements have been carried out.</p>	No damage of core caused by durability test.	P <input checked="" type="checkbox"/> F <input type="checkbox"/> N/A <input type="checkbox"/> N/T <input type="checkbox"/>
6.2	<p>Handles:</p> <p>a) Strength of the handles $\geq 1,5$ x mattress weight b) Function of handles: Positioning, handiness, grip</p>	Mattress core without cover.	P <input type="checkbox"/> F <input type="checkbox"/> N/A <input checked="" type="checkbox"/> N/T <input type="checkbox"/>
6.3	<p>Marking in acc. with ProdSG</p> <p>According to the German Product Safety Law (ProdSG) the article has to be marked permanently on the product before it is brought onto the market. The following information has to be given:</p> <p>a) name of manufacturer or importer and his contact address b) type or article number</p>	<p>requirements fulfilled</p> <p>a) name of manufacturer or importer available</p> <p>b) no type or article number available</p> <p>More Details on Pic. 4 on page 3.</p>	P <input checked="" type="checkbox"/> F <input type="checkbox"/> N/A <input type="checkbox"/> N/T <input type="checkbox"/>
6.4	<p>Textile Labeling Regulation:</p> <p>REGULATION (EU) No 1007/2011 on textile fibre names and related labelling and marking of the fibre composition of textile products</p>	Mattress core without 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"/>
6.5	<p>Product information:</p> <p>The customer should also be informed beside about the following facts:</p> <p>Maintenance: e.g. to advance the durability by periodic turning over of the mattress. Cleaning instruction of the cover (care labelling symbols) Aeration: Customers should be informed about mould or stains caused by inadequate aeration and climatical conditions.</p>	Mattress core without 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"/>

ZUSATZ-DOKUMENTATION
ADDITIONAL-DOCUMENTATION

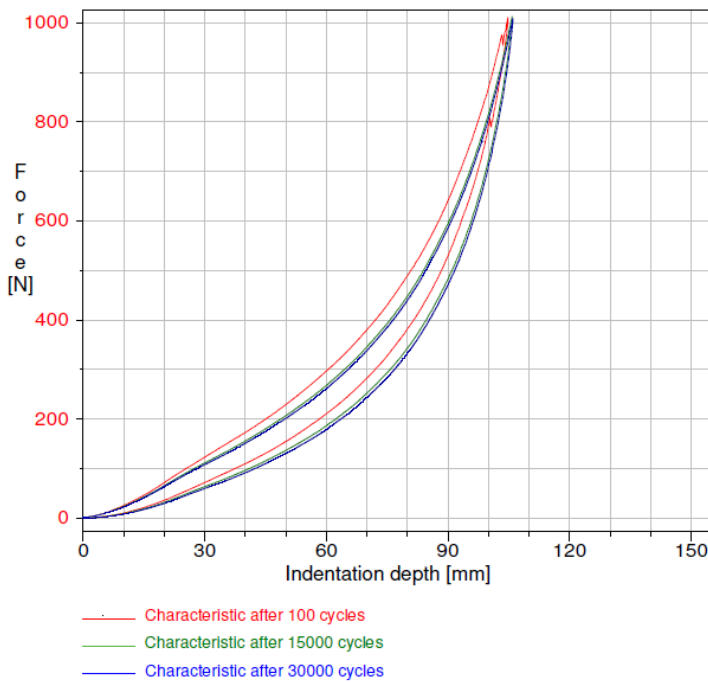
A 4. Mattress resilience characteristics according to DIN EN 1957



Mattress resilience characteristics

Client: Richert Pieris
 Test item: Natural Latex foam mattress core
 Test sample no.: 3359135-1

Force-Displacement-Plot



	Data after 100	15000	30000
Hardness rating H:	6,92	6,95	7,07
Area A (0-450N):	13825,82	13987,99	14001,84
Hardness value K:	1998,18	2012,00	1981,18
Subjective hardness HS:	5,41	5,45	5,37
Hysteresis:	22,17	22,83	23,53

Durability characteristics:

Change in height 15000 cycles:	-0,9 mm
Change in height 30000 cycles:	-1,2 mm
Change in hardness 15000 cycles:	0,6 %
Change in hardness 30000 cycles:	-0,7 %
Resilience loss factor 15000 cycles:	2,5
Resilience loss factor 30000 cycles:	3,0

Durability rating:

Change in height:	25
Change in hardness (stage 1):	25
Change in hardness (stage 2):	25
Resilience loss factor:	25
Total number of points: (max. 100 points)	100