

Prüfbericht - Nr.: 21193777_002e		Seite 1 von 13 Page 1 of 13
<i>Test Report No.:</i>		
Auftraggeber: <i>Client:</i>	Coco Latex Exports (P) Ltd. Chungorn, Alleppey 688011 Kerala Indien	
Gegenstand der Prüfung: <i>Test item:</i>	mattresscore	
Bezeichnung: <i>Identification:</i>	" natural latex Cocolatex "	Serien-Nr.: <i>Serial No.:</i>
Wareneingangs-Nr.: <i>Receipt No.:</i>	A0000030490 / 2	Eingangsdatum: 2012-12-13 <i>Date of receipt:</i>
Zustand des Prüfgegenstandes bei Anlieferung: vollständig und ohne Beschädigung Condition of test item at delivery: complete and without damage		
Prüfört: <i>Testing location:</i>	TÜV Rheinland LGA Products GmbH	
Prüfgrundlage: <i>Test specification:</i>	2 PfG-Q 2215: 2012-03 Matratzen im Wohnbereich-Dauerhaltbarkeit nach DIN EN 1957 zur Erlangung des Qualitätszertifikates Mattresses domestic use – durability (DIN EN 1957) for the Quality certificate	
Prüfergebnis: <i>Test Result:</i>	Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n). <i>The test item passed the test specification(s).</i>	
Prüflaboratorium: <i>Testing Laboratory:</i>	Möbelprüfinstitut Nürnberg <i>Furniture Testing Institut Nuremberg</i>	
geprüft/ tested by:	kontrolliert/ reviewed by:	
		
2013-01-07 M. Globisch/Sachverständiger/Expert	2013-01-07 R. Heym/Laborleiter/Head of laboratory	
Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>
Sonstiges/ Other Aspects:		
Auftragsnummer/ Order No.: 3066449		
The reached total number of points is 100 points.		
Abkürzungen:	<i>P(ass) = entspricht Prüfgrundlage</i>	Abbreviations: <i>P(ass) = passed</i>
	<i>F(ail) = entspricht nicht Prüfgrundlage</i>	<i>F(ail) = failed</i>
	<i>N/A = nicht anwendbar</i>	<i>N/A = not applicable</i>
	<i>N/T = nicht getestet</i>	<i>N/T = not tested</i>
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugswise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report relates to the a. m. test item. 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 safety mark on this or similar products.</i>		

Test object

Item: mattress core " natural latex CocoLatex"
Number of samples: 1
Test sample
Delivered on: 2012-12-13
Supplier: manufacturer
ID-Nr.: A0000030490 / 2
Applicable documents: -

Scope of testing

Durability test in two stages according LGA-Guidelines
33003-5 and DIN EN 1957 08:2000

Test base

2 PFG-Q 2215:2012-03 Mattresses domestic use – durability (DIN EN 1957) for the Quality certificate
DIN EN 1957:08.2000 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

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.

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.

General examination

Dimensions

Length:	1990 mm
Width:	915 mm
Height:	125 mm
Weight:	14,2 kg
Density:	62,39 kg/m ³

Description

Core: ca. 125 mm natural latex foam.

Fine padding: -

Drill: -

Material

./.

Connections

./.

Surface

./.

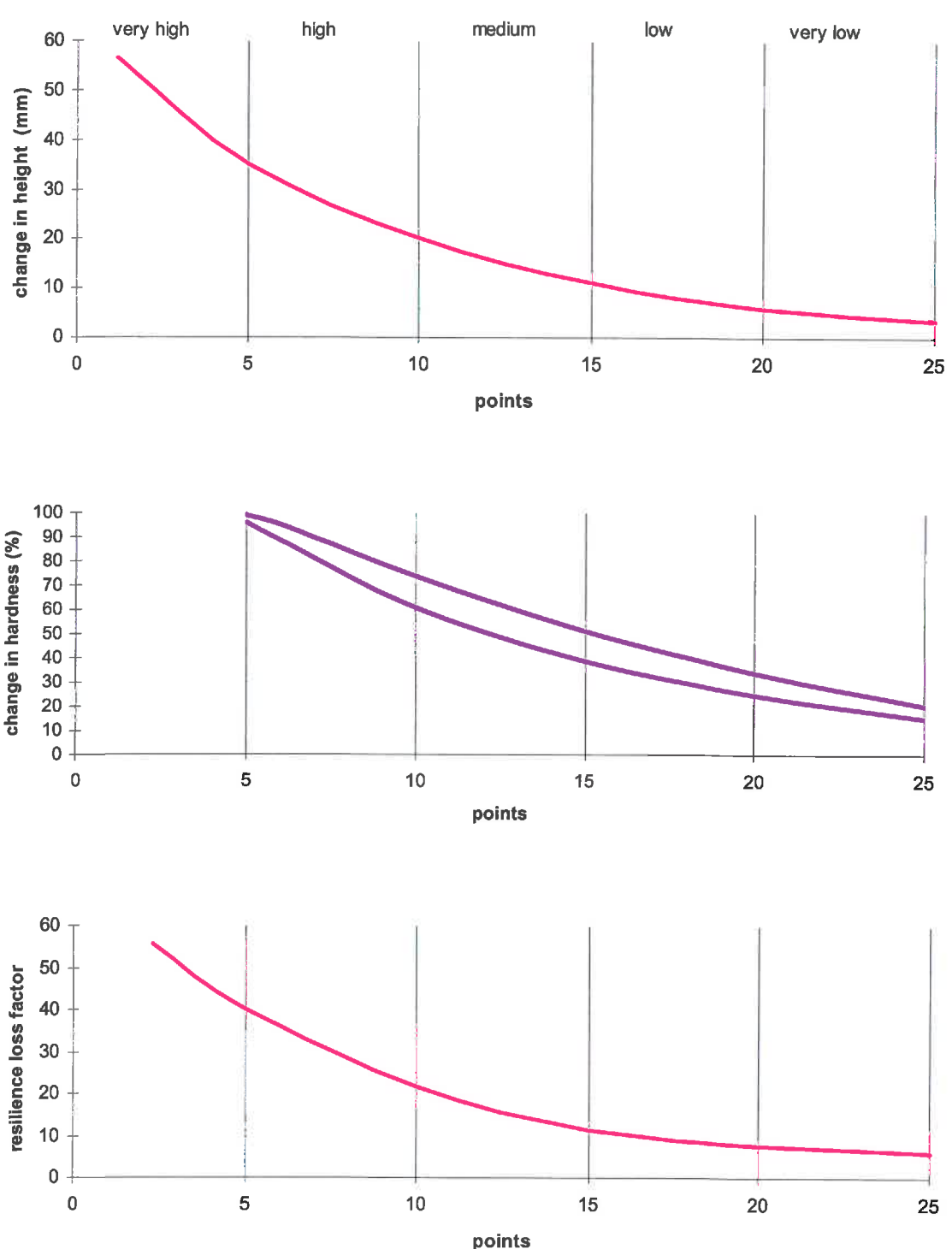
Section	Remarks																															
	<p>Test results</p> <p>The mattresscore " natural latex CocoLatex" has been tested in a durability test rig with a roller load of 1400 N in two test stages with a total of 30 000 cycles. In the centre of the area three measurements of the characteristic curves of resilience have been taken:</p> <table data-bbox="347 613 788 707"> <tr> <td>a)</td> <td>after</td> <td>200 strokes</td> </tr> <tr> <td>b)</td> <td>after</td> <td>30.000 strokes</td> </tr> <tr> <td>c)</td> <td>after</td> <td>60.000 strokes</td> </tr> </table> <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> <p>Characteristics before the test</p> <table data-bbox="347 875 1034 969"> <tr> <td>Hardness index:</td> <td>4.52</td> </tr> <tr> <td>Hysteresis:</td> <td>18.1 %</td> </tr> <tr> <td>Height of system:</td> <td>125 mm</td> </tr> </table> <p>Characteristics after test::</p> <table data-bbox="347 1070 1026 1223"> <tr> <td>Change in height after the test:</td> <td>3.0 mm</td> </tr> <tr> <td>Change in hardness after 30000 strokes:</td> <td>- 6 %</td> </tr> <tr> <td>Change in hardness after teh test:</td> <td>- 7 %</td> </tr> <tr> <td>Resilience loss factor after the test: (devating from DIN EN 1957)</td> <td>3.1</td> </tr> </table> <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 hardnesses 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 reached total number of points for the 4 characteristic data is 100 points.</p> <table data-bbox="339 1615 1013 1740"> <tr> <td>Change in height after test:</td> <td>25 points</td> </tr> <tr> <td>Change in hardness after 30 000 strokes:</td> <td>25 points</td> </tr> <tr> <td>Change in hardness after test:</td> <td>25 points</td> </tr> <tr> <td>Resilience loss factor after test:</td> <td>25 points</td> </tr> </table> <p>The results of the test refer solely to the tested sample.</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>	a)	after	200 strokes	b)	after	30.000 strokes	c)	after	60.000 strokes	Hardness index:	4.52	Hysteresis:	18.1 %	Height of system:	125 mm	Change in height after the test:	3.0 mm	Change in hardness after 30000 strokes:	- 6 %	Change in hardness after teh test:	- 7 %	Resilience loss factor after the test: (devating from DIN EN 1957)	3.1	Change in height after test:	25 points	Change in hardness after 30 000 strokes:	25 points	Change in hardness after test:	25 points	Resilience loss factor after test:	25 points
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Section	Remarks
	<p>Durability Test – Roller Test</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 laquered 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: 20 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>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>

Section	Remarks
	<p>Determination of resilience characteristics (Force-Displacement-Plot)</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: $\pm 1 \%$</p> <p>Design of the loading pad:</p> <p>Spherical pad, diameter 355 mm Curvature radius 800 mm (surface 1000 cm²)</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>


Section	Remarks
	<p>Assessment of the Force-Displacement-Plot</p> <p>Change in height and change in hardness as well as resilience loss are dimensions of durability as measurable functional characteristics.</p> <p>Change in height</p> <p>The change in height is determined after testing under a load of 50 N applied by the loading pad.</p> <p>The change in height in mm indicates how intensive the mattress will visibly deform under frequent use.</p> <p>Hardness rating and change in hardness rating</p> <p>The hardness rating is calculated as mean inclination of the Force-Displacement-Plot at a load of 210 N, 275 N and 340 N.</p> $H = \frac{C_1 + C_2 + C_3}{3} \text{ N/mm}^2$ <p>C1 Inclination at a load of 210 N C2 Inclination at a load of 275 N C3 Inclination at a load of 340 N</p> <p>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.</p> <p>Resilience loss factor (deviating to DIN EN 1957)</p> <p>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.</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>

Section	Remarks
	<p>Determination of subjective hardness rating H_s</p> <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 H_s is a figure on a scale from 1 to 10 that indicates the hardness of the resilience.</p> <p>$H_s = 1$ is a hard resilience, $H_s = 10$ is a soft resilience</p> <p>H_s 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 = 5.92×10^{-4} b = 0.148</p> <p>Determination of the hysteresis</p> <p>The per cent hysteresis is calculated from the quotient of the area enclosed by the load and re-load curves and the area below the load curve (up to max. depth of indentation at 1000 N) multiplied by a factor of 100.</p> <p>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).</p> <p>Results of measurement and assessment</p> <p>The following pages contain the Force-Displacement-Plot, results of measurement and assessment as well as rating points according to LGA-rating system.</p>

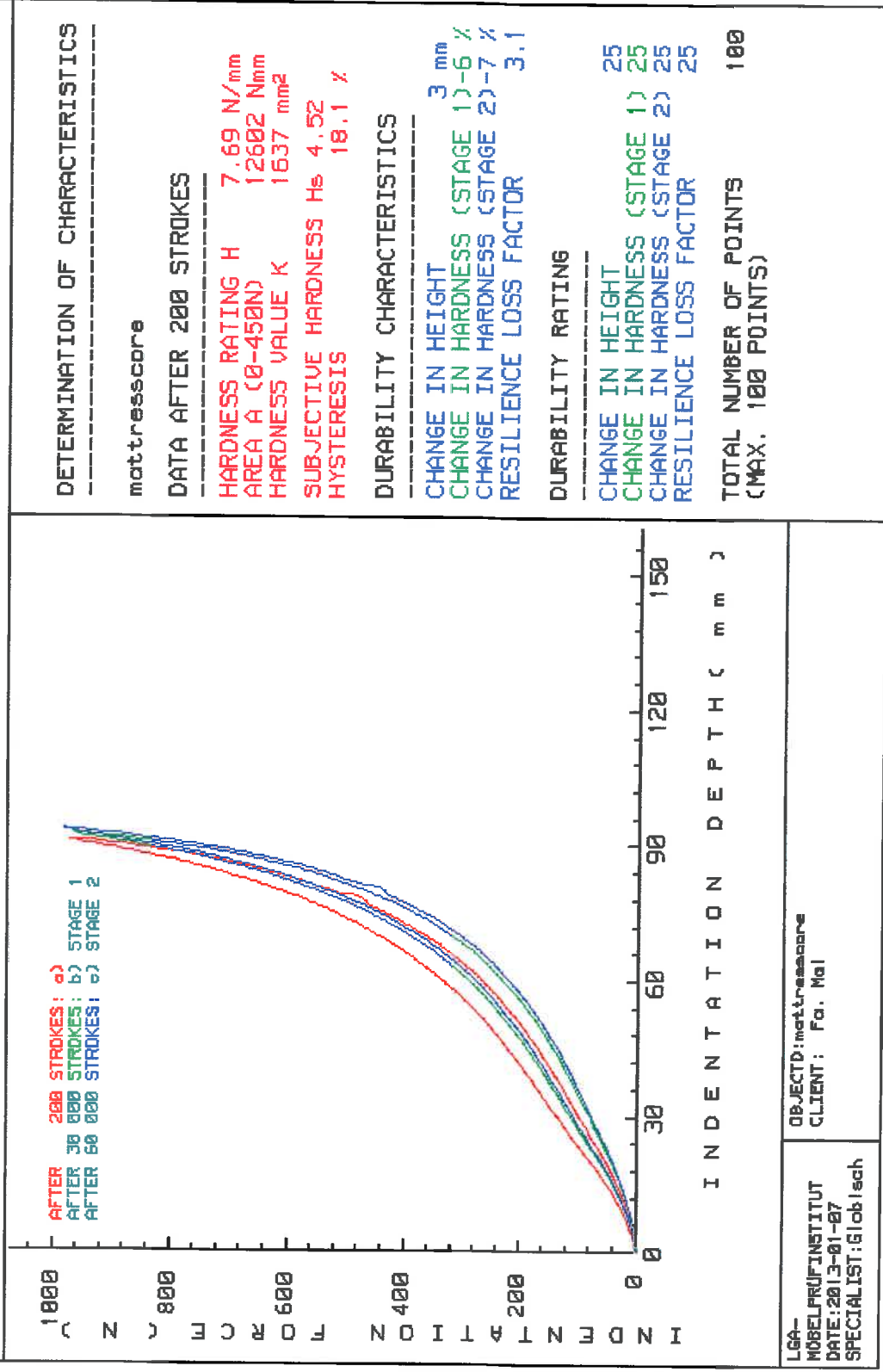
Section	Remarks																												
TÜV Rheinland LGA – Rating System	 <p>The following table summarizes the data points estimated from the three graphs:</p> <table border="1"> <thead> <tr> <th>Points</th> <th>Change in height (mm)</th> <th>Change in hardness (%)</th> <th>Resilience loss factor</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>~58</td> <td>-</td> <td>~55</td> </tr> <tr> <td>5</td> <td>~35</td> <td>~95</td> <td>~40</td> </tr> <tr> <td>10</td> <td>~20</td> <td>~60</td> <td>~25</td> </tr> <tr> <td>15</td> <td>~10</td> <td>~40</td> <td>~15</td> </tr> <tr> <td>20</td> <td>~5</td> <td>~25</td> <td>~8</td> </tr> <tr> <td>25</td> <td>~3</td> <td>~15</td> <td>~5</td> </tr> </tbody> </table>	Points	Change in height (mm)	Change in hardness (%)	Resilience loss factor	0	~58	-	~55	5	~35	~95	~40	10	~20	~60	~25	15	~10	~40	~15	20	~5	~25	~8	25	~3	~15	~5
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25	~3	~15	~5																										

Section	Requirements/tests	Remarks	Results
	Mechanical properties of the cover No damage of the cover caused by the durability test (e.g. cracked textiles or joints)		N/A
	Handling Washable cover (evidence for washable cover without shrinkage of the cover when washing with the washing machine and keep to the laundry symbols).		N/A
	Strenght of the handles Strenght of the handles $\geq 1,5$ x mattress weight		N/A
	Handles (postioning, manipulation, grip/ traction).		N/A
	Declaration Denomination by manufacturer or trade name		N/A
	Product information The customer should be informed beside about the following facts:		N/A
	maintenance e.g. to advance the durability by periodic turning over of the mattress		N/A
	cleaning instruction of the cover		N/A
	Aeration Customers should be informed about mould or stains caused by inadequate aeration and climatical conditions.		N/A

Pictures

	
<p>Picture 1: view of the mattresscore</p>	
<p>Picture 5:</p>	<p>Picture 6:</p>

MATTRESS RESILIENCE CHARACTERISTICS



DETERMINATION OF CHARACTERISTICS

mattresscore

DATA AFTER 200 STROKES

HARDNESS RATING H 7.69 N/mm
 AREA A (Ø-45Ø) 12602 Nmm
 HARDNESS VALUE K 1637 mm²
 SUBJECTIVE HARDNESS Hs 4.52
 HYSTERESIS 18.1 %

DURABILITY CHARACTERISTICS

CHANGE IN HEIGHT 3 mm
 CHANGE IN HARDNESS (STAGE 1) -6 %
 CHANGE IN HARDNESS (STAGE 2) -7 %
 RESILIENCE LOSS FACTOR 3.1

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 100
 (MAX. 100 POINTS)

LGÄ-
MÖBELPRÜFINSTITUT
DATE: 2013-01-07
SPECIALIST: 51obisch

OBJECT: mattresscore
CLIENT: Fa. Mal