Thermagrip Ltd

BS 7976-2 Slip Test Report

Addressee:	Jonathan Hamp
Report carried out on behalf of:	Thermagrip Ltd The Stables King Edward Street Macclesfield Cheshire SK10 1AQ
Tests conducted at:	Grip Potential Ltd Ringstead Business Centre 1-3 Spencer Street Ringstead Northants NN14 4BX
Test date(s):	21/08/15
Report date:	21/08/15
Report Reference:	1659THER210815
Purchase Order:	-

Contents

Summary

Test Surface	Slider	Slip Risk	
		Dry	Wet
Fused Alumina	Slider #96 / 4S	Low	Low
Glass Bead	Slider #96 / 4S	Low	Low

Results have been classified in accordance with the latest UKSRG Guidelines (Issue 4, 2011) and current UK Health & Safety Executive guidance.

BS 7976-2 Test Certificate

Fused Alumina

Site location: In house Date of test: 21/08/15 Test conducted by: Ben Powers

Image 1. Pendulum tester in-situ

Image 2. Test surface

Pendulum Test Results

Slider #96 / 4S

Direction	Condition	Pendulum Test Value					Median Values		Slip Risk Classification
Principal	Dry	66	66	66	66	66	66	63	Low
45°		62	62	62	63	63	62		
90°		63	63	63	63	63	63		
Principal	Wet	59	58	58	58	58	58	58	Low
45°		56	56	56	56	56	56		
90°		58	58	58	58	58	58		

Results generated using a BS 7976 Munro Portable Skid Tester, serial number 9652. The device was calibrated by BSI on 03/02/15, UKAS certificate number 4828. The above results have been classified in accordance with the latest UKSRG Guidelines (Issue 4, 2011) and current UK Health & Safety Executive guidance.

Rz Surface Roughness Results

Direction	Principal			45°			90°			Mean Rz Value (µm)
Rz Value (µm)										n/a

Results not recorded as the surface presents a macro-profile, particulate based profile, or is otherwise unsuitable for measurement with the roughness meter.

Declaration

The above assessment was carried out by Grip Potential adhering to the UKSRG, HSE and CIRIA guidelines on pedestrian slip risk assessment. The results given are accurate representations of data acquired in house and through the client. The results have been interpreted to give slip risk classifications based on parameters recommended by the UKSRG and HSE.

Signed:

Ben Powers, BSc (Hons)
Slip risk consultant
21/08/15

BS 7976-2 Test Certificate

Glass Bead

Site location: In house Date of test: 21/08/15 Test conducted by: Ben Powers

Image 1. Pendulum tester in-situ

Image 2. Test surface

Pendulum Test Results

Slider #96 / 4S

Direction	Condition	Pendulum Test Value					Median Values		Slip Risk Classification
Principal	Dry	61	63	65	66	66	65	65	Low
45°		66	69	69	69	68	69		
90°		65	64	64	65	65	65		
Principal	Wet	61	61	59	61	61	61	61	Low
45°		64	66	65	64	66	65		
90°		62	60	61	59	59	60		

Results generated using a BS 7976 Munro Portable Skid Tester, serial number 9652. The device was calibrated by BSI on 03/02/15, UKAS certificate number 4828. The above results have been classified in accordance with the latest UKSRG Guidelines (Issue 4, 2011) and current UK Health & Safety Executive guidance.

Rz Surface Roughness Results

Direction	Principal			45°			90°			Mean Rz Value (µm)
Rz Value (µm)										n/a

Results not recorded as the surface presents a macro-profile, particulate based profile, or is otherwise unsuitable for measurement with the roughness meter.

Declaration

The above assessment was carried out by Grip Potential adhering to the UKSRG, HSE and CIRIA guidelines on pedestrian slip risk assessment. The results given are accurate representations of data acquired in house and through the client. The results have been interpreted to give slip risk classifications based on parameters recommended by the UKSRG and HSE.

Signed:

Ben Powers, BSc (Hons)
Slip risk consultant
21/08/15

Additional Comments

Test Reference	Comments
General comment	Both surfaces offer excellent slip resistance properties in both dry and water wet conditions. Variable results were produced on the "Glass Bead" specimen, as a result of significant profile height. It was noted that some of the particulate broke free form the surface during testing, however this was limited to the most prominent protrusions and occurred only during the first few swings of the pendulum. Loose particulate was swept from the surface after initial swings in order to prevent marbling and further variation in recorded results.

Calibration Records - BS 7976 Pendulum

Records applicable on 21/08/15

Certificate of Test

bsi. For a TRRL Type Portable Skid-Resistance Tester in accordance with BS 812-114: 1989 and BS 7976-3: 2002

UKAS TESTING 0135

Client: Grip Potential Ltd
1-3 Spencer Street
Ringstead
Northants
NN14 4BX

Job No: 287/8287956 **Date Received:** 30 January 2015

Serial No: 9652 **Date of Test:** 3 February 2015

Certificate No: 4828

Authority to test: Quotation No 0000667389

Ambient Conditions: (20 ± 3)°C (50 ± 20)% RH

This Certificate details the results obtained during the test of the above instrument.
All measurements were conducted after allowing the instrument to stabilize in the laboratory.

Uncertainties stated are those relating to the measuring equipment used and to the equipment under test. They apply only under the ambient conditions specified above. The uncertainties do not allow for repeatability or reproducibility of the equipment under test and secular change is not taken into account.

The reported expanded uncertainties are based on the standard uncertainties multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

Periodicity

The instrument should be returned at least once a year for re-evaluation Ref: BS 812-114: 1989 Clause 5.2.2.1, BS EN 1097-8: 2009 Clause 7.3 (Annex D), BS 7976-3: 2002 Clause 4 and BS EN 13036-4: 2003 Clause 7.1.

Notes

The test procedure used to verify this PSRT was No: T.2285.019 in accordance with BS 812-114: 1989 Clause 5.2, BS EN 1097-8 Clause 7.3 and Annex D, BS 7976-3: 2002 and BS EN 13036-4: 2003 Clause 6 and Annex A.2. UKAS accreditation applies to BS 812-114: 1989 Clause 5.2, BS EN 1097-8 Clause 7.3 and Annex D, BS 7976-3: 2002 and BS EN 13036-4: 2003 Clause 6 and Annex A.2.

Authorized by: Date: 10 February 2015

M Mayo
Testing Team Manager

BSI, Maylands Avenue, Hemel Hempstead, Herts HP2 4SQ Telephone: +44 (0)845 080 9000

Page 1 of 3

Certificate of Test

bsi. For a TRRL Type Portable Skid-Resistance Tester in accordance with BS 812-114: 1989 and BS 7976-3: 2002

UKAS TESTING 0135

Job No: 287/8287956 **Cert No:** 4828 **Date tested:** 3 February 2015

Results	Symbol	Specified	Actual	Uncertainty
Sliding Distance	(D)	Nominal	126 mm	± 0.6 mm
Length of Pointer	(p)	Not specified	305 mm	± 0.65 mm
Mass of Pointer		85 g max	79.0 g	± 0.6 g
Angle of Slider		(26 ± 3)°	24.9°	± 1°
BS 812-114:1989				
Mass of Swinging Arm	(W^1)	(1.500 ± 0.03) kg	1.517 kg	± 0.0006 kg
Force of Swinging Arm	(W)	Calculated	14.88 N	± 0.009 N
C of G from Centre of Oscillation	(X)	(410 ± 5) mm	412 mm	± 0.9 mm
'F' Scale – Vertical Distance	(Z)	10mm Nominal	N/T	± 0.6 mm
Slider Force	(P)	(22.20 ± 0.5) N	22.68 N	± 0.004 N
Change in Slider Force	(N)	0.2 N/mm max	0.10 N/mm	± 0.004 N/mm
BS 7976-3:2002				
Spring Tension Force	(F)	Calculated	22.61 N	± 0.009 N
Actual Spring Tension Force		Not specified	22.85 N	± 0.009 N
Change in Spring Tension Force		± 0.5 N	0.23 N	± 0.009 N
Mass of Slider and base		(35 ± 5) g	36.0 g	± 0.6 g
Sliding edge to axis of suspension		(514 ± 6) mm	514 mm	± 0.9 mm

N/T denotes not tested

Note: Due to wear in the arm engaging mechanism it is recommended that the verticality of the arm is checked when engaged in its catch before use

Tested by: C. D. Tearle

C Tearle
Test Engineer

BSI, Maylands Avenue, Hemel Hempstead, Herts HP2 4SQ Telephone: +44 (0)845 080 9000

Page 2 of 3

Certificate of Test

bsi. For a TRRL Type Portable Skid-Resistance Tester in accordance with BS 812-114: 1989 and BS 7976-3: 2002

UKAS TESTING 0135

Job No: 287/8287956 **Cert No:** 4828 **Date tested:** 03 February 2015

Testing Results	**BSI PS Master (Main Scale)**	**Clients (Main Scale)**
Serial No's	9931	9652
Pre-calibration validation results		
		BS 7976-3: 2002
Zero		N/T
Glass Surface		N/T
Pink Lapping Paper		N/T
Final calibration results		
	BS 7976-3: 2002 (4S Slider)	**BS 7976-3: 2002** (4S Slider)
Glass Surface	8	7
Pink Lapping Paper	62	63
	BS 812-114: 1989 (TRL Slider)	**BS 812-114: 1989** (TRL Slider)
Glass Surface	8	8
Pink Lapping Paper	63	60
Surface 2S	10	10
Surface 3S	55	54
Surface 4S	64	63
Surface 5S	38	37
Surface 7R	49	52
Surface 8R	54	54
Surface 9R	68	68
Surface 10R	68	68
Surface 11R	75	75
Mean Value	50.18	49.91

Largest Difference: 3 (≤ 3) Mean Value Difference: 0.27 (≤1.5)

S - Smooth, R - Rough

Tested by: C. D. Tearle

C Tearle
Test Engineer

BSI, Maylands Avenue, Hemel Hempstead, Herts HP2 4SQ Telephone: +44 (0)845 080 9000

Page 3 of 3

Calibration Records - Pavigres Verification Surface

MUNRO INSTRUMENTS

Date: 4 March 2015

Your Ref:

Our Ref: 2986

Grip Potential Ltd
Ringstead Business Centre
1-3 Spencer Street
Ringstead
Northants
NN14 4BX

Certificate of Conformity for Pavigres Verification Surface

Tested & Certified for use as a Verification Surface for 4S(96) Mounted Rubber Slider

We confirm that the Pendulum Test Value (PTV) Range below has been obtained using this Pavigres Tile under water wet conditions using a 4S(96) Mounted Rubber Slider.

Certified PTV 32 – 36

Notes

1. The verification sample has been tested in accordance with the guidelines for the UK Slip Resistance Group.
2. The verification tile is good for 700 verification test swings of the pendulum or twelve months from first customer use, following which the customer may wish to consider having it replaced.
3. Each test swing of the pendulum must be performed in the direction indicated by the arrow.

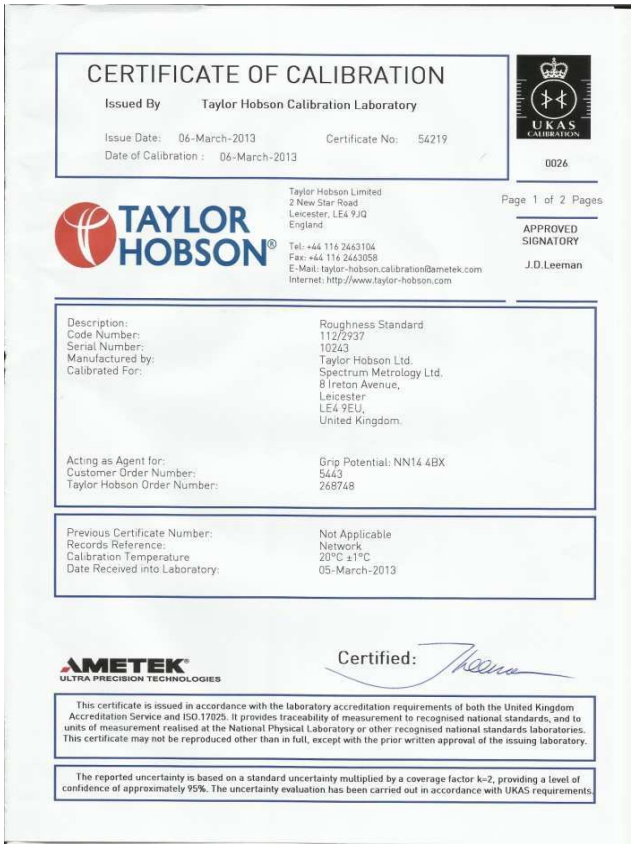
Date of Test: 4 March 2015
Recommended Replacement Date: March 2016

Signed: Date of issue: 04.03.2015

Munro Instruments Ltd, Gilbert House, 406 Roding Lane South, Woodford Green, Essex, IG8 8EY UK
T +44 (0) 20 8551 7000 / F +44 (0) 20 8551 4565 / E info@munroinstruments.co.uk / www.munroinstruments.co.uk
Company Registration Number: 06965050 VAT Number: GB 977 7939 30

Calibration Records

Records applicable on 21/08/15



CERTIFICATE OF CALIBRATION

Issued By Taylor Hobson Calibration Laboratory

Issue Date: 06-March-2013 Certificate No: 54219

Date of Calibration : 06-March-2013

0026

Page 1 of 2 Pages

TAYLOR HOBSON®

Taylor Hobson Limited
2 New Star Road
Leicester, LE4 9JQ
England.

Tel: +44 116 2463104
Fax: +44 116 2463058
E-Mail: taylor-hobson.calibration@ametek.com
Internet: http://www.taylor-hobson.com

APPROVED SIGNATORY
J.D.Leeman

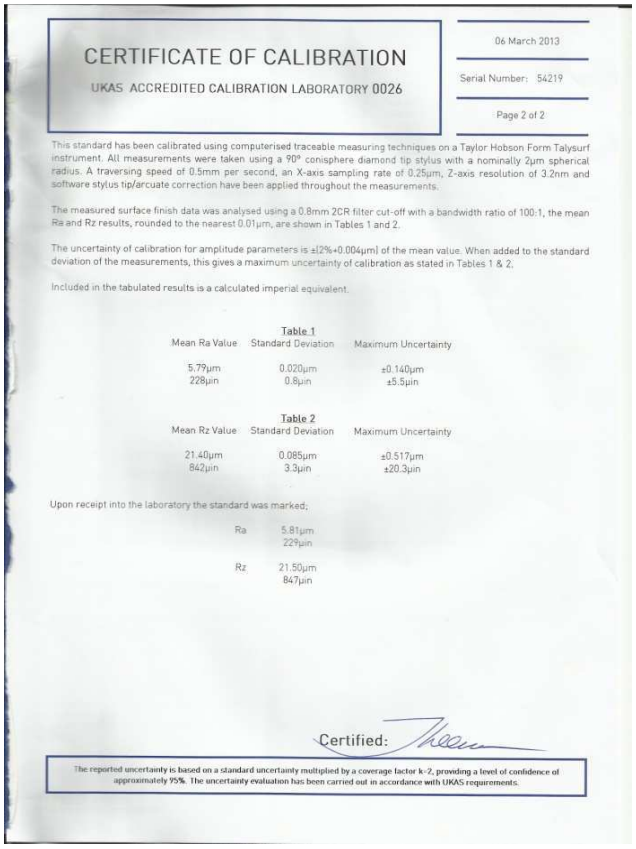
Description:	Roughness Standard
Code Number:	112/2937
Serial Number:	10243
Manufactured by:	Taylor Hobson Ltd.
Calibrated For:	Spectrum Metrology Ltd. 8 Ireton Avenue, Leicester LE4 9EU, United Kingdom.
Acting as Agent for:	Grip Potential: NN14 4BX
Customer Order Number:	5443
Taylor Hobson Order Number:	268748
Previous Certificate Number:	Not Applicable
Records Reference:	Network
Calibration Temperature	20°C ±1°C
Date Received into Laboratory:	05-March-2013

AMETEK ULTRA PRECISION TECHNOLOGIES

Certified:

This certificate is issued in accordance with the laboratory accreditation requirements of both the United Kingdom Accreditation Service and ISO.17025. It provides traceability of measurement to recognised national standards, and to units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.



CERTIFICATE OF CALIBRATION

UKAS ACCREDITED CALIBRATION LABORATORY 0026

06 March 2013

Serial Number: 54219

Page 2 of 2

This standard has been calibrated using computerised traceable measuring techniques on a Taylor Hobson Form Talysurf instrument. All measurements were taken using a 90° conisphere diamond tip stylus with a nominally 2µm spherical radius. A traversing speed of 0.5mm per second, an X-axis sampling rate of 0.25µm, Z-axis resolution of 3.2nm and software stylus tip/arcuate correction have been applied throughout the measurements.

The measured surface finish data was analysed using a 0.8mm 2CR filter cut-off with a bandwidth ratio of 100:1, the mean Ra and Rz results, rounded to the nearest 0.01µm, are shown in Tables 1 and 2.

The uncertainty of calibration for amplitude parameters is ±(2%+0.004µm) of the mean value. When added to the standard deviation of the measurements, this gives a maximum uncertainty of calibration as stated in Tables 1 & 2.

Included in the tabulated results is a calculated imperial equivalent.

Table 1

Mean Ra Value	Standard Deviation	Maximum Uncertainty
5.79µm 228µin	0.020µm 0.8µin	±0.140µm ±5.5µin

Table 2

Mean Rz Value	Standard Deviation	Maximum Uncertainty
21.40µm 842µin	0.085µm 3.3µin	±0.517µm ±20.3µin

Upon receipt into the laboratory the standard was marked;

Ra 5.81µm 229µin

Rz 21.50µm 847µin

Certified:

The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

Calibration Records - Pendulum Rubber Sliders

Date : 4 March 2015

Your Ref.:

Our Ref: Grip Potential Ltd

Grip Potential Ltd
Ringstead Business Centre
1-3 Spencer Street
Ringstead
Northants
NN14 4BX

MUNRO INSTRUMENTS

Certificate of Conformity for Four S Rubber

Description and Part Number	Qty	Specification
881032/2 - Mounted Four S Rubber (96) Slider – Large – for Main Tester. Batch No. 671	10	Hardness : BS ISO 48:2010 Lüpke Resilience : BS ISO 4662:2009

Temperature :	**5°C**	**23°C**	**40°C**
Resilience % (limits)	**19-24**	**22-26**	**26-30**
Resilience % (mean results)	**23**	**26**	**29**

Hardness was determined at a temperature of 23 ± 2°C. Five readings were taken on the test pieces and a value of 95 was obtained. This falls within the specified limit of 96±2

Resilience was determined at the specified temperature in accordance with BS ISO 4662:2009 The Lupke resilience was within the specified limits.

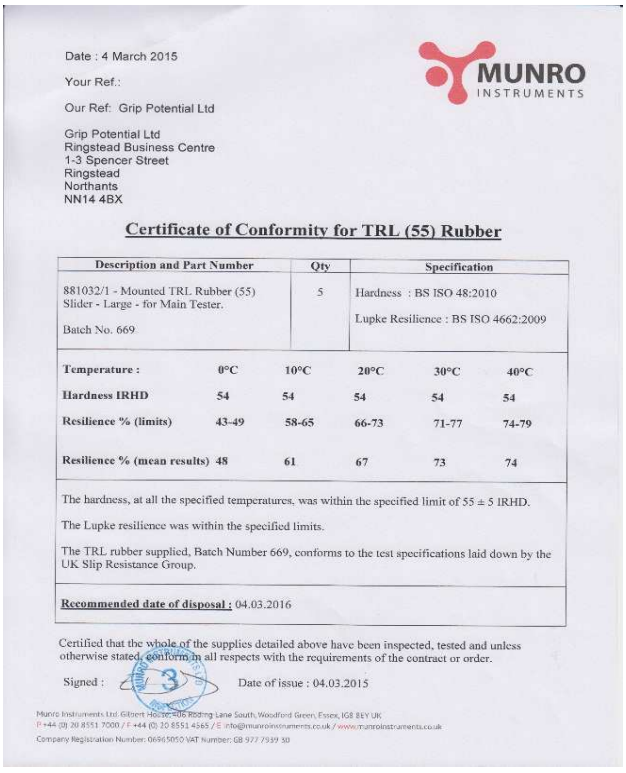
The Four S rubber supplied, Batch Number 671, conforms to the test specifications laid down by the UK Slip Resistance Group.

Recommended date of disposal : 04.03.2016

Certified that the whole of the supplies detailed above have been inspected, tested and unless otherwise stated, conform in all respects with the requirements of the contract or order.

Signed: Date of issue: 04.03.2015

Munro Instruments Ltd. Gilbert House, 406 Roding Lane South, Woodford Green, Essex, IG8 8EY UK
P +44 (0) 20 8551 7000 / F +44 (0) 20 8551 4565 / E info@munroinstruments.co.uk / www.munroinstruments.co.uk
Company Registration Number: 06965050 VAT Number: GB 977 7939 30



Date : 4 March 2015

Your Ref.:

Our Ref: Grip Potential Ltd

Grip Potential Ltd
Ringstead Business Centre
1-3 Spencer Street
Ringstead
Northants
NN14 4BX

MUNRO INSTRUMENTS

Certificate of Conformity for TRL (55) Rubber

Description and Part Number	Qty	Specification
881032/1 - Mounted TRL Rubber (55) Slider - Large - for Main Tester. Batch No. 669	5	Hardness : BS ISO 48:2010 Lupke Resilience : BS ISO 4662:2009

Temperature :	**0°C**	**10°C**	**20°C**	**30°C**	**40°C**
Hardness IRHD	**54**	**54**	**54**	**54**	**54**
Resilience % (limits)	**43-49**	**58-65**	**66-73**	**71-77**	**74-79**
Resilience % (mean results)	**48**	**61**	**67**	**73**	**74**

The hardness, at all the specified temperatures, was within the specified limit of 55 ± 5 IRHD.

The Lupke resilience was within the specified limits.

The TRL rubber supplied, Batch Number 669, conforms to the test specifications laid down by the UK Slip Resistance Group.

Recommended date of disposal : 04.03.2016

Certified that the whole of the supplies detailed above have been inspected, tested and unless otherwise stated, conform in all respects with the requirements of the contract or order.

Signed : Date of issue : 04.03.2015

Munro Instruments Ltd. Gilbert House, 406 Roding Lane South, Woodford Green, Essex, IG8 8EY UK
P +44 (0) 20 8551 7000 / F +44 (0) 20 8551 4565 / E info@munroinstruments.co.uk / www.munroinstruments.co.uk
Company Registration Number: 06965050 VAT Number: GB 977 7939 30

Theory

Research carried out by the Health and Safety Laboratory, in conjunction with the UK Slip Resistance Group (UKSRG), has shown that it is possible to assess the characteristics of floor surface materials needed for satisfactory slip resistance. The UKSRG, in partnership with several major laboratories including the Health and Safety Laboratory, has developed a "reliable and robust" test method that forms the basis of Grip Potential's assessment procedure.

The BS 7976-2 pendulum slip test forms the basis of the coefficient of dynamic friction measurement of a floor. A calibrated 'foot' swings from a horizontal point of release, strikes the test surface for a known distance, then reads the "Pendulum Test Value" (PTV) on its overswing. The rubber slider that contacts the floor is constructed of '4S' rubber (Standard Simulated Shoe Sole) and is designed to replicate the most common slipping motion experienced by pedestrians wearing shoes. A softer, more malleable, rubber (TRL rubber) can be used to simulate a barefoot or soft soled shoe slip. Pendulum testing is one of the few methods that accurately models the formation of a hydrodynamic squeeze film between the floor and shoe sole, a major factor in a wet slip.

A surface roughness meter is used to predict the ability of the floor's surface to puncture the hydrodynamic squeeze film. The film forms a barrier between sole and floor and significantly reduces grip, in a similar way that a car tyre aquaplanes. The HSE recommend a minimum Rz value of 20µm for a surface subject to water contamination. A thicker contaminant, such as motor oil, will require a greater surface roughness in order to facilitate a sole-floor contact. For this reason it is important to take into account expected contaminants when specifying a floor surface. In our extensive experience conducting BS 7976-2 pendulum tests alongside Rz surface roughness measurements we have not found a reliable correlation between pendulum and Rz values. On this basis Rz values are included in our assessments to provide additional information about test surfaces only, pendulum test values should be considered the overriding measurement of slip resistance in dry and water wet conditions.

A site assessment is an important component in determining the slip risk of any given floor. The HSE's pedestrian Slips Potential Model highlights important environmental factors in a slip. Contaminating substances, frequency and methods of cleaning, types of footwear and likely pedestrian behaviour all affect the potential for a slip incident and are given due consideration when interpreting PTV's and fitness for purpose of the test surface.

BS 7976-2:2002 - Pendulum Testers, Method of Operation

Coefficient of dynamic friction measurement is carried out in accordance with BS 7976-2 and the UKSRG Guidelines 2011. These industry standard methods of testing are essentially the same but with a slight difference between the two methods of preparation of the rubber sliders. Testing has been carried out in accordance with the UKSRG Guidelines 2011 as both the HSE and UKSRG agree that this is best practice.

A prepared standard rubber slider attached to a weighted 'shoe' is allowed to swing from a horizontal point of release. The slider is mounted on a spring loaded bracket and makes contact with the floor for a known distance, applying a calibrated force. The height to which the shoe travels after contacting the floor gives a reading of the Pendulum Test Value (PTV, formally known as SRV Slip Resistance Value). The dynamic coefficient of friction of a test surface has a direct and measurable effect on the PTV reading obtained.

Test surfaces are subject to eight measurements of the PTV with the first three being discounted from calculations of the median. Tests are carried out in the principal direction, at 45° to the principal direction and at 90° to the principal direction. Each direction is tested under both wet and dry conditions, totalling 48 measurements. A median value is generated for wet and dry tests based on the performance in different directions, though consideration should be given to surfaces with a directional finish. Surfaces may be subject to 'indicative' testing conducted in a single direction only, typically this method of assessment is used when the directionality of the test surface is either already known or of no interest. Additional contaminants may be used as appropriate to the environment.

A slip potential classification be applied using the following table from the UKSRG Guidelines.

PTV	Slip Potential
<25	High
25-35	Moderate
>35	Low

The law requires provision of a safe environment and that slip risks must be controlled, though there is no requirement for all surfaces present within an area of responsibility to achieve a >35PTV in dry and water wet conditions. It is the opinion of Grip Potential Ltd that surfaces must present a low risk of slip (>35PTV) in the conditions of end use if responsible parties are to demonstrate they have complied with their duty of care in terms of slip resistance. In our experience of slip accident investigations, and subsequent involvement in personal injury cases, surfaces producing anything other than a low risk of slip classification in the conditions of the accident typically result in settlement in the claimant's favour. Of course it should be noted that a wide range of factors can contribute to a slip accident, slips may still occur on surfaces producing values comfortably in excess of 36PTV.

An alternative measure of flooring slip resistance is its coefficient of dynamic friction (CoDF). PTV can be converted to CoDF using the formula below. It should be noted, however, that CoDF describes an interaction between two specific surfaces. This relationship is further complicated by the nature and behaviour of any lubricating film between the two surfaces. A CoDF value for a floor surface is likely to vary dependent on the method used to obtain it and should not be used to convert slip resistance ratings between test methods.

CoDF = (3xPTV) / (330-PTV)

The pendulum skid tester is one of the few test methods that accurately models the hydrodynamic squeeze film formed in a contaminated slip and as experienced by pedestrians. This should be taken into consideration when comparing CoDF values for contaminated surfaces from other test methods.

Surface Roughness Measurement (Rz)

Surface roughness, in particular the Rz value, describes the mean vertical peak to valley distance over a given horizontal sample. The microscopic construction of a surface affects its ability to puncture the fluid film generated in a slip. An Rz meter is a valuable tool to assess changes in a surface over time, as a result of wear, contamination, cleaning or other factors affecting the surface at a microscopic level.

Grip Potential use a Surtronic Duo surface roughness meter for assessment. The meter moves a stylus along the test surface, measuring the floor profile's average vertical peak to valley distance in microns. A test site will be measured ten times using this method, with samples taken in the principal direction, at 45° to the principal direction and at 90° to the principal direction. This is in line with UKSRG guidance.

Surface roughness is often used in isolation to give a general indication of the slip risk potential of a floor, this can result in erroneous classifications of surfaces, possibly exposing pedestrians to an undue risk of slip. Grip Potential Ltd do not use Rz measurements to determine the slip resistance of floor surfaces, nor do we recommend Rz values are used to determine the slip resistance of floor surfaces. Grip Potential use surface roughness measurements married to pendulum results to enable accurate ongoing monitoring of the surface. The UKSRG published the data shown in the table below to use in conjunction with pendulum testing.

Rz	Slip Potential
<10µm	High
10-20µm	Moderate
>20µm	Low

The UKSRG Guidelines 2011 state that, "Microroughness measurements should be used in conjunction with pendulum test values wherever possible. One should not confuse roughness measurements with slip resistance measurements." Limitations of the Rz measurement are that it does not take into account the density, shape or deformation of micro-profile, all of which are factors affecting the dispersal of a fluid film and contact between sole and floor in contaminated conditions. The stylus measuring peak to valley height may travel around anti-slip particulate or may be too wide to measure the depth of narrow valleys, in addition the Rz parameter does not take into account the effect of a macro-profile on fluid film behaviour. In our experience it is common for surfaces to have mismatching pendulum test vs roughness measurement slip resistance classifications.

Where pendulum testing is impossible, Rz measurements married to a similar nearby surface is sometimes the only way to relate a PTV, as recognised by the UKSRG guidelines. This is based on a linear approximation of the relationship between Rz and PTV and is to be considered as a guide only.

Site Assessment

A site assessment is designed to highlight factors that have an impact on slip risk potential. The Grip Potential site assessment follows the pedestrian slip risk potential model as developed by the HSE alongside guidance published by the UKSRG and CIRIA and our own expert knowledge and experience.

A Grip Potential site assessment aims to provide the client with all necessary information of the factors contributing to slip risk of the tested areas. Drawing assessment criteria from a wide range of expert sources ensures that a complete and thorough report of slip risk is produced. Knowledge of factors adversely affecting slip risk allows intelligent decision making in ongoing health and safety procedures.

Our site assessment regime broadly covers the following factors;

Surface composition and condition, construction and wear.
Contamination, likely types, sources, levels and effects.
Footwear, control, expected soles and their effects.
Cleaning regime, effectiveness, risk of any wet processes.
Surface usage, moving heavy loads, running, turning, high risk user groups.
Environmental factors, lighting, distractions, weather etc.

This is in line with the Health and Safety Laboratory developed 'Slips Potential Model' considered to give the most accurate assessment of factors affecting slip risk.

Depending on the function of the report as an accident investigation, standard risk assessment or product certification the site assessment will focus on appropriate factors. An accident investigation will seek to highlight all factors contributing to a particular slip, where a risk assessment will highlight factors that should be considered in the effective ongoing management of the surface.

Information required to complete the site assessment is gathered primarily at the time and location of the test and is based on observations made by the test operator. Information not readily available from a site inspection, such as cleaning regimes, footwear control measures, work controls/processes, is supplied by the person responsible for the site, or a representative of that person. Where information is uncertain, or an assumption is made, we endeavour to make it clear that this is the case.

Personnel Competency

Test Operator(s)

Operator 1
Ben Powers

Relevant Competencies
BS 7976-2
BS EN 13036-4
UKSRG Guidelines
Rz measurement
Slip risk assessment

Requiring Supervision
None

Relevant Qualifications
NEBOSH National General Certificate
BSc (Hons) Computational Physics
A-level Maths, Physics
AS-level Chemistry

Relevant Experience
>6 years as Slip Risk Consultant (Grip Potential Ltd)
18 months as Floorcoverings Technician (SATRA Technology Centre)

Memberships
UK Slip Resistance Group

Additional Notes
Slip tests conducted personally on a daily basis for a wide range of clients across a wide range of environments. Test reports utilised to demonstrate compliance, as part of ongoing risk assessment, to identify and prevent slippery surfaces, as evidence in personal injury cases. Tests regularly conducted alongside established laboratories as part of research conducted by the UK Slip Resistance Group. Reports given in evidence unsuccessfully challenged by opposing expert witnesses of considerable experience in the field of slip resistance. Previously held the position of Laboratory Technician at a reputable test laboratory, working within the floorcoverings team. A large percentage of time was spent conducting slip tests and assessments to a range of standards including BS 7976-2. BS 7976-2 tests were conducted extensively on and off site

Operator 2
n/a

Relevant Competencies

Requiring Supervision

Relevant Qualifications

Relevant Experience

Memberships

Report Author

Name
Ben Powers

Relevant Competencies
BS 7976-2
BS EN 13036-4
UKSRG Guidelines
Rz measurement
Slip risk assessment

Requiring Supervision
None

Relevant Qualifications
NEBOSH National General Certificate
BSc (Hons) Computational Physics
A-level Maths, Physics
AS-level Chemistry

Relevant Experience
>6 years as Slip Risk Consultant (Grip Potential Ltd)
18 months as Floorcoverings Technician (SATRA Technology Centre)

Memberships
UK Slip Resistance Group

Additional Notes
Slip tests conducted personally on a daily basis for a wide range of clients across a wide range of environments. Test reports utilised to demonstrate compliance, as part of ongoing risk assessment, to identify and prevent slippery surfaces, as evidence in personal injury cases. Tests regularly conducted alongside established laboratories as part of research conducted by the UK Slip Resistance Group. Reports given in evidence unsuccessfully challenged by opposing expert witnesses of considerable experience in the field of slip resistance.