SLIP RESISTANCE ASSESSMENT TEST:

Center Parcs – 4 No Resin Samples

Report No: Bow & Kirk 210414

Client:	Mr Ian Douglas Bowmer & Kirkland
Issue Date:	21st April 2014
Prepared by:	K Ward Surefoot Systems UK Ltd

Surefoot Systems UK Ltd
'Consto House' 164 Marsh Lane
Shepley Huddersfield
HD8 8AX
E Mail: info@surefootsystems.com
Website: www.surefootsystems.com
Tel: +44(0) 1484608001

CONDITIONS OF ISSUE OF REPORT

Our slip assessment testing is undertaken with due care and accuracy. The attached results are given in good faith and we believe these results to be an accurate assessment of the floor areas tested on the date of testing. Reported test results in no way imply that the flooring material under test is approved or endorsed by Surefoot Systems UK Ltd. Surefoot Systems UK Ltd also do not give or assume warranty or condition express or implied statutory or otherwise as to condition quality performance merchantability or fitness for the purpose of the test subject and all such warranties and conditions are hereby excluded save to the extent that such exclusion is absolutely prohibited by law.

Accordingly Karl Ward and Surefoot Systems UK Ltd, accept no liability whatsoever for the same including, without limit, for direct, indirect or consequential loss, business interruption, loss of profits, production, contracts, goodwill incurred by the client as a result of information contained within this report.

FURTHER INFORMATION

Requests for further additional information on the subject of this report or other queries should be addressed to:
K Ward Surefoot Systems UK Ltd 164 Marsh Lane Shepley Huddersfield HD8 8AX

REFERENCES

1. United Kingdom Slip Resistance Group 2011, The Measurement of Floor Slip Resistance Guidelines Recommended by the UK Slip Resistance Group Issue 4

2. BS 7976 – 2 2013: Pendulum testers part 2: Method of operation

3. Pie, PW Harrison, H.W 2003, BRE Building Elements: Floors and Flooring – performance, diagnosis, maintenance, repair and the avoidance of defects. BRE report 460, 2003

4. Harper, F.C, Warlow, W.J and Clarke, B.I 1961, The forces applied to the floor by the foot in walking. National Building Studies Research Paper 32, Building Research Station , Her Majesty's Stationery Office, London, England

5. Greater London Council 1971. Slip resistance of floors stairs and paving's GLC Department of Architecture and Civic Design, Bulletin No 43 (2nd Series) March 1971

CONTENTS

1. INTRODUCTION

Surefoot Systems UK Ltd was instructed by Mr Ian Douglas of Bowmer & Kirkland to carry out slip assessment testing of 4 resin flooring samples.

2. PENDULUM TEST METHOD – BS7976-2:2013

In order to assess the slip resistance of the floors in question tests were undertaken using a portable Wessex TRL Pendulum slip tester. The tests were carried out in accordance with UK Slip Resistance Group (UKSRG) Guidelines issue (4.0 2011) and BS 7976 – 2 2013 as recommended by the UK Health & Safety Executive. Measurements of the floors surface Pendulum Test Value (PTV) which is closely related to the coefficient of dynamic friction were measured using a fully calibrated Wessex Pendulum machine. Testing was carried out in both dry and wet conditions using the slider 55 developed to replicate a bare foot

Pendulum testing is a method that models the formation of a hydrodynamic squeeze film between the floor and shoe sole, a major factor in wet slip accidents. The test operates by the pendulum arm being raised to the horizontal position and clamped. The arm is then released by the operator and the arm then swings freely driving a pointer around the graduated scale and the retardation of the pendulum arm as it moves across the surface is recorded. The recorded value is representative of the resistance due to friction of the floor covering against the moving pendulum. This simulates the walking action of a person over the surface.

3. United Kingdom Slip Resistance Guidelines

The UKSRG classification of slip potential is based on research undertaken by the UK Building Research Establishment (BRE) The level of friction required by a person to walk without slipping is related to the speed of movement and the step length. The level of friction required also varies from person to person, where persons required level of coefficient of friction is greater than that available from the interaction of the shoe soul, flooring material and any contamination the person will experience a slip accident. The classifications arriving from the BRE study apply to basic conditions e.g. for low activity normal walking environments. Activities such as rushing pulling pushing or turning in any environment are likely to require a higher level of friction than normal walking. Some individuals will experience minor slips from which they can recover their balance without a fall occurring so every slip does not result in a fall accident.

4. Control Measure to Prevent Slips

Where reasonably practical control measures outlined in the HSE guidelines (http://www.hsegov.uk/slips/employersriskas.htm) should be used to control the risk of slips. Attention should therefore be paid to the minimisation of floor contamination before any action is taken to modify or replace the floor surface material or substrate. However the level of contamination required to increase the risk of slips is considered to be minimal. Therefore floors know to be slippery when contaminated must be kept thoroughly clean and dry to maintain satisfactory slip resistance. Where this is not possible consideration should be given to floor surface modification or replacement,

5. TEST EQUIPMENT

Wessex Portable Pendulum Skid Tester

Serial Number:	SK1673
Calibrated By:	Knightcott Surface Solutions
Calibration Date:	18.03.2014
Certificate Number:	CN165
Calibration Due	17.03.2015

Notes: Calibration checks are carried out regularly in house using float glass Pavigres tile and lapping film. In addition an annual calibration is undertaken by an independent UKAS accredited organisation as per BS 7976-3.

Daily Calibration Test Values
Date:

	PTV					Mean	Expected
Lapping Film	61	61	60	61	62	61	60 - 66
Float Glass	10	10	10	10	10	10	5-10
Pavigres Tile	14	14	15	15	15	15	13 - 19

6. RESULTS OF SLIP TESTING

Date Tested: 16.04.14
Equipment Used: Portable Wessex Pendulum Slip Assessment Tester (’55 Slider)
Equipment ID No: SK1673
Calibration No: CN 165
Calibration Date: 18.03.14
Expiry Date: 17.03.15
Calibration Company: Knightcott Surface Solutions

FLOORING DESCRIPTION: ***Resin Sample C***

Direction	Condition	PTV					Mean
Principal	Dry	*98*	*98*	*98*	*99*	*99*	*98*
45◦		*100*	*100*	*100*	*99*	*99*	*100*
90◦		*99*	*99*	*99*	*99*	*99*	*99*
					Mean Wet PTV		***99***

Direction	Condition	PTV					Mean
Principal	Wet	*56*	*56*	*56*	*56*	*56*	*56*
45◦		*55*	*56*	*55*	*56*	*55*	*55*
90◦		*56*	*56*	*56*	*57*	*56*	*56*
					Mean Wet PTV		***56***

FLOORING DESCRIPTION: ***RESIN SAMPLE LC***

Direction	Condition	PTV					Mean
Principal	Dry	*102*	*102*	*102*	*102*	*102*	*102*
45◦		*101*	*101*	*101*	*102*	*102*	*101*
90◦		*101*	*102*	*101*	*102*	*102*	*102*
					Mean Wet PTV		***102***

Direction	Condition	PTV					Mean
Principal	Wet	*52*	*52*	*52*	*53*	*52*	*52*
45◦		*54*	*55*	*55*	*54*	*55*	*55*
90◦		*55*	*55*	*55*	*56*	*55*	*55*
					Mean Wet PTV		***54***

6. RESULTS OF SLIP TESTING (CONTINUED)

Date Tested: 16.04.14
Equipment Used: Portable Wessex Pendulum Slip Assessment Tester (’55 Slider)
Equipment ID No: SK1673
Calibration No: CN 23
Calibration Date: 18.03.14
Expiry Date: 17.03.15
Calibration Company: Knightcott Surface Solutions

FLOORING DESCRIPTION: ***Resin Sample S***

Direction	Condition	PTV					Mean
Principal	Dry	*85*	*84*	*84*	*85*	*84*	*84*
45◦		*84*	*84*	*85*	*85*	*83*	*84*
90◦		*82*	*82*	*82*	*83*	*83*	*82*
					Mean Wet PTV		***83***

Direction	Condition	PTV					Mean
Principal	Wet	*18*	*17*	*18*	*18*	*17*	*18*
45◦		*16*	*16*	*17*	*16*	*16*	*16*
90◦		*18*	*19*	*19*	*18*	*18*	*18*
					Mean Wet PTV		***17***

FLOORING DESCRIPTION: ***RESIN SAMPLE VC***

Direction	Condition	PTV					Mean
Principal	Dry	*108*	*108*	*109*	*109*	*109*	*108*
45◦		*105*	*106*	*106*	*106*	*106*	*106*
90◦		*108*	*108*	*108*	*108*	*108*	*108*
					Mean Wet PTV		***107***

Direction	Condition	PTV					Mean
Principal	Wet	*57*	*58*	*58*	*57*	*57*	*57*
45◦		*53*	*53*	*54*	*54*	*53*	*53*
90◦		*57*	*56*	*56*	*57*	*57*	*57*
					Mean Wet PTV		***56***

7. COMMENTS

The results of the slip assessment tests showed that the surface of all 4 resin samples has a dry slip resistance value well above minimum standards and with a slip risk potential of very Low Risk.

The wet slip tests showed that 3 of the resin samples have a very similar wet slip resistance value with all 3 samples providing a slip risk potential of Low Risk in wet conditions. The surface of sample S however showed a wet slip resistance value of 17 PTV when tested which is substantially lower than the other 3 samples and represents a slip risk potential of High Risk.

It should be noted that when a resin is applied to a surface to improve slip resistance there is likely to be variations in the surface finish due to potential inconsistency in application teqniques. This subsequently may lead to variations in the slip resistance and PTV value of the surface particularly over a larger area. Variations in resin manufacture can also result in an inconsistent surface and variable PTV rating.

Although the testing of the samples in question will provide a good indication of the expected slip resistance values consideration should be given to further in situ testing over a larger area to ensure that there are no large variations in surface slip resistance caused by inconsistent application methods.

8. Guidelines

The Assessment of Floor Slip Resistance
The United Kingdom Slip Resistance Group Guidelines
Issue 4.0, September 2011

The criteria for judging the results of slip resistance tests are based on the work of the Building Research Station (now known as the BRE) in the 1960s supported by the experience of investigators and bodies such as the former Greater London Council over the last 40 years. This work suggested that for unencumbered, able bodied, working aged people, a PTV of 36 or above represented an acceptably low risk of slipping when walking in a straight line on a level surface.

Table 1: Slip potential classifications for PTV

PTV	Slip Potential
0- 24	High Risk
25 - 35	Moderate Risk
36+	Low Risk

Table 2: Predictions of friction requirements for pedestrians for level walking made by BRE

Risk 1 in :	Minimum PTV	Slip Potential
1,000,000	36	Low
100.000	34	Moderate
10,000	29	Moderate
200	27	Moderate
20	24	High
2	19	High