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Customer Details:	Thermagrip Ltd The Stables King Edward Street MACCLESFIELD Cheshire SK10 1AQ	SATRA Reference:	FLO0221354
		Your reference:	P19717KRO
		Date of report:	25 February 2014
For the attention of:	Jonathan Hamp	Samples received:	16 January 2014

TECHNICAL REPORT

Subject: Testing of one sample described by the customer as 'Thermagrip' for biomechanical abrasion to 1,000,000 cycles. BS 7976-2:2002 to be conducted initally and at 250K intervals.

Report signed by: J.Lund
Position: Technologist
Department: Floor coverings

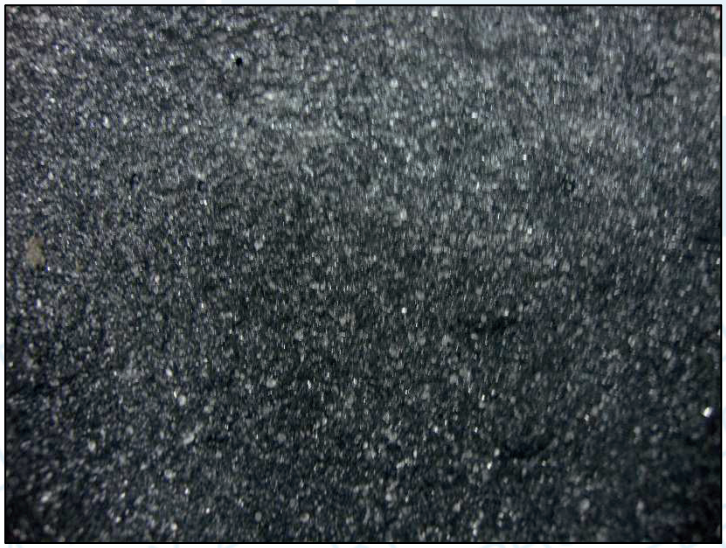
TECHNICAL REPORT

TESTING OF ONE SAMPLE DESCRIBED BY THE CUSTOMER AS 'THERMAGRIP' FOR BIOMECHANICAL ABRASION TO 1,000,000 CYCLES. BS 7976-2:2002 TO BE CONDUCTED INITALLY AND AT 250K INTERVALS.

As requested by Thermagrip Ltd, an assessment to determine the performance of a flooring material referenced as "Thermagrip" over a period of time has been undertaken, as detailed below.

SAMPLE SUBMITTED

Product name: 'Thermagrip'(1)
Appearance:



Date received: 16th January 2014
Conditioning commenced: 24th January 2014
Testing commenced: 27th January 2014
Testing completed: 24th February 2014
Testing conducted by: Phil Weal

TESTS CARRIED OUT

- SATRA TM391D: 2003 Biomechanical Abrasion of flooring materials
- BS 7976-2: 2002 Pendulum Testers, method of operation (2)

Note:

(1) Information supplied by customer, not verified by SATRA

(2) Results have been assessed in accordance with the UK Slip Resistance Group Guidelines – Issue 4: 2011.

(3) The surface roughness values have been taken from different area of the specimen.

CONDITIONING

The test specimen was allowed to condition for a minimum of 2 hours at a temperature of 20 ± 2°C and relative humidity of 65 ± 5% rh, prior to testing.

COMMENTS

The sample was bonded to the substrate by SATRA.

CONCLUSION

The sample of flooring referenced as 'Thermagrip' was assessed for slip resistance after a prescribed number of biomechanical abrasion cycles.

The tested sample referenced 'Thermagrip' showed a decrease in the wet slip potential after 1,000,000 cycles. The wet results all equate to a low slip potential up to and including 1,000,000 cycles.

The dry results all equate to a low slip potential when assessed in accordance with the UK slip resistance group guidelines issue 4: 2011.

RESULTS

Table 1. SATRA TM391D: 2003 Biomechanical Abrasion of flooring materials and assessment of slip resistance in accordance with BS 7976-2: 2002 Pendulum Testers, method of operation.

'Thermagrip'

Cycles Completed	Pendulum Slip Value Dry	Pendulum Slip Value Wet
	Slider #96	Slider #96
Initial	63	59
250,000	60	55
500,000	63	55
750,000	62	53
1,000,000	62	56

Note: see annex 1.0 for further test results.

SATRA TM391D: 2003 Biomechanical Floor Abrasion

This test has been carried out in accordance with a SATRA test method (TM391D) for assessing flooring coverings using the walking machine, where a standard shoe (having a patterned sole unit with a tread dept of 5mm ± 0.5mm and shore A hardness of 54 is mounted on a foot form that is attached to the leg of a walking machine. The flooring specimen is subjected to a cyclic walking action from the standard shoe, where the specimen rotates incrementally while the forepart is in contact with the sample. These individual footsteps are designed to replicate a mixture of walking in a straight line and turning a corner. The flooring sample under test rotates such that it completes a full 360° rotation every 150 footfalls.

BS 7976-2: 2002 Pendulum Testers, method of operation.

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 rubber slider referenced Slider 96 (formally known as Four S rubber) is allowed to swing so the slider contacts dry or wet 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. The results are then assessed in accordance with the UK Slip Resistance Groups Guidelines issue 4: 2011 (see table 4)

Table 4. UK Slip Resistance Group Guidelines.

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

Annex 1.0

Individual Pendulum Test Results (BS 7976-2: 2002 Pendulum Testers, method of operation) and surface roughness values.

'Thermagrip'

Initial Measurements 0 Biomechanical abrasive cycles (As Received)

Condition	Direction of Test			Overall average slip measurement (PTV's)
	A	B	C	
Slider #96 dry	**62**	**63**	**63**	**63**
Slider #96 wet (water)	**59**	**59**	**60**	**59**

Surface Roughness measurements (Rz) [3]

Roughness measurement	1	2	3	4	5	6	7	8	9	10	Ave
RZ value	44.1	54.2	53.2	69.3	126.8	74.9	46.3	109.2	89.0	82.5	**75.0**

After 250,000 Biomechanical abrasive cycles

Condition	Direction of Test			Overall average slip measurement (PTV's)
	A	B	C	
Slider #96 dry	**60**	**60**	**61**	**60**
Slider #96 wet (water)	**56**	**55**	**55**	**55**

Surface Roughness measurements (Rz) [3]

Roughness measurement	1	2	3	4	5	6	7	8	9	10	Ave
RZ value	40.6	84.4	48.5	61.5	68.0	43.7	74.8	61.0	55.3	65.3	**60.3**

After 500,000 Biomechanical abrasive cycles

Condition	Direction of Test			Overall average slip measurement (PTV's)
	A	B	C	
Slider #96 dry	**64**	**63**	**62**	**63**
Slider #96 wet (water)	**56**	**53**	**55**	**55**

Surface Roughness measurements (Rz) [3]

Roughness measurement	1	2	3	4	5	6	7	8	9	10	Ave
RZ value	18.9	51.4	126.1	38.1	61.1	81.2	99.6	89.2	71.7	76.8	**71.4**

After 750,000 Biomechanical abrasive cycles

Condition	Direction of Test			Overall average slip measurement (PTV's)
	A	B	C	
Slider #96 dry	**65**	**61**	**59**	**62**
Slider #96 wet (water)	**56**	**53**	**50**	**53**

Surface Roughness measurements (Rz) [3]

Roughness measurement	1	2	3	4	5	6	7	8	9	10	Ave
RZ value	90.2	48.5	48.7	66.5	57.0	69.1	68.5	42.3	70.7	68.3	**63.0**

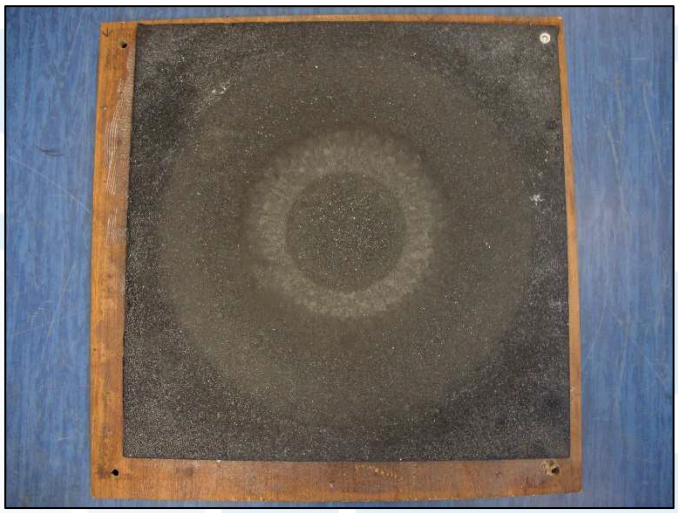
After 1,000,000 Biomechanical abrasive cycles

Condition	Direction of Test			Overall average slip measurement (PTV's)
	A	B	C	
Slider #96 dry	**60**	**61**	**64**	**62**
Slider #96 wet (water)	**54**	**56**	**59**	**56**

Surface Roughness measurements (Rz) [3]

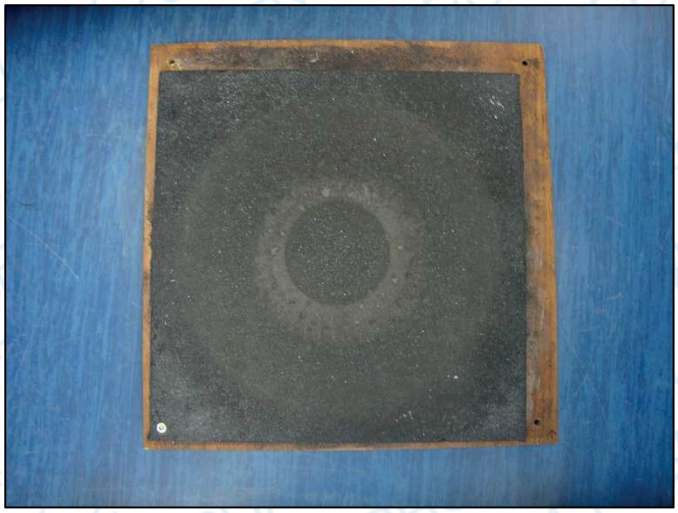
Roughness measurement	1	2	3	4	5	6	7	8	9	10	Ave
RZ value	70.1	62.6	50.4	70.8	22.0	91.3	58.9	80.4	45.8	60.4	**61.3**

APPENDIX 2.0



250,000 Cycles – 'Thermagrip'

250,000 Cycles – 'Thermagrip'

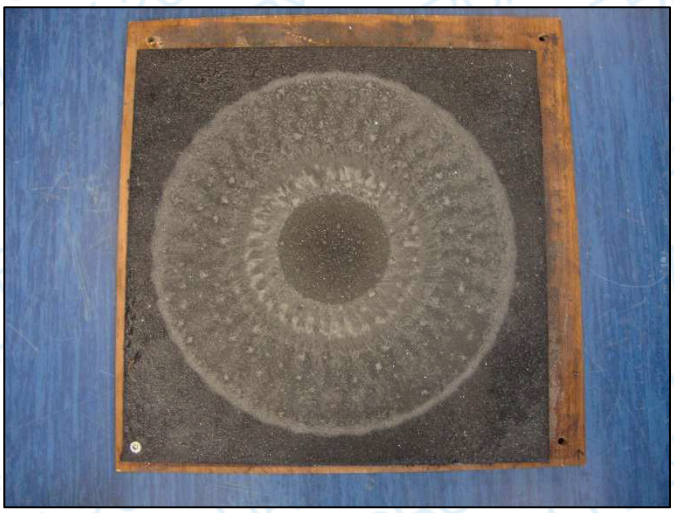


500,000 Cycles – 'Thermagrip'

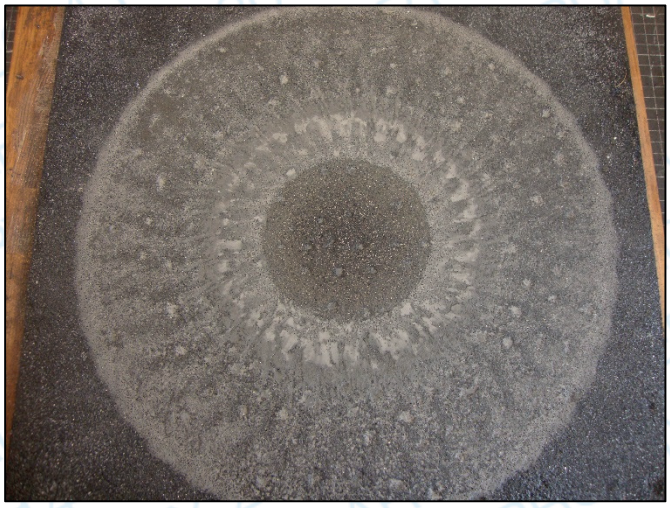
500,000 Cycles – 'Thermagrip'

750,000 Cycles – 'Thermagrip'

750,000 Cycles – 'Thermagrip'



1,000,000 Cycles – 'Thermagrip'



1,000,000 Cycles – 'Thermagrip'

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.

4. CANCELLATION AND RETURNS
Cancellation of orders for goods, services, training or consultancy is only acceptable by prior agreement of SATRA 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 the Customer's credit account. Should the customer become subject to an administration order, or becomes bankrupt or goes into liquidation, SATRA has a right to cancel any contract and discontinue any work. SATRA 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 SATRA 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 SATRA. Payment of invoices in full will entitle the customer to use the software under licence until (a) they cease to be a member of SATRA or (b) they cease trading. In both instances, the licence shall then revert to SATRA.

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.

12. CONFIDENTIALITY
Unless specifically excluded in the terms of an individual contract between SATRA and its Customer, 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 SATRA.
   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

Signed: