SATRA TECHNOLOGY CENTRE

Technical Services Report

UKAS TESTING 0248

SLIP RESISTANCE TESTING OF WOODEN FLOORING

As requested we have conducted an analysis of the Pendulum Slip Value of the 22 mm wood flooring submitted with various surface lacquers, as detailed below

SAMPLES SUBMITTED

Reference: Beech flooring samples.
No. 1 - with 1 coat of Junckers High Performance seal
No. 2 - with 1 coat of Junckers IsoLacquer and Friction Plus
No. 3 - with 1 coat of Junckers High Performance seal with anti slip medium 60
No. 4 - with 1 coat of Junckers High Performance seal with anti slip high 90

Description: Engineered timber (beech) flooring planks.
Intended application: Internal residential flooring
Date received: 19th April 2007
Conditioning commenced: 20th April 2007
Testing commenced: 23rd April 2007
Testing completed: 26th April 2007
Testing conducted by: S Braithwaite, D Smith

TESTS CARRIED OUT

- TM2002:1999 Slip Resistance of Floorings – Pendulum Method * (equivalent to BS 7976-2: 2002)
- Surface Roughness measurements (Rz)*

* The results have been assessed against In accordance with UK Slip resistance group guidelines – Issue 3: November 2005

RESULTS

TM 202:1999 Slip Resistance of Floorings – Pendulum Method,

Sample No. 1 - 1 coat of Junckers High Performance seal

Sample	Condition	Direction of Test			Overall average slip measurement (PTV's)
		A	B	C	
No. 1	Dry	**78**	**77**	**76**	**77**
	Wet (water)	**13**	**12**	**11**	**12**

For a complete set of test measurements see Annex A

Sample No. 2 - 1 coat of Junckers IsoLacquer and Friction Plus

Sample	Condition	Direction of Test			Overall average slip measurement (PTV's)
		A	B	C	
No. 2	Dry	**69**	**67**	**66**	**67**
	Wet (water)	**14**	**22**	**18**	**18**

For a complete set of test measurements see Annex A

Sample No. 3 - 1 coat of Junckers High Performance seal with anti slip medium 60

Sample	Condition	Direction of Test			Overall average slip measurement (PTV's)
		A	B	C	
No. 3	Dry	**65**	**65**	**63**	**64**
	Wet (water)	**50**	**53**	**48**	**50**

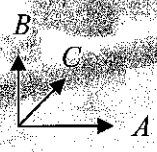
For a complete set of test measurements see Annex A

Sample No. 4 - 1 coat of Junckers High Performance seal with anti slip high 90

Sample	Condition	Direction of Test			Overall average slip measurement (PTV's)
		A	B	C	
No. 4	Dry	**64**	**64**	**62**	**63**
	Wet (water)	**49**	**48**	**47**	**48**

For a complete set of test measurements see Annex A

Direction of Test



Surface Roughness measurements (Rz)

Sample No. 1

Sample	Roughness measurement	1	2	3	4	5	6	7	8	9	10	Average
1	**RZ Value**	3.6	3.8	7.4	12.6	2.1	2.1	3.6	2.1	3.2	2.9	**4.13**
2		5.3	3.8	5.6	5.1	4.5	5.4	4.3	4.2	4.1	4.0	**4.63**
3		25.9	17.6	<300[1]	18.4	24.4	28.9	18.8	20.1	20.2	25.2	**22.17**
4		<300	<300	<300	<300	<300	16.8[1]	<300	<300	27.0[1]	<300	**<300**

[1] Result excluded as an outlier

Surface roughness criterion. These values apply to water wet situations.

Slip potential	**Rz value**
High slip potential	Below 10 µm
Moderate slip potential	10 - 20 µm
Low slip potential	20 + µm

COMMENTS

TM 202: 1999 Pendulum Test

The method of test is intended to assess the potential of slipping for people walking on a flooring material. A pendulum attached to a spring loaded foot fitted with a standard Four S rubber slider is allowed to swing so the slider contacts a wet or dry test flooring over a set distance. The extent to which the pendulum fails to reach its release height on the overswing is determined as a measurement of the slip resistance. The procedure is carried out in three directions, in one principle direction, at 90° to this and at 45° to the principle direction.

When assessed in accordance with the guidelines stipulated in the UK Slip Resistance Group Guidelines – Issue 3: November 2005 all of the samples supplied and tested have demonstrated a low potential for slip under dry test when tested using the Pendulum Method TM2002:1999 (BS 7976-2: 2002).

UK Slip resistance group guidelines.

Slip potential	PTV
High slip potential	0-24
Moderate slip potential	25-35
Low slip potential	36+

Sample numbers 3 (coated with Junckers High Performance seal with anti slip medium 60) and 4 (coated with Junckers High Performance seal with anti slip high 90) have demonstrated a low potential of slip when tested under the wet conditions.

Samples number 1 and 2 (coated with Junckers High Performance seal & Junckers IsoLacquer and Friction Plus respectively) demonstrated a high potential of slip under wet conditions.

Surface Roughness measurements

During the assessment the surface roughness meter travelled across the surface of the floor covering at ten different areas. The surface roughness meter travels over a 4mm distance and takes measurements at 0.8mm intervals, with the Rz roughness being the average height from trough to peak over this distance.

The surface roughness measurements obtained from sample numbers 1 and 2 indicate that they have a high slip potential under water wet conditions.

The measurements made on samples 3 and 4 show them to have a low slip potential under wet conditions.

CONCLUSIONS

When assessed according to UK Slip Resistance Group guidelines: Issue 3 November 2005, based on the pendulum test TM2002:1999 (BS 7976-2) the sample coated with Junckers High Performance seal with anti slip medium 60, and that with a coat of Junckers High Performance seal with anti slip high 90, each demonstrated a low potential for slip under both wet and dry conditions.

The sample coated with Junckers High Performance seal and the sample with a coat of Junckers IsoLacquer and Friction Plus, each have a low potential for slip under dry conditions and a high potential for slip under wet conditions when assessed according to UK Slip Resistance Group guidelines. These two samples are therefore, not suitable for use where there is a risk of water spillages.

Report signed by: S P Ferry
Floorcoverings Team Leader
Floorcoverings Evaluation Centre
On behalf of SATRA Technology Centre Ltd

Annex A

TM202:1999 Slip Resistance of Floorings – Pendulum Method, Sample No. 1

Test Conditions		Data/Readings					Average		Slip Potential
Dry	A	80	79	78	77	77	78	**77**	**Low**
	B	79	77	77	76	75	77		
	C	77	76	76	76	74	76		
Wet	A	13	13	13	12	12	13	**12**	**High**
	B	12	12	12	12	12	12		
	C	11	11	11	11	11	11		

TM202:1999 Slip Resistance of Floorings – Pendulum Method, Sample No. 2

Test Conditions		Data/Readings					Average		Slip Potential
Dry	A	72	70	68	67	67	69	**67**	**Low**
	B	68	67	67	66	65	67		
	C	67	67	66	66	66	66		
Wet	A	15	14	14	13	12	14	**18**	**High**
	B	23	23	22	22	22	22		
	C	19	19	18	18	18	18		

TM202:1999 Slip Resistance of Floorings – Pendulum Method, Sample No. 3

Test Conditions		Data/Readings					Average		Slip Potential
Dry	A	67	66	64	63	63	65	**64**	**Low**
	B	67	66	64	63	63	65		
	C	65	64	63	63	62	63		
Wet	A	50	50	50	49	49	50	**50**	**Low**
	B	53	53	53	53	53	53		
	C	48	48	48	48	48	48		

TM202:1999 Slip Resistance of Floorings – Pendulum Method, Sample No. 4

Test Conditions		Data/Readings					Average		Slip Potential
Dry	A	64	65	64	63	63	64	**63**	**Low**
	B	66	65	63	63	62	64		
	C	63	63	62	62	62	62		
Wet	A	51	50	49	49	48	49	**48**	**Low**
	B	48	48	47	48	47	48		
	C	48	47	47	47	47	47		

SATRA TERMS AND CONDITIONS OF BUSINESS

1. GENERAL
Work done or services undertaken are subject to the terms and conditions detailed below and all other conditions, warranties and representations, expressed or implied are hereby excluded.

2. PRICES
Prices are based on current material and production costs, exchange rates, duty and freight and are subject to change without notice.

3. DELIVERY ESTIMATES
Delivery estimates are made in good faith and date from receipt of a written order and full information to enable us to proceed. While we make every effort to fulfil them, such estimates are subject to unforeseen events and if not maintained, cannot give rise to any claim. Offers "ex stock" are subject to prior sale.

4. CANCELLATION AND RETURNS
Cancellation of orders for goods, services, training or consultancy is only acceptable by prior agreement of SATRA or its subsidiaries (hereafter called The Centre) and a charge will normally be made.

5. CLAIMS
Claims for errors, shortages etc should be notified within 10 days of date of receipt. In the event of goods damaged in transit, packing materials should be retained for examination; otherwise no liability can be accepted.

6. PAYMENT TERMS
Payment terms are net 21 days from date of invoice. Failure to comply with the terms of payment may result in delayed delivery of goods and services and a review of your credit account. Should the customer become subject to an administration order, or becomes bankrupt or goes into liquidation, The Centre has a right to cancel any contract and discontinue any work. The Centre reserves the right to adjust US Dollar and Euro sales price where customer exceeds credit terms and where the exchange rate has moved more than 10% since invoicing.

7. RETENTION OF TITLE
All goods remain the property of The Centre until paid in full. Under no circumstances will a customer's purchase order override our Retention of Title clause. In the case of software, the ownership of the software remains with The Centre. Payment of invoices in full will entitle the customer to use the software under licence until (a) they cease to be a member of The Centre or (b) they cease trading. In both instances, the licence shall then revert to The Centre.

8. GUARANTEE
All goods manufactured by us are guaranteed both as regards material and workmanship. Any part returned carriage paid, within twelve months from date of supply and found defective, will be repaired or replaced at our option free of charge. We admit no liability for loss, damage or delay consequent on any defect in any goods supplied by us. Any goods supplied but not made by The Centre carry only the maker's guarantee.

9. RESPONSIBILITY
Every effort is made to ensure accuracy in description, drawings and other information in correspondence, catalogues, etc but no warranty is given in this respect and we shall not be liable for any error therein. The Centre carries out all tests and/or advises only on the basis that the same are carried out, made or given without any responsibility whether for negligence or otherwise. The Centre and its servants or agents will not be liable for any damage or loss direct or indirect of whatsoever kind, whether or not the same results directly or indirectly from negligence on the part of The Centre or its servants or agents.

10. CONFIDENTIALITY

Unless specifically excluded in the terms of an individual contract between The Centre and its client, the following shall apply to all reports, advice, drawings, photographs, specifications or data:

i. The above shall not be disclosed to third parties or used in litigation without the consent of The Centre.

ii. Where The Centre has given consent to disclosure, the client shall draw the attention of the third party to these terms of business and the basis on which The Centre undertakes test, reporting and advising. The client shall indemnify The Centre for any failure to do so.

iii. The above items are submitted to the client as confidential documents. Confidentiality shall continue to apply after completion of the business, but shall cease to apply to information or knowledge which may come into the public domain.

11. CONSTRUCTION AND ARBITRATION

The laws of England shall govern all contracts and the parties submit to exclusive jurisdiction of the courts of England, unless otherwise agreed.

SATRA TECHNOLOGY CENTRE

Footwear • Furniture • Safety Products • Test Equipment
Clothing • Fabric Care • Design & Print • Floorcoverings

SATRA House, Rockingham Road, Kettering, Northamptonshire, NN16 9JH, United Kingdom
Tel: +44 (0)1536 410000. Fax: +44 (0)1536 410626. e-mail: info@satra.co.uk

To whom it may concern,

I am writing to confirm that the following methods of test are the same.

TRRL Pendulum Test
BS 7976-2 Pendulum – Method of Operation
SATRA TM202 Pendulum Test

These are all the same method of test and all utilize a pendulum test device built in accordance with BS 7976-1.

It is important that the correct slider is applied to look at shod conditions. In the case of airports then Slider 96 would be applied in retail and concourse application to represent shod conditions.

In the case of the report conducted on 22 mm Beech flooring with 1 coat of Junckers High Performance seal with anti slip medium 60 for Junckers Ltd (FLO 0150863-0716) testing was conducted using calibrated Slider 96 (Four S rubber) in accordance with the requirements stipulated by the UK Slip Resistance Group – Issue 3 – November 2005.

These are the guidelines applied by the Health & Safety Laboratory and are in accordance with the requirements of BAA Standard – Floors Issue 5 – March 2006 Section 1.2.

I would be happy to discuss this in more details with any persons concerned. I can be contacted with the following:

Email: stevef@satra.co.uk
Telephone: 0044 1536 410000
Direct Fax: 0044 1536 313474

Yours Sincerely

Steve Ferry
Floorings – Head of Department