



TEST Reg. No. 37



**DANISH  
TECHNOLOGICAL  
INSTITUTE**

Novopan Træindustri, Vibopan afd.  
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DK-8800 Viborg

Project/ 1214195-02  
Order no. 321662-2  
Page 1 of 1  
Appendices 7  
Initials tnp/jlj/hbs

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**CE** 1235

EU Notified Body  
EU Notified Body

## Test Report – ITT testing according to EN 1195:1997 *Timber structures.*

### *The testing of structural floor decking*

Material:	<b>Floor construction – 12 mm Multi layer flooring on 22 mm particleboard Sub floor with floor heating system.</b> See Appendix 1
Sampling:	The test material was sampled and sent by the client and received at the Danish Technological Institute 16-07-2009
Method:	<p>EN 322:1993 “Wood Based Panels. Determination of moisture content”</p> <p>EN 323:1993 “Wood Based Panels. Determination of density”</p> <p>EN 324-1:1993 “Wood Based Panels. Determination of dimensions of boards – Part 1: Determination of thickness, width and length”</p> <p>EN 1195:1997 “Timber structures. The testing of structural floor decking”</p> <p>EN 12871:2000 “Wood based panels. Performance specifications and requirements for load bearing boards for use in floors, walls and roofs”</p> <p>Installed according to guidance given by Vibopan in e-mail, dated 13-07-2009 Tested with a centre to centre span of 600 mm. Tested at unsupported end joints. Glued in T&amp;G and fixed with screws 4.6 × 64 mm countersunk and maximum spacing at Perimeter/-Intermediate: 150 mm/300 mm. Top floor installed according to the supplier’s laying instructions.</p> <p>ENV 12872:2000 “Wood based panels. Guidance on the use of load bearing board in floors, walls and roofs”</p> <p>The test material was not conditioned prior to testing.</p>
Test Equipment	Load cell: 50 kN HBM, Type U2, EQP-652. Length transducer: ± 50 mm HBM, W50K Nr 39712
Period:	July 2009
Result:	<p>Tested as structural floor decking with heating system (load category A Residential) on joists with a 600 mm centre to centre span and unsupported end joints the test results are given in :</p> <p>Appendix 2: Impact load, Appendix 3: Static Load, Appendix 4: Load/deflection curves, Appendix 5: Moisture Content, sub floor Appendix 6: Density, sub floor Appendix 7: Thickness, sub floor</p> <p>Evaluation of test results: <u>Soft body impact load</u> The floor structure meets the requirements for floors given in EN 12871. <u>Static point load</u> <math>R_m = 475 \text{ N/mm}</math> <math>F_{ser,k} = 3036 \text{ N}</math> <math>F_{ult,k} = 5106 \text{ N}</math> The floor structure meets the requirements for wood based panel floorings (point load + soft body impact test) given in the Danish NA to EN 13986.</p>
Terms:	The test has been performed according to attached conditions, which are according to the guidelines laid down by DANAK (The Danish Accreditation). The testing is only valid for the tested specimen. The test report may only be extracted, if this is either public accessible, or if the laboratory has approved the extract.
Date/place	29-07-2009, Danish Technological Institute, Wood and Textile, Taastrup

**Materials**

Laboratory No 321662

**Sub floor**

Material	:	Particleboard
Thickness	:	Nominal 22 mm
Production date	:	17-04-2009 kl. 5:19 (T&G) (Panels from more production dates are tested)
Panel width and length	:	600 mm by 1800 mm
Edges	:	T&G in all edges - See cross section below
Grooves for heat system	:	See cross section below
Marking	:	CE 1073-CPD-803 Novopan 09 EN 13986 EN 312-6 Flooring E1 D <sub>fl</sub> -S1 22 mm > 600 kg/m <sup>3</sup> 130409 Denne side op 17=04=09 05:19
Number of panels	:	51
Tested number of elements	:	24

**Heat distribution plates**

Heat distribution plate	:	Wavin, Trigris heat distribution plate Alu Ø 16 x 180 mm, date 04-08-2008
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**Heating hose**

Heating hose	:	Wavin 21 PE-RT Gulvvarme-Floor heating DIN 16833/4721 ISO/DIS 22391 D433420 Iltspærre- oxygen barrier DIN 4726 2009/06/22 22:50 16 x 2,0 60 °C PN 6 18561 M
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**Floor cardboard**

Material	:	Paper
Dimension	:	500 grams/m <sup>2</sup>
Production date	.	No information
Marking	:	None

**Top Flooring**

Material	:	HARA Parkett. 3-strip Multi Layer Flooring. Ash.
Thickness	:	Nominal 12 mm
Production date	.	-
Board width and length	:	180 mm by 1095 mm
Edges	:	Double T&G in ends, click system T&G in long edges.
Marking	:	↓Wand/Wall↓ Made in Germany + Production No.

**Floor construction:**

- 45x 195 mm joists, cc 600 mm, on steel frame
- Sub floor. 22 mm particleboard – glued together in T&G with PVAC and fixed to joist with screws 4,6 x 64 mm. Installed with unsupported end joints. Minimum panel length 300 mm.
- Heat distribution plates fitted into grooves in sub floor and nailed to the particleboard with 2 roofing felt nails per plate.
- Heating hose pressed into heat distribution plates
- Cardboard – no overlay.
- Top flooring. 12 mm HARA Multi Layer Flooring clicked together and not fixed to the sub floor. Installed parallel to the sub floor – perpendicular to the joists.

**Test setup**



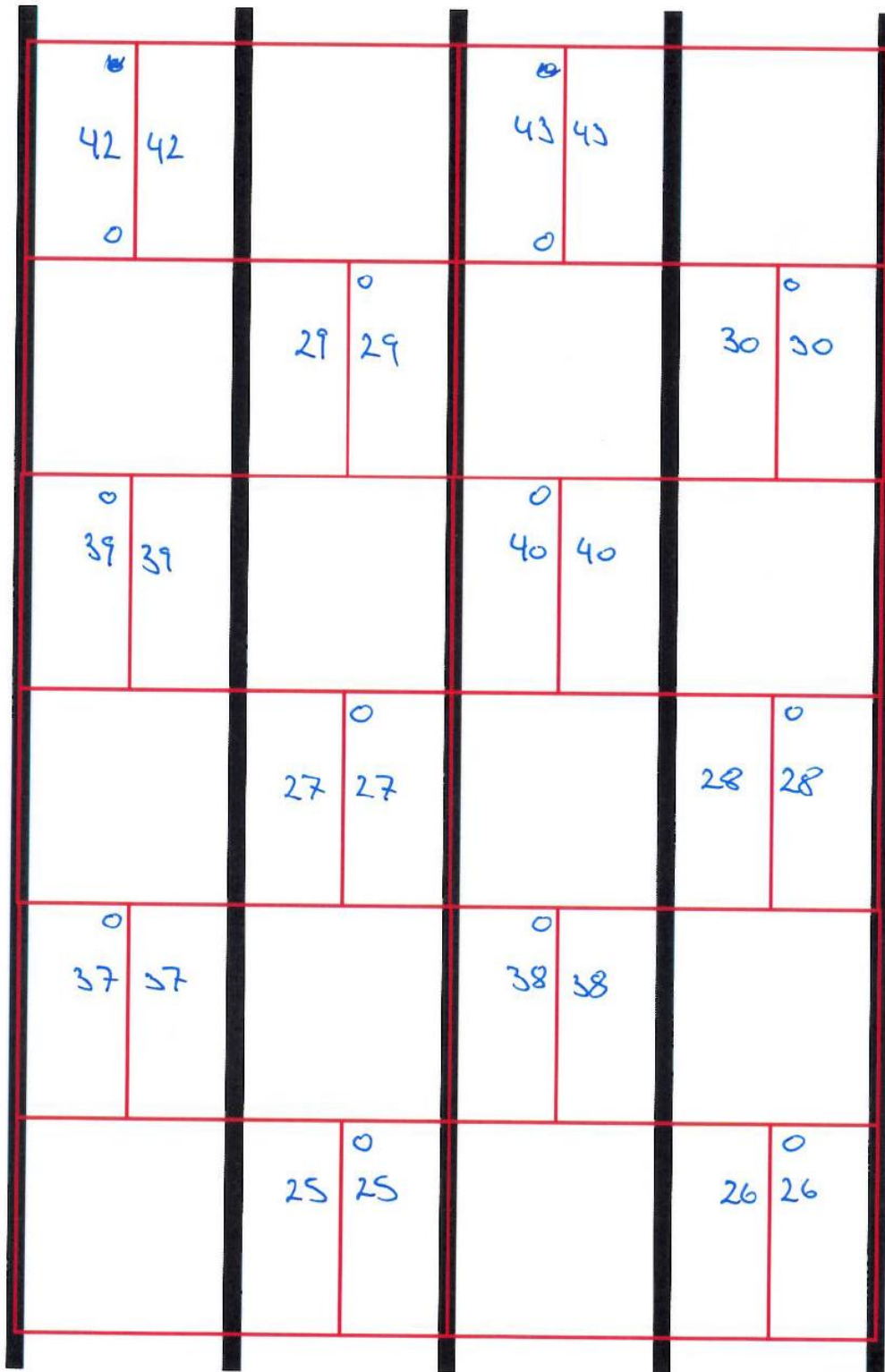
APPENDIX 1

1214195-02

321662-2

tnp/jlj/hbs

Page 4/5



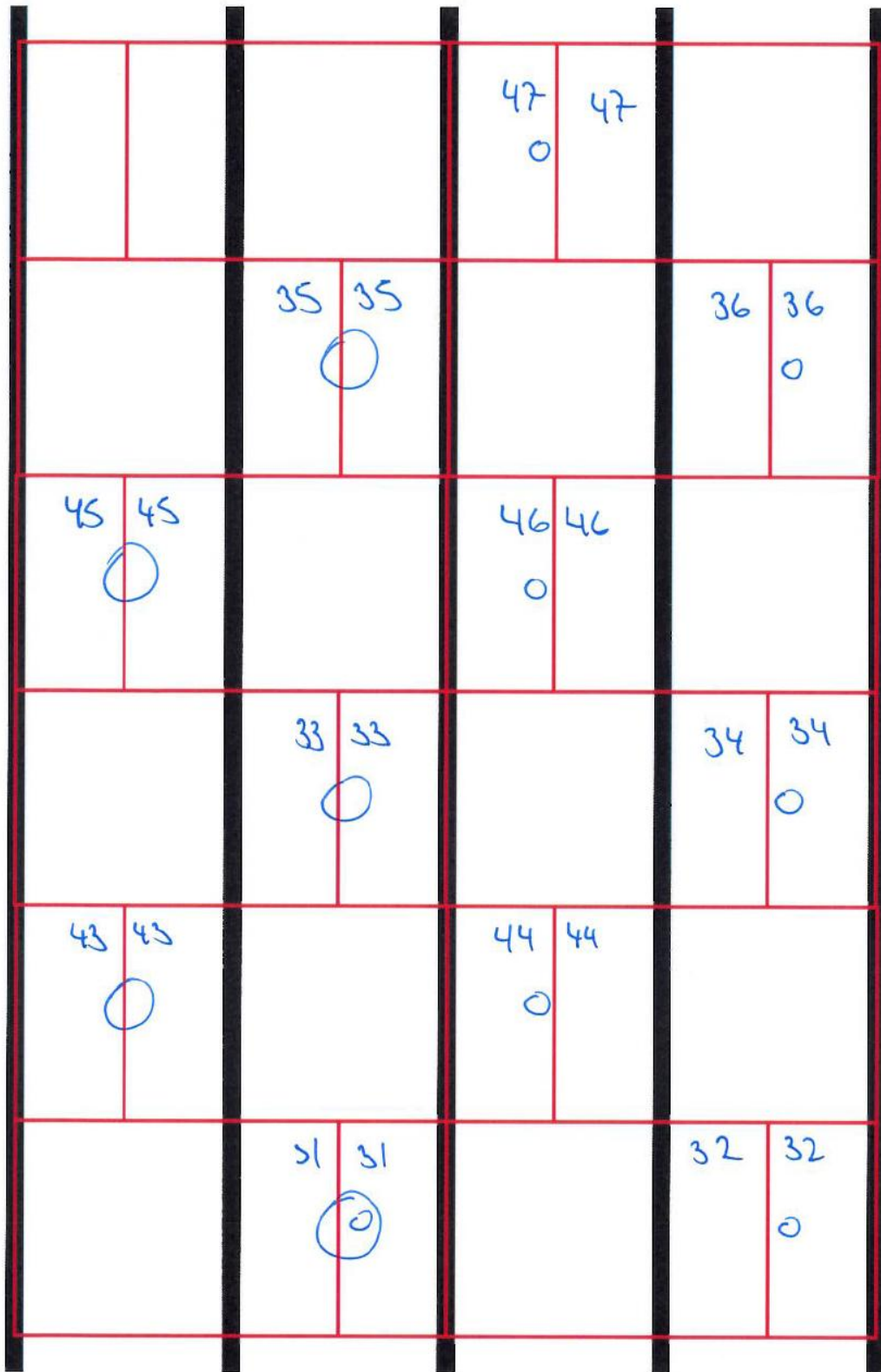
APPENDIX 1

1214195-02

321662-2

tnp/jlj/hbs

Page 5/5



**Test Results EN 1195 IMPACT LOAD. Floor Decking**

**Material: Particleboard floor heating system covered by 12 mm Multi Layer Flooring**

Panel thickness: 22 mm

Cc: 600 mm

Drop height mm	Point No. 43 Joint in sub floor			Point No. 45 Joint in sub floor			Point No. 35 Joint in sub floor			Point No. 33 Joint in sub floor			Point No. 31 Joint in sub floor		
	Ser ult.	set	diff. set	Ser ult.	set	diff. set	Ser ult.	set	diff. set	Ser ult.	set	diff. set	Ser ult.	set	diff. set
0	-	0	Nm	-	0	Nm	-	0	Nm	-	0	Nm	-	0	Nm
150	-	0	Nm	-	-0,19	Nm	-	-0,13	Nm	-	-0,09	Nm	-	-0,20	Nm
300	-	-0,83	Nm	-	-0,29	Nm	-	-0,15	Nm	-	-0,25	Nm	-	-0,26	Nm
450	-	-0,90	Nm	-	-0,25	Nm	-	-0,46	Nm	-	-0,15	Nm	-	-0,28	Nm
600	-	-0,99	Nm	-	-0,37	Nm	-	-0,50	Nm	ser	-0,85	Nm	-	-0,26	Nm
750	ser	-1,45	Nm	ser	-0,76	Nm	ser	-0,47	Nm	ser	-1,30	Nm	-	-0,19	Nm
900	ult	-2,99	Nm	ult	-5,88	Nm	ser	-0,62	Nm	ser	-2,99	Nm	ser	-10,31	Nm

- Set: Set at point of impact in mm. Measured on top side of panel.
- Diff. set: Differential set in nearest joint in mm. Measured on top side of panel.
- Nm: Not possible to measure due to the construction of the floor
- Os: Out of scale (more than 10 mm)
  
- Ser: Serviceability limit (When cracks occur)
- Ult: Ultimate limit (When failures occur)
- : No cracks or failures have been recorded

**Test results EN 1195. Static point load. Floor decking**

Sample: Panel type: Particleboard  
 Sample mark: Top floor: Haro parkett  
 Nominal thick- 22 mm  
 ness:  
 Description: 22 mm sub floor, heating system and Haro parkett

Test setup: Load cell: HBM U2 5t  
 Transducer: HBM 50  
 Load diameter: 25 mm  
 Span, cc: 600 mm  
 Period: 2009-07-29 - 2009-07-30

Results:

Test Point	Wm Deformation mm	R Stiffness N/mm	Fser Service N	Fmax Ultimate N
37	5,41	434	3891	6410
39	5,61	465	4187	5545
42	4,94	485	4002	6000
29	4,33	537	2925	6547
27	5,16	498	5013	6244
25	5,24	496	4065	5538
38	4,51	580	3628	7113
40	5,56	468	5014	6631
43	4,90	529	4388	6917
30	3,87	614	3600	6563
28	4,94	495	4147	5290
26	4,93	539	4350	5781
36	6,05	431	3177	6049
34	5,69	408	3733	6402
32	5,54	425	4371	5788
44	6,01	376	5201	6085
46	6,04	426	4632	6633
47	6,48	408	5033	5081
Number	18	18	18	18
Mean	5,29	475	4187	6145
Std.dev.	0,67		643	562
COV	12,61		15	9
Char.Val.	5,29		3036	5106



# APPENDIX 4

1214195-02

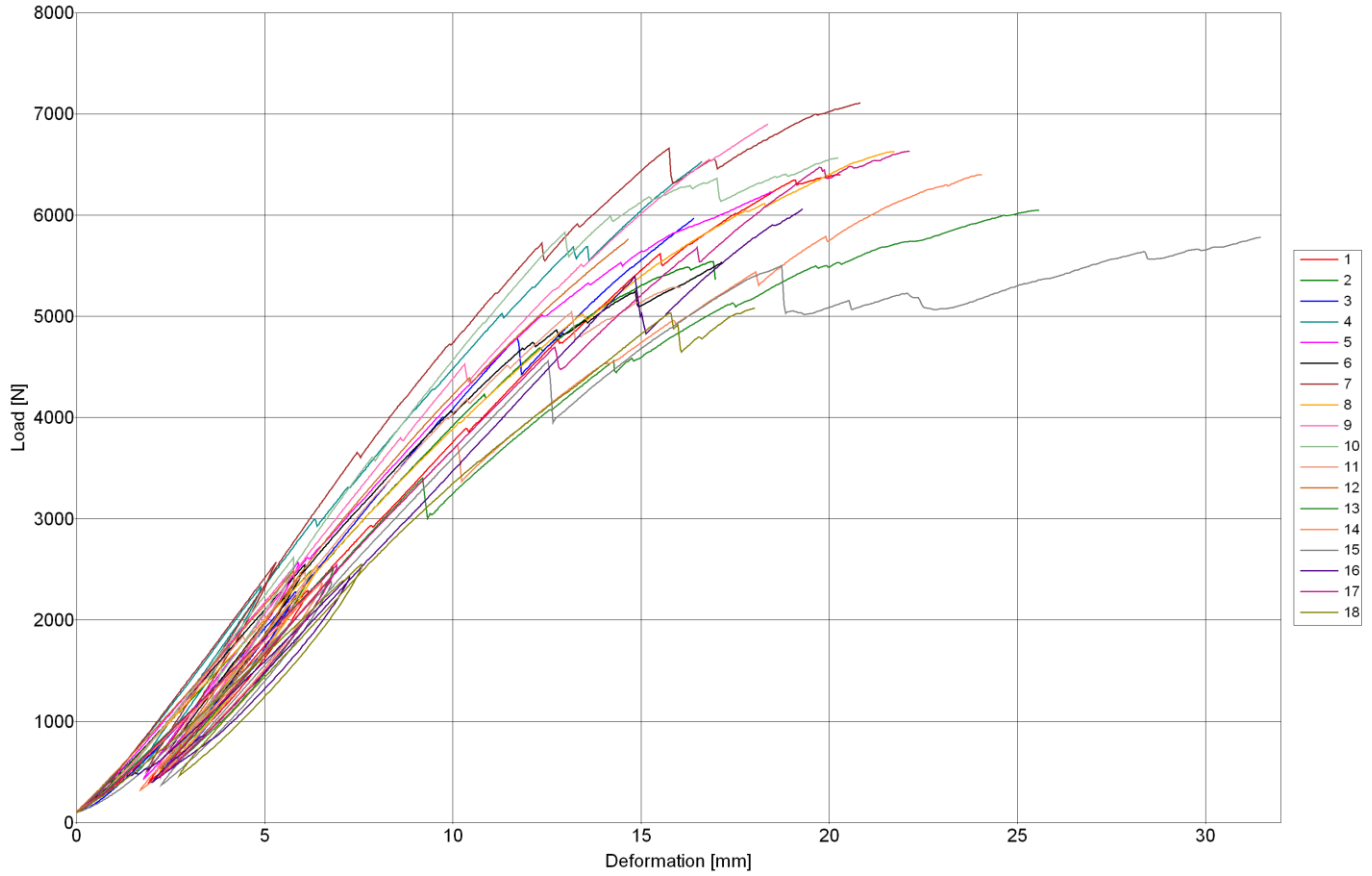
321662-2

tnp/jlj/hbs

Page 1/1

## Test results EN 1195. Load-deflection curves

Order no.: 321662 - Sample mark: Top floor: Haro parkett - Test series: EN 1195. Static load. Floor decking. T&G.



## APPENDIX 5


1214195-02

321662-2

tnp/jlj/hbs

Page 1/1

### Test Results EN 322. Sub floor. Moisture Content after Test

Danish Technological Institute Timber					
<b>EN 322 - Moisture Content</b>					
Panel:	<b>0443</b>	Test date:	<b>2009.07.30.</b>	Tester:	<b>TNP</b>
Quality:	<b>EN 312-6</b>	Customer:	<b>Novopan Træindustri, Vibopab afd.</b>		
Thickness [mm]:	<b>22</b>	Case no.:	<b>321662-2</b>		
Lab. no.:		Produced:	Week:		
Factory:		Production line:			
Material:	<b>Spånplade med spor til varmeslanger</b>				
Sample no.	Initial Weight [g]	Final Weight [g]	Moisture Content [%]		
1	41,27	38,63	6,8		
2	40,85	38,17	7,0		
3	40,88	38,30	6,7		
4	41,10	38,52	6,7		
5	40,61	38,06	6,7		
6	41,03	38,44	6,7		
7	39,68	37,16	6,8		
8	38,50	36,23	6,3		
9	39,19	36,86	6,3		
10	36,36	34,54	5,3		
11	40,21	37,80	6,4		
12	40,85	38,37	6,5		
13	40,49	37,96	6,7		
14	40,92	38,40	6,6		
15	40,13	37,65	6,6		
16	40,76	38,27	6,5		
17	40,47	37,95	6,6		
18	40,13	37,62	6,7		
19	41,04	38,48	6,7		
20	40,01	37,51	6,7		
21	40,77	38,21	6,7		
22	39,73	37,56	5,8		
23	39,02	36,89	5,8		
Number:	23	23	23		
<b>Mean:</b>	<b>40,17</b>	<b>37,72</b>	<b>6,5</b>		
Standard Deviation:	1,10	0,93	0,4		
Coefficient of Variation:	2,7	2,5	6,0		

Comments:

# APPENDIX 6

1214195-02

321662-2

tnp/jlj/hbs

Page 1/1

## Test results EN 323. Sub floor. Density after test

Danish Technological Institute  
Timber



### EN 323 - Density

Panel:	<b>0443</b>	Test date:	<b>2009.07.29.</b>	Tester:	<b>TNP</b>
Grade:	<b>EN 312-6</b>	Customer:	<b>Novopan Træindustri, Vibopab afd.</b>		
Thickness [mm]:	<b>22</b>	Case no.:	<b>321662-2</b>		
Lab. no.:		Produced:		Week:	
Factory:		Prod.line:			
Material:	<b>Spånplade med spor til varmeslanger</b>				

Sample no.	Weight [g]	Thickness [mm]	Width [mm]	Length [mm]	Area Weight [kg/m <sup>2</sup> ]	Density [kg/m <sup>3</sup> ]
1	41,29	22,01	51,12	50,90	15,9	721,0
2	40,78	22,00	50,78	50,20	16,0	727,2
3	40,90	22,01	51,31	50,30	15,8	720,0
4	41,12	22,02	51,30	50,10	16,0	726,6
5	40,62	22,01	50,39	50,80	15,9	721,0
6	41,06	21,99	50,74	50,50	16,0	728,7
7	39,69	22,00	51,03	49,10	15,8	720,0
8	38,47	21,97	50,14	50,40	15,2	692,9
9	39,21	21,96	50,12	50,30	15,6	708,2
10	36,39	22,16	48,78	47,40	15,7	710,2
11	40,21	22,26	50,87	50,80	15,6	699,0
12	40,87	22,22	51,97	50,30	15,6	703,6
13	40,52	21,98	50,44	50,20	16,0	728,1
14	40,94	21,99	50,83	50,40	16,0	726,7
15	40,15	22,05	50,33	50,00	16,0	723,6
16	40,79	22,11	50,66	50,00	16,1	728,3
17	40,47	21,99	50,63	49,30	16,2	737,3
18	40,10	21,98	51,02	48,90	16,1	731,3
19	41,03	22,08	50,06	50,80	16,1	730,7
20	40,02	22,01	49,19	50,40	16,1	733,4
21	40,78	21,99	50,38	50,30	16,1	731,8
22	39,77	22,10	50,17	49,60	16,0	723,2
23	39,05	21,98	49,78	49,40	15,9	722,5
Number:	23	23	23	23	23	23
<b>Mean:</b>	<b>40,18</b>	<b>22,04</b>	<b>50,52</b>	<b>50,0</b>	<b>15,9</b>	<b>721,5</b>
Standard Deviation:	1,10	0,08	0,70	0,8	0,2	11,4
Coefficient of Variatic	2,7	0,4	1,4	1,6	1,5	1,6

Comments:

## APPENDIX 7

1214195-02  
321662-2  
tnp/jlj/hbs  
Page 1/2

### Test Results EN 324-1, Sub floor. Panel thickness

Thickness 1	Thickness 2	Thickness 3
Thickness 8		Thickness 4
Thickness 7	Thickness 6	Thickness 5

**APPENDIX 7**

1214195-02

321662-2

tnp/jlj/hbs

Page 2/2

**Test Results EN 1195 IMPACT LOAD. Floor Decking**

Panel No	Thickness [mm]								Max	Min
	1	2	3	4	5	6	7	8		
1	21,94	21,98	21,98	21,98	22,02	21,99	22,00	21,99	22,02	21,94
2	21,95	21,96	21,99	22,01	22,00	22,01	21,99	21,98	220,1	21,95
3	21,97	22,14	21,98	22,01	22,00	220,3	22,00	21,99	22,03	21,97
4	22,11	22,14	22,08	22,05	22,05	22,04	22,04	22,01	22,14	22,01
5	21,95	21,98	21,98	21,99	21,96	22,00	21,97	21,97	22,00	21,95
6	21,96	21,95	21,98	21,97	21,96	22,00	21,98	21,94	22,00	21,44
7	21,95	21,98	21,99	22,01	21,98	22,05	21,98	21,99	22,05	21,98
8	21,93	21,98	21,94	21,96	21,93	21,95	21,90	21,94	21,98	21,90
9	21,95	21,99	21,94	21,95	21,92	21,92	21,91	21,96	21,99	21,91
10	22,16	22,19	22,14	22,13	22,11	22,011	22,08	22,11	22,19	22,08
11	22,19	22,15	22,17	22,13	22,12	22,15	22,15	22,16	22,19	22,12
12	22,20	22,20	22,13	22,14	22,16	22,15	22,16	22,21	22,21	22,13
13	22,04	22,05	22,03	22,00	22,01	21,99	21,98	21,98	22,05	21,98
14	22,02	22,02	22,01	21,98	22,01	21,98	21,99	21,98	22,02	21,98
15	21,98	21,98	21,99	21,99	21,95	22,00	21,97	22,01	22,01	21,95
16	22,02	21,98	21,98	21,98	21,96	21,99	21,98	22,02	22,02	21,96
17	21,99	22,00	21,95	21,97	21,96	22,00	22,00	22,00	22,00	21,95
18	21,99	22,00	21,94	21,98	21,98	21,97	22,01	22,01	22,01	21,94
19	22,03	22,02	21,97	21,98	21,97	22,00	21,99	22,05	22,05	21,97
20	22,01	22,01	21,96	21,98	21,96	21,97	22,00	22,01	22,01	21,96
21	21,99	21,99	21,98	22,02	21,97	22,00	21,99	22,02	22,02	21,97
22	21,98	22,02	21,98	21,99	21,96	21,99	22,01	22,02	22,02	21,96
23	21,97	21,98	21,96	21,99	21,96	22,02	21,99	22,02	22,02	21,96
24	21,97	21,97	21,99	22,00	22,01	22,02	22,00	22,02	22,02	21,97

EN 12871 Dimensional thickness tolerances for sanded panels  $\pm 0,4$  mm