SATRA Technology Centre Ltd
Wyndham Way, Telford Way, Kettering
Northamptonshire, NN16 8SD
United Kingdom
Tel: +44 (0) 1536 410000
Fax +44 (0) 1536 410626
email: info@satra.co.uk
www.satra.co.uk

UKAS TESTING 0248

Customer:	R - Tek Manufacturing Limited Unit 1 Hamiltownsbawn Industrial Estate Armagh County Armagh BT60 1HW	SATRA Ref:	FLO0182952/1009/5
		Report Date:	22 April 2010
		Samples received:	1 March 2010
Contact:	Peadar Hurson		

TECHNICAL SERVICES REPORT

Subject: Testing of materials for to BS EN 660-2:1999

Your reference:

Conditions of Issue:

This report may be forwarded to other parties provided that it is not changed in any way. It must not be published, for example by including it in advertisements, without the prior, written permission of SATRA.

Results given in this report refer only to the samples submitted for analysis and tested by SATRA. Comments are for guidance only.

Tests marked † fall outside the UKAS Accreditation Schedule for SATRA. All interpretations of results of such tests and the comments based upon them are outside the scope of UKAS accreditation and are based on current SATRA knowledge.

A satisfactory test report in no way implies that the product tested is approved by SATRA and no warranty is given as to the performance of the product tested. SATRA shall not be liable for any subsequent loss or damage incurred by the client as a result of information supplied in the report.

Report signed by: Jacqueline Glasspool
Position: Business area manager
Department: Flooring

Technical Services Report

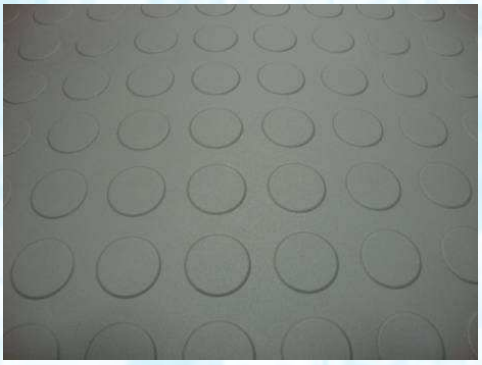
TESTING OF MATERIALS TO BS EN 660-2:1999

As requested by R-Tek Manufacturing Limited, we have assessed the floor covering submitted for assessment of the wear resistance characteristics and classification, as detailed below.

SAMPLE SUBMITTED

Reference:	7mm Textured, 5mm Studded, 5mm Slate
Description:	Profiled PVC floor covering
Colour:	Black, Grey
Appearance:	

7mm Textured



5mm Studded

5mm Slate

Date received:	1st March 2010
Testing completed:	31st March 2010
Testing conducted by:	Mandy De Wet

TESTS CARRIED OUT

- BS EN 660-2: 1999 – Resilient floor coverings. Determination of wear resistance. Part 2 Frick Taber test (1)

Note:
(1) The results have been assessed against the requirements of BS EN 649: 1997 – Resilient floor coverings – Homogenous and heterogeneous polyvinyl chloride floor coverings – Specification.

RESULTS

Table 1 - EN 649 Classification requirements for wear groups

Test Method	Property	Requirements for wear group			
		T	P	M	F
BS EN 660-2	Volume Loss *Fv* mm^3	$\leq$ 2.0	> 2.0 - $\leq$ 4.0	> 4.0 - $\leq$ 7.5	>7.5 - $\leq$ 15.0

The mean volume loss mm^3 per 100 revolutions for the sample referenced '7mm Textured' was calculated as being 1.92 mm^3. When assessed against the requirements of BS EN 649:1997 the sample has been classified within wear group T.

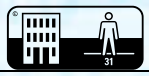
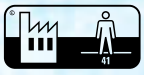
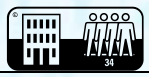
The mean volume loss mm^3 per 100 revolutions for the sample referenced '5mm Slate' was calculated as being 2.40 mm^3. When assessed against the requirements of BS EN 649:1997 the sample has been classified within wear group P.

The mean volume loss mm^3 per 100 revolutions for the sample referenced '5mm studded' was calculated as being 2.90 mm^3. When assessed against the requirements of BS EN 649:1997 the sample has been classified within wear group P.

Note:

For individual test results see annex 1.0

Classification requirements for level of use

Class	Symbol	Level of Use	Overall thickness (mm) required for wear rating			
			T	**P**	**M**	**F**
21		Domestic Moderate	1.0	1.0	1.0	1.0
22		Domestic General	1.5	1.5	1.5	1.5
23		Domestic Heavy	1.5	1.5	1.5	1.5
31		Commercial Moderate				
32		Commercial General	1.5	1.5	1.5	2.0
41		Light Industrial Moderate				
33		Commercial Heavy	2.0	2.0	2.0	2.0
42		Light Industrial general				
34		Commercial Very Heavy	2.0	2.0	2.0	2.5
43		Light Industrial Heavy				
Test Method			EN 428*			

* Overall thickness results summarised in annex 2.0

COMMENTS

BS EN 660-2: 1999 – Resilient floor coverings. Determination of wear resistance. Part 2 Frick Taber test is intended to assess the wear layer of poly vinyl chloride floor coverings under laboratory conditions.

A 100 x 100 mm sample was prepared (cut) from the sample submitted and conditioned in a laboratory at 23 ± 2°C, 50 ± 5% Relative Humidity, until a constant mass has been reached. (A constant mass is defined as being: when the mass change is less than 0,002g per day). *Under normal test conditions three samples are tested in order to satisfy the requirements set out in BS EN 660-2.*

The sample was then abraded to 5,000 revolutions, with a break for weighing after each cycle of 1,000 revolutions.

Note: Sample was regarded as a homogeneous floor covering, and therefore the recorded density value was determined from the whole sample

CONCLUSION

With regard to the wear resistance assessment, according to BS EN 660-2 (Volume loss method), the sample submitted under reference '7mm Textured', with a overall thickness of 7.0mm has demonstrated a mean volume loss of 1.92 mm^3 per 100 revolutions, therefore when assessed against the requirements of BS EN 649: 1997 is classified within wear group T.

In relation to the classification for end use suitability for wear resistance, the sample referenced '7mm Textured', with an overall thickness of 7.0mm is classed as suitable for all applications up to and including Class 34/43 Very Heavy Commercial / Heavy Light Industrial.

With regard to the wear resistance assessment, according to BS EN 660-2 (Volume loss method), the sample submitted under reference '5mm Slate', with a overall thickness of 5.6mm has demonstrated a mean volume loss of 2.40 mm^3 per 100 revolutions, therefore when assessed against the requirements of BS EN 649: 1997 is classified within wear group P.

In relation to the classification for end use suitability for wear resistance, the sample referenced '5mm Slate', with an overall thickness of 5.6mm is classed as suitable for all applications up to and including Class 34/43 Very Heavy Commercial / Heavy Light Industrial.

With regard to the wear resistance assessment, according to BS EN 660-2 (Volume loss method), the sample submitted under reference '5mm Studded', with a overall thickness of 4.8mm has demonstrated a mean volume loss of 2.90 mm^3 per 100 revolutions, therefore when assessed against the requirements of BS EN 649: 1997 is classified within wear group P.

In relation to the classification for end use suitability for wear resistance, the sample referenced '5mm Slate', with an overall thickness of 4.8mm is classed as suitable for all applications up to and including Class 34/43 Very Heavy Commercial / Heavy Light Industrial.

Annex 1.0

BS EN 660-2:1999, Sample referenced 7mm Textured

	Specimen 1	Specimen 2	Specimen 3
Wear Layer - density, g/cm^3	1.731		
Loss in mass after 1000 revs, and cleaning with dry cloth, mg	28.7	35.6	22.4
Loss in mass after 2000 revs, mg	63.0	67.1	41.7
Loss in mass after 3000 revs, mg	90.4	101.9	81.2
Loss in mass after 4000 revs, mg	119.2	117.1	143.9
Loss in mass after 5000 revs, mg (Post conditioning)	174.2	164.3	160.8
Average loss, mg per 100 revolutions	3.48	3.29	3.22
Average volume loss mm^3 per 100 revolutions	**2.01**	**1.90**	**1.86**

	Mean Values
Mean loss, mg per 100 revolutions	3.33
Mean volume loss mm^3 per 100 revolutions	**1.92**
BSEN 649: 1997 Wear group classification	**T**

BS EN 660-2:1999, Sample referenced 5mm Slate

	Specimen 1	Specimen 2	Specimen 3
Wear Layer - density, g/cm^3	1.585		
Loss in mass after 1000 revs, and cleaning with dry cloth, mg	25.7	38.4	56.6
Loss in mass after 2000 revs, mg	63.2	65.0	98.3
Loss in mass after 3000 revs, mg	100.6	88.0	138.1
Loss in mass after 4000 revs, mg	125.7	137.2	179.4
Loss in mass after 5000 revs, mg (Post conditioning)	171.9	171.5	227.1
Average loss, mg per 100 revolutions	3.44	3.43	4.54
Average volume loss mm^3 per 100 revolutions	**2.17**	**2.16**	**2.86**

	Mean Values
Mean loss, mg per 100 revolutions	3.80
Mean volume loss mm^3 per 100 revolutions	**2.40**
BSEN 649: 1997 Wear group classification	**P**

BS EN 660-2:1999, Sample referenced 5mm Studded

	Specimen 1	Specimen 2	Specimen 3
Wear Layer - density, g/cm^3	1.137		
Loss in mass after 1000 revs, and cleaning with dry cloth, mg	25.5	27.7	33.7
Loss in mass after 2000 revs, mg	57.7	53.1	58.1
Loss in mass after 3000 revs, mg	88.0	73.0	87.1
Loss in mass after 4000 revs, mg	121.6	115.9	121.6
Loss in mass after 5000 revs, mg (Post conditioning)	161.8	165.0	166.9
Average loss, mg per 100 revolutions	3.24	3.30	3.34
Average volume loss mm^3 per 100 revolutions	**2.85**	**2.90**	**2.94**

	Mean Values
Mean loss, mg per 100 revolutions	3.29
Mean volume loss mm^3 per 100 revolutions	**2.90**
BSEN 649: 1997 Wear group classification	**P**

Annex 2.0

BS EN 428: 1993, Determination of the overall thickness

In accordance with this standard the mean value for the overall thickness of the sample referenced ‘7mm Textured’ was 7.0 mm.

In accordance with this standard the mean value for the overall thickness of the sample referenced ‘5mm Slate’ was 5.6 mm.

In accordance with this standard the mean value for the overall thickness of the sample referenced ‘5mm Studded’ was 4.8 mm.

Technical Services Report

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 SATRA or its subsidiaries (hereafter referred to as "SATRA") 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.

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Cancellation of orders for goods, services, training or consultancy is only acceptable by prior agreement of SATRA and a charge will normally be made.

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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
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8. GUARANTEE
All goods manufactured by SATRA 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 SATRA's option free of charge. SATRA admits no liability for loss, damage or delay consequent on any defect in any goods supplied by SATRA.

9. TEST REPORTS
Results given in test reports refer only to samples submitted for analysis and tested by SATRA. A satisfactory test report in no way implies that the product tested is approved by SATRA and no warranty is given as to the performance of the product tested. SATRA shall not be liable for any subsequent loss or damage incurred by the client as a result of information supplied in a test report.

10. TEST SAMPLES
Unless otherwise agreed in advance, test samples will be disposed of 6 weeks after the date of the final report. If required, samples can be returned at the Customer's expense.

11. 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 SATRA shall not be liable for any error therein. SATRA 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. SATRA 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 SATRA or its servants or agents.

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   ii. Where SATRA has given consent to disclosure, the Customer shall draw the attention of the third party to these terms of business and the basis on which SATRA undertakes test, reporting and advising. The Customer shall indemnify SATRA for any failure to do so.
   iii. The above items are submitted to the Customer 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.

13. 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.

Issue Date: 1st October 2009